

MT8801C
Option 12: CDMA Measurement
Operation Manual

Fourth Edition

Read this manual before using the equipment.
Keep this manual with the equipment.

ANRITSU CORPORATION

Safety Symbols

To prevent the risk of personal injury or loss related to equipment malfunction, Anritsu Corporation uses the following safety symbols to indicate safety-related information. Insure that you clearly understand the meanings of the symbols **BEFORE** using the equipment. Some or all of the following five symbols may not be used on all Anritsu equipment. In addition, there may be other labels attached to products which are not shown in the diagrams in this manual.

Symbols used in manual

DANGER  This indicates a very dangerous procedure that could result in serious injury or death if not performed properly.

WARNING  This indicates a hazardous procedure that could result in serious injury or death if not performed properly.

CAUTION  This indicates a hazardous procedure or danger that could result in light-to-severe injury, or loss related to equipment malfunction, if proper precautions are not taken.

Safety Symbols Used on Equipment and in Manual

The following safety symbols are used inside or on the equipment near operation locations to provide information about safety items and operation precautions. Insure that you clearly understand the meanings of the symbols and take the necessary precautions **BEFORE** using the equipment.



This indicates a prohibited operation. The prohibited operation is indicated symbolically in or near the barred circle.



This indicates an obligatory safety precaution. The obligatory operation is indicated symbolically in or near the circle.



This indicates warning or caution. The contents are indicated symbolically in or near the triangle.



This indicates a note. The contents are described in the box.



These indicate that the marked part should be recycled.

MT8801C

Option 12: CDMA Measurement

Operation Manual

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Printed in Japan

For Safety

WARNING



1. ALWAYS refer to the operation manual when working near locations at which the alert mark shown on the left is attached. If the operation, etc., is performed without heeding the advice in the operation manual, there is a risk of personal injury. In addition, the equipment performance may be reduced.

Moreover, this alert mark is sometimes used with other marks and descriptions indicating other dangers.

2. Measurement Categories

This instrument is designed for Measurement category I (CAT I). Don't use this instrument at the locations of measurement categories from CAT II to CAT IV.

In order to secure the safety of the user making measurements, IEC 61010 clarifies the range of use of instruments by classifying the location of measurement into measurement categories from I to IV.

The category outline is as follows:

Measurement category I (CAT I):

Secondary circuits of a device connected to an outlet via a power transformer etc.

Measurement category II (CAT II):

Primary circuits of a device with a power cord (portable tools, home appliance etc.) connected to an outlet.

Measurement category III (CAT III):

Primary circuits of a device (fixed equipment) to which power is directly supplied from the power distribution panel, and circuits from the distribution panel to outlets.

Measurement category IV (CAT IV):

All building service-line entrance circuits through the integrating wattmeter and primary circuit breaker (power distribution panel).



or



3. When supplying power to this equipment, connect the accessory 3-pin power cord to a grounded outlet. If a grounded outlet is not available, before supplying power to the equipment, use a conversion adapter and ground the green wire, or connect the frame ground on the rear panel of the equipment to ground. If power is supplied without grounding the equipment, there is a risk of receiving a severe or fatal electric shock.

For Safety

WARNING

Repair

WARNING 

4. This equipment cannot be repaired by the user. DO NOT attempt to open the cabinet or to disassemble internal parts. Only Anritsu-trained service personnel or staff from your sales representative with a knowledge of electrical fire and shock hazards should service this equipment. There are high-voltage parts in this equipment presenting a risk of severe injury or fatal electric shock to untrained personnel. In addition, there is a risk of damage to precision parts.

Falling Over

5. This equipment should be used in the correct position. If the cabinet is turned on its side, etc., it will be unstable and may be damaged if it falls over as a result of receiving a slight mechanical shock.
And also DO NOT use this equipment in the position where the power switch operation is difficult.

Battery Fluid

6. DO NOT short the battery terminals and never attempt to disassemble it or dispose of it in a fire. If the battery is damaged by any of these actions, the battery fluid may leak.
This fluid is poisonous.
DO NOT touch it, ingest it, or get in your eyes. If it is accidentally ingested, spit it out immediately, rinse your mouth with water and seek medical help. If it enters your eyes accidentally, do not rub your eyes, irrigate them with clean running water and seek medical help. If the liquid gets on your skin or clothes, wash it off carefully and thoroughly.

LCD

7. This instrument uses a Liquid Crystal Display (LCD); DO NOT subject the instrument to excessive force or drop it. If the LCD is subjected to strong mechanical shock, it may break and liquid may leak.
This liquid is very caustic and poisonous.
DO NOT touch it, ingest it, or get in your eyes. If it is ingested accidentally, spit it out immediately, rinse your mouth with water and seek medical help. If it enters your eyes accidentally, do not rub your eyes, irrigate them with clean running water and seek medical help. If the liquid gets on your skin or clothes, wash it off carefully and thoroughly.

For Safety

CAUTION

Replacing Fuse

CAUTION 

1. Before Replacing the fuses, ALWAYS remove the power cord from the poweroutlet and replace the blown fuses. ALWAYS use new fuses of the type and rating specified on the fuse marking on the rear panel of the cabinet.

T6.3A indicates a time-lag fuse.

T6.3A or F6.3A indicate a normal fusing type fuse.

There is risk of receiving a fatal electric shock if the fuses are replaced with the power cord connected.

Cleaning

2. Keep the power supply and cooling fan free of dust.
 - Clean the power inlet regularly. If dust accumulates around the power pins, there is a risk of fire.
 - Keep the cooling fan clean so that the ventilation holes are not obstructed. If the ventilation is obstructed, the cabinet may overheat and catch fire.

 CAUTION/注意

>18kg

HEAVY WEIGHT/重量物

3. Use two or more people to lift and move this equipment, or use a trolley. There is a risk of back injury, if this equipment is lifted by one person.

Check Terminal



4. Never input a signal of more than the specified voltage between the measured terminal and ground. Input of an excessive signal may damage the equipment.
5. Do not take out the floppy disk if the lamp of the floppy disk drive is on. If it is taken out, the contents of the storage medium will be damaged, resulting in floppy disk drive failure.

For Safety

CAUTION

Replacing Memory Back-up Battery

The power for memory back-up of the MT8801C is supplied by a polycarbomonofluoride lithium battery. this battery should only be replaced by a battery of the same type; since replacement can only be made by Anritsu, contact the nearest Anritsu representative when replacement is required. At the end of it's life, the battery should be recycled or disposed properly.

Note: The Battery life is about 7 years. Early battery replacement is recommended.

External Storage Media

The MT8801C stores data and programs using a floppy disk (FD), memory card (MC), and backed-up memories.

Data and programs may be lost due to improper use or failure.

Anritsu therefore recommends that you back up the memory.

ANRITSU CANNOT COMPENSATE FOR ANY MEMORY LOSS.

Please pay careful attention to the following points. Do not remove the floppy disk from the equipment being accessed.

(FD)

- Do not touch the FD directly or by using any object.
- Do not place the equipment where dirty and dusty.
- Isolate the FD and memory card from static electricity.
- Avoid to placing the FD in direct sunlight or near heating sources.
- Store under temperature of 40° to 54°C, humidity of 8 to 90% (No condensation).

(Memory card)

- Isolate the memory card from static electricity.

(Backed-up memory)

- Isolate the memory from static electricity.

Disposing of Product

The MT8801C uses chemical compound semiconductor including arsenic. At the end of its life, the MT8801C should be recycled or disposed properly according to the local disposal regulations.

Equipment Certificate

Anritsu Corporation certifies that this equipment was tested before shipment using calibrated measuring instruments with direct traceability to public testing organizations recognized by national research laboratories including the National Institute of Advanced Industrial Science and Technology, and the Communications Research Laboratory, and was found to meet the published specifications.

Anritsu Warranty

Anritsu Corporation will repair this equipment free-of-charge if a malfunction occurs within 1 year after shipment due to a manufacturing fault, provided that this warranty is rendered void under any or all of the following conditions.

- The fault is outside the scope of the warranty conditions described in the operation manual.
- The fault is due to mishandling, misuse, or unauthorized modification or repair of the equipment by the customer.
- The fault is due to severe usage clearly exceeding normal usage.
- The fault is due to improper or insufficient maintenance by the customer.
- The fault is due to natural disaster including fire, flooding, earthquake, etc.
- The fault is due to use of non-specified peripheral equipment, peripheral parts, consumables, etc.
- The fault is due to use of a non-specified power supply or in a non-specified installation location.

In addition, this warranty is valid only for the original equipment purchaser. It is not transferable if the equipment is resold.

Anritsu Corporation will not accept liability for equipment faults due to unforeseen and unusual circumstances, nor for faults due to mishandling by the customer.

Anritsu Corporation Contact

If this equipment develops a fault, contact Anritsu Service and Sales offices at the address at the end of paper-edition manual or the separate file of CD-edition manual.

Software License Agreement

Please read this Software License Agreement before using the accompanying software program (hereafter this software).

You are authorized to use this software only if you agree to all the terms of this License. By opening the sealed package containing this software, you are agreeing to be bound by the terms of this License.

If you do not agree to these terms, return the unopened software package to Anritsu Corporation (hereafter Anritsu).

1. License

- (1) This License gives you the right to use this software on one MT8801C Radio Communication Analyzer, MX880201A CDMA Measurement Software (hereafter computer system).
- (2) To use this software on one computer system, this License allows you to make one copy of this software on the storage device of your computer system.
- (3) You must obtain a site license to use this software on more than one computer system even if such computer systems are not operating simultaneously.

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- (1) Anritsu will deem this License to be automatically terminated if you fail to comply with any provision of this License. Upon termination, you will lose all rights to this software.
- (2) Either party (Anritsu or yourself) to this Software License Agreement may terminate this Agreement by giving 1 months notice in writing to the other party.
- (3) Upon termination of this License for any reason, you must either immediately destroy this software and related documentation, or return it to Anritsu.

Front Panel Power Switch

To prevent malfunction caused by accidental touching, the front power switch of this equipment turns on the power if it is pressed continuously for about one second in the standby state. If the switch is pressed continuously for one second in the power-on state, the equipment enters the standby state.

In the power-on state, if the power plug is removed from the outlet, then reinserted into it, the power will not be turned on. Also, if the lines is disconnected due to momentary power supply interruption or power failure, the power will not be turned on (enters the standby state) even if the line is recovered.

This is because this equipment enters the standby state and prevents incorrect data from being acquired when the line has to be disconnected and reconnected.

For example, if the data acquisition requires a long time at the BER measurement, momentary power supply interruption (power failure) might occur during measurement and the line could be recovered automatically to power-on. In such a case, the equipment may mistake incorrect data for correct data without recognizing the momentary power supply interruption.

If this equipment enters the standby state due to momentary power supply interruption or power failure, check the state of the measuring system and press the front power switch to restore power to this equipment.

Further, if this equipment is built into a system and the system power has to be disconnected then reconnected, the power for this equipment must also be restored by pressing the front power switch.

Consequently, if this equipment is built into remote monitoring systems that use MODEMs, the standby function of this equipment must be modified.

Notes On Export Management

This product and its manuals may require an Export License/Approval by the Government of the product's country of origin for re-export from your country.

Before re-exporting the product or manuals, please contact us to confirm whether they are export-controlled items or not.

When you dispose of export-controlled items, the products/manuals are needed to be broken/shredded so as not to be unlawfully used for military purpose.

Trademark and Registered Trademark

[IBM] is a registered trademark of the IBM Corporation.

[HP] is a registered trademark of the Hewlett-Packard Company.

[MS-DOS] is a registered trademark of the Microsoft Corporation.

[NEC] is a registered trademark of the NEC Corporation.

CE Conformity marking

Anritsu affixes the CE Conformity marking on the following product (s) in accordance with the Council Directive 93/68/EEC to indicate that they conform with the EMC and LVD directive of the European Union (EU).

CE Marking



1. Product Model

Model: MT8801C Radio Communication Analyzer

2. Applied Directive

EMC: Council Directive 89/336/EEC

LVD: Council Directive 73/23/EEC

3. Applied Standards

- EMC: Emission: EN61326: 1997 / A2: 2001 (Class A)
Immunity: EN61326: 1997 / A2: 2001 (Annex A)

	Performance Criteria*
IEC 61000-4-2 (ESD)	B
IEC 61000-4-3 (EMF)	A
IEC 61000-4-4 (Burst)	B
IEC 61000-4-5 (Surge)	B
IEC 61000-4-6 (CRF)	A
IEC 61000-4-8 (RPFMF)	A
IEC 61000-4-11 (V dip/short)	B

*: Performance Criteria

A: During testing normal performance within the specification limits

B: During testing, temporary degradation, or loss of function or performance which is self-recovering

Harmonic current emissions:

EN61000-3-2: 2000 (Class A equipment)

- LVD: EN61010-1: 2001 (Pollution Degree 2)

C-tick Conformity marking

Anritsu affixes the C-tick marking on the following product (s) in accordance with the regulation to indicate that they conform with the EMC framework of Australia/New Zealand.

C-tick marking



1. Product Model

Model: MT8801C Radio Communication Analyzer

2. Applied Standards

EMC: Emission:

AS/NZS 2064.1 / 2 (ISM, Group 1, Class A equipment)

Power Line Fuse Protection

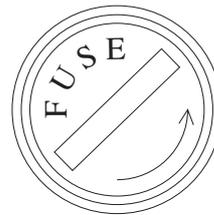
For safety, Anritsu products have either one or two fuses in the AC power lines as requested by the customer when ordering.

Single fuse: A fuse is inserted in one of the AC power lines.

Double fuse: A fuse is inserted in each of the AC power lines.

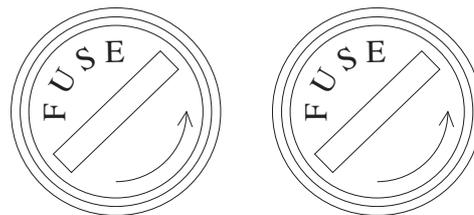
Example 1: An example of the single fuse is shown below:

Fuse Holder



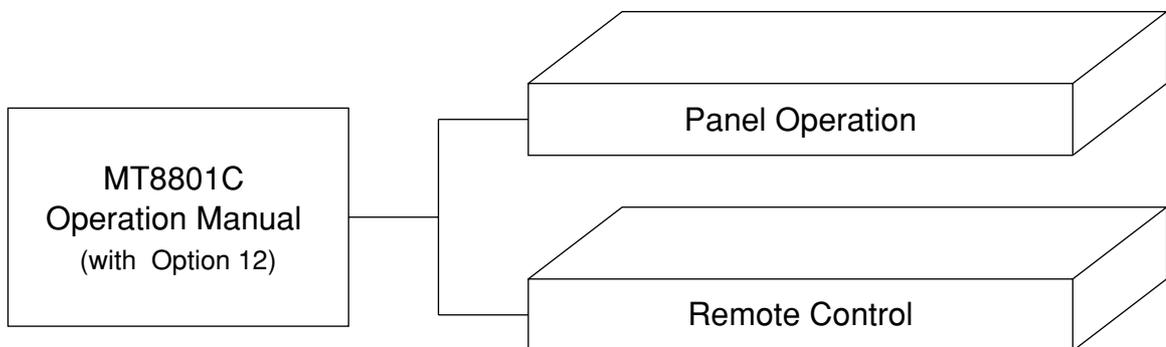
Example 2: An example of the double fuse is shown below:

Fuse Holders



About This Manual

- (1) This manual describes the operation of the MT8801C Radio Communication Analyzer using the measurement software installed.
- (2) MT8801C Operation Manual
MT8801C CDMA Measurement Operation Manual consist of the following two manuals. Use the manuals matching the usage objective.



Panel operation: Outlines the MT8801C and describes its preparations, panel explanations, operations, performance text, calibrations, storage and transportation.

Remote Control: Describes RS-232C/GPIB remote control and the sample programs etc.

MT8801C

Option 12: CDMA Measurement Operation Manual (Panel Operation)

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1.1 General

The MT8801C Radio Communication Analyzer is a measuring-instrument platform that consists of the hardware components necessary for testing mobile telecommunication terminals. Using the MT8801C along with the optionally available measurement software allows you to evaluate the performance of mobile telecommunication equipment with efficiency.

By using measurement software MX880201A, you can use the MT8801C as an integrated measuring instrument (hereafter called this analyzer) that can evaluate the functions and performance of the mobile telecommunication equipment conforming to CDMA.

This analyzer is provided with such measurement functions as digital and analog mobile-station (MS) control, transmission measurement, and reception measurement. This analyzer alone can test the CDMA dual-mode mobile station for transmission and reception.

The MT8801C provides a general-purpose analog measurement function.

For the IS-95A, TSB74, and J-STD-008 standard, enables the controlling a analog mobile station.

The option 07: Spectrum analyzer provides a general-purpose 10-MHz to 3-GHz spectrum analyzer function.

Measurement functions offered by this analyzer are as follows:

- Mobile station control:

A mobile station can be set for the following standard-specified measurement by performing call processing.

US: 800 MHz cellular (IS-95A, TSB74 standard)

US: 1.9 GHz PCS (J-STD-008 standard)

Japan: 800 MHz cellular (ARIB STD-T53 standard)

Call Processing of registration, origination, termination, conversation, loop-back (service option 2), frequency channel change, MS release, NW release etc. can be conducted.

- Transmission measurement: IS-95A/TSB74/J-STD-008/ARIB STD-T53-specified digital modulated signals (e.g., carrier frequency, RF level, modulation accuracy) can be measured. The analog modulated signals (e.g., modulation degree, distortion ratio etc.) can also be measured.

- Reception measurement: The frame error rate can be measured by outputting a modulated signal using loop back. This enables the reception performance of the mobile station to be measured based on the measured frame error rate.

The AF level and SINAD can also be measured. This enables the reception performance of the analog mobile station to be measured.

This analyzer is equipped with a high-speed digital signal processing technology, allowing you to carry out transmission and reception measurements quickly and with high accuracy.

1.2 Manual Composition

This manual is made up of the following sections.

Section 1 General

Describes the introduction, composition, function specifications and performance of this instrument.

Section 2 Preparations before Use

Explains various work to be performed before using this instrument.

Section 3 Panel Layout and Overview of Operation

Explains the basic items for operating this equipment.

Section 4 Operation

Explains basic operation and how to operate for each measurement item.

Section 5 Measurement Examples

Describes the measurement procedures used to perform the performance tests.

Section 6 Performance Test

Explains the performance test method for this instrument.

Section 7 Calibration

Describes calibration items and methods for the periodical calibration of this equipment.

Section 8 Storage and Transportation

Describes how to store and transport this equipment.

Appendix A Screens and Function Key Transition Diagrams

Appendix B Initial Values

Appendix C Index

1.3 Equipment Configuration

This paragraph describes the configuration of the MT8801C (with Option 12) standard accessories.

1.3.1 Standard configuration

The table below shows the configuration of the MT8801C (with Option 12) with the standard accessories.

Table 1-1 MT8801C (with Option 12) standard accessories

Item	Order No.	Name	Qty	Remarks
Main instrument	MT8801C Options 12	CDMA Measurement	1	
Accessories	W1673AE	Operation manual	1	For CDMA system

The table below shows the configuration of the MT8801C with the standard accessories.

Table 1-2 MT8801C standard accessories

Item	Order No.	Name	Qty	Remarks
Main instrument	MT8801C	Radio communication analyzer	1	
Accessories	J0576B	Coaxial cord	1	N-P · 5D-2W · N-P, 1 m
	J0768	Coaxial adapter	2	N-J · TNC-P
	J0017F	Power cord	1	2.6 m
	J0266	Adapter	1	3 poles to 2 poles plug conversion adapter
	F0014	Fuse	2	6.3 A for 100 V/200 V system

1.3.2 Option

The table below shows the MT8801C option.
This is sold separately.

Table 1-3 Option

Option No.	Name	Remarks
01	Analog measurement	
04	AF low impedance output	
07	Spectrum analyzer	
10, 11	GSM Audio Test	Option 01 is required.

1.4 Optional Accessories and Peripherals

The following table shows the optional accessories and peripherals for the MT8801C which are all sold separately.

Table 1-5 Optional Accessories and Peripherals

<Optional accessories>

Model*/Order No.	Name*	Remarks
J0127C	Coaxial cord	BNC-P·RG-58A/U·BNC-P, 0.5 m
J0769	Coaxial adapter	BNC-J·TNC-P
J0040	Coaxial adapter	N-P·BNC-J
J0007	GPIB connection cable	408JE-101, 1 m
J0008	GPIB connection cable	408JE-102, 2 m
J0742A	RS-232C cable	1 m, D-sub 25 pins, for PC-9800 Series personal computer of NEC Corp.
J0743A	RS-232C cable	1 m, D-sub 9 pins, for IBM PC/AT personal computer
MN1607A	Coaxial switch	DC to 3 GHz, 50 Ω , externally controllable
MA1612A	4-Port junction pad	5 to 3000 MHz
J0395	Attenuator for high power	30 dB, 30 W, DC to 9 GHz
B0329D	Protective cover	
B0331D	Front handle kit	2 pcs/set
B0332	Coupling plate	4 pcs/set
B0333D	Rack mounting kit	
B0334D	Carrying case	With casters and protective cover

* Please specify the model/order number, name, and quantity when ordering.

<Peripherals and applicable units>

Model*/Order No.*	Name*
MS8606A	Digital mobile radio transmitter tester
MS2602A	Spectrum analyzer
MG3671B	Digital modulation signal generator

* Please specify the model/order number, name, and quantity when ordering.

Table 1-6 MT8801C Specifications (continued)

Others	Display		Color TFT LCD display Size : 8.4 inches Number of dots : 640 × 480
	Hard copy		Enables data hard copy on the display through a parallel interface. (applicable only for EPSON VP-series or equivalent)
	External control	GPIOB	Function : This equipment is specified as a device, can be controlled from external controller. (excluding power switch and FD ejection key) No controller function Interface function : SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT1, C0, and E2
		Parallel	Function : Conforms to the Centronics. Outputs printing data to a printer. Data line exclusive for output: 8 Control line: 4 (BUSY, DTSB, ERROR, PE) Connectors : D-sub 25 pins, Female (Equivalent to the connector of IBM-PC/AT built-in printer)
RS-232C		Controlled from an external controller (except for the power switch) Baud rate : 1200, 2400, 4800, or 9600 bps	
Dimensions Mass Power supply	Dimensions		221.5 mm (H) × 426 mm (W) × 451 mm (D)
	Mass		≤27 kg (without any options)
	Power supply		100 to 120 V, 200 to 240 V 47.5 to 63 Hz, ≤300 VA Automatic voltage switch system
	Operating temperature range		0 to 50°C
EMC	Conducted Emission		EN61326: 1997 / A2: 2001
	Radiated Emission		EN61326: 1997 / A2: 2001
	Harmonic Current Emission		EN61000-3-2: 2000
	Electrostatic Discharge		EN61326: 1997 / A2: 2001
	Electromagnetic Field Immunity		EN61326: 1997 / A2: 2001
	Fast Transient / Burst		EN61326: 1997 / A2: 2001
	Surge		EN61326: 1997 / A2: 2001
	Conducted RF		EN61326: 1997 / A2: 2001
	Power Frequency Magnetic Field		EN61326: 1997 / A2: 2001
Voltage Dips / Short Interruptions		EN61326: 1997 / A2: 2001	

Section 1 General

Table 1-7 MT8801C Option 12 : CDMA Measurement Specifications

Transmission measurement	Modulation analysis For single input code channel Guaranteed after Adjust Range	Frequency range		824.01 MHz to 848.97 MHz, 30 kHz step (IS-95A, TSB74) 1850.00 MHz to 1909.95 MHz, 50 kHz step (J-STD-008) 887.0125 MHz to 888.9875 MHz, 898.0125 MHz to 900.9875 MHz, 915.0125 MHz to 924.9875 MHz, 12.5 kHz step (ARIB STD-T53) 1715.05 MHz to 1780.00 MHz, 50kHz step (KOREA-PCS)
		Level range		+40 to -20 dBm (average power in burst, Main connector)
		Frequency measurement		Measurement error: Reference ± 10 Hz Guaranteed after Adjust Range
		Waveform quality		Measurement range: 0.9 to 1.0 Measurement error: ± 0.003 Guaranteed after Adjust Range
		Residual vector error		<5% Guaranteed after Adjust Range
	Power measurement (IF level meter)	Frequency range		824.01 MHz to 848.97 MHz, 30 kHz step (IS-95A, TSB74) 1850.00 MHz to 1909.95 MHz, 50 kHz step (J-STD-008) 887.0125 MHz to 888.9875 MHz, 898.0125 MHz to 900.9875 MHz, 915.0125 MHz to 924.9875 MHz, 12.5 kHz step (ARIB STD-T53)
		Measurement range		+40 to -50 dBm
		Measurement accuracy		± 0.4 dB (+40 to 0 dBm, after Power Meter calibration) ± 0.4 dB (+40 to -10 dBm, after Power Meter calibration, 18 to 28°C) ± 0.7 dB (+40 to -10 dBm, after Int. OSC. Calibration, 18 to 28°C) Linearity: (Reference level -10 dBm) 0 to -10 dB; ± 0.1 dB -10 to -20 dB; ± 0.2 dB -20 to -40 dB; ± 0.5 dB
		Input connector		Main connector
		Measurement item		Modulation analysis, gated output power measurement, power meter, standby output power measurement, access probe output power measurement, open loop power control time response measurement
	Power measurement (Power meter)	Frequency range		824.01 MHz to 848.97 MHz, 30 kHz step (IS-95A, TSB74) 1850.00 MHz to 1909.95 MHz, 50 kHz step (J-STD-008) 887.0125 MHz to 888.9875 MHz, 898.0125 MHz to 900.9875 MHz, 915.0125 MHz to 924.9875 MHz, 12.5 step (ARIB STD-T53) 1715.05 MHz to 1780.00MHz, 50kHz step (KOREA-PCS)
		Level range		+40 to -10 dBm (Main connector)
		Measurement accuracy		$\pm 10\%$ (0°C to 50°C, 0 to +40 dBm) $\pm 10\%$ (+40 to -10 dBm, average power) Input connector: Main connector Guaranteed after zero-point calibration, and at ≤ -53 dBm signal generator output level
	Occupied bandwidth measurement	Frequency range		20 MHz to 2.2 GHz
		Input level range		0 to +40 dBm (average power in burst) at MAIN connector -20 to +20 dBm (average power in burst) at AUX connector
		Measurement method	Standard mode	Sweeps the DUT signal using a sweep-type spectrum analyzer, and calculates the occupied bandwidth to be displayed.
	High speed mode		Analyzes the DUT signal (1 burst) using a FFT, and calculates the occupied bandwidth to be displayed.	
	Spurious close to the carrier measurement	Frequency range		20 MHz to 2.2 GHz
		Input level range		0 to +40 dBm (average power in burst) at MAIN connector -20 to +20 dBm (average power in burst) at AUX connector
		Measurement method		Calculates the ratio of the carrier power measured with 3 MHz bandwidth to the power measured using a sweep-type spectrum analyzer with 30 kHz bandwidth to be displayed.
Measurement range		≥ 50 dB at 900 kHz offset ≥ 60 dB at 1.98 MHz offset		
Spurious measurement	Frequency range		10 MHz to 2.2 GHz	
	Input level range		0 to +40 dBm (average power in burst) at MAIN connector -20 to +20 dBm (average power in burst) at AUX connector	
	Measurement method		Calculates the ratio of the carrier power measured with 3 MHz bandwidth to the power measured using a sweep-type spectrum analyzer with 30 kHz bandwidth to be displayed.	
	Measurement range		≥ 60 dB	

Table 1-7 MT8801C Option 12 : CDMA Measurement Specifications (continued)

Reception measurement	Signal generator	Frequency range	869.01 MHz to 893.97 MHz, 30 kHz step (IS-95A, TSB74) 1930.00 MHz to 1989.95 MHz, 50 kHz step (J-STD-008) 832.0125 MHz to 833.9875 MHz, 843.0125 MHz to 845.9875 MHz, 860.0125 MHz to 869.9875 MHz, 12.5 kHz step (ARIB STD-T53) 1805.05 MHz to 1870.00 MHz, 50 kHz step (KOREA-PCS)
		Level range	-18 to -133 dBm (Main, AWGN off) +2 to -133 dBm (AUX, AWGN off) -24 to -133 dBm (Main, AWGN on) -4 to -133 dBm (AUX, AWGN on)
		Relative level accuracy	At varying level on open-loop power-control time-response measurement ± 0.2 dB/20 dB (18 to 28°C)
		Waveform quality	$\rho > 0.99$ (Pilot Channel 0 dB)
		Channel level	Pilot Channel 0 dB, -5 to -10 dB, 0.1 dB step Paging Channel -7 to -20 dB, 0.1 dB step Sync Channel -7 to -20 dB, 0.1 dB step Traffic Channel -7 to -20 dB, 0.1 dB step (full rate) -10 to -23 dB, 0.1 dB step (half rate) -13 to -26dB, 0.1dB step (quarter rate) -16 to -29dB, 0.1dB step (eighth rate) OCNS Channel Automatic setting
		Channel level accuracy	± 0.2 dB (relative level accuracy between any two channels)
		AWGN level range	+6 to -20 dB/1.23 MHz or off, 0.1 dB step (Relative level to 1.23 MHz bandwidth power of BS transmission signal)
		AWGN level accuracy	± 0.2 dB (Relative level to Forward Traffic Channel power)
	Auxilliary output signal	CDMA Reference output 19.6608 MHz, BNC connector, TTL level CDMA Timing output 1.25 ms, 20 ms, 26.67 ms, 80 ms, 2 s, D-SUB 25 pins, TTL level	
	FER measurement	Function	Measures frame error rate of traffic channel using mobile station loop-back mode
Measurement result		FER measurement, number of error frames, number of test frames reliability limit Pass/Fail	
Call processing function	Function	Executes processing of registration, origination, termination, conversation, loop back (service option 2), frequency channel change, mobile station disconnect, network disconnect, CDMA-to-Analog handoff (IS-95A, TSB74, J-STD-008)	
	Protocol	IS-95A, TSB74, J-STD-008 (CDMA, Analog), ARIB STD-T53	
	Input frequency range	824.01 MHz to 848.97 MHz, 30 kHz step (IS-95A, TSB74) 1850.00 MHz to 1909.95 MHz, 50 kHz step (J-STD-008) 887.0125 MHz to 888.9875 MHz, 898.0125 MHz to 900.9875 MHz, 915.0125 MHz to 924.9875 MHz, 12.5 kHz step (ARIB STD-T53) 1715.05 MHz to 1780.00 MHz, 50kHz step (KOREA-PCS)	

Section 1 General

Section 2 Preparations Before Use

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2.1 Installation Site and Environmental Conditions

The MT8801C Radio Communication Analyzer operates normally at temperatures from 0° to 50°C. However, for the best performance, the following locations should be avoided.

- Where there is severe vibration
- Where the humidity is high
- Where the equipment will be exposed to direct sunlight
- Where the equipment will be exposed to active gases

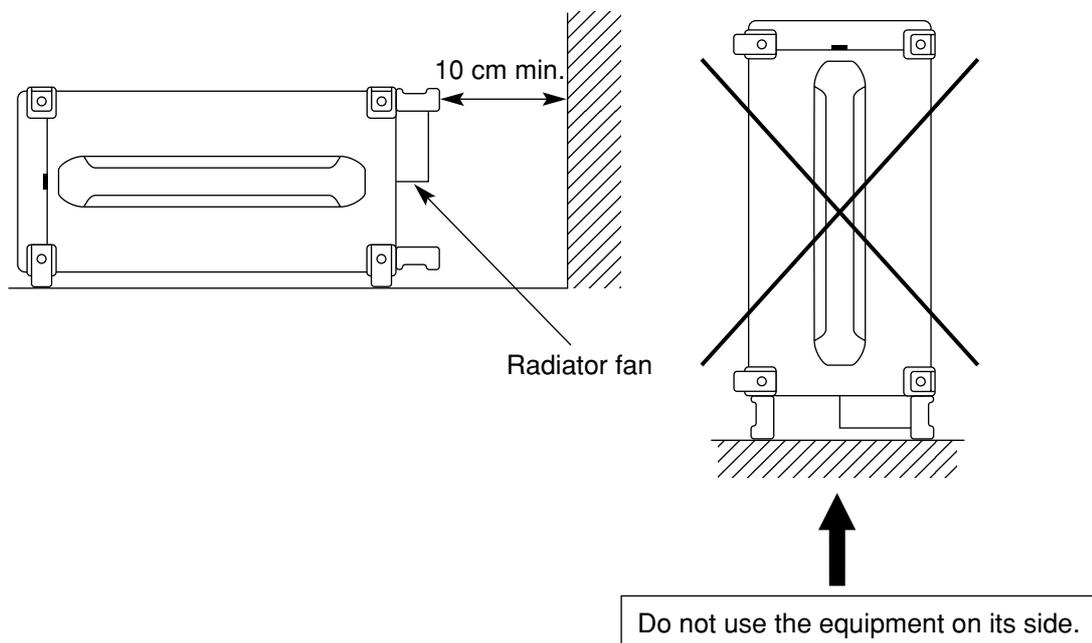
To insure long-term trouble-free operation, the equipment should be used at room temperature and in a location where the power supply voltage does not fluctuate greatly.

CAUTION

- **Prevention of failure due to condensation**
If the MT8801C is used at normal temperatures after it has been used or stored for a long time at low temperature, there is a risk of short-circuiting caused by condensation. To prevent this risk, do not turn the power on until the MT8801C has been allowed to dry out sufficiently.

Fan clearance:

To suppress any internal temperature increase, the MT8801C has a fan on the rear panel as shown in the diagram below. Leave a gap of at least 10 cm between the rear panel and the wall, nearby equipment or obstructions so that fan ventilation is not blocked.



2.2 Safety Measures

This paragraph explains the safety procedures which should be followed under all circumstances to counter the risk of an accidental electric shock, damage to the equipment or a major operation interruption.

2.2.1 Safety measures for power supply

WARNING

■ **Before power-on:**

• **Protective grounding**

The MT8801C must be connected to ground. If the power is turned on without taking this countermeasure, there is a risk of receiving an accidental electric shock.

• **Power supply voltage**

In addition, it is essential to check the power supply voltage. If an abnormal voltage that exceeds the specified value is input, there is an accidental risk of damage to the MT8801C and fire.

■ **During power on:**

- **To maintain the MT8801C, sometimes it is necessary to make internal checks and adjustments with the top, bottom or side covers removed while power is supplied. Very-high, dangerous voltages are used in the MT8801C; if insufficient care is taken, there is a risk of an accidental electric shock being received or of damage to the equipment. To maintain the MT8801C, request service by service personnel who has received the required training.**
-

In the following, special notes on safety procedures are explained for sections other than Section 2. To prevent accidents, read this section together with the related sections before beginning operation.

2.2.2 Maximum power to connector

The allowable maximum power to the MT8801C connectors are as follows.

Connector	Allowable maximum power
Main Input/Output	10 W (40 dBm)
AUX Input	100 mW (20 dBm)
AUX Output	Exclusive output connector, 0.5 mW (-3 dBm)
AF Input	30 Vrms
AF Output	Dedicated output connector, 6 Vrms (output impedance: 600 Ω), 0.6 Vrms (output impedance: 50 Ω)
DUT Interface	TTL level
Reference Input	2 to 5 Vp-p
10MHz Buffered Output	Dedicated output connector, TTL level
Detector Output	Dedicated output connector, TTL level
BER Input connectors	TTL level
Ext Trig Input	TTL level
Ext Trig Output	Dedicated output connector, TTL level
Ext FM Input	±10 Vp-p
Demod Output	Dedicated output connector, ±8 Vp-p

CAUTION

-
- **Excessive power protection**
Never apply power more than the allowable maximum power. Also, do not input external signal to the output connector.
-

2.3 Preparations before Power-on

The MT8801C operates normally when connected to 100 to 120 Vac, 47.5 to 63 Hz, or 200 to 240 Vac, 47.5 to 63 Hz AC power supply via the power inlet.

To prevent the following problems, take the necessary procedures described on the following pages before power is supplied.

- Accidental electric shock
- Damage caused by abnormal voltage
- Ground current problems

To protect the operator, the following WARNING and CAUTION notices are attached to the rear panel of the MT8801C.

WARNING 
NO OPERATOR SERVICE-
ABLE PARTS INSIDE.
REFER SERVICING TO
QUALIFIED PERSONNEL.

WARNING
Disassembly, adjustment, maintenance, or other access inside this instrument by unqualified personnel should be avoided. Maintenance of this instrument should be performed only by Anritsu trained service personnel who are familiar with the risks involved of fire and electric shock.

CAUTION 
FOR CONTINUED FIRE
PROTECTION REPLACE
ONLY WITH SPECIFIED
TYPE AND RATED FUSE.

CAUTION
Replace only with fuses of the specified type and rating. The use of improper fuses may cause fire.

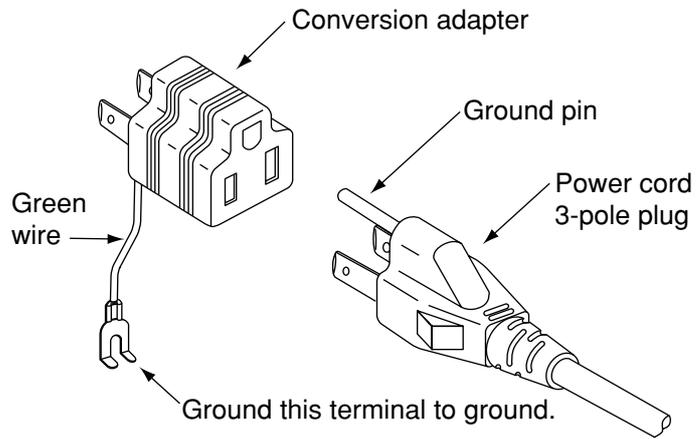
2.3.1 Protective grounding

(1) Grounding with 3-pole power outlet

The power supply polarity of the 3-pole (grounded, 2-pole type) matches that of the 3-core power cord plug. Therefore, the MT8801C is connected to ground potential when the power cord is connected to the plug. As a result, it is not necessary to connect the FG terminal to ground.

(2) Grounding with conversion adapter

If a 3-pole power socket is not provided, use the 3-pole to 2-pole conversion adapter as shown in the figure below. Connect the green wire protruding from the 3 to 2 conversion adapter to ground.

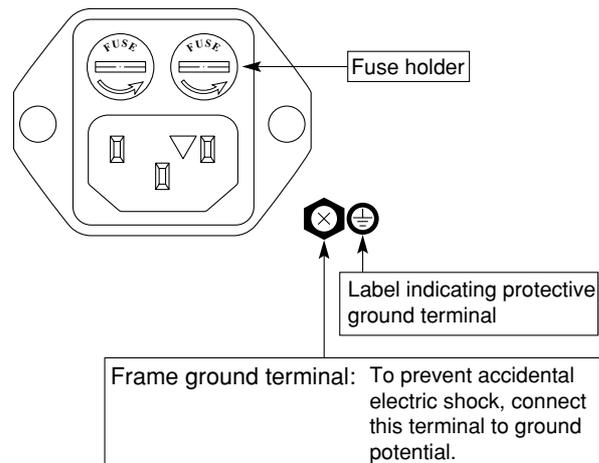


(3) Grounding with frame ground (FG) terminal

If a 3-pole AC power supply outlet is not available and the green wire cannot be grounded, the protective frame ground (FG) terminal on the rear panel must be connected directly to ground potential.

WARNING

- **Prevention of danger using protective ground terminal**
If power is supplied without protective grounding, there is a risk of accidental electric shock. If a 3-pole power supply outlet is not available and the green wire cannot be grounded, the protective frame-ground (FG) terminal on the rear panel must be connected to ground potential before power is supplied to the MT8801C.



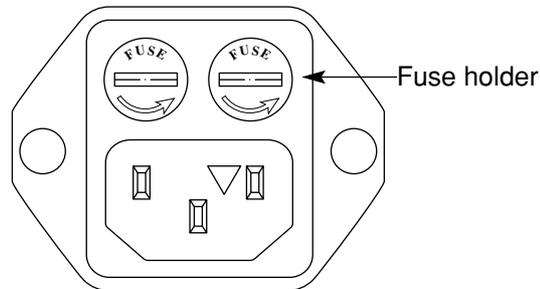
Section 2 Preparations Before Use

2.3.2 Replacing fuse

The MT8801C with standard accessories has two spare fuses (T6.3A250V). Use these fuses to replace the blown fuses. If the fuses must be replaced, locate and remedy the cause before replacing the blown fuses.

Power supply system	Voltage range	Fuse rating plate	Fuse rating	Fuse name	Model/Order No.
100 Vac	100 – 120 V	T6.3 A	6.3 A, 250 V	T6.3 A 250 V	F0014
200 Vac	200– 240 V	T6.3 A			

AC 100–120V ⇄ T 6.3A
 AC 200–240V ⇄ T 6.3A



WARNING ⚠

- **Prevention of electric shock**
 Before replacing the fuses, turn the power switch off and remove the power cord from the power outlet. If the fuses are replaced while power is being supplied, there is a serious risk of electric shock.
- **Confirmation before turning the power on**
 After replacing fuses, the protective grounding mentioned above must be provided before turning the power on again, and the proper AC power supply voltage must be confirmed.
 If the AC power supply voltage is improper, there is a risk of the internal circuits of the MT8801C being damaged.

CAUTION **• Check on replacing fuses**

If the replacement fuses are not provided, obtain replacement fuses of the same rated voltage and current as the fuses in the fuse holders.

If the replacement fuses are not of the same type, they may not fit correctly, and failure will occur due to melting of the fuse.

When the rated voltage and current are over-sufficient, the fuses may not blow even if there is a risk of damage to the equipment by fire.

After performing the safety procedures, replace the fuses according to the following procedure.

Step	Procedure
1	Turn off the power switches on the front and rear panels, then remove the power cord from the power supply outlet.
2	Use a screwdriver to turn the fuse holder cap shown in the figure counterclockwise. The cap and fuse are removed together as a unit from the AC inlet.
3	Remove the fuse from the fuse cap and replace it with a spare fuse*.
4	Return the fuse cap with the fuse to the fuse holder, then fasten it by turning it clockwise with the screwdriver.

* Contact the Anritsu service department for fuses by specifying the model name, order number, name, and quantity.

2.4 Installation

2.4.1 Rack mounting

The B0333D Rack Mounting Kit (sold separately, Table 1-3) is required to mount the MT8801C in a rack.

The installation method is included in the rack mount kit diagram.

2.4.2 Stacking

When stacking several MT8801C's or stacking the MT8801C with equipment of the same width as the MT8801C, the B0332 Coupling Plate (sold separately, Table 1-3) are required.

2.5 Precautions for Handling Storage Media

2.5.1 Floppy disk

The following explains how to handle the floppy disk media of this instrument.

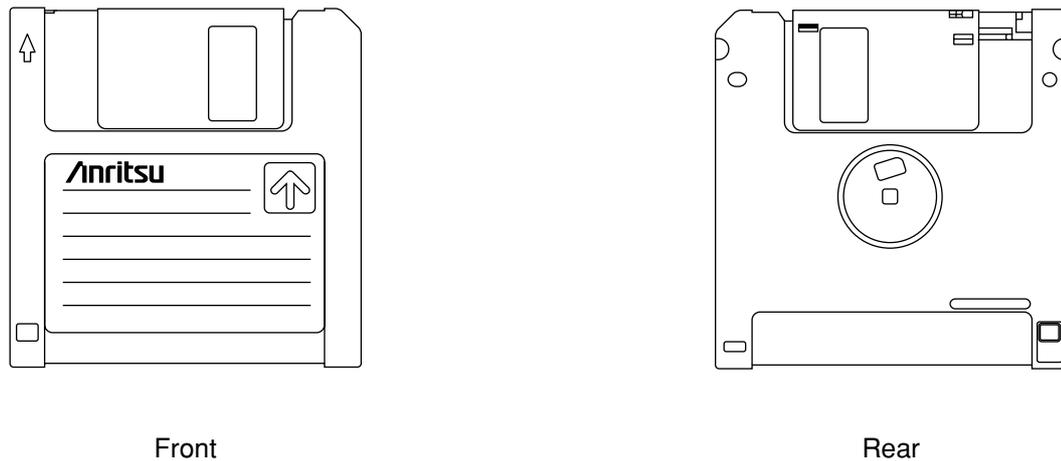


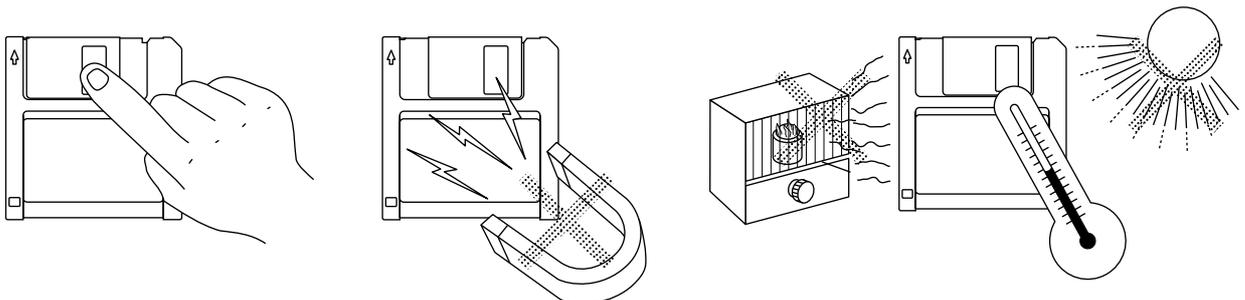
Fig. 2-1 3.5-inch Floppy Disk

(1) Precautions

The plastic case of the 3.5-inch floppy disk has a shutter to protect the disk inside. When the disk is inserted into the disk drive, the shutter opens to expose part of the disk. Do not touch the shutter.

The following care must be taken for handling the disk.

- (a) When a floppy disk is inserted, and LED lamp on the disk drive lights, do not eject the disk. Otherwise, the memory contents may be damaged, resulting in disk drive failure.
- (b) Do not directly touch the magnetic surface with your hand or any object.
- (c) Do not expose the disk to dust.
- (d) Do not place the disk near any magnetic objects.
- (e) Do not place the disk in direct sunlight or near heater.
- (f) Store the disk under a temperature range of 4° to 53°C, and humidity of 8 to 90% (no condensation).



(2) Write-protection tab

A write-protection tab is provided on the 3.5-inch floppy disk. Sliding this tab downward in the arrow direction beforehand prevents accidental writing and deletion. (A write operation is disabled in this state.)

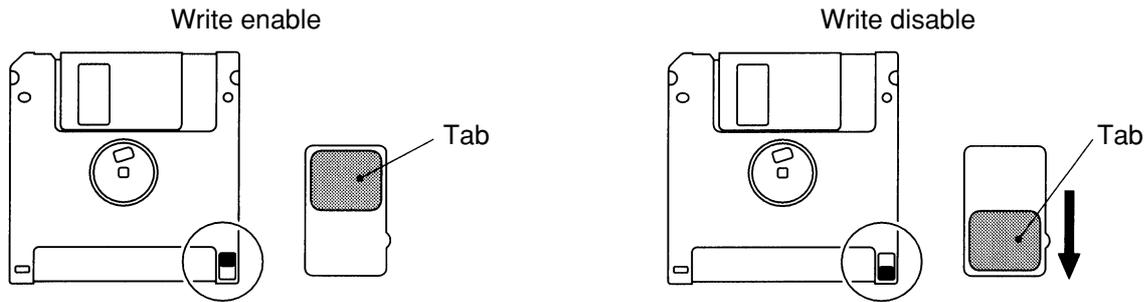


Fig. 2-2 Write-protection Tab for 3.5-inch Floppy Disk

(3) Inserting and ejecting the floppy disk

With the front surface of the floppy disk facing up, fully insert the disk in the arrow direction until a clicking sound is heard. To eject, press the eject button on the right side of the disk drive. Remove the disk after confirming that the LED lamp is off.

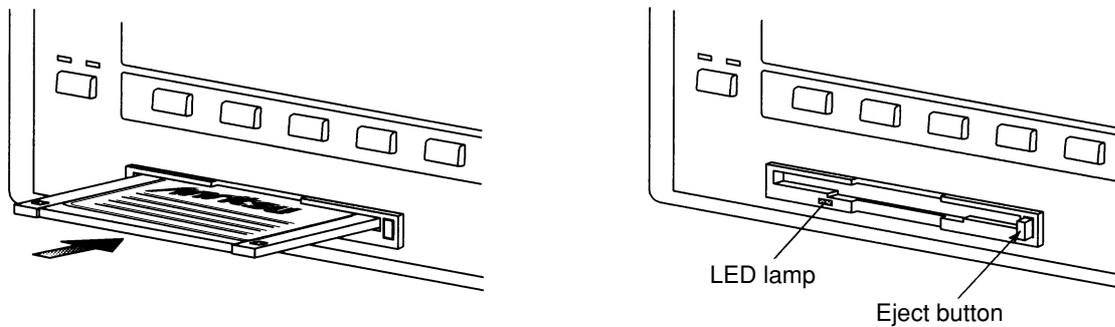


Fig. 2-3 Inserting and Ejecting the 3.5-inch Floppy Disk

Section 3 Panel Layout and Overview of Operation

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Section 3 Panel Layout and Overview of Operation

3.1 Panel Layout

This paragraph describes the keys, switches, LEDs, and connectors on the front and rear panels of the MT8801C Radio Communication Analyzer.

3.1.1 Front panel layout

This paragraph describes the keys, switches, LED, connectors, and the rotary knob on the front panel.

No.	Display	Function
1	F1, F2, F3, F4, F5, F6	<p>Main function keys</p> <p>Group of keys that select and execute the corresponding menus displayed on the LCD screen.</p> <p>When the [Main Func] F6 key is on, the menus for F1 to F5 are placed in MT8801C measurement mode.</p> <p>When the [Main Func] F6 key is off, the menus of F1 to F5 are displayed for the currently used screen function.</p>
2	F7, F8, F9, F10, F11, F12	<p>Function keys</p> <p>Group of keys that select and execute the corresponding menus displayed on the LCD screen. These screen functions are related to the current operation.</p>
3	Next Menu	
	▲	Displays the next page of the function key menu.
	◀	Displays the next page of the main function key menu.
4		Key group for entering data.
	Shift	Switches the function of keys with a shift function. When the shift key is pressed, the key's LED goes on. Subsequent operation must be started with this LED on.
	BS	Back space key used to correct input data.
	0, ., -/+, 1, 2, 3,	Numeric keys (ten-keypad) used for data input.
	A/4, B/5, C/6, D/7, E/8, F/9	These keys become alphanumeric keys at shift function activation.
	(Definition key group)	The data input using the numeric keys is defined with these keys.
	W/GHz/dBm/dB	Validates data when W/GHz/dBm/dB unit system data is input.
	mW/MHz/dBμV/sec	Validates data when mW/MHz/dBμV/sec unit system data is input.
	μW/kHz/mV/ms	Validates data when μW/kHz/mV/ms unit system data is input.
	nW/Hz/μV/μs/Enter	Validates data when nW/Hz/μV/μs unit system data or non-unit system data is input.

No.	Display	Function
5	Measure	Key group used to start measurement.
	Single	Key used to execute measurement once.
	Continuous	Key used to execute measurement continuously.
6	Copy	Outputs display screen to the specified printer. (Hard copy function)
7	Cursor	Key group used to control the cursor on the LCD screen.
	Set	Opens the input window for data in the item pointed to by the cursor. After the completion of data entry, the window is closed.
	Cancel	Closes the window. The input data becomes invalid.
	^<>v	Moves the cursor.
8	Step	Key group increment or decrement numeric data.
	^	Increments numeric data by the specified step value.
	v	Decrements numeric data by the specified step value.
9	(Rotary knob)	Knob used for data input. When this knob is turned clockwise, the value increases and when it is turned counterclockwise, the value decreases. For input by the rotary knob, data is validated each time it is incremented/decremented.
10	Main Input/Output	Input/output connector for RF signal. (N type connector)
11	AUX	Auxiliary input/output connectors for RF signal. (TNC connector)
	Input	Auxiliary input connector for RF signal. This is used when the output level of DUT is too low.
	Output	Auxiliary output connector for RF signal. This is used when the sensitivity of DUT is too low.
12	AF Input	AF signal input connector for Analog, (BNC connector)
	AF Output	AF signal output connector for Analog, (BNC connector)
13	DUT Interface	Multi-pole connector used to output AF signal and measure the BER (D-SUB connector, 25-pin, female).
14	(Floppy disk drive)	Slot in which the floppy disk is loaded for saving and recalling data, and loading system program.
15	Stby On	Change-over switch to turn the standby power supply on when the Line Input on/off switch on the rear of this instrument is turned on. In Standby mode, power is only supplied to the reference crystal oscillator.
16	Panel Lock	Invalidates all key operations except the Panel Lock key and the Stby On power supply switch on the front panel. In lock mode, the LED on this key goes on.
17	Remote Local	Resets GPIB remote mode and returns to local mode. In GPIB remote mode, the LED (Remote) goes on.
18	Preset	Initializes measurement parameters.

Section 3 Panel Layout and Overview of Operation

3.1.2 Rear panel layout

This paragraph describes the switch and connectors on the rear panel.

No.	Display	Function
19	 I	Input switch for AC power supply. If this switch is turned off, the Power switch on the front panel cannot be turned on.
20	(Fuses)	Power supply fuses. For safety, always use fuses of the specified rating.
21		Frame grounding terminal. For safety, always ground this terminal.
22	(Memory card cover)	The memory card is built-in. Close the cover for card use.
23	(Power supply inlet)	For safety, always use a power supply of the rated voltage.
24	GPIB	GPIB interface connector.
25	Parallel	Parallel interface connector (conforms to Centronics type). Used to connect printer (D-SUB connector, 25-pin, female).
26	Serial	RS232C interface connector (D-SUB connector, 9-pin, female).
27	10 MHz Buffered Output	10 MHz reference signal (TTL level) for internal use is output (BNC connector).
28	10 MHz/13 MHz Reference Input	10 MHz or 13 MHz reference signal (2 to 5 Vp-p) is input (BNC connector).
29	Detector Output	RF burst signal detection output connector (BNC connector).
30	BER Input	Signal input connectors for measuring bit error rate (BNC connector).
	Data	Input connector for measurement data of bit error rate (BNC connector). TTL level signal is input.
	Clock	Input connector for clock of bit error rate (BNC connector). TTL level signal is input.
31	Ext FM Input	External FM modulation signal input connector for Analog measurement, (BNC connector)
32	Demod Output	FM demodulated signal monitor connector for Analog measurement, (BNC connector)
33	Ext Trig Input	Input connector for external trigger signal (BNC connector). TTL level signal is input.
34	Ext Trig Output	Output connector for external trigger signal (BNC connector). TTL level signal is output.
35	(Fan)	Instrument internal air cooling fan.
36	CDMA Reference Input	Not used.
37	CDMA Reference Output	Output connector for CDMA clock signal (BNC connector). TTL level signal is output.
38	CDMA Timing	Connector for CDMA timing (D-SUB25 connector, 25 pins, female).

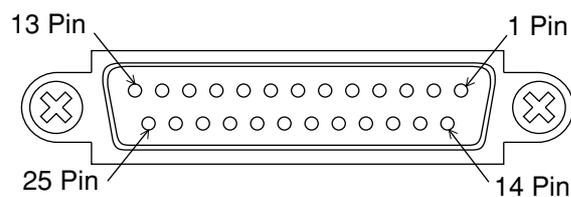
[Specifications of CDMA Timing connector]

CDMA Timing connector is a connector of 25-pin, female, and D-SUB.

Pin No.	Signal name	Remarks	Specifications
1	GND	Signal ground	
2	1.25MSEC_OUT	Reference signal of 1.25-ms period Note 1	5 V TTL level
3	26.7MSEC_OUT	Reference signal of 26.7-ms period Note 1	5 V TTL level
4	PP2S_OUT	Reference signal out of 2-s period Note 1	5 V TTL level
5	RESERVED	Not used	
6	NC	Not connected	
7	NC	Not connected	
8	NC	Not connected	
9	NC	Not connected	
10	NC	Not connected	
11	NC	Not connected	
12	NC	Not connected	
13	NC	Not connected	
14	GND	Signal ground	
15	20MSEC_OUT	Reference signal of 20-ms period Note 1	5 V TTL level
16	80MSEC_OUT	Reference signal of 80-ms period Note 1	5 V TTL level
17	RESERVED	Not used	
18	RESERVED	Not used	
19	NC	Not connected	
20	NC	Not connected	
21	NC	Not connected	
22	NC	Not connected	
23	NC	Not connected	
24	NC	Not connected	
25	NC	Not connected	

Note 1:

Pulse width is 813 ns (1/1.2288 MHz).



Pin Configuration of CDMA Timing Connector

Section 3 Panel Layout and Overview of Operation

3.1.3 Panel layout

The front panel and rear panel layouts are shown in Figs. 3-1 and 3-2, respectively. The numbers in the diagram correspond to those in paragraphs 3.1.1 and 3.1.2.

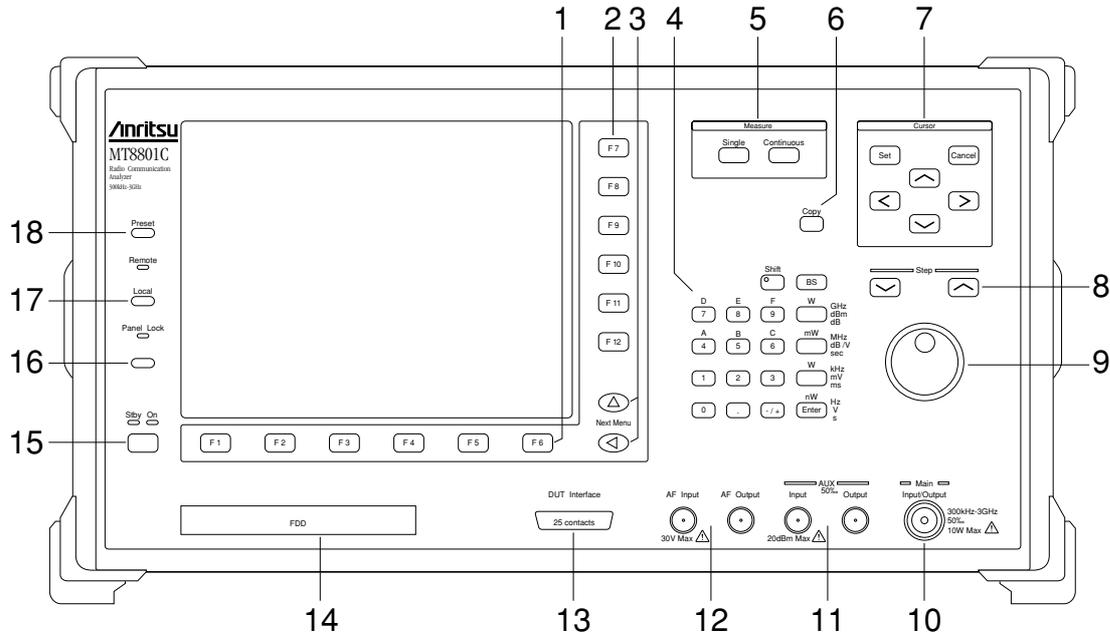


Fig. 3-1 Front Panel

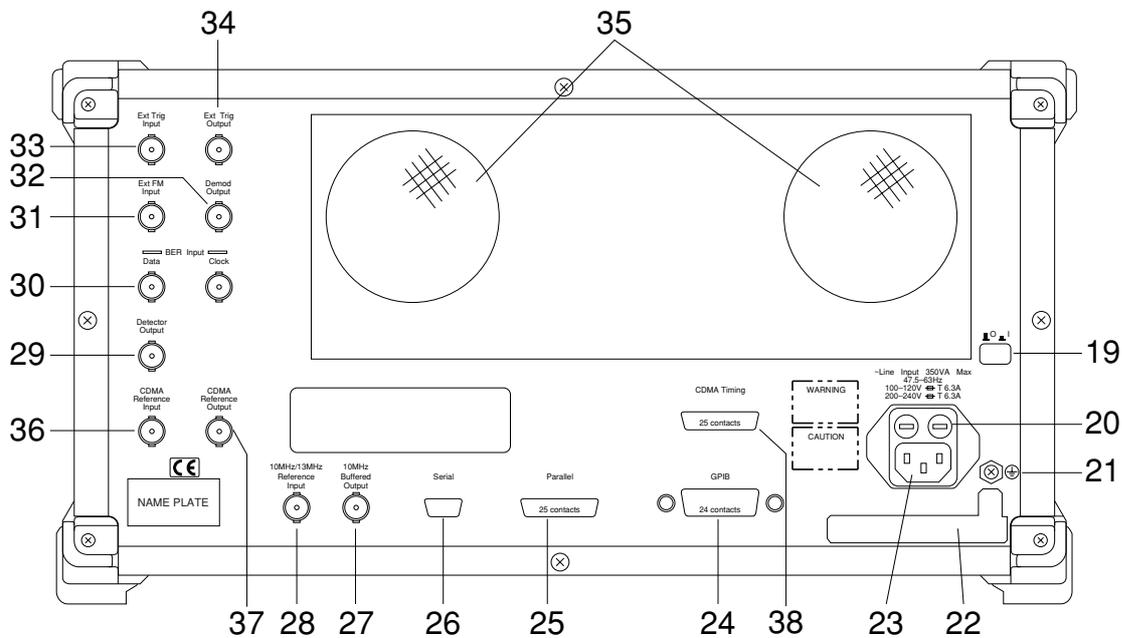


Fig. 3-2 Rear Panel

3.2 Overview of Operation

3.2.1 Overview of functions

The MT8801C with Option 12 CDMA Measurement can perform CDMA TX/RX measurement.

- CDMA TX/RX measurement --- TX/RX Measure mode

The following measurement can be performed by using the function menus displayed on the screen.

(1) CDMA Transmitter measurement

The MT8801C can measure the items below by receiving modulated signals from a CDMA transmitter.

- Modulation analysis
Carrier frequency, Carrier frequency error, r (waveform quality), t (timing error), vector error: RMS/Maximum value, phase error, amplitude error, origin offset
- Gated output power (with standard line template): Slot, frame, rising edge, falling edge
- Power meter (Note: Measures the average power with a power sensor.)
- IF level meter (Note: Measures the IF signal level of the MT8801C.)
- Standby Tx power
- Access probe Tx power
- Time response of open-loop power control

(2) Analog transmitter measurement

The MT8801C can measure the items below by outputting an AF signal to the microphone terminal of an analog transmitter (DUT) and receiving the analog modulated signal from the transmitter.

- RF frequency
- RF power
- FM/f_M deviation
- Modulation signal (AF) level
- Modulation (AF) distortion
- Modulation (AF) frequency

(3) CDMA Receiver measurement

The MT8801C sends a digital modulated test signal to the CDMA receiver (DUT), and the demodulation data from the receiver is input to the MT8801C. Then the MT8801C measures the following items:

- Frame error rate (FER)

(4) Analog receiver measurement

The MT8801C sends an analog modulated test signal to an analog receiver (DUT), and the demodulated signal (AF signal) from the receiver is input to the MT8801C. Then the MT8801C measures the following items:

- Demodulated signal (AF) level
- Demodulated signal (AF) SINAD value
- Demodulated signal (AF) distortion
- Demodulated signal (AF) frequency

(5) AF signal measurement

The MT8801C sends an AF signal from the AF Output connector to a DUT, and an AF signal from the DUT is input to the AF Input connector of the MT8801C. Then the MT8801C measures the following items:

- AF input signal (AF Input) level
- AF input signal (AF Input) frequency
- AF input signal (AF Input) distortion

(6) Call processing

The MT8801C performs the call-processing (location registration, origination, termination, conversation, hand-off, mobile-station release, network release, and others) sequence between the MT8801C and the DUT (mobile station).

The following functions are provided to these functions.

- Save/recall

In TX Measure mode, the measurement conditions (Parameters) and Gated output power measurement templates (amplitude standard lines) can be saved or recalled up to 100 types to/from an FD (3.5-inch floppy disk).

Also in RX Measure mode, set output patterns up to 100 types can be saved and recalled through the FD.

- Copy

Outputs the image on LCD screen to an external printer using a parallel interface (conforming to Centronics type).

- GPIB

The MT8801C can be controlled by an external controller using the GPIB interface.

- RS232C

The MT8801C can be controlled by an external controller using a serial interface (RS232C).

3.2.2 Overview of operation

At power-on operation begins in “TX&RX Tester” (Transmitter and Receiver test) status (Setup Common Parameter screen).

(1) Main menu selection

If measurement is to be started from another mode, or from other than a measurement mode, first select one of the main menu items, as shown below.

TX&RX Tester (Transmitter and Receiver test)
Recall (Parameter file recall)
Save (Parameter file save)
File Operation (File retrieval/deletion/protect, FD initialization)
Change System (Measurement system change)
Instrument Set (MT8801C main-frame setting)
Change Color (Selection of screen color)

First press the [Main Func On/Off] F6 key to ON, then select the desired function by using main function keys F1 to F5 and the Next Menu key [◀].

(2) Selection of measurement items

Items are set by using cursor keys ([↑],[↓],[<],[>]), and other function keys while observing the screen menu.

Press the [Set] key to open the input window.

(3) Item input

For selection items displayed:

Select the required value using the cursor keys and validate it by using the [Set] or [Enter] key. The window closes.

For numeric values:

Input data using the numeric keys or change data using the rotary knob and [Step] keys. Validate by pressing a unit key, [Enter] key, or [Set] key. The window closes.

Section 3 Panel Layout and Overview of Operation

(4) Outline of screen configuration

The screen configuration is shown below. A tree-shaped Hierarchical configuration of items below each the main menu is indicated. (Details of operation are explained in Section 4. The screens, setup items and function key flowchart for each screen are summarized in Appendix A, “Screen and Function Key Transition Diagrams.”)

[Overview of screens]

- TX & RX Tester mode
 - └ Setup Common Parameter screen
(Setting TX/RX common measurement conditions)
 - └ TX Measure mode
 - └ Setup TX Measure Parameter screen
(Setting items of TX measurement parameter)
 - └ Modulation Analysis screen
 - └ Gated Power screen
(Gated output power measurement)
 - └ Setup Template screen
 - └ Recall Template screen
 - └ Save Template screen
 - └ Power Meter screen
 - └ Standby Output Power screen
 - └ Access Probe Measure screen
 - └ Open Loop Time Response screen
(Open-Loop Power Control Time Response measurement screen)
 - └ Setup Analog TX Measure Parameter screen
(Setting items of Analog TX measurement parameter)
 - └ Analog TX Meas with SG screen
(Signal generator + Analog TX measurement)
 - └ RX Measure mode
 - └ Setup RX Measure Parameter screen
(Setting items of RX measurement parameter)
 - └ Setup Signal screen
 - └ Frame Error Rate screen
(Frame error rate (FER) measurement)
 - └ Setup Analog RX Measure Parameter screen
(Setting items of Analog RX measurement parameter)
 - └ Analog RX Measure screen
(Analog RX measurement)
 - └ Call Processing mode
 - └ Setup Call Processing Parameter screen
(Setting call processing test parameter)

- Recall mode
 - └ Recall Parameter screen
(Screen for recalling parameter-file)
- Save mode
 - └ Save Parameter screen
(Screen for saving parameter-file)
- File Operation mode
 - └ File Operation screen
(Screen for file retrieval/deletion/protection-setup in FD, and FD initialization)
- Change System mode
 - └ Change System screen
(Screen for changing TX&RX Tester mode measurement system)
- Instrument Setup mode
 - └ Instrument Setup screen
(Screen for setting up RS232C/GPIB, etc. for MT8801C main frame)

Note:

Change Color mode (Selection for screen display color) is setup using the function key menu. There is no screen in Change Color mode.

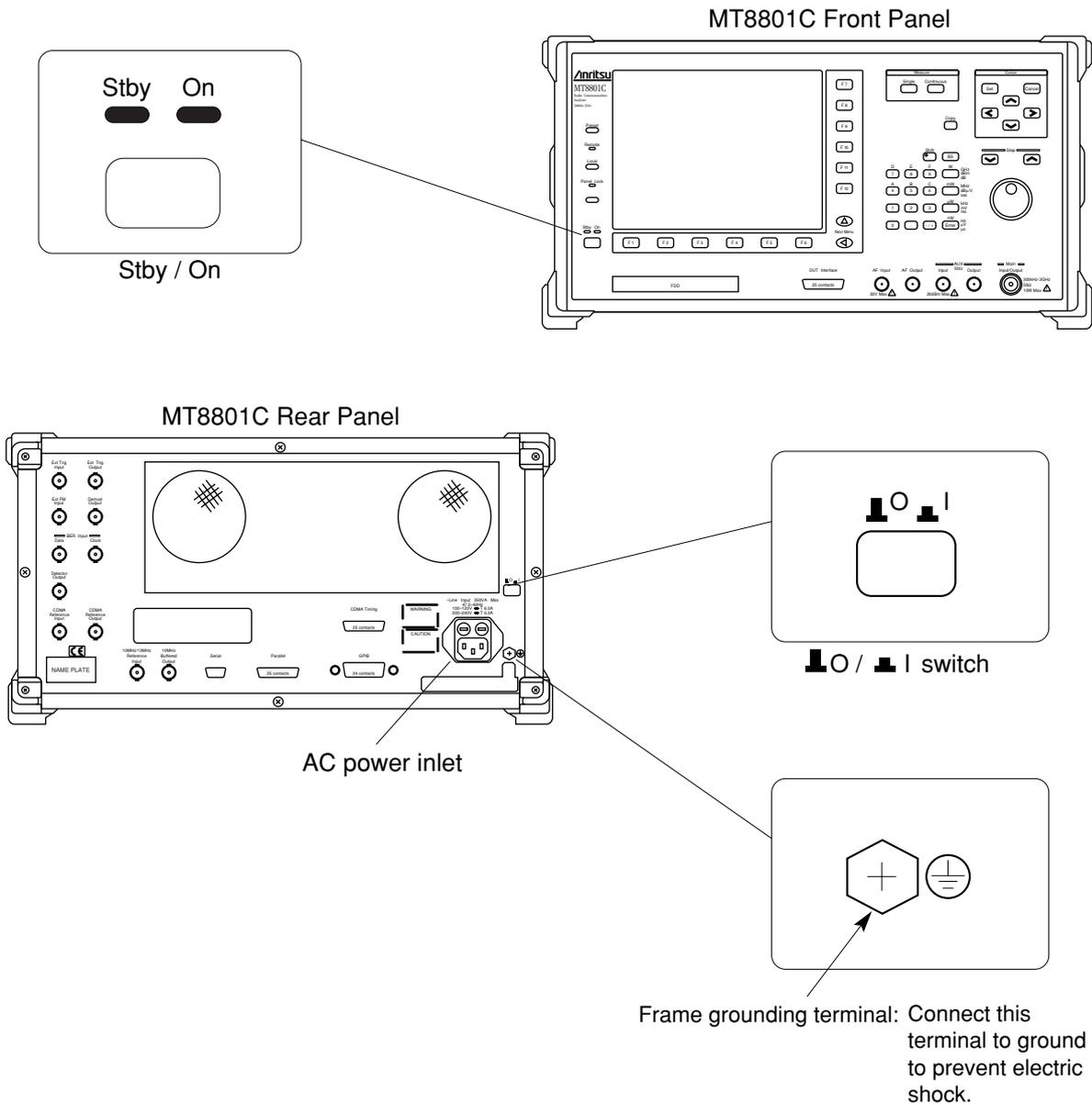
Section 3 Panel Layout and Overview of Operation

Section 4 Operation

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4.1 Turning on and off the Power

The MT8801C has two power switches: The Stby/On switch on the front panel and  (main power) switch on the rear panel.



WARNING

- **Protective grounding**

If the power is turned on without protective grounding, operator runs the risk of electric shock. If the MT8801C does not have a three-pole (grounding type two-pole) power outlet, be sure to connect the frame grounding (FG) terminal on the rear panel or ground terminal of the accessory power cable to ground before turning on the MT8801C power.

CAUTION 

- **Checking the power supply voltage**

If the AC power supply voltage is improper, abnormal voltage may damage the mechanism inside the equipment. Confirm that the AC power supply voltage is within the specified rating before turning on the MT8801C power.

The following shows the specified power supply voltage and frequency:

Voltage: 100 to 120 Vac or 200 to 240 Vac (Because an automatic input voltage rating switching system is used, the rating need not be switched.)

Frequency: 47.5 to 63 Hz

For normal MT8801C operation, leave the power switch on the rear panel set to on when the AC power inlet is connected to the power outlet, and only use the Stby/On switch on the front panel to turn the power on and off.

Check the power display lamps at the lower-left part of the front panel as listed in the table below to confirm the power supply state.

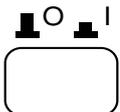
Table 4-1 Power Display Lamp Indications and Power Supply States

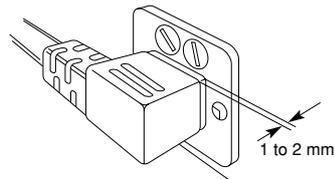
Display lamp State	Power standby display lamp (green) (Stby)	Power on display lamp (orange) (On)
Main power off	Off	Off
Only main power on	On	Off
All power supplies on	Off	On

Section 4 Operation

4.1.1 Turning on the Power

Perform the power-on procedure through warming up the internal reference oscillator to normal MT8801C operation in order of the following steps:

Step	Operation	Result check
1.	Connect the frame grounding terminal on the rear panel to ground.	<ul style="list-style-type: none"> When using a three-pole power cable with a grounding terminal, the MT8801C need not be grounded.
2.	 Set the O I switch on the rear panel to O (Off).	<ul style="list-style-type: none"> When the button is pressed down and set, it is I (On). Press the button again to release it. When the button is set Off, the AC power is turned off even if the power switch on the front panel is set On.
3.	Connect the power cable plug to the AC power outlet.	<ul style="list-style-type: none"> Fully insert the power cable jack so that there is a gap of 1 to 2 mm as shown in the figure below.

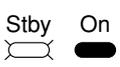


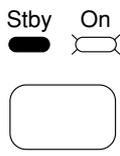
4.	Connect the power cable jack to the AC power inlet on the rear panel.	
5.	Set the O I switch on the rear panel to I (On)	<ul style="list-style-type: none"> The Stby lamp on the front panel power switch lights. The reference crystal oscillator circuit built in the MT8801C starts to warmed up. Before operating the MT8801C under low temperatures, warm up the crystal oscillator for 24 hours. The table below lists the stability of the crystal oscillator based on the warm-up time.



Crystal oscillator stability

Item		Stability
Starting characteristics	After 30-minute operation	5×10^{-8} /day or less
Aging rate (after 24-hour operation)		2×10^{-8} /day or less
Stability at ambient temperature change of crystal oscillator ($25^{\circ}\text{C} \pm 25^{\circ}\text{C}$)		$\pm 5 \times 10^{-8}$ or less

6.	 Hold down the Stby/On switch on the front panel for a few seconds to set it On.	<ul style="list-style-type: none"> The On lamp on the front panel power switch lights and the Stby lamp goes off. Power is supplied to all circuits in the MT8801C, then the MT8801C becomes operable.
----	---	--



Notes:

If neither power display lamp lights, check the following:

1. Are the power cables properly connected to the power inlet and power plug?
2. Are the specified fuses set in the fuse holders?
3. Is the power supply voltage correct?

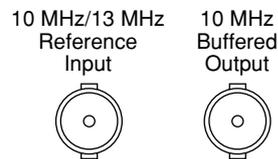
Notes:

The left figure shows the reference signal input/output connectors on the MT8801C rear panel. The internal 10 MHz reference signal is output from the 10 MHz OUTPUT connector at TTL level. When the internal reference signal is not used, input an external reference signal satisfying the following conditions to the 10 MHz/13 MHz Reference Input connector:

- i) Frequency: 10 MHz \pm 1 ppm, signal level: 2 to 5 Vp-p
- ii) Frequency: 13 MHz \pm 1 ppm, signal level: 2 to 5 Vp-p

Set the reference frequency on the Instrument Setup screen (see paragraph 4.3.1) according to the external reference signal used as described in i) and ii) above.

Warm up the external reference signal equipment separately from warming up the MT8801C.



Section 4 Operation

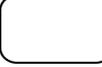
4.1.2 Turning off the Power

Turn off the power as described below.

(1) Normal power-off procedures

Step	Operation	Result check
1.	  Press the Stby/On switch on the front panel for a few seconds to set it to Stby state. 	<ul style="list-style-type: none"> The On lamp of the Power switch on the front panel goes off, and the Stby lamp lights. Only the internal reference crystal oscillator is turned on. 

(2) Power-off procedures for storage or long stop

Step	Operation	Result check
1.	  Press the Stby/On switch on the front panel for a few seconds to set it to Stby state. 	<ul style="list-style-type: none"> The On lamp of the power switch on the front panel goes off and the Stby lamp lights. Only the internal reference crystal oscillator is turned on. 
2.	 Set the O I switch on the rear panel to the O (off) position. 	<ul style="list-style-type: none"> The AC power is turned off. Both the Stby and On lamps of the Power switch on the front panel go off. 

4.1.3 Setup state after power-on

- The Setup Common Parameter screen is displayed shortly after power-on. At this time, parameters can be set by specifying Power-On Initial on the Instrument Setup screen. (See paragraph 4.3.3.)
- If a short power failure occurs, the power switch on the front panel goes Off. In this case, press the power switch On again.

4.2 Screen Descriptions

This paragraph describes the common items displayed on the screen.

(1) Screen layout

The composition of the measurement screen is described below.

- Title display area The type MT8801C, and date (**_**_**) time (**:**:**), or user-defined character string (title) are displayed on the top left line. These are set on the Instrument Setup Screen.
- Screen name display area The screen name (paragraph 3.2.2 (4)) and measurement system name CDMA are displayed on the second line from the top left.
- Measurement error messages display area
Messages for errors generated during measurement are reverse displayed on the third line from the top left.
There are 16 measurement error messages as follows. TX messages are shown in high priority order.

[CDMA TX measurement]

RF input limit	RF input level limit.
Level Over	Level too high
Level Under	Level too low
Unmeasurable	Measurements cannot be carried out.
Short Code Not Found	Short code undetectable
Time-out	Time out

[CDMA RX measurement]

Time-out	Time out
Upper Limited Error	Upper-limit value error
Call Processing Error	Call processing error

[Analog RF measurement]

Input Level Over	RF input level out of hardware use limit
Level Over	RF input level too high
Level Under	RF input level too low
Deviation Under	Deviation measured results too small

[Analog AF measurement]

Input Level Over	RF input level out of hardware use limit
Level Over	RF input level too high
Level Under	RF input level too low

Section 4 Operation

- RF input/output display

M” and “m”, or “A” and “a” displayed on the first line from the top center indicates the RF connector used.

M: Main Input/Output
 A: AUX Input/Output

m: Main Input, AUX Output
 a: AUX Input, Main Output

- Calibrated display

If the MT8801C is already calibrated, “C” is displayed on the second line from the top center.

This is appeared after executing calibration on the Modulation Analysis screen etc..

C: Calibrated

- User calibration factor setting display

If a user calibration coefficient is being set, "U" is displayed on the third line from the top center.

This appears when the user Cal. factor is set to a value other than 0.00 dB in the Setup TX Measure Parameter screen or Setup RX Measure Parameter screen.

U: User Cal. Factor

- Measurement mode display area

The measurement mode is displayed on the first line from the top center.

This is appeared depending on the Measure key (Continuous/Single).

Measure: Continuous: Continuous measurement (The measurement mode becomes forcibly to Single, depending on the measurement item.)

Measure: Single: Single (one time) measurement

In average storage mode, nothing is displayed in this area.

- Storage mode display area

The displayed value or waveform storage mode is displayed on the second line from the top right.

This is the setting value of the storage mode on the current measurement screen.

Storage:

Normal: Normal display
 Overwrite: Trace data overwriting
 Average : Averaging
 (order of storage operations performed and total number of operations)

Max Hold: Maximum value held
 Min Hold: Minimum value held
 Cumulative: Dot data accumulation display

Call Processing state: When the DUT Control is set to Call Proc to make Call Processing mode, the current Call Processing state is displayed.

Stop:	Call Processing function stops.
Idle:	Standby state on Paging Channel. The MT8801C generates the Pilot Channel, Synch Channel and Paging Channel signal, then wait for the Reverse Access Channel signal from the DUT.
Registration:	Sequence execution state for location registration
Idle (Regist) (waiting):	Idle state after Registration
Origination:	Sequence execution state for origination This is the transition state from Idle to Loop Back or Conversation, and is triggered from DUT.
NW Originate:	Sequence execution state for termination This is the transition state from Idle to Loop Back or Conversation, and is triggered by pressing [NW Originate] F2 key on MT8801C.
Loop Back:	Communication state on Traffic channel (Service option: SO2, SO9)
Conversation:	Communication state on Traffic channel (Service options: SO1, SO3)
MS Release:	Sequence execution state for disconnection from MS This is the transition state from Loop Back or Conversation to Idle, and is triggered from DUT.
NW Release:	Sequence execution state for disconnection from Network (i.e.MT8801C) This is the transition state from Loop Back or Conversation to Idle, and is triggered by pressing [NW Release] F2 key on MT8801C.
Handoff:	Sequence execution state of hardware hand off. This is the transition state between Traffic Channels of different frequency.
Others:	Sequence execution state for DUT control This occurs in the Communication state on Traffic Channel.
Trace:	This is set when the waveform display mode of the Modulation Analysis screen is set. Constellation Eye Diagram Vector Error Phase Error Magnitude Error

Section 4 Operation

- Menu display area

The titles of up to six main function keys (F1 to F6) are displayed horizontally along the bottom.

When the [Main Func on off] (F6) key on the right is set On, the main function menu is displayed.

When the [Main Func on off] (F6) key is set Off, the menu is displayed according to the screen contents.

Use the Next Menu [◀] key to display the next page.

The display of 1 (first page), 2 (second page), or later above the F6 menu indicates the current page.

The titles of up to six function keys (F7 to F12) are displayed vertically along the right side.

The display of 1 (first page), 2 (second page), or later under function key F12 indicates the menu page number.

The current page is reverse displayed. If there are multiple pages, use the Next Menu [▲] key to display the next page under the F12 key.

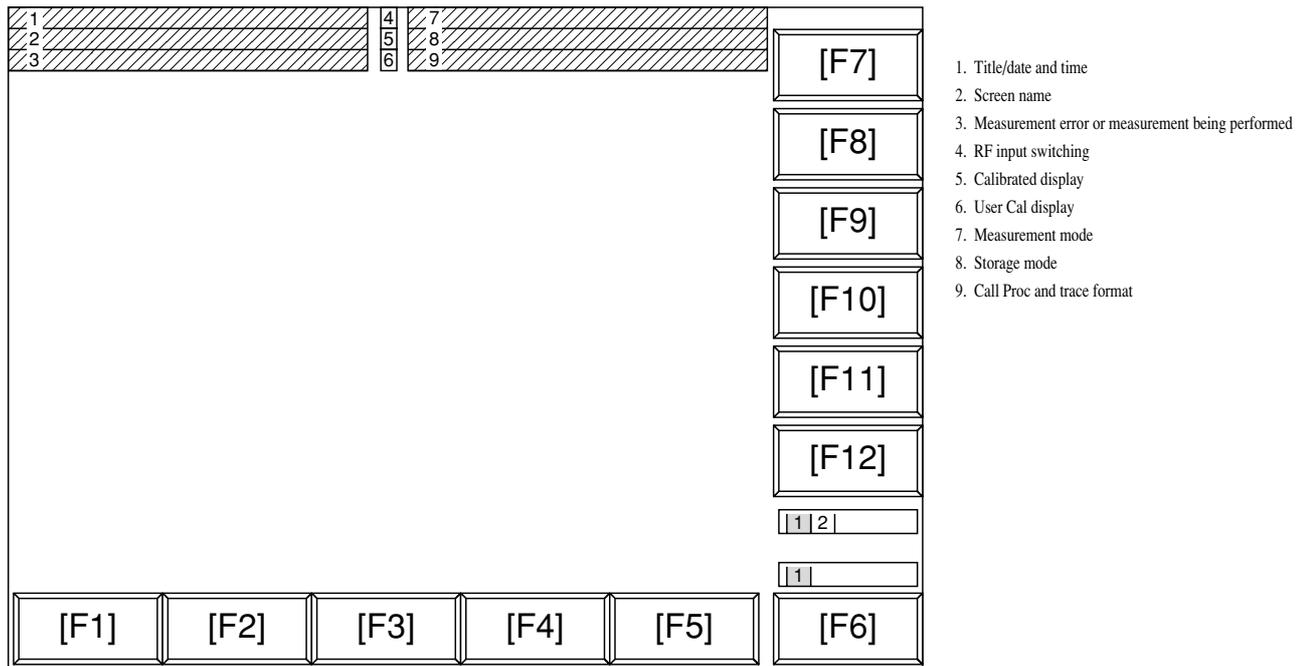


Fig. 4-1 Screen Layout

(2) Function keys

The symbols displayed on the top right of the function keys indicate the following functions:

- * : Indicates a lower level function key is displayed when this function key is pressed.
- > : Indicates the screen is changed by pressing this function key.
- # : Indicates a window is opened to set a value using the ten-keypad, Step key, or rotary knob when this function key is pressed.

- (a) Menu for transition to lower hierarchy screen

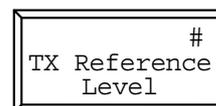
(The Back screen key switches the current screen to the higher hierarchy screen.)



- (b) Menu for transition to lower hierarchy menu



- (c) Menu for opening the value setting window



- Function key menu that select setting item:

One of the multiple selection keys (displayed in the same menu hierarchy) can be selected. The top and right frames of the selected key are reverse displayed. (See para. (e) below.)

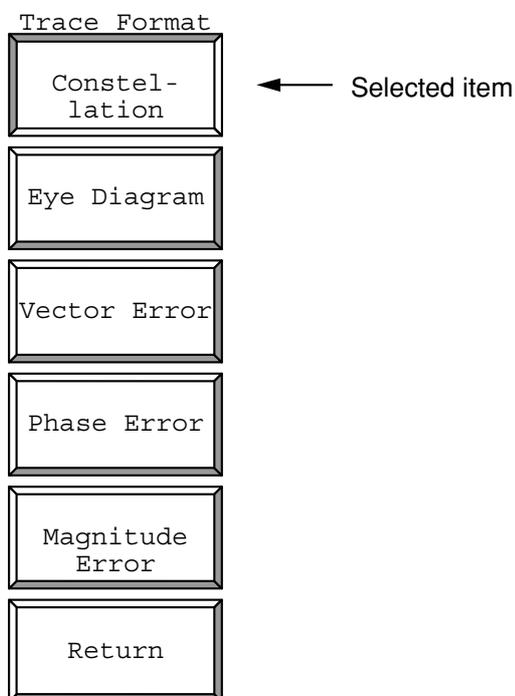
The setting values displayed in a key are changed alternately. When such a key is selected, the set value is reverse displayed. (See para. (d) below.)

- (d) Menu on which set items are switched alternately (alternate key menu)

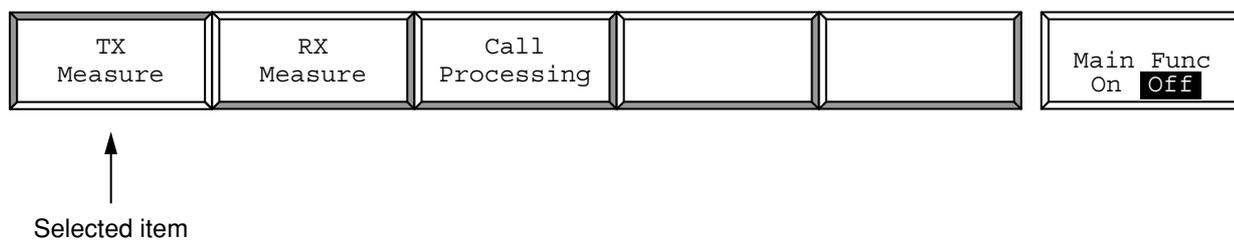


Section 4 Operation

- (e) Menu on which a set item is selected
[Example of the function key menu]



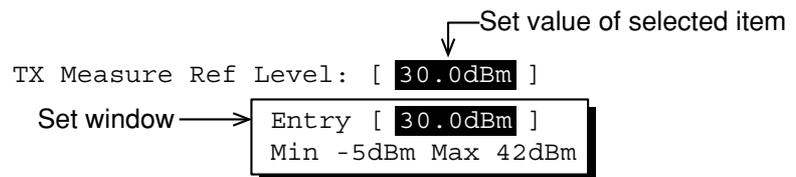
- [Example of the main function key menu]



(3) Entering the data

- (a) Entering numeric data by opening/closing the window
- (i) Entering numeric data by moving the cursor and opening/closing the window

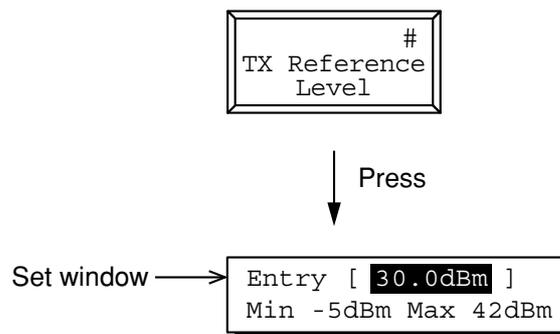
Move the cursor to the brackets enclosing the item to be set, then press the Set key. The value setting window shown below is opened and numeric data can be set.



When a value is entered using the ten-key pad, Step key, or encoder, then press the unit or Set key, the numeric data is defined and the window is closed.

If the Cancel key, a function key or main function key is pressed while the window is open, the window is closed and the previously set value is displayed.

- (ii) Entering numeric data by pressing a function key or main function key
- When the key marked # on the top right of the menu is pressed, the value setting window shown below is opened and numeric data can be set.



When a value is entered using the ten-key pad, Step key, or encoder, then press the unit or Set key, the numeric data is defined and the window is closed.

If the Cancel key, a function key or main function key is pressed while the window is open, the window is closed and the previously set value is displayed.

Section 4 Operation

- (b) Entering selection item by opening/closing the window

Move the cursor to the brackets enclosing the item to be set, then press the Set key. The selected item setting window shown below is opened and the selected item can be set.

RF Input : [Main]



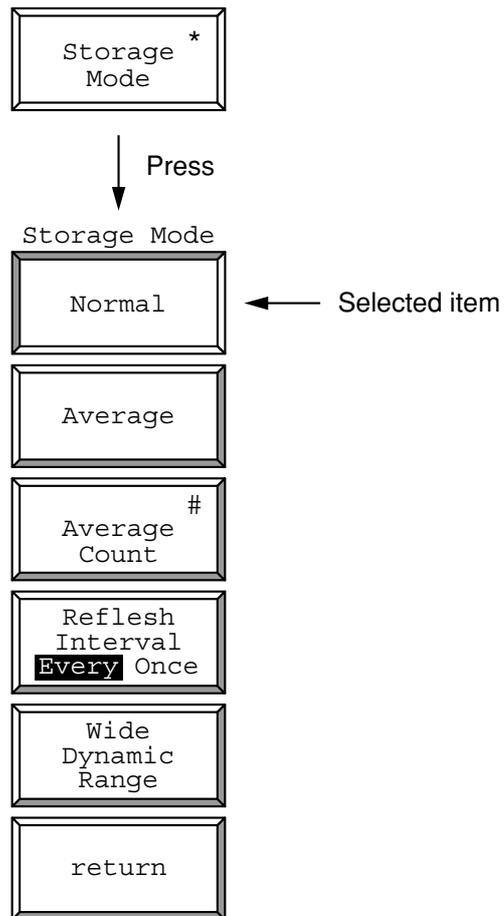
When an item in the window is selected using the cursor keys and the Set key is pressed, the set value is defined and the window is closed.

- (c) Entering selected items using alternate keys

Selection items are displayed on the function key menu. Each time one of these keys is pressed, set values are switched alternately. The currently selected item is reverse displayed.



- (d) Entering selected items using function keys with lower hierarchy
 When the key marked * on the top right of the menu is pressed, the menu set of the lower hierarchy shown below is displayed.
 Select an item from the menu set and press the corresponding function key.
 The menu display of the selected item is changed. When the return function key is pressed, display returns to the menu set of the higher hierarchy.



- (e) Entering the title
 See paragraph 4.3.3, "Instrument Setup screen."

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

This paragraph describes operation using the MT8801C Option 12 CDMA Measurement to measure the CDMA transmitter and receiver.

4.3.1 Preparations

This paragraph describes the setup, zero-point calibration of the power meter, and RF cable loss correction when measuring the DUT.

(1) Setup

This paragraph explains how to set the MT8801C and device under test (DUT) when conducting tests.

[DUT Interface connector]

The DUT Interface connector is equipped on the bottom of the MT8801C front panel to transmit and receive signals for control and measurement.

The following lists the specifications and functions of the DUT connector and gives and notes on its use.

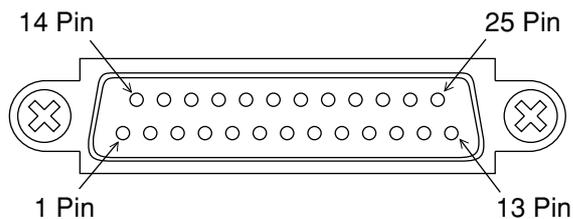
4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

1) Specifications of the DUT Interface connector

The DUT Interface connector is a 25-pin female D-SUB connector.

Signal assignment

Pin number	Signal name	Signal type	Specification	Direction
1	GND	Signal ground		---
2	DUT_TXD12	Spare output	12 V level	MT8801C -> DUT
3	DUT_RXD	Spare input	5 V TTL/3 V C-MOS/12 V	MT8801C <- DUT
4	DUT_RTS12	Spare output	12 V level	MT8801C -> DUT
5	DUT_CTS	Spare input	5 V TTL/3 V C-MOS/12 V	MT8801C <- DUT
6	AF_SHELL	AF signal output (floating output -)		MT8801C -> DUT
7	GND	Signal ground		---
8	DUT_RTS5	Spare output	5 V TTL level	MT8801C -> DUT
9	DUT_IN0	Spare input	5 V TTL/3 V C-MOS level	MT8801C <- DUT
10	DUT_IN1	Spare input	5 V TTL/3 V C-MOS level	MT8801C <- DUT
11	DUT_IN2	Spare input	5 V TTL/3 V C-MOS level	MT8801C <- DUT
12	DUT_IN3	Spare input	5 V TTL/3 V C-MOS level	MT8801C <- DUT
13	PRSS_TLK0	Press talk switch 0	Current capacity: 0.5 A or less	MT8801C -> DUT
14	DUT_OUT0	Spare output	5 V TTL/3 V C-MOS level	MT8801C -> DUT
15	DUT_OUT1	Spare output	5 V TTL/3 V C-MOS level	MT8801C -> DUT
16	DUT_OUT2	Spare output	5 V TTL/3 V C-MOS level	MT8801C -> DUT
17	DUT_OUT3	Spare output	5 V TTL/3 V C-MOS level	MT8801C -> DUT
18	AF_SIGNAL	AF signal output (floating output +)		MT8801C -> DUT
19	DUT_TXD5	Spare output	5 V TTL level	MT8801C -> DUT
20	12VOUT	+12 V power output	12 V, 50 mA or less	MT8801C -> DUT
21	BCLK_IN	BER measurement clock	5 V TTL/3 V C-MOS level	MT8801C <- DUT
22	BDAT_IN	BER measurement data	5 V TTL/3 V C-MOS level	MT8801C <- DUT
23	DUT_TXD3	Spare output	3 V C-MOS level	MT8801C -> DUT
24	DUT_RTS3	Spare output	3 V C-MOS level	MT8801C -> DUT
25	PRSS_TLK1	Press talk switch 1	Current capacity: 0.5 A or less	MT8801C -> DUT



Note:

The DUT Interface connector is not used by CDMA Measurement (with Option 12).

Section 4 Operation

2) Pin descriptions

2.1) Signal ground (GND)

This signal ground is the common grounding terminal of all signals using this connector.

2.2) 12 V power output

The 12 V power output can be used for the DUT or external interface for the DUT.

The maximum current capacity of this output is 50 mA.

2.3) BER measurement signal

The BER measurement signal is applied to this terminal to receive the data output from the DUT when measuring TDMA reception.

CDMA does not support this terminal. Leave this terminal unconnected.

2.4) Press talk switch

The press talk switch is a control terminal for the transmission On/Off switch used mainly for simplex communication.

Because CDMA does not use this terminal, leave it unconnected.

2.5) AF signal output

AF signal output (floating output) for analog transmitter measurement.

Output is made from AF Output (BNC connector) at the same time. The output impedance is fixed to 600 Ω .

Connect the GND of the MT8801C to the GND of the DUT. Connect the floating output – side to the low impedance side of DUT microphone input.

Use a shielded cable for microphone input and connect the sheath to GND.

2.6) Spare input and output

Spare input and output are terminals provided for future expansion.

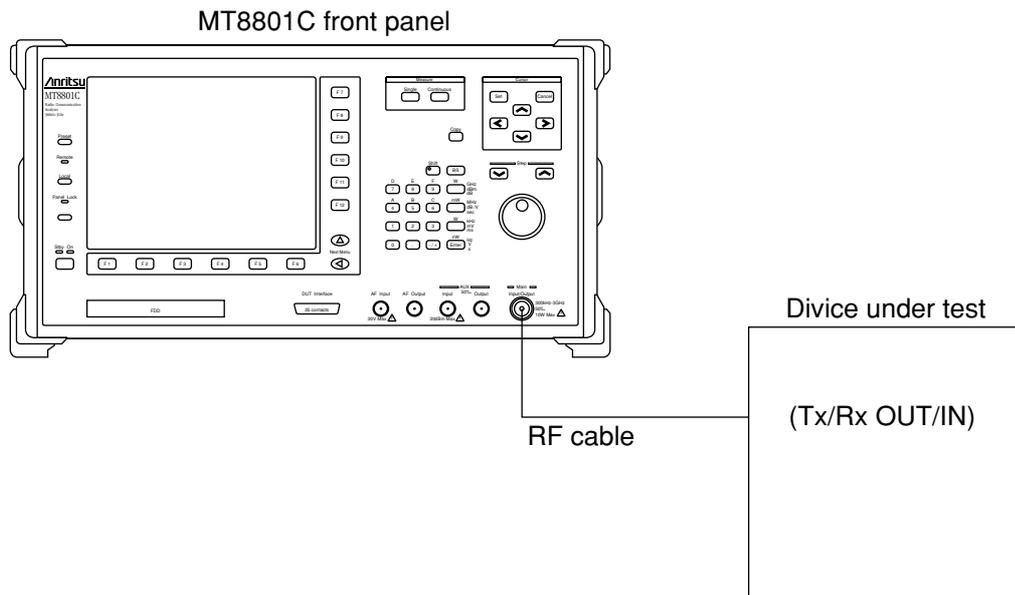
CDMA does not support these terminals. Leave these terminals unconnected.

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

(a) Setup for CDMA TX/RX measurement

In transmitter measurement, the MT8801C receives the modulated signal (RF signal) from the DUT to measure modulation accuracy and other conditions.

In the call processing test, the DUT receives the forward signal (RF signal) from the MT8801C; the MT8801C receives the reverse signal (RF signal) from the DUT.



Note:

The RF measurement connectors of the MT8801C are composed of the Main Input/Output, and AUX Input and Output. The CDMA system uses only the Main Input/Output connector.

Section 4 Operation

(b) Setup for Analog TX measurement

In the Analog TX measurement, the MT8801C sends the AF signal to the DUT for modulating the transmission signal of the DUT, and receives the transmission signal. Then, modulates the signal to measure the modulation degree.

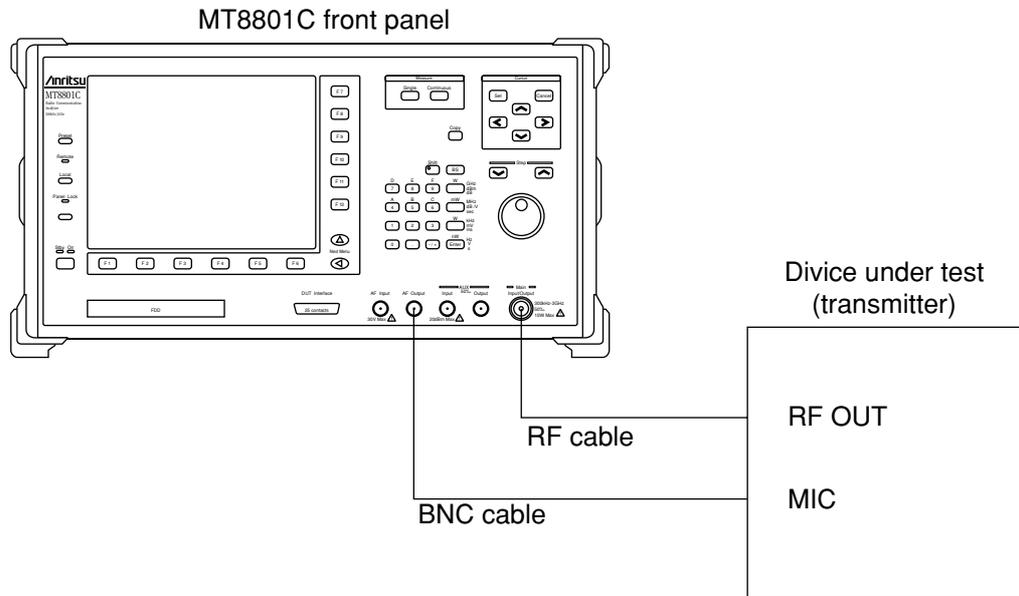
There are 2 methods for sending the AF signal to the DUT for modulation.

- (i) Sending AF signal with AF Output connector (front panel)
- (ii) Sending AF signal with DUT Interface connector (front panel)

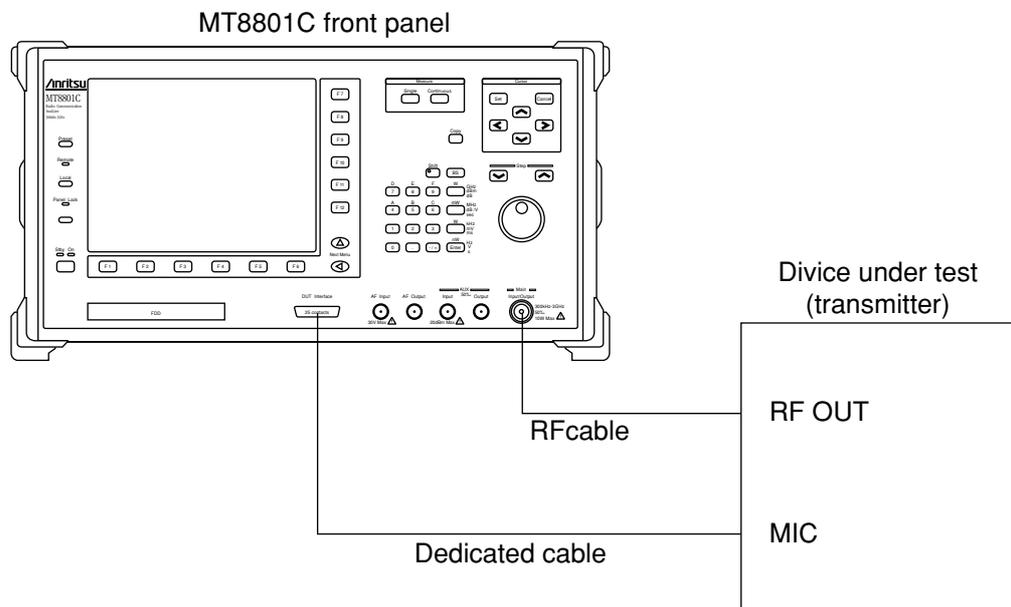
Setup is described depending on these methods, below.

(i) Setup using AF Output connector (at front panel)

Setup:



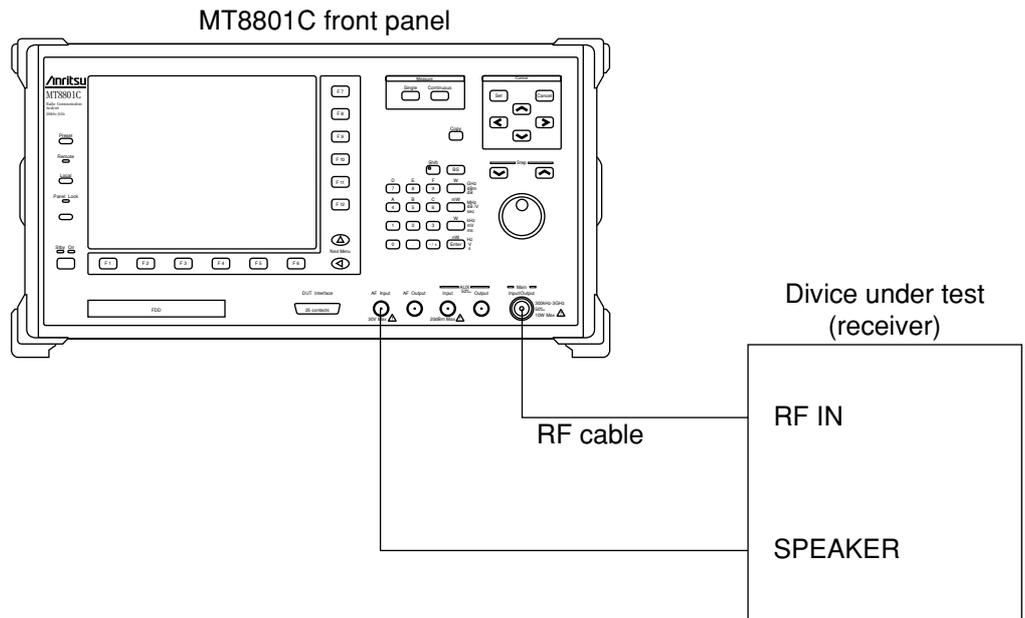
(ii) Setup using DUT Interface connector (at front panel)



4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

(c) Setup for Analog RX measurement

Send the modulated RF test signal from the MT8801C to the DUT which demodulates the signal, input the demodulated result to the MT8801C, then measure the distortion ratio.



CAUTION

- **The maximum input level of the AUX Input connector**
The maximum input level of the AUX Input connector is +20 dBm. If a signal whose level exceeds the specified value is input, the internal circuit of the MT8801C may be damaged.
- **AUX Output connector**
The AUX Output connector is the dedicated output connector of the signal generator in the MT8801C. If a transmitter signal is input in the AUX Output connector, the internal circuit may be damaged.

(2) Calibration before measurement

The MT8801C has two types of power measurement functions.

For high precision measurements, calibrate the MT8801C as shown below.

(a) Power meter function

The power meter function uses a thermocouple for high-precision wide-band measurement of average power.

In transmitter measurement, press the [Power Meter] F12 key in TX Measure mode and then select the Power Meter in Power Measure Method to set the power meter function.

Calibrate the MT8801C at the zero power point for high-precision measurements.

Zero-point calibration: Disconnect anything from the Main Input/Output connector to set no input power, and press the [Zero Set] F11 key to automatically calibrate the power meter at the zero power point.

For details on operation, see Paragraph 4.3.6, (5) "Power Meter."

(b) Burst-power measurement/IF level meter function

This function performs high-linearity narrow-band measurement of the IF signal level of the MT8801C.

In transmitter measurement, press the [Gated Power] F9 key in TX Measure mode, or press the [Power Meter] F12 key and select the IF Level Meter in Power Measure Method to set this function.

This function can measure the on/off power, rise/fall times and other conditions of burst signals.

For high precision measurement, internal calibration is required.

There are two types of internal calibrations of the Adjust Range and Calibration, as described below.

Adjust Range:

Optimizes the internal RF ATT, A/D input level, and power meter range of the MT8801C for the signal to be measured. This function can increase the measurement range for the on/off ratio.

Calibration:

The MT8801C has two types of level calibration functions of Power Meter Calibration (using an internal power meter) and Internal Osc. Calibration (using an internal oscillator), those are used for calibrating the power measured results.

Pressing the Calibration Cancel key clears the calibration factor to 0 dB.

The calibration factor may become incorrect when the internal temperature rises, the ambient temperature changes, the measurement frequency changes etc.. For precise measurement of the TX power, perform Calibration at that time.

For details on operation, see Paragraph 4.3.6 "Transmitter measurement."

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

Notes:

1. When the Adjust Range and Calibration are performed in any TX measurement screen, the compensation data is valid in any other TX measurement screens.
2. If the MT8801C input level is small or the input frequency does not match the setup frequency, the Adjust Range and Calibration may not be performed properly.
3. Execute Adjust Range and Calibration while the measurement signals are input stationary.
4. When performing Calibration results in an error (corrected data cannot be generated), calibration factor of the Calibration (held before the execution) is lost.

Section 4 Operation

(3) Correcting RF cable loss when conducting the transmitter measurement: Setting User Cal Factor

When conducting transmitter measurement, set the loss of the RF cable connecting the MT8801C and transmitter under test as a correction value (User Cal Factor) to measure RF power in the transmitter under test.

Step	Key operation	Description
1.	[Main Func on off] F6	Sets Main Func on to display the Main Menu at the bottom of the screen.
2.	[TX&RX Tester] F1	Sets TX&RX Tester mode. The Setup Common Parameter screen appears.
3.	[TX Measure] F1 Next Menu [▲] [Setup TX Parameter] F9	Displays the first page of the TX Measure menu. Displays the second page of the TX Measure menu. Displays the Setup TX Measure Parameter screen.
4.	Cursor [^] [v]	Moves the cursor to User Cal Factor.
5.	[Set][-/+][0][1] to [F/9][BS]	Enter the RF cable loss. Example: For 5 dB loss, enter 5.00 dB.
7.	[Enter]	Defines the entered value.
8.	[Back Screen] F12	Returns to the Setup Common Parameter screen.

In receiver measurement, perform the same operation to set the User Cal Factor.

Step	Key operation	Description
1.	[Main Func on off] F6	Sets the Main Func on to display the Main Menu at the bottom of the screen.
2.	[TX&RX Tester] F1	Sets the TX&RX Tester mode. The Setup Common Parameter screen appears.
3.	[RX Measure] F2 Next Menu [▲] [Setup RX Parameter] F9	Displays the first page of the RX Measure menu. Displays the second page of the RX Measure menu. Displays the Setup RX Measure Parameter screen.
4.	Cursor [^] [v]	Move the cursor to User Cal Factor.
5.	[Set] [-/+][0][1] to [F/9][BS]	Enter the RF cable loss. Example: For 5 dB loss, enter 5.00 dB.
6.	[Enter]	Defines the entered value.
7.	[Back Screen] F12	Returns to the Setup Common Parameter screen.

4.3.2 Selecting and changing the measurement system: Change System screen

Change the measurement system according to the following steps.

For measurement after change, refer to the manual of the selected measurement system.

Step	Key operation	Description
1.	[Main Func on off] F6	Sets the Main Func on. The Main Menu appears at the bottom of the screen.
	Next Menu [◀]	Displays the second page of the Main Menu.
2.	[Change System] F1	Sets Change System mode. The Change System screen and System menu appear.

This screen is used to select anyone of measuring systems and to upgrade the system software.

Note:

Changing any measuring system in this screen initializes the corresponding measurement parameters. Save the parameters before changing if necessary.

Section 4 Operation

(1) Changing the built-in measuring system

This paragraph describes how to exchange the measuring system used when more than one measuring systems are built in the MT8801C.

Step	Key operation	Description
1.		Make sure that “Current System” shows the system currently selected and that “Application Memory” contains a new measuring system to select.
2.	Cursor [∧] [∨]	Select one of the measuring system softwares in the “Application Memory”. Displays one of the measuring system softwares in the “Application Memory” in reverse display.
3.	[Change System] F7	Sets Change System mode.
	Cursor [<] [>]	Select “Yes” and Press the [Set] to confirm the measuring system software.

(2) Loading measuring systems from an external floppy disk

This paragraph describes how to load measuring systems from an external floppy disk.

(This function is effective only when the measuring software floppy disk is used.)

Step	Key operation	Description
1.		Set the floppy disk containing measuring system files in the floppy disk driver of the MT8801C.
2.	[Floppy Disk Dir] F8	Displays measuring system files on the floppy disk. Here, confirm the “Unused area” under “Application Memory”, and also the size of the measuring systems on the floppy disk. The measuring systems can be loaded when the value in “Unused area” is greater than size of measuring systems to be loaded.
3.	[Install system form FD] F10	Loads measuring system from the floppy disk to “Application Memory.”
4.	Set	Make sure that the measuring systems are displayed (saved) in “Application Memory.”

4.3.3 Setting the measurement system conditions: Instrument Setup screen

Set the standard frequency of the measurement system (10 MHz or 13 MHz), RF connector (Main or AUX), screen title/date/time display, interface (GPIB or RS232C), printer (ESC/P), and alarm (on or off) on this screen.

Procedure for transition to the Instrument Setup screen

Step	Key operation	Description
1.	[Main Func on off] F6	Set Main Func on. The Main Menu appears at the bottom of the screen.
	Next Menu [◀]	Displays the second page of the Main Menu.
2.	[Instrument Setup] F2	Sets Instrument Setup mode. The Instrument Setup screen appears. The Instrument Setup function key menu appears on F7 to F12.

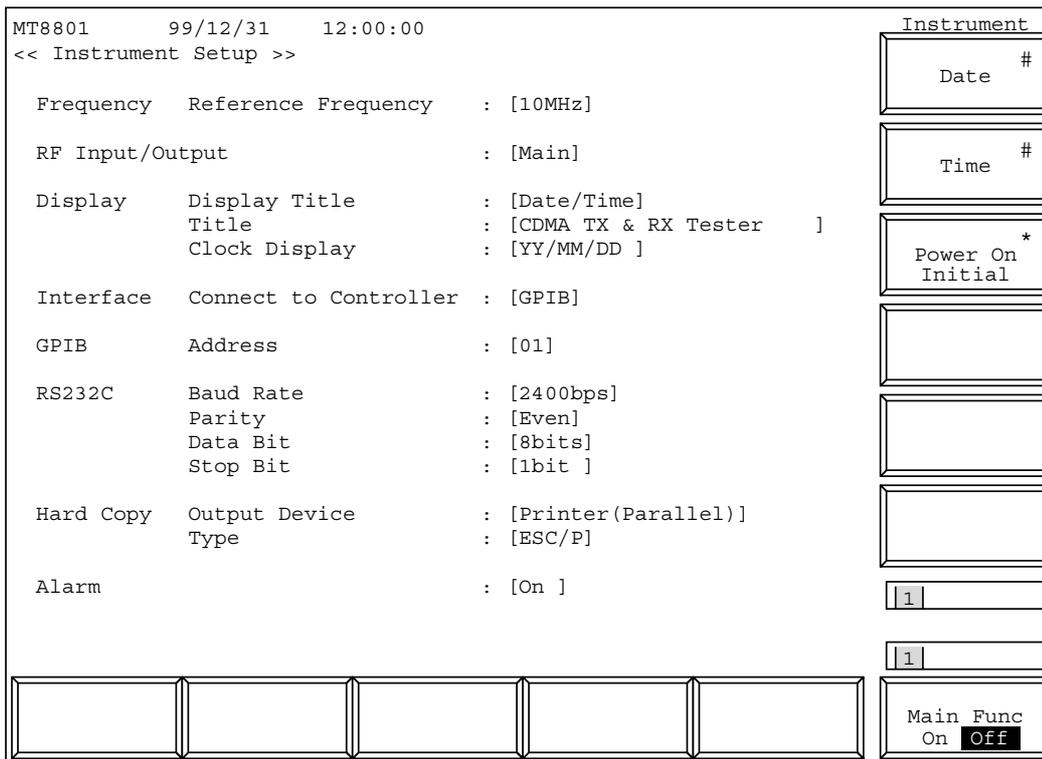


Fig. 4-3 Instrument Setup Screen

Section 4 Operation

- Set the following items:

Item	Range	Initial value
Frequency		
Reference Frequency	10 MHz, 13 MHz	10 MHz
RF Input/Output	Main, AUX, Main In/AUX Out, Main Out/AUX In (*1)	Main
Display		
Display Title	User Define, Date/Time, Off	User Define
Title	(32 alphanumeric characters) (*2)	
Clock Display	YY/MM/DD (year, month, day) MM-DD-YY (month, day, year) DD-MM-YY (day, month, year)	YY/MM/DD (year, month, day)
Interface		
Connect to Controller	GPIB, RS232C	GPIB
GPIB		
Address	00 to 30	01
RS232C		
Baud Rate	1200, 2400, 4800, 9600 (bps)	2400
Parity	Even, Odd, Off	Even
Data Bit	7 bits, 8 bits	8 bits
Stop Bit	1 bit, 2 bits	1 bit
Hard Copy		
Output device	Printer (Parallel), File	Printer (Parallel)
Type	ESC/P, HP2225... for Printer (Parallel) BMP (B&W)... for File	ESC/P
Alarm	On, Off	On

***1:**

For the MT8801C Option 12, use only Main (Main:Input/Output).

***2:**

Entering the title:

A title up to 32 characters can be entered in the title display area. (User Define)
MT8801C**_**_** (date) **:***:** (time) is displayed as an initial value.
(Date/Time)

Enter a title according to the following steps. (User Define)

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

Step	Key operation	Description
1.	Cursor [^] [v]	Moves the cursor to the Title entry area.
2.	[Set]	Opens the Title entry window.
3.	Step [^] [v]	Moves the cursor into position in the Title entry area to enter character.
4.	Cursor [<] [>]	Select a character.
5.	[Enter]	Defines the character.
6.	[BS]	Correct any incorrect character.
7.		Repeat steps 3 to 6 to enter all characters in the Title entry area.
8.	[Set]	Defines the entered character string.

- Function keys

Main function key:	None
Function keys:	
[Date] F7:	Opens the date entry window.
[Time] F8:	Opens the time entry window.
[Power On Initial] F9:	<p>Displays the Power On menu to select Initialization modes, which are classified into Previous Status and Recall File.</p> <p>Initial value: Previous Status</p> <p>When Previous Status mode is selected, the parameters after power-on retain the status held before the previous power-off.</p> <p>When Recall File mode is selected, the parameters after power-on are set by reading the specified file.</p>
[Previous Status] F7	Sets the parameters after power-on to the status held before the previous power-off.
[Recall File] F8	Sets the mode in that the parameters after power-on are read from floppy disk.
[File No.] F9	<p>Opens the parameter-file setting-location (number) entry window.</p> <p>File No.: 0 to 99, Initial value: 0</p>
[return] F12	Returns to the previous menu.

Section 4 Operation

- Selecting Power On Initial mode

The following describes how to select parameter initialization mode after power-on.

1. Selecting Previous Status mode

Step	Operation
1.	Press the [Power On Initial] F9 key.
2.	Press the [Previous Status] F7 key.
3.	Press the [return] F12 key to define the parameters then return to the previous menu.

2. Selecting Recall File mode (being developed)

Step	Operation
1.	Press the [Power On Initial] F9 key.
2.	Press the [Recall File] F8 key. (Access the floppy disk to call the parameter list file.)
3.	Press the [File No.] F9 key. (Open the parameter-file setting-location [number] window.)
4.	Enter the number of the parameter file to be set.
5.	Press the [Set] key to define the parameters, then press the [return] F12 key to return to the previous menu.
6.	Set the floppy disk (on which parameters to be read before power-on are written) in the floppy disk drive. When the next power on, the parameters in floppy disk is set.

Notes:

- If no floppy disk is set before power-on or a floppy disk other than that used at setting is used, parameters may be set in Previous Status mode or different parameters may be set.
- The ambient temperature range of the floppy disk is specified as 5 to 45°C. If a set temperature is outside the specified range, operation is not guaranteed.

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

- Changing the time and date of the built-in clock

1. Changing the date

Step	Key operation	Description
1.	[Date] F7 Displays the current date and time of the built-in clock.	Opens the date setting window.
2.	Cursor [^] [v]	Moves the cursor to the part to be changed.
3.	0 to 9, [BS]	Sets the data.
4.	Cursor [^] [v]	Moves the cursor to the next part to be changed.
5.	0 to 9, [BS]	Sets the data.
6.	[Set]	Closes the setting window and establishes the set value.

2. Changing the time

Step	Key operation	Description
1.	[Time] F8 Displays the current time of the built-in clock.	Opens the time setting window.
2.	Cursor [^] [v]	Moves the cursor to the part to be changed.
3.	0 to 9, [BS]	Sets the data.
4.	Cursor [^] [v]	Moves the cursor to the next part to be changed.
5.	0 to 9, [BS]	Sets the data.
6.	[Set]	Closes the setting window and establishes the set value.

Note:

To stop changing the date or time of the built-in clock

To stop changing the date or time after opening the setting window of the built-in clock, press the [Cancel] key in the above Step 4 or 5 (do not use the [Set] key). If the [Set] key is pressed again after the date and time window is opened, the value on the setting window is set again. The date and time window remains in the state when the window was opened. Therefore, if the [Set] key is pressed without changing the display on the window, the date and time of the built-in clock are delayed.

Section 4 Operation

4.3.4 Setting the screen display color: Change Color menu

To set a screen color, display the Change Color menu as follows.
 (The F7 to F12 function keys menu changes to the Change Color menu, but the screen does not change.)

Step	Key operation	Description
1.	[Main Func on off] F6	Sets Main Func on. The Main Menu appears at the bottom of the screen.
	Next Menu [◀]	Displays the second page of the Main Menu.
2.	[Change Color] F3	Sets Change Color mode. The Change Clr. function key menu appears on F7 to F12.
3.		Use the function key on the next page to set a color.
4.	[return] F12	Returns to the previous menu.

• Function keys

Main function key:	None
Function keys:	
Change Color menu:	Initial value: Color Pattern 1
[Color Pattern 1] F7:	Selects Anritsu-specified color 1.
[Color Pattern 2] F8:	Selects Anritsu-specified color 2.
[Color Pattern 3] F9:	Selects Anritsu-specified color 3.
[Color Pattern 4] F10:	Selects Anritsu-specified color 4.
[Define User Color] F11:	Displays the Define Clr. menu to set a user-specified color.
[Copy Color Ptn from] F7	Displays the [Copy from] menu to select an Anritsu-specified color as an original color to set a user-specified color.
[Color Pattern 1] F7:	Selects Anritsu-specified color 1 as an original color.
[Color Pattern 2] F8:	Selects Anritsu-specified color 2 as an original color.
[Color Pattern 3] F9:	Selects Anritsu-specified color 3 as an original color.
[Color Pattern 4] F10:	Selects Anritsu-specified color 4 as an original color.
[return] F12:	Returns to the previous menu.
[Select Item frame **] F8:	Selects the screen configuration field to set a display color. Use a number ** from 0 to 16 for this setting. The number increases in step of one by pressing this key.
[Red *] F9:	Set red intensity of the item frame selected by F8.
[Green *] F10:	Set green intensity of the item frame selected by F8.
[Blue *] F11:	Set blue intensity of the item frame selected by F8.
[return] F12:	Returns to the previous menu.
[return] F12:	Returns to the previous menu.

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

- Relation between screen assignment and number ** in [Select Item Frame **] F8 key
 - [Select Item Frame 0] Back-screen of function keys
 - [Select Item Frame 1] Back-screen of the main function keys
 - [Select Item Frame 2] Display frame of function and main function keys
 - [Select Item Frame 3] Characters and display frame of function and main function keys
 - [Select Item Frame 4] Back-screen of waveform display
 - [Select Item Frame 5] Scale line and frame of waveform display
 - [Select Item Frame 6] Waveform display (1)
 - [Select Item Frame 7] Waveform display (2)
 - [Select Item Frame 8] Display other than function and main function keys
 - [Select Item Frame 9] Characters right over the main function keys
 - [Select Item Frame 10] Measurement execution error display
 - [Select Item Frame 11] Template and zone frames
 - [Select Item Frame 12] Marker
 - [Select Item Frame 13] Window back-screen
 - [Select Item Frame 14] Window shade and characters
 - [Select Item Frame 15] (Not used)
 - [Select Item Frame 16] Back-screen

4.3.5 Setting the common measurement parameters: Setup Common Parameter screen

- Switch to the Setup Common Parameter screen according to the following steps. Set common measurement conditions on this screen.

Step	Key operation	Description
1.	[Main Func on off] F6	Sets the Main Function on to display the Main Menu at the bottom of the screen.
2.	[TX&RX Tester] F1	Sets TX&RX Tester mode. The Setup Common Parameter screen appears.
3.	[TX Measure] F1	The TX Measure (for transmitter test) function keys appear on F7 to F12.
	[RX Measure] F2	The RX Measure (for receiver test) function keys appear on F7 to F12.
	[Call Processing] F3	The Call Processing (sequence monitor: operation status display) function keys appear on F7 to F12.

Executable measurement varies depending on the Call Proc. State on the Setup Common Parameter screen, as below with the corresponding screen:

When the Call Proc. State is Stop, the following measurements can be executed:

TX Measure (Transmitter measurement)

- Parameter setting → Setup TX Measure Parameter screen
- Template setting → Setup Template screen
- Power meter → Power Meter screen
- Occupied bandwidth measurement → Occupied Bandwidth screen
- Spurious close to the carrier measurement → Spurious close to the Carrier screen
- Spurious measurement → Spurious Emission screen

TX Measure (Analog transmitter measurement)

- Parameter setting → Setup Analog TX Measure Parameter screen

RX Measure (Receiver measurement)

- Parameter setting → Setup RX Measure Parameter screen
- Signal setting → Setup Signal screen

RX Measure (Analog receiver measurement)

- Parameter setting → Setup Analog RX Measure Parameter screen

Call Processing (Call processing test)

- Parameter setting → Setup Call Processing Parameter screen

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

When the Call Proc. State is Idle or Idle (Regist), the following measurements can be executed:

TX Measure (Transmitter measurement)

- Parameter setting → Setup TX Measure Parameter screen
- Template setting → Setup Template screen
- Power meter → Power Meter screen
- Standby output power measurement → Standby Output Power screen
- Access Probe output power measurement → Access Probe Measure screen
- Occupied bandwidth measurement → Occupied Bandwidth screen
- Spurious close to the carrier measurement → Spurious close to the Carrier screen
- Spurious measurement → Spurious Emission screen

TX Measure (Analog transmitter measurement)

- Parameter setting → Setup Analog TX Measure Parameter screen

RX Measure (Receiver measurement)

- Parameter setting → Setup RX Measure Parameter screen
- Signal setting → Setup Signal screen

RX Measure (Analog receiver measurement)

- Parameter setting → Setup Analog RX Measure Parameter screen

Call Processing (Call processing test)

- Parameter setting → Setup Call Processing Parameter screen

When the Call Proc. State is Loop Back or Conversation, the following measurements can be executed:

TX Measure (Transmitter measurement)

- Parameter setting → Setup TX Measure Parameter screen
- Template setting → Setup Template screen
- Modulation analysis → Modulation Analysis screen
- Gated output power measurement → Gated Power screen
- Power meter → Power Meter screen
- Open-loop power-control time response measurement → Open Loop Time Response screen
- Occupied bandwidth measurement → Occupied Bandwidth screen
- Spurious close to the carrier measurement → Spurious close to the Carrier screen
- Spurious measurement → Spurious Emission screen

TX Measure (Analog transmitter measurement)

- Parameter setting → Setup Analog TX Measure Parameter screen
- Signal generator + Analog TX measurement → Analog TX Meas with SG screen

RX Measure (Receiver measurement)

- Parameter setting → Setup RX Measure Parameter screen
- Signal setting → Setup Signal screen
- Frame error rate (FER) measurement → Frame Error Rate screen

RX Measure (Analog receiver measurement)

- Parameter setting → Setup Analog RX Measure Parameter screen
- Analog RX measurement → Analog RX Measure screen

Call Processing (Call processing test)

- Parameter setting → Setup Call Processing Parameter screen

When the Call Proc. State is Conversation (Service Option: SO1, SO3); the modulation analysis, gated output power, open-loop power-control time response, and frame error rate (FER) measurements cannot be executed:

Option 07: When a spectrum analyzer is mounted, this system changes to the spectrum analyzer mode and enables the user to observe the sending spectrum in progress of loopback or conversion. In this case, note that the forward channel signal from this device is also observed.

Section 4 Operation

Call Proc. state: Stop, CDMA mode

MT8801 99-12-31 12:00:00 << Setup Common Parameter (CDMA) >> Call Proc. : Stop					TX Measure	TX Measure
DUT Control (Tester Mode) : (Call Proc.) Using Specification : [IS-95A]						
Frequency Band Traffic Band : [C800MHz] Control Band : [C800MHz] CDMA Channel : [1CH] TX Meas. (825.030000MHz) RX Meas. (870.030000MHz)					Modulation -> Analysis	
Analog Traffic Channel : [1CH] TX Meas. (825.030000MHz) RX Meas. (870.030000MHz)						Setup -> TX Parameter
Analog Control Channel : [1CH]						Setup -> Gated Power Template
Level Reference Level : [30.0dBm] Auto Set : [Off] BS Output Level (Total) : [-55.0dBm]					Occupied -> Bandwidth	Spurious -> close to the Carrier
AWGN Level : [-20.0dB] = (-75.0dBm) : [Off] Access Parameter NOM_PWR : [0dB] Access Parameter INIT_PWR : [0dB] MS Power Level (VMAC) : [2]					Power Meter ->	Spurious -> Emission
Signal Service Option : [SO2] Data Rate : [Full] Call Drop Threshold : [On] [250Frames] Echo Delay : [1sec]					MSID Information MSID: (---3E7F9EBE7)H ESN : (FFFFFFFF)	
					[1 | 2]	[1 | 2]
					[1 | 2]	
TX Measure	RX Measure		Call Processing		Main Func On Off	

Fig. 4-4 (1/18) Setup Common Parameter Screen (TX Measure)

MT8801 99-12-31 12:00:00 << Setup Common Parameter (CDMA) >> Call Proc. : Stop					RX Measure	RX Measure
DUT Control (Tester Mode) : (Call Proc.) Using Specification : [IS-95A]						
Frequency Band Traffic Band : [C800MHz] Control Band : [C800MHz] CDMA Channel : [1CH] TX Meas. (825.030000MHz) RX Meas. (870.030000MHz)						
Analog Traffic Channel : [1CH] TX Meas. (825.030000MHz) RX Meas. (870.030000MHz)						Setup -> RX Parameter
Analog Control Channel : [1CH]						Setup -> Signal
Level Reference Level : [30.0dBm] Auto Set : [Off] BS Output Level (Total) : [-55.0dBm]						
AWGN Level : [-20.0dB] = (-75.0dBm) : [Off] Access Parameter NOM_PWR : [0dB] Access Parameter INIT_PWR : [0dB] MS Power Level (VMAC) : [2]						
Signal Service Option : [SO2] Data Rate : [Full] Call Drop Threshold : [On] [250Frames] Echo Delay : [1sec]					MSID Information MSID: (---3E7F9EBE7)H ESN : (FFFFFFFF)	
					[1 | 2]	[1 | 2]
					[1 | 2]	
TX Measure	RX Measure		Call Processing		Main Func On Off	

Fig. 4-4 (2/18) Setup Common Parameter Screen (RX Measure)

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

MT8801 99-12-31 12:00:00		Call Proc.	Call Proc.
<< Setup Common Parameter (CDMA) >> Call Proc. : Stop			
DUT Control (Tester Mode)	: (Call Proc.)		
Using Specification	: [IS-95A]		
Frequency			
Band Traffic Band	: [C800MHz] Control Band : [C800MHz]		
CDMA Channel	: [1CH] TX Meas. (825.030000MHz)		
	RX Meas. (870.030000MHz)		Setup -> Call Proc. Parameter
Analog Traffic Channel	: [1CH] TX Meas. (825.030000MHz)		
	RX Meas. (870.030000MHz)		
Analog Control Channel	: [1CH]		
Level			
Reference Level	: [30.0dBm] Auto Set : [Off]		
BS Output Level (Total)	: [-55.0dBm]		
AWGN Level	: [-20.0dB] = (-75.0dBm) : [Off]		
Access Parameter NOM_PWR	: [0dB]		
Access Parameter INIT_PWR	: [0dB]		
MS Power Level (VMAC)	: [2]		
Signal			
Service Option	: [SO2]	MSID Information	
Data Rate	: [Full]	MSID: (----3E7F9EBE7)H	
Call Drop Threshold	: [On] [250Frames]	ESN : (FFFFFFF)	
Echo Delay	: [1sec]		
		[1 | 2]	[1 | 2]
		[1 | 2]	
TX Measure	RX Measure	Call Processing	Main Func On Off

Fig. 4-4 (3/18) Setup Common Parameter Screen (Call Processing)

Call Proc. state: Idle, Idle (Regist), CDMA mode

MT8801 99-12-31 12:00:00		TX Measure	TX Measure
<< Setup Common Parameter (CDMA) >> Call Proc. : Idle			
DUT Control (Tester Mode)	: (Call Proc.)		
Using Specification	: [IS-95A]		
Frequency			
Band Traffic Band	: [C800MHz] Control Band : [C800MHz]	Access -> Probe Measure	
CDMA Channel	: [1CH] TX Meas. (825.030000MHz)		
	RX Meas. (870.030000MHz)		
Analog Traffic Channel	: [1CH] TX Meas. (825.030000MHz)	-> Standby Output Power	-> Setup TX Parameter
	RX Meas. (870.030000MHz)		
Analog Control Channel	: [1CH]		Setup -> Gated Power Template
Level			
Reference Level	: [30.0dBm] Auto Set : [Off]		
BS Output Level (Total)	: [-55.0dBm]		
AWGN Level	: [-20.0dB] = (-75.0dBm) : [Off]	-> Occupied Bandwidth	-> Spurious close to the Carrier
Access Parameter NOM_PWR	: [0dB]		
Access Parameter INIT_PWR	: [0dB]		
MS Power Level (VMAC)	: [2]		
Signal			
Service Option	: [SO2]	MSID Information	-> Spurious Emission
Data Rate	: [Full]	MSID: (----3E7F9EBE7)H	
Call Drop Threshold	: [On] [250Frames]	ESN : (FFFFFFF)	
Echo Delay	: [1sec]	Power Meter	
		[1 | 2]	[1 | 2]
		[1 | 2]	
TX Measure	RX Measure	Call Processing	Main Func On Off

Fig. 4-4 (4/18) Setup Common Parameter Screen (TX Measure)

Section 4 Operation

MT8801 99-12-31 12:00:00		RX Measure		RX Measure	
<< Setup Common Parameter (CDMA) >>		Call Proc. : Idle			
DUT Control (Tester Mode)	: (Call Proc.)				
Using Specification	: [IS-95A]				
Frequency					
Band Traffic Band	: [C800MHz] Control Band : [C800MHz]				
CDMA Channel	: [1CH] TX Meas. (825.030000MHz)				
Analog Traffic Channel	: [1CH] TX Meas. (825.030000MHz)			-> Setup RX Parameter	
Analog Control Channel	: [1CH] RX Meas. (870.030000MHz)				
Level					
Reference Level	: [30.0dBm] Auto Set : [Off]				
BS Output Level (Total)	: [-55.0dBm]				
AWGN Level	: [-20.0dB] = (-75.0dBm) : [Off]				
Access Parameter NOM_PWR	: [0dB]				
Access Parameter INIT_PWR	: [0dB]				
MS Power Level (VMAC)	: [2]				
Signal		MSID Information			
Service Option	: [SO2]	MSID: (----3E7F9EBE7)H			
Data Rate	: [Full]	ESN : (FFFFFFF)			
Call Drop Threshold	: [On] [250Frames]			| 1 | 2 |	
Echo Delay	: [1sec]			| 1 | 2 |	
TX Measure		RX Measure		Call Processing	
				Main Func On Off	

Fig. 4-4 (5/18) Setup Common Parameter Screen (RX Measure)

MT8801 99-12-31 12:00:00		Call Proc.		Call Proc.	
<< Setup Common Parameter (CDMA) >>		Call Proc. : Idle			
DUT Control (Tester Mode)	: (Call Proc.)				
Using Specification	: [IS-95A]				
Frequency					
Band Traffic Band	: [C800MHz] Control Band : [C800MHz]				
CDMA Channel	: [1CH] TX Meas. (825.030000MHz)				
Analog Traffic Channel	: [1CH] TX Meas. (825.030000MHz)			-> Setup Call Proc. Parameter	
Analog Control Channel	: [1CH] RX Meas. (870.030000MHz)				
Level					
Reference Level	: [30.0dBm] Auto Set : [Off]				
BS Output Level (Total)	: [-55.0dBm]				
AWGN Level	: [-20.0dB] = (-75.0dBm) : [Off]				
Access Parameter NOM_PWR	: [0dB]				
Access Parameter INIT_PWR	: [0dB]				
MS Power Level (VMAC)	: [2]				
Signal		MSID Information			
Service Option	: [SO2]	MSID: (----3E7F9EBE7)H			
Data Rate	: [Full]	ESN : (FFFFFFF)			
Call Drop Threshold	: [On] [250Frames]			| 1 | 2 |	
Echo Delay	: [1sec]			| 1 | 2 |	
TX Measure		RX Measure		Call Processing	
				Main Func On Off	

Fig. 4-4 (6/18) Setup Common Parameter Screen (Call Processing)

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

Call Proc. state: Loop Back, Conversation, CDMA mode

MT8801 99-12-31 12:00:00		TX Measure		TX Measure	
<< Setup Common Parameter (CDMA) >> Call Proc. : Loop Back					
DUT Control (Tester Mode) : (Call Proc.)					
Using Specification : [IS-95A]					
Frequency		-> Modulation Analysis			
Band Traffic Band : [C800MHz] Control Band : [C800MHz]					
CDMA Channel : [1CH] TX Meas. (825.030000MHz)					
	RX Meas. (870.030000MHz)				
Analog Traffic Channel : [1CH] TX Meas. (825.030000MHz)		-> Gated Power		-> Setup TX Parameter	
	RX Meas. (870.030000MHz)				
Analog Control Channel : [1CH]					
Level		-> Open Loop Power Cont.		-> Setup Gated Power Template	
Reference Level : [30.0dBm] Auto Set : [Off]					
BS Output Level (Total) : [-55.0dBm]					
AWGN Level : [-20.0dB] = (-75.0dBm) : [Off]		-> Occupied Bandwidth		-> Spurious close to the Carrier	
Access Parameter NOM_PWR : [0dB]					
Access Parameter INIT_PWR : [0dB]					
MS Power Level (VMAC) : [2]		-> Power Meter		-> Spurious Emission	
Signal		MSID Information			
	MSID: (---3E7F9EBE7)H				
	ESN : (FFFFFFF)				
Service Option : [SO2]		[1 | 2]		[1 | 2]	
Data Rate : [Full]					
Call Drop Threshold : [On] [250Frames]					
Echo Delay : [1sec]		[1 | 2]			
TX Measure		RX Measure		Call Processing	
				Main Func On Off	

Fig. 4-4 (7/18) Setup Common Parameter Screen (TX Measure)

MT8801 99-12-31 12:00:00		RX Measure		RX Measure	
<< Setup Common Parameter (CDMA) >> Call Proc. : Loop Back		-> FER Measure			
DUT Control (Tester Mode) : (Call Proc.)					
Using Specification : [IS-95A]					
Frequency					
Band Traffic Band : [C800MHz] Control Band : [C800MHz]					
CDMA Channel : [1CH] TX Meas. (825.030000MHz)					
	RX Meas. (870.030000MHz)				
Analog Traffic Channel : [1CH] TX Meas. (825.030000MHz)				-> Setup RX Parameter	
	RX Meas. (870.030000MHz)				
Analog Control Channel : [1CH]				-> Setup Signal	
Level					
Reference Level : [30.0dBm] Auto Set : [Off]					
BS Output Level (Total) : [-55.0dBm]					
AWGN Level : [-20.0dB] = (-75.0dBm) : [Off]					
Access Parameter NOM_PWR : [0dB]					
Access Parameter INIT_PWR : [0dB]					
MS Power Level (VMAC) : [2]					
Signal		MSID Information			
	MSID: (---3E7F9EBE7)H				
	ESN : (FFFFFFF)				
Service Option : [SO2]		[1 | 2]		[1 | 2]	
Data Rate : [Full]					
Call Drop Threshold : [On] [250Frames]					
Echo Delay : [1sec]		[1 | 2]			
TX Measure		RX Measure		Call Processing	
				Main Func On Off	

Fig. 4-4 (8/18) Setup Common Parameter Screen (RX Measure)

Section 4 Operation

MT8801 99-12-31 12:00:00		Call Proc.	Call Proc.
<< Setup Common Parameter (CDMA) >> Call Proc. : Loop Back			
DUT Control (Tester Mode)	: (Call Proc.)		
Using Specification	: [IS-95A]		
Frequency			
Band Traffic Band	: [C800MHz] Control Band : [C800MHz]		
CDMA Channel	: [1CH] TX Meas. (825.030000MHz)		
			Setup -> Call Proc. Parameter
Analog Traffic Channel	: [1CH] TX Meas. (825.030000MHz)		
Analog Control Channel	: [1CH] RX Meas. (870.030000MHz)		
Level			
Reference Level	: [30.0dBm] Auto Set : [Off]		
BS Output Level (Total)	: [-55.0dBm]		
AWGN Level	: [-20.0dB] = (-75.0dBm) : [Off]		
Access Parameter NOM_PWR	: [0dB]		
Access Parameter INIT_PWR	: [0dB]		
MS Power Level (VMAC)	: [2]		
Signal			
		MSID Information	
Service Option	: [SO2]	MSID: (----3E7F9EBE7)H	
Data Rate	: [Full]	ESN : (FFFFFFFF)	
Call Drop Threshold	: [On] [250Frames]		[1 | 2]
Echo Delay	: [1sec]		[1 | 2]
TX Measure	RX Measure	Call Processing	Main Func On Off

Fig. 4-4 (9/18) Setup Common Parameter Screen (Call Processing)

Call Proc. state: Stop, Analog mode

MT8801 99-12-31 12:00:00		TX Measure	TX Measure
<< Setup Common Parameter (CDMA) >> Call Proc. : Stop			
DUT Control (Tester Mode)	: (Call Proc.)		
Using Specification	: [IS-95A]		
Frequency			
Band Traffic Band	: [A800MHz] Control Band : [A800MHz]		
CDMA Channel	: [1CH] TX Meas. (825.030000MHz)		
			Setup -> Analog TX Parameter
Analog Traffic Channel	: [1CH] TX Meas. (825.030000MHz)		
Analog Control Channel	: [1CH] RX Meas. (870.030000MHz)		
Level			
Reference Level	: [30.0dBm] Auto Set : [Off]		
BS Output Level (Total)	: [-55.0dBm]		
AWGN Level	: [-20.0dB] = (-75.0dBm) : [Off]		
Access Parameter NOM_PWR	: [0dB]		
Access Parameter INIT_PWR	: [0dB]		
MS Power Level (VMAC)	: [2]		
Signal			
		MSID Information	
Service Option	: [SO2]	MSID: (----3E7F9EBE7)H	
Data Rate	: [Full]	ESN : (FFFFFFFF)	
Call Drop Threshold	: [On] [250Frames]		[1 | 2]
Echo Delay	: [1sec]		[1 | 2]
TX Measure	RX Measure	Call Processing	Main Func On Off

Fig. 4-4 (10/18) Setup Common Parameter Screen (TX Measure)

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

MT8801 99-12-31 12:00:00		RX Measure		RX Measure	
<< Setup Common Parameter (CDMA) >> Call Proc. : Stop		Analog -> RX Measure			
DUT Control (Tester Mode) : (Call Proc.)					
Using Specification : [IS-95A]					
Frequency					
Band Traffic Band	: [A800MHz] Control Band : [A800MHz]				
CDMA Channel	: [1CH] TX Meas. (825.030000MHz)				
				Setup -> Analog RX Parameter	
Analog Traffic Channel	: [1CH] TX Meas. (825.030000MHz)				
Analog Control Channel	: [1CH] RX Meas. (870.030000MHz)				
Level					
Reference Level	: [30.0dBm] Auto Set : [Off]				
BS Output Level (Total)	: [-55.0dBm]				
AWGN Level	: [-20.0dB] = (-75.0dBm) : [Off]				
Access Parameter NOM_PWR	: [0dB]				
Access Parameter INIT_PWR	: [0dB]				
MS Power Level (VMAC)	: [2]	MSID Information			
Signal		MSID: (----3E7F9EBE7)H			
Service Option	: [SO2]	ESN : (FFFFFFF)			
Data Rate	: [Full]			[1 | 2]	
Call Drop Threshold	: [On] [250Frames]				
Echo Delay	: [1sec]			[1 | 2]	
TX Measure		RX Measure		Call Processing	
				Main Func On Off	

Fig. 4-4 (11/18) Setup Common Parameter Screen (RX Measure)

MT8801 99-12-31 12:00:00		Call Proc.		Call Proc.	
<< Setup Common Parameter (CDMA) >> Call Proc. : Stop					
DUT Control (Tester Mode) : (Call Proc.)					
Using Specification : [IS-95A]					
Frequency					
Band Traffic Band	: [A800MHz] Control Band : [A800MHz]				
CDMA Channel	: [1CH] TX Meas. (825.030000MHz)				
				Setup -> Call Proc. Parameter	
Analog Traffic Channel	: [1CH] TX Meas. (825.030000MHz)				
Analog Control Channel	: [1CH] RX Meas. (870.030000MHz)				
Level					
Reference Level	: [30.0dBm] Auto Set : [Off]				
BS Output Level (Total)	: [-55.0dBm]				
AWGN Level	: [-20.0dB] = (-75.0dBm) : [Off]				
Access Parameter NOM_PWR	: [0dB]				
Access Parameter INIT_PWR	: [0dB]				
MS Power Level (VMAC)	: [2]	MSID Information			
Signal		MSID: (----3E7F9EBE7)H			
Service Option	: [SO2]	ESN : (FFFFFFF)			
Data Rate	: [Full]			[1 | 2]	
Call Drop Threshold	: [On] [250Frames]				
Echo Delay	: [1sec]			[1 | 2]	
TX Measure		RX Measure		Call Processing	
				Main Func On Off	

Fig. 4-4 (12/18) Setup Common Parameter Screen (Call Processing)

Section 4 Operation

Call Proc. state: Idle, Idle (Regist), Analog mode

MT8801 99-12-31 12:00:00		TX Measure		TX Measure	
<< Setup Common Parameter (CDMA) >>		Call Proc. : Idle			
DUT Control (Tester Mode) : (Call Proc.)					
Using Specification : [IS-95A]					
Frequency					
Band	Traffic Band : [A800MHz]	Control Band : [A800MHz]			
CDMA	Channel : [1CH]	TX Meas. (825.030000MHz)			
		RX Meas. (870.030000MHz)			
Analog Traffic Channel	: [1CH]	TX Meas. (825.030000MHz)	Setup -> Analog TX Parameter		
		RX Meas. (870.030000MHz)			
Analog Control Channel	: [1CH]				
Level					
Reference Level	: [30.0dBm] Auto Set	: [Off]			
BS Output Level (Total)	: [-55.0dBm]				
AWGN Level	: [-20.0dB] = (-75.0dBm)	: [Off]			
Access Parameter NOM_PWR	: [0dB]				
Access Parameter INIT_PWR	: [0dB]				
MS Power Level (VMAC)	: [2]				
Signal		MSID Information			
Service Option	: [SO2]	MSID: (----3E7F9EBE7)H			
Data Rate	: [Full]	ESN : (FFFFFFF)			
Call Drop Threshold	: [On] [250Frames]	[1 | 2]	[1 | 2]		
Echo Delay	: [1sec]	[1 | 2]			
TX Measure	RX Measure		Call Processing		Main Func On Off

Fig. 4-4 (13/18) Setup Common Parameter Screen (TX Measure)

MT8801 99-12-31 12:00:00		RX Measure		RX Measure	
<< Setup Common Parameter (CDMA) >>		Call Proc. : Idle			
DUT Control (Tester Mode) : (Call Proc.)					
Using Specification : [IS-95A]					
Frequency					
Band	Traffic Band : [A800MHz]	Control Band : [A800MHz]			
CDMA	Channel : [1CH]	TX Meas. (825.030000MHz)			
		RX Meas. (870.030000MHz)			
Analog Traffic Channel	: [1CH]	TX Meas. (825.030000MHz)	Setup -> Analog RX Parameter		
		RX Meas. (870.030000MHz)			
Analog Control Channel	: [1CH]				
Level					
Reference Level	: [30.0dBm] Auto Set	: [Off]			
BS Output Level (Total)	: [-55.0dBm]				
AWGN Level	: [-20.0dB] = (-75.0dBm)	: [Off]			
Access Parameter NOM_PWR	: [0dB]				
Access Parameter INIT_PWR	: [0dB]				
MS Power Level (VMAC)	: [2]				
Signal		MSID Information			
Service Option	: [SO2]	MSID: (----3E7F9EBE7)H			
Data Rate	: [Full]	ESN : (FFFFFFF)			
Call Drop Threshold	: [On] [250Frames]	[1 | 2]	[1 | 2]		
Echo Delay	: [1sec]	[1 | 2]			
TX Measure	RX Measure		Call Processing		Main Func On Off

Fig. 4-4 (14/18) Setup Common Parameter Screen (RX Measure)

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

MT8801 99-12-31 12:00:00		Call Proc.	Call Proc.
<< Setup Common Parameter (CDMA) >> Call Proc. : Idle			
DUT Control (Tester Mode)	: (Call Proc.)		
Using Specification	: [IS-95A]		
Frequency			
Band Traffic Band	: [A800MHz] Control Band : [A800MHz]		
CDMA Channel	: [1CH] TX Meas. (825.030000MHz)		
			Setup -> Call Proc. Parameter
Analog Traffic Channel	: [1CH] TX Meas. (825.030000MHz)		
Analog Control Channel	: [1CH] RX Meas. (870.030000MHz)		
Level			
Reference Level	: [30.0dBm] Auto Set : [Off]		
BS Output Level (Total)	: [-55.0dBm]		
AWGN Level	: [-20.0dB] = (-75.0dBm) : [Off]		
Access Parameter NOM_PWR	: [0dB]		
Access Parameter INIT_PWR	: [0dB]		
MS Power Level (VMAC)	: [2]		
Signal			
		MSID Information	
Service Option	: [SO2]	MSID: (----3E7F9EBE7)H	
Data Rate	: [Full]	ESN : (FFFFFFF)	
Call Drop Threshold	: [On] [250Frames]		[1 | 2 | ]
Echo Delay	: [1sec]		[1 | 2 | ]
TX Measure	RX Measure	Call Processing	Main Func On Off

Fig. 4-4 (15/18) Setup Common Parameter Screen (Call Processing)

MT8801 99-12-31 12:00:00		TX Measure	TX Measure
<< Setup Common Parameter (CDMA) >> Call Proc. : Conversation			
DUT Control (Tester Mode)	: (Call Proc.)		
Using Specification	: [IS-95A]		
Frequency			
Band Traffic Band	: [A800MHz] Control Band : [A800MHz]		
CDMA Channel	: [1CH] TX Meas. (825.030000MHz)		
			Setup -> Analog TX Parameter
Analog Traffic Channel	: [1CH] TX Meas. (825.030000MHz)		
Analog Control Channel	: [1CH] RX Meas. (870.030000MHz)		
Level			
Reference Level	: [30.0dBm] Auto Set : [Off]		
BS Output Level (Total)	: [-55.0dBm]		
AWGN Level	: [-20.0dB] = (-75.0dBm) : [Off]		
Access Parameter NOM_PWR	: [0dB]		
Access Parameter INIT_PWR	: [0dB]		
MS Power Level (VMAC)	: [2]		
Signal			
		MSID Information	
Service Option	: [SO2]	MSID: (----3E7F9EBE7)H	
Data Rate	: [Full]	ESN : (FFFFFFF)	
Call Drop Threshold	: [On] [250Frames]		[1 | 2 | ]
Echo Delay	: [1sec]		[1 | 2 | ]
TX Measure	RX Measure	Call Processing	Main Func On Off

Fig. 4-4 (16/18) Setup Common Parameter Screen (TX Measure)

Section 4 Operation

MT8801 99-12-31 12:00:00 << Setup Common Parameter (CDMA) >> Call Proc. : Conversation		RX Measure	RX Measure				
DUT Control (Tester Mode) :	(Call Proc.)	Analog -> RX Measure					
Using Specification :	[IS-95A]						
Frequency							
Band Traffic Band :	[A800MHz] Control Band : [A800MHz]						
CDMA Channel :	[1CH] TX Meas. (825.030000MHz)						
			Setup -> Analog RX Parameter				
Analog Traffic Channel :	[1CH] TX Meas. (825.030000MHz)						
Analog Control Channel :	[1CH] RX Meas. (870.030000MHz)						
Level							
Reference Level :	[30.0dBm] Auto Set : [Off]						
BS Output Level (Total) :	[-55.0dBm]						
AWGN Level :	[-20.0dB] = (-75.0dBm) : [Off]						
Access Parameter NOM_PWR :	[0dB]						
Access Parameter INIT_PWR :	[0dB]						
MS Power Level (VMAC) :	[2]						
Signal	MSID Information						
Service Option :	[SO2]	MSID: (----3E7F9EBE7)H					
Data Rate :	[Full]	ESN : (FFFFFFF)					
Call Drop Threshold :	[On] [250Frames]	[1 2]	[1 2]				
Echo Delay :	[1sec]	[1 2]					
<table border="1" style="width: 100%;"> <tr> <td style="text-align: center;">TX Measure</td> <td style="text-align: center;">RX Measure</td> <td style="text-align: center;">Call Processing</td> <td style="text-align: center;">Main Func On Off</td> </tr> </table>		TX Measure	RX Measure	Call Processing	Main Func On Off		
TX Measure	RX Measure	Call Processing	Main Func On Off				

Fig. 4-4 (17/18) Setup Common Parameter Screen (RX Measure)

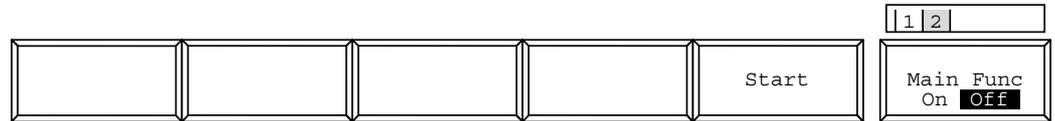
MT8801 99-12-31 12:00:00 << Setup Common Parameter (CDMA) >> Call Proc. : Conversation		Call Proc.	Call Proc.				
DUT Control (Tester Mode) :	(Call Proc.)						
Using Specification :	[IS-95A]						
Frequency							
Band Traffic Band :	[A800MHz] Control Band : [A800MHz]						
CDMA Channel :	[1CH] TX Meas. (825.030000MHz)						
			Setup -> Call Proc. Parameter				
Analog Traffic Channel :	[1CH] TX Meas. (825.030000MHz)						
Analog Control Channel :	[1CH] RX Meas. (870.030000MHz)						
Level							
Reference Level :	[30.0dBm] Auto Set : [Off]						
BS Output Level (Total) :	[-55.0dBm]						
AWGN Level :	[-20.0dB] = (-75.0dBm) : [Off]						
Access Parameter NOM_PWR :	[0dB]						
Access Parameter INIT_PWR :	[0dB]						
MS Power Level (VMAC) :	[2]						
Signal	MSID Information						
Service Option :	[SO2]	MSID: (----3E7F9EBE7)H					
Data Rate :	[Full]	ESN : (FFFFFFF)					
Call Drop Threshold :	[On] [250Frames]	[1 2]	[1 2]				
Echo Delay :	[1sec]	[1 2]					
<table border="1" style="width: 100%;"> <tr> <td style="text-align: center;">TX Measure</td> <td style="text-align: center;">RX Measure</td> <td style="text-align: center;">Call Processing</td> <td style="text-align: center;">Main Func On Off</td> </tr> </table>		TX Measure	RX Measure	Call Processing	Main Func On Off		
TX Measure	RX Measure	Call Processing	Main Func On Off				

Fig. 4-4 (18/18) Setup Common Parameter Screen (Call Processing)

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

- The 2nd page of the main function keys on the Setup Common Parameter screen

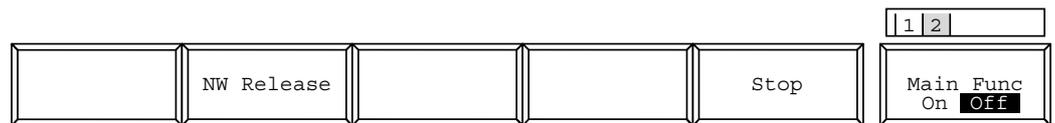
(1) When the MT8801C is at the Call Processing status of Stop:



(2) When the MT8801C is at the Call Processing status of Idle or Idle (Regist):



(3) When the MT8801C is at the Call Processing status of Loop Back and Conversation:



Section 4 Operation

- Set the following items:

Item	Range	Initial value	
Using Specification	IS-95A,J-STD-008,ARIB-T53,KOREA-PCS,TSB74	IS-95A	Note1
Frequency			
Control Band	C800MHz (Using Specification:IS-95A,ARIB-T53,TSB74) C1.9GHz (Using Specification:J-STD-008) C1.7GHz (Using Specification:KOREA-PCS) A800MHz (Using Specification:IS-95A,TSB74)	C800MHz	Note1
Traffic Band	C800MHz (Using Specification:IS-95A,ARIB-T53,TSB74) C1.9GHz (Using Specification:J-STD-008) C1.7GHz (Using Specification:KOREA-PCS) A800MHz (Using Specification:IS-95A,TSB74,J-STD-008) N800MHz-L (Using Specification:IS-95A,TSB74,J-STD-008) N800MHz-M (Using Specification:IS-95A,TSB74,J-STD-008) N800MHz-N (Using Specification:IS-95A,TSB74,J-STD-008)	C800MHz	Note10
CDMA Channel	1 to 799,990 to 1023CH (Using Specification:IS-95A,TSB74) 0 to 1199CH (Using Specification:J-STD-008) 1 to 799,801 to 1039 (Using Specification:ARIB-T53) 1041 to 1149CH 1 to 1300CH (Using Specification:KOREA-PCS)	1CH	Note2
Analog Traffic Channel	1 to 799,990 to 1023CH (Using Specification:IS-95A,TSB74,J-STD-008)	1CH	
Analog Control Channel	1 to 799,990 to 1023CH (Using Specification:IS-95A,TSB74,J-STD-008)	1CH	
Channel Spacing	30kHz (Using Specification:IS-95A,TSB74) 50kHz (Using Specification:J-STD-008) 12.5kHz (Using Specification:ARIB-T53) 50kHz (Using Specification:KOREA-PCS)	30kHz	Note2
TX Meas.frequency	Using Specification:IS-95A,TSB74 825.000+0.030N[MHz] (Channel(N):1 to 799CH) 825.000+0.030(N-1023)[MHz] (Channel(N):990 to 1023CH) Using Specification:J-STD-008 1850.000+0.050N[MHz] (Channel(N):0 to 1199CH) Using Specification:ARIB-T53 915.000+0.0125N[MHz] (Channel(N):1 to 799CH) 898.000+0.0125(N-800)[MHz] (Channel(N):801 to 1039CH) 887.000+0.0125(N-1040)[MHz] (Channel(N):1041 to 1149CH) Using Specification:KOREA-PCS 1750.050+0.050N[MHz] (Channel(N):1 to 600CH) 1715.050+0.050(N-600)[MHz] (Channel(N):601 to 1300CH)	825.030MHz	Note2

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

Item	Range	Initial value	
RX Meas.frequency	Using Specification:IS-95A,TSB74 870.000+0.030N[MHz] (Channel(N):1 to 799CH) 870.000+0.030(N-1023)[MHz] (Channel(N):990 to 1023CH) Using Specification:J-STD-008 1930.000+0.050N[MHz] (Channel(N):0 to 1199CH) Using Specification:ARIB-T53 860.000+0.0125N[MHz] (Channel(N):1 to 799CH) 843.000+0.0125(N-800)[MHz] (Channel(N):801 to 1039CH) 832.000+0.0125(N-1040)[MHz] (Channel(N):1041 to 1149CH) Using Specification:KOREA-PCS 1840.050+0.050N[MHz] (Channel(N):1 to 600CH) 1805.050+0.050(N-600)[MHz] (Channel(N):601 to 1300CH)	870.030MHz	Note2
Level			
Reference Level	-60dBm to 42dBm (RF Input:Main) -60dBm to 22dBm (RF Input:AUX)	30.0dBm	Note3
Auto Set	On,Off	Off	Note3
BS Output Level(Total)	-133.0dBm to -18.0dBm (RF Output:Main,AWGN Off) -133.0dBm to 2.0dBm (RF Output:AUX,AWGN Off) -133.0dBm to -24.0dBm (RF Output:Main,AWGN On) -133.0dBm to -4.0dBm (RF Output:Aux,AWGN On)	-55.0dBm	Note4
AWGN Level (/1.23MHZ)	-20.0dB to 6.0dB	-20.0dB	Note5
AWGN On,Off	On,Off	Off	Note5
Access Parameter NOM_PWR	-8dB to 7dB	0dB	Note6
Access Parameter INIT_PWR	-16dB to 15dB	0dB	Note6
MS Power Lever(VMAC)	0 to 7	2	Note9
Signal			
Service Option	SO1,SO2,SO3,SO9	SO2	Note7
Data Rate	Full,1/2,1/4,1/8	Full	Note8
Call Drop Threshold	On,Off 50 Frames to 500 Frames	Off,250 Frames	Note11
Echo Delay	0 sec to 5 sec	1 sec	Note12

Notes:

1. Only when Call Process state is “Stop”, this item can be set.
2. The items of Using Specification, Band, and Channel determine this item uniquely.
3. <Reference Level, Auto Set>
Reference Level sets the TX level of mobile station (input level to MT8801C).
For the burst signal, it indicates the average power in burst.
When Auto Set is On, Reference Level is automatically changed depending on the BS Output Level.
Normally, set Auto Set to On.
When Auto Set is On and Reference Level is set, Reference Level is set to the specified value.
When the BS Output Level is changed, the Reference Level is also changed to the corresponding value.
Reference Level = – BS Output Level [dBm]
 + K
 + NOM_PWR [dB]
 + INIT_PWR [dB]
 (IS-95A, TSB74, ARIB-T53: K=-73, J-STD-008, KOREA-PCS: K=-76)
4. <BS Output Level (Total)>
BS Output Level (Total) sets the TX level of the base station (Forward channel output level from the MT8801C).
It indicates the summed power of the Pilot, Sync, Paging, Traffic, Power Control, and OCNS channels., where AWGN power is not included.
5. <AWGN Level>
The MT8801C has a AWGN (additive white Gaussian noise) generator to add the AWGN to the TX signal of the base station (Forward channel output signal from the MT8801C).
Set to ON to perform RX measurement under AWGN.
AWGN Level sets the AWGN (AWGN generator of the MT8801C) level within the 1.23 MHz bandwidth.
It sets the relative value to the TX level (BS Output Level) of the base station, and displays AWGN absolute power within 1.23 MHz bandwidth.
6. <Access Parameter NOM_PWR, INIT_PWR>
These parameters are specified from the MT8801C to the mobile station to be set at the access parameter message in the Paging channel.
NOM_PWR and INIT_PWR are the nominal TX power offset and initial power offset for access, respectively.

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

7. <Service Option>

This specifies the loop-back mode of the mobile station.

Set SO2 (Service option 2) or SO9 (Service option 9) for carrying out the measurement.

When SO1 (Service option 1) or SO3 (Service option 3) is set, normal voice communication state comes on.

In this case, the MT8801C returns the voice from mobile station after approx. 1 sec. delay. Note that this parameter can be set at all Call Processing states.

The Service Option enabled to be set is determined by the setting of the Using Specification, as shown in the following table.

Using specification	Service option
IS-95A	SO1, SO2, SO9
TSB74	SO1, SO2, SO9
J-STD-008	SO1, SO2, SO9
ARIB-T53	SO2, SO3, SO9
KOREA-PCS	SO1, SO2, SO9

8. <Traffic Channel Data Rate>

This sets the data rate of the Traffic channel.

The data rate is shown below, depending on the Rate Set.

	Rate set 1 (Service option 2)	Rate set 2 (Service option 9)
Full	9600 bps	14400 bps
1/2	4800 bps	7200 bps
1/4	2400 bps	3600 bps
1/8	1200 bps	1800 bps

9. <MS Power Level>

This specifies the output level of the mobile station (MS) in Analog mode.

The output level depends on the output level class of the mobile station, as shown in the table below:

Output level from MS [dBm]

MS Power Level	Output level from MS [dBm]		
	MS output level class		
	I	II	III
0	36	32	28
1	32	32	28
2 (Initial value)	28	28	28
3	24	24	24
4	20	20	20
5	16	16	16
6	12	12	12
7	8	8	8

Section 4 Operation

10. When the Traffic Band is changed to A800MHz under the following conditions, the Handoff (CDMA → Analog) is performed. However, the Handoff (Analog → CDMA) cannot be performed.

Conditions:

Using Specification: IS-95A

Control Band: C800 MHz

Traffic Band: C800 MHz

Call Proc.: Loop Back or Conversation

11. <Call Drop Threshold>

When the call is dropped at the Call Processing state of the “Loop Back” or “Conversation”, “Idle” or “Idle (Regist)” is displayed. The timing to judge the call drop, is set by the number of frames.

(The call drop state means that no signal of the mobile station is up-linked.)

The On/Off of this item selects the execution of this function.

12. <Echo Delay>

In voice communication state, this echo delay is set for returning the voice from the MT8801C to the mobile station.

The delay time: 0 to 5 seconds can be set.

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

- Notes on setup items

(1) Relationship between measurement frequencies and channels

The IS-95A/TSB74/J-STD-008/ARIB-T53 system uses different transmit and receive frequencies for the same frequency channel. If a frequency channel is selected, the relationship between the channel and the transmit/receive frequencies depend on the unit to be measured (that is, signals to be measured).

RF Signal Frequency of the CDMA System

BAND	Channel	TX Measure Freq. (MHz)	RX Measure Freq. (MHz)
800 MHz (IS-95A,TSB74)	1	825.030	870.030
	2	825.060	870.060
	3	825.090	870.090
	797	848.910	893.910
	798	848.940	893.940
	799	848.970	893.970
	990	824.010	869.010
	991	824.040	869.040
	992	824.070	869.070
	1021	824.940	869.940
	1022	824.970	869.970
	1023	825.000	870.000
	1.9 GHz (J-STD-008)	0	1850.000
1		1850.050	1930.050
2		1850.100	1930.100
1197		1909.850	1989.850
1198	1909.900	1989.900	
1199	1909.950	1989.950	
800 MHz (ARIB-T53)	1	915.0125	860.0125
	2	915.0250	860.0250
	3	915.0375	860.0375
	797	924.9625	869.9625
	798	924.9750	869.9750
	799	924.9875	869.9875
	801	898.0125	843.0125
	802	898.0250	843.0250
	803	898.0375	843.0375
	1037	900.9625	845.9625
	1038	900.9750	845.9750
	1039	900.9875	845.9875
	1041	887.0125	832.0125
	1042	887.0250	832.0250
	1043	887.0375	832.0375
	1197	888.9625	833.9625
	1198	888.9750	833.9750
	1199	888.9875	833.9875

Section 4 Operation

BAND	Channel	TX Measure Freq. (MHz)	RX Measure Freq. (MHz)
1.7 GHz (KOREA-PCS)	1	1750.050	1840.050
	2	1750.100	1840.100
	3	1750.150	1840.150
	598	1779.900	1869.900
	599	1779.950	1869.950
	600	1780.000	1870.000
	601	1715.050	1805.050
	602	1715.100	1805.100
	603	1715.150	1805.150
	1298	1749.900	1839.900
	1299	1749.950	1839.950
	1300	1750.000	1840.000

- Main function keys:

1st page

[TX Measure] F1: Displays the TX Measure (transmitter measurement) function keys appear on F7 to F12.

[RX Measure] F2: Displays the RX Measure (receiver measurement) function keys appear on F7 to F12.

[Call Processing] F4: Displays the Call Processing (call processing test) function keys appear on F7 to F12.

2nd page

Call Processing main function keys:

The following main function keys are displayed depending on the Call-Processing execution state.

[NW Originate] F2: Executes NW Originate sequence for the MT8801C to call DUT.

[NW Release] F2: Executes Network (NW) Release sequence.

[Register] F4: Executes Forced Registration.

[Start] F5: Executes the Call-Processing function for the MT8801C to enter the “Idle” state.

[Stop] F5: Stops the Call-Processing function for the MT8801C to enter “Stop” state.

- Function keys for Stop State CDMA transmitter measurement:

1st page

[Modulation Analysis] F8: Displays the Modulation Analysis screen.

[Occupied Bandwidth] F11: Displays the Occupied Bandwidth screen.

[Power Meter] F12: Displays the Power Meter screen.

2nd page

[Setup TX Parameter] F9: Displays the Setup TX Measure Parameter screen.

[Setup Gated Power Template] F10: Displays the Setup Template screen.

[Spurious close to the Carrier] F11: Displays the Spurious close to the Carrier screen.

[Spurious Emission] F12: Displays the Spurious Emission screen.

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

- Function keys for Stop State Analog transmitter measurement:
 - 1st page
 - [Analog TX Measure with SG] F10: Displays the Analog TX Measure SG screen.
 - 2nd page
 - [Setup Analog TX Parameter] F9: Displays the Setup Analog TX Parameter screen.

- Function keys for Stop State CDMA receiver measurement:
 - 1st page (None)
 - 2nd page
 - [Setup RX Parameter] F9: Displays the Setup RX Measure Parameter screen.
 - [Setup Signal] F10: Displays the Setup Signal screen.

- Function keys for Stop State Analog receiver measurement:
 - 1st page
 - [Analog RX Measure] F7: Displays the Analog RX Measure screen.
 - 2nd page
 - [Setup Analog RX Parameter] F9: Displays the Setup Analog RX Parameter screen.

- Function keys for Idle State CDMA transmitter measurement:
 - 1st page
 - [Access Probe Measure] F8: Displays the Access Probe Measure screen.
 - [Standby Output Power] F9: Displays the Standby Output Power screen.
 - [Occupied Bandwidth] F11: Displays the Occupied Bandwidth screen.
 - [Power Meter] F12: Displays the Power Meter screen.
 - 2nd page
 - [Setup TX Parameter] F9: Displays the Setup TX Measure Parameter screen.
 - [Setup Gated Power Template] F10: Displays the Setup Template screen.
 - [Spurious close to the Carrier] F11: Displays the Spurious close to the Carrier screen.
 - [Spurious Emission] F12: Displays the Spurious Emission screen.

- Function keys for Idle State Analog transmitter measurement:
 - 1st page (None)
 - 2nd page
 - [Setup Analog TX Parameter] F9: Displays the Setup Analog TX Parameter screen.

Section 4 Operation

- Function keys for Idle State CDMA receiver measurement:

1st page (None)

2nd page

[Setup RX Parameter] F9: Displays the Setup RX Measure Parameter screen.

[Setup Signal] F10: Displays the Setup Signal screen.

- Function keys for Idle State Analog receiver measurement:

1st page (None)

2nd page

[Setup Analog RX Parameter] F9:
Displays the Setup Analog RX Parameter screen.

- Function keys for Loop Back and Conversation States CDMA transmitter measurement:

1st page

[Modulation Analysis] F8: Displays the Modulation Analysis screen.

[Gated Power] F9: Displays the RF Power screen.

[Open Loop Power Cont.] F10: Displays the Open Loop Power Cont. screen.

[Occupied Bandwidth] F11: Displays the Occupied Bandwidth screen.

[Power Meter] F12: Displays the Power Meter screen.

2nd page

[Setup TX Parameter] F9: Displays the Setup TX Measure Parameter screen.

[Setup Gated Power Template] F10:
Displays the Setup Template screen.

[Spurious close to the Carrier] F11:
Displays the Spurious close to the Carrier screen.

[Spurious Emission] F12: Displays the Spurious Emission screen.

- Function keys for Loop Back and Conversation States Analog transmitter measurement:

1st page

[Analog TX Measure with SG] F10:
Displays the Analog TX Measure with SG screen.

2nd page

[Setup Analog TX Parameter] F9:
Displays the Setup Analog TX Parameter screen.

- Function keys for Loop Back and Conversation States CDMA receiver measurement:

1st page

[FER Measure] F7: Displays the FER Measure screen.

2nd page

[Setup RX Parameter] F9: Displays the Setup RX Measure Parameter screen.

[Setup Signal] F10: Displays the Setup Signal screen.

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

- Function keys for Loop Back and Conversation States Analog receiver measurement:

1st page

[Analog RX Measure] F7: Displays the Analog RX Measure screen.

2nd page

[Setup Analog RX Parameter] F9: Displays the Setup Analog RX Parameter screen.

- Function keys for call processing test:

1st page (None)

2nd page

[Setup Call Proc. Parameter] F9: Displays the Setup Call Proc. Parameter screen.

- Comment on the Call-Processing main function keys:

When DUT Control is set to Call Processing, the 2nd page is appeared.

The 2nd page indicates the call-processing trigger keys.

These 2nd-page main-function keys are displayed depending on the call processing status, as described below:

State 1: Stop state

Main function key --- [Start] F5

State 2: Idle and Idle-Reg states

Possible to perform TX/RX measurements in this state.

Main function keys --- [NW Originate] F2, [Register] F4, [Stop] F5

State 3: Loop Back and Conversation (communication) states

Possible to perform TX/RX measurement in this state.

Main function keys --- [NW Release] F2, [Stop] F5

State 4: Each sequence executing state in progress

Execution states of the sequences --- Registration, Origination, NW Originate, MS Release and NW Release

Main function key---[Stop] F5

4.3.6 CDMA Transmitter Measurement

On the Setup Common Parameter screen; set the Control Band to C800 MHz, C1.9 GHz, or C1.7 GHz; and press the [TX Measure] F1 main function key to set CDMA transmitter measurement mode.

This paragraph describes the following CDMA transmitter measurement items:

1. Setting the parameters (Setup TX Measure Parameter screen)
2. Modulation analysis (Modulation Analysis screen)
3. Gated output power measurement (Gated Power screen)
4. Setting the template (Setup Template screen)
5. Power meter (Power Meter screen)
6. Standby Output Power measurement (Standby Output Power screen)
7. Access Probe output power measurement (Access Probe Measure screen)
8. Open Loop Power Control Time Response measurement (Open Loop Time Response screen)
9. Measuring the occupied frequency bandwidth (Occupied Bandwidth screen)
10. Spurious close to the Carrier measurement (Spurious close to the Carrier screen, Setup Spurious Template screen)
11. Spurious measurement (Spurious Emission screen, Setup Frequency Table screen)

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

(1) Setting the parameters: Setup TX Measure Parameter screen

This paragraph describes how to set parameters (on the Setup TX Measure Parameter screen) for transmitter measurement.

- Switch to the Setup TX Measure Parameter screen according to the following steps:

Step	Key operation	Description
1.	[Main Func on off] F6	Sets Main Func on to display the Main Menu at the bottom of the screen.
2.	[TX&RX Tester] F1	Sets the TX&RX Tester mode. The Setup Common Parameter screen appears.
3.	[TX Measure] F1	Displays the first page of the TX Measure menu.
4.	Next Menu [▲]	Displays the second page of the TX Measure menu.
5.	[Setup TX Parameter] F9	Displays the Setup TX Measure Parameter screen.

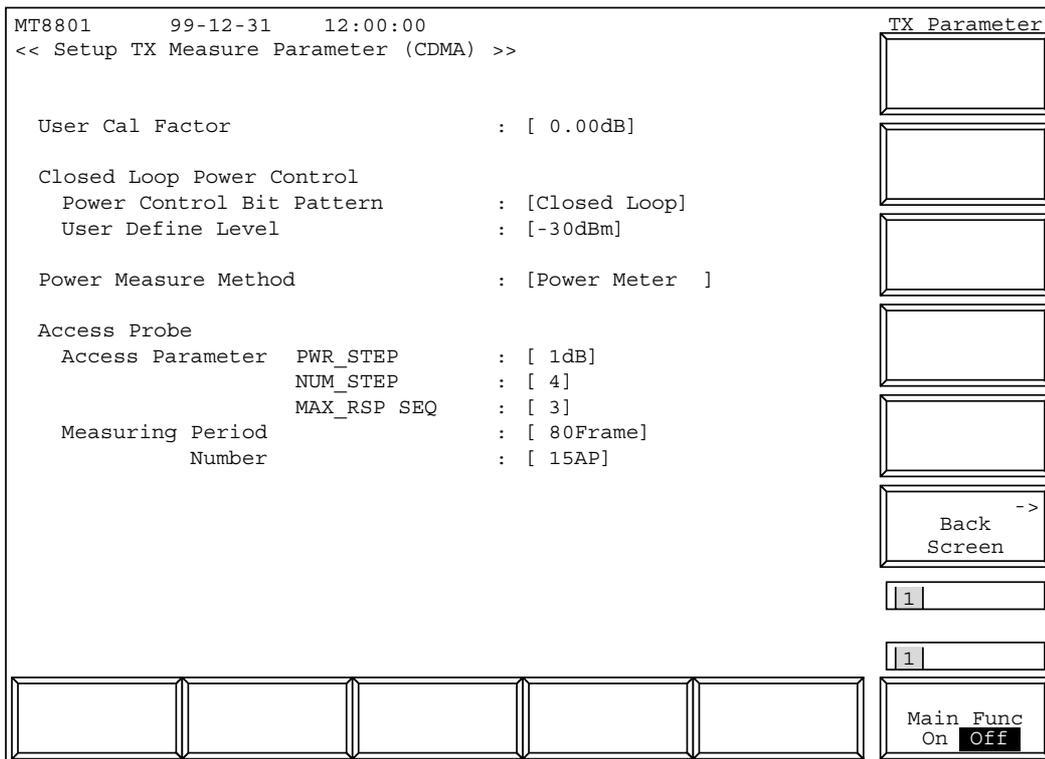


Fig. 4-5 Setup TX Measure Parameter Screen

Section 4 Operation

- Set the following items:

Item	Range	Resolution	Initial value	
User Cal Factor (TX)	55.00 dB to 55.00 dB	0.01 dB	0.00 dB	Note 2
Power Control Bit Pattern.	Closed Loop, Alternate, Auto, All 0, All 1	(None)	Closed Loop	Note 5
User Define Level	-60 to 40 dBm	1 dB	-30 dBm	Note 6
Power Measure Method	Power Meter, IF Level Meter	(None)	Power Meter	
PWR_STEP	0 dB to 7 dB	1 dB	1 dB	Note 3
NUM_STEP	0 to 15	1	4	Note 3
MAX_RSP_SEQ	1 to 15	1	3	Note 3
Measuring Period	1 Frame to 9999 Frames	1 Frame	80 Frames	Note 4
Measuring Number	1 AP to 240 AP	1 AP	15 AP	Note 4

Notes:

1. Only when Call Processing state is Stop, this item can be set.
2. <User Cal Factor>
When there is a loss in the cable between the mobile-station RF output and the MT8801C RF input, set the User Cal. Factor to convert the TX power measured results to the output level of the mobile station.
For example, when there is a 5-dB loss, set the User Cal. Factor to 5 dB.
3. <Access Parameter PWR_STEP, NUM_STEP, MAX_RSP_SEQ>
These parameters are specified from the MT8801C to the mobile station to be set at the access parameter message in the Paging channel.
PWR_STEP sets the power increment between access probes in dB unit.
NUM_STEP sets [maximum number of access probes in one sequence -1].
MAX_RSP_SEQ sets [maximum number of access-probe sequences].
4. <Measuring Period, Measuring Number>
The Measuring Period sets the measurement time of the access probe power measurement in terms of frame units.
The Measuring Number sets the access probe number of the access probe power measurement. The measurement is terminated when whichever of the following occurs earlier, when the measurement time exceeds the Measurement Period or the access probe number attains a value equal to the Measuring Number. Hence, the Measuring Period should be sufficiently large when a certain value of the access probe number is to be measured, and the Measuring Number should be sufficiently large when the access probe is to be measured in a certain period.

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

5. <Power Control Bit Pattern>

This sets the Power Control Bit Pattern.

Closed Loop: Performs power control of the TX level of the mobile station to the desired value using the Closed Loop Power Control Bit.

Alternate: Sets the power control bits to 0 or 1, alternately.

All 0: Sets all the power control bits to 0.

All 1: Sets all the power control bits to 1.

Auto: Performs the power control in real time operation.

The setting of this parameter is valid on all screens. This parameter can also be specified using the function key on the Power Meter screen. (See paragraph 4.3.6, (5).)

6. <User Define Level>

When the [User Define Level] function key is pressed on the Power Meter screen, the TX level of the mobile station is set to this defined level using the Power Control Bit.

- Function keys

Main function key:	None
Function key:	TX Parameter
[Back Screen] (F12):	Displays the previous screen.

Section 4 Operation

(2) Modulation analysis: Modulation Analysis screen

Use the parameters set on the Setup Common Parameter screen (see paragraph 4.3.5) and Setup TX Measure Parameter screen (see paragraph 4.3.6, (1)) to analyze a modulated signal from the transmitter, and display a measured value or waveform. (The TX power indicates the output power in the burst.)

- Display the Modulation Analysis screen according to the following steps:

Step	Key operation	Description
1.	[Main Func on off] F6	Sets the Main Func on to display the Main Menu at the bottom of the screen.
2.	[TX&RX Tester] F1	Sets TX&RX Tester mode. The Setup Common Parameter screen appears.
3.	[TX Measure] F1	Displays the first page of the TX Measure menu.
4.	Next Menu [◀]	Displays the second page of the Main Func menu.
5.	[Start] F5	Sets Call Processing state to Idle.
6.	Connect call.	Turn on the power of the mobile station under test. Wait until the Call Processing state becomes Idle (Regist) after Registration.
7.	[NW Originate] F2	Sets Call Processing state to Loop Back.
8.	[Modulation Analysis] F8	Displays the Modulation Analysis screen.

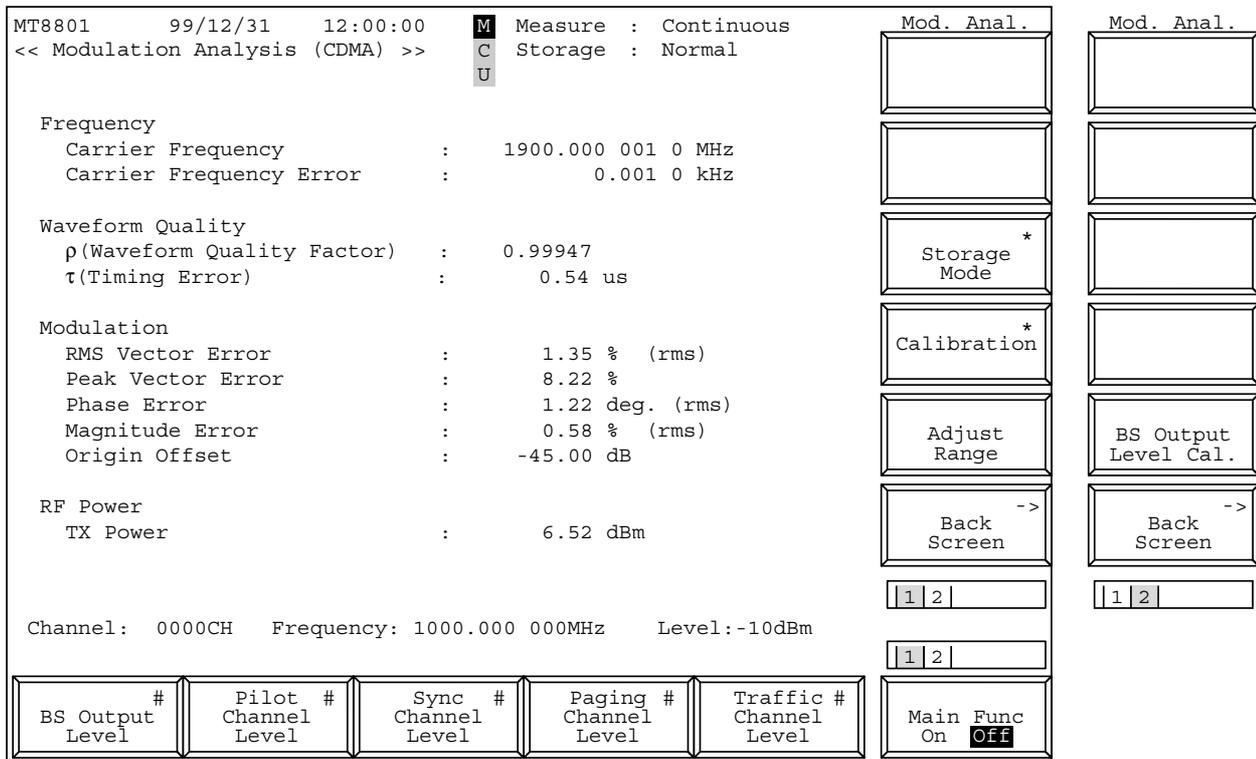


Fig. 4-6 Modulation Analysis Screen

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

The 2nd page of the main function keys on the Modulation Analysis screen



- Main function keys

- Function keys:

Main function keys

1st page

- [BS Output Level] F1: Sets the level of signal output from the MT8801C.
 Initial value: -55.0 dBm
 Setting range: -133.0 dBm to -18.0 dBm (RF Output: Main, AWGN Off)
 -133.0 dBm to +2.0 dBm (RF Output: AUX, AWGN Off)
 -133.0 dBm to -24.0 dBm (RF Output: Main, AWGN On)
 -133.0 dBm to -4.0 dBm (RF Output: AUX, AWGN On)
 Resolution: 0.1 dB
- [Pilot Channel Level] F2: Sets the level of Pilot Channel output from the MT8801C.
 Initial value: -7.0 dB
 Setting range: -5.0 dB to -10.0 dB, 0 dB
 Setting 0 dB at Pilot Channel can be performed only by GPIB command. (See para. 2.5.10 of Remote Control volume of this manual.)
 Resolution: 0.1 dB
- [Sync Channel Level] F3: Sets the level of Sync Channel output from the MT8801C.
 Initial value: -16.0 dB
 Setting range: -7.0 dB to -20.0 dB
 Resolution: 0.1 dB
- [Paging Channel Level] F4: Sets the level of Paging Channel output from the MT8801C.
 Initial value: -12.0 dB
 Setting range: -7.0 dB to -20.0 dB (Paging Data Rate: "Full")
 Resolution: 0.1 dB
- [Traffic Channel Level] F5: Sets the level of Traffic Channel output from the MT8801C.
 Initial value: -16.0 dB
 Setting range: -7.0 dB to -20.0 dB (Data Rate: "Full")
 -10.0 dB to -23.0 dB (Data Rate: "1/2")
 -13.0 dB to -26.0 dB (Data Rate: "1/4")
 -16.0 dB to -29.0 dB (Data Rate: "1/8")
 Resolution: 0.1 dB

Section 4 Operation

2nd page

[Channel] F1: Sets the Channel number.
Initial value: 1
Setting range: 1 to 799, 900 to 1023 (Band: 800 MHz)

[Reference Level] F3: Sets the reference level of signal input to the MT8801C.
Initial value: 30 dBm
Setting range: 42 dBm to -60 dBm (RF Input: Main)
22 dBm to -60 dBm (RF Input: AUX)
Resolution: 1 dB

• Function keys: Mod. Anal.

1st page

[Storage Mode] F9: Displays the storage mode setup menu.

[Normal] F7: Sets normal mode (initial value).

[Average] F8: Sets averaging mode.
Measure mode is set to Single.

[Average Count] F9: Sets an averaging count.
2 to 9999 Initial value: 10

[Refresh Interval] F10: Sets the update time of the averaged-measurement data display.
Every: after every single measurement
Once: after the specified-count-measurement averaging processing

[return] F12: Returns to the previous menu.

[Calibration] F10: Displays the level calibration menu.

[Power Meter Calibration] F7: Performs the level calibration using an internal power meter.
Calibration progress window is displayed during calibration.

[Int. Osc. Calibration] F8: Performs the level calibration using an internal oscillator.
Calibration progress window is displayed during calibration.

[Calibration Cancel] F9: Deletes level calibration data.

[return] F12: Returns to the previous menu.

[Adjust Range] F11: Sets the measurement level ranges (RF power meter range and reference level) to the status appropriate for measurement signal. (See paragraph 4.3.1(2))

[Back Screen] F12: Displays the previous screen.

2nd page

[BS Output Level Cal.] F11: Performs the level calibration of the BS Output Level.

[Back Screen] F12: Displays the previous screen.

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

(3) Gated output power measurement: Gated Power screen

Measure the Gated output power (in-burst power) of the transmitter with the parameters specified on the Setup Common Parameter screen (Section 4.3.5) and Setup TX Measure Parameter screen (Section 4.3.6, (1)).

For the burst signal measurement, the template (magnitude standard line) of the Gated output power waveform can be set (on Setup Template screen). One hundred types of templates can be saved on floppy disk (3.5-inch) (on Save Template screen) and recalled (on Recall Template screen).

Note that a template can be displayed only when a relative level mode is set at burst signal measurement.

Note:

On the Gated Power screen, the power sensor is not used; the internal IF level is used to measure the power.

- Display the Gated Power screens according to the following steps:

Step	Key operation	Description
1.	[Main Func on off] F6	Sets the Main Func on to display the Main Menu at the bottom of the screen.
2.	[TX&RX Tester] F1	Sets TX&RX Tester mode. The Setup Common Parameter screen appears.
3.	[TX Measure] F1	Displays the first page of the TX Measure menu.
4.	Next Menu [◀]	Displays the second page of the Main Func menu.
5.	[Start] F5	Sets Call Processing state to Idle.
6.	Connect call.	Turn on the power of the mobile station under test. Wait until the Call Processing state becomes Idle (Regist) after Registration.
7.	[NW Originate] F2	Sets Call Processing state to Loop Back.
8.	[Gated Power] F9	Displays the Gated Power screen.

Section 4 Operation

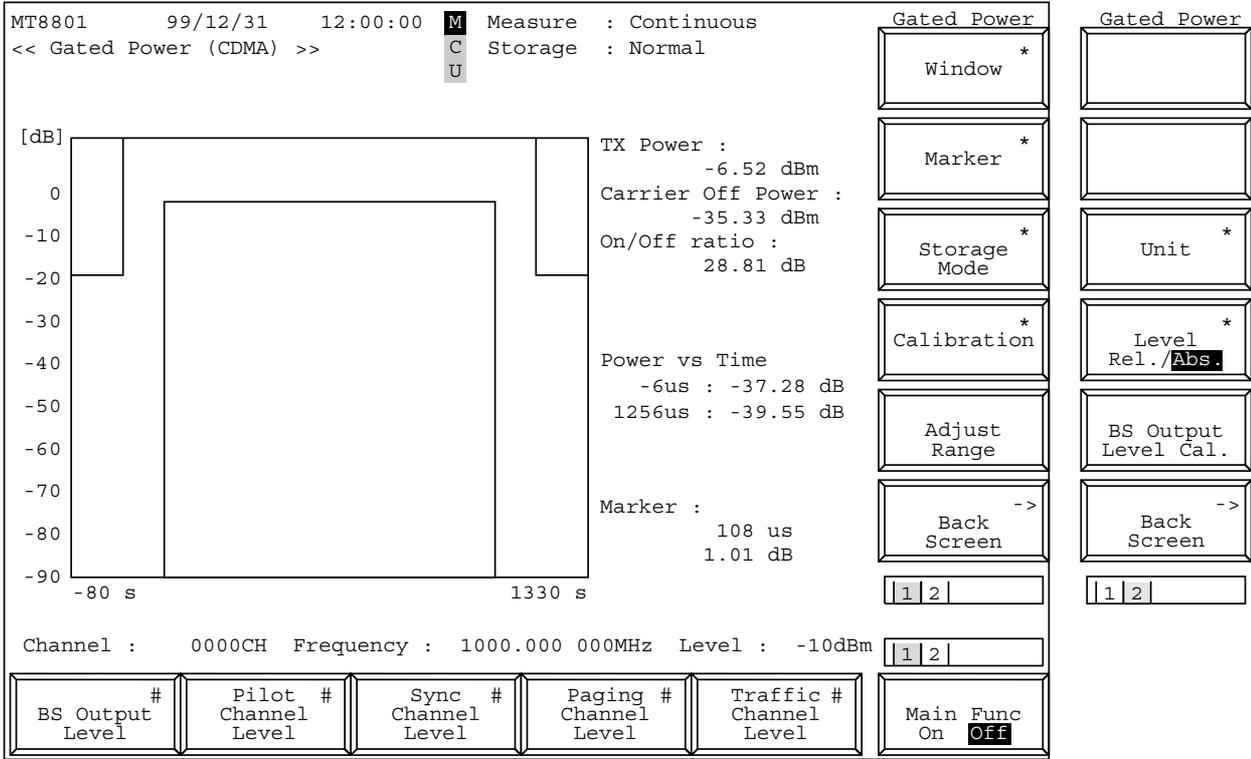


Fig. 4-7 (1/3) Gated Power Screen

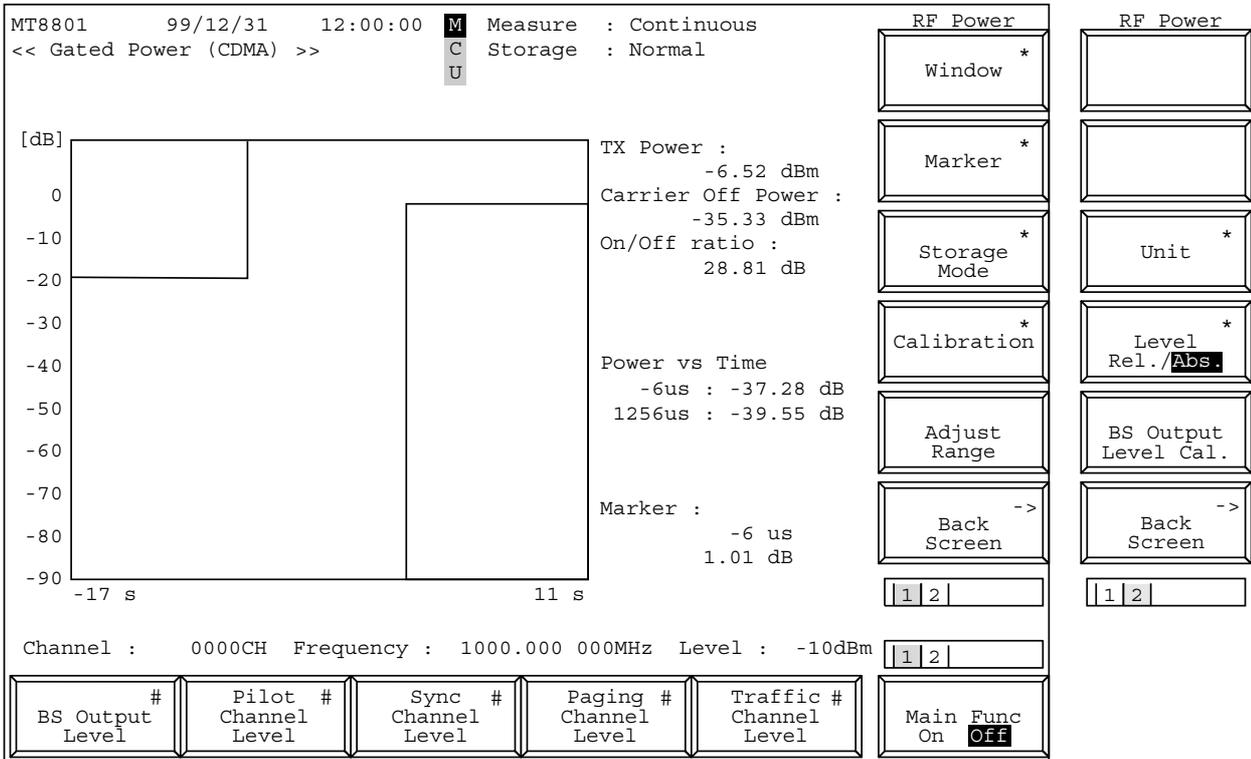


Fig. 4-7 (2/3) Gated Power Screen

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

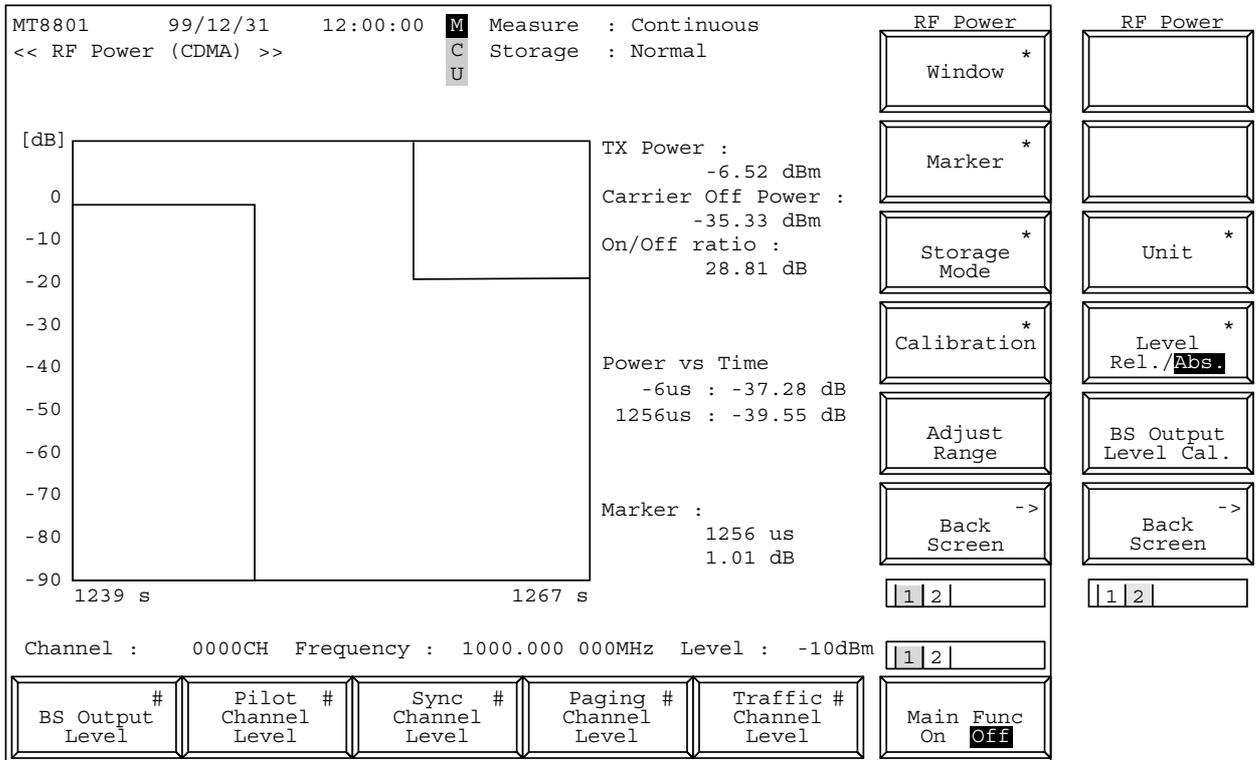
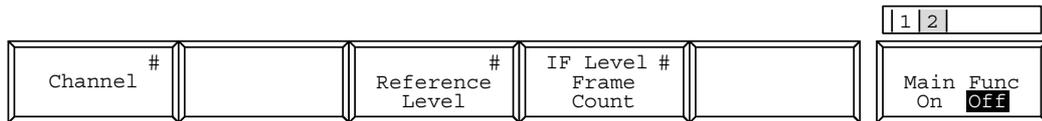


Fig. 4-7 (3/3) RF Power Screen

The 2nd page of the main function keys on the RF Power screen



Section 4 Operation

- Main function keys
- Function keys:

Main function keys

1st page

[BS Output Level] F1:	Sets the level of signal output from the MT8801C. Initial value: -55.0 dBm Setting range:-133.0 dBm to -18.0 dBm (RF Output: Main, AWGN Off) -133.0 dBm to +2.0 dBm (RF Output: AUX, AWGN Off) -133.0 dBm to -24.0 dBm (RF Output: Main, AWGN On) -133.0 dBm to -4.0 dBm (RF Output: AUX, AWGN On) Resolution: 0.1 dB
[Pilot Channel Level] F2:	Sets the level of Pilot Channel output from the MT8801C. Initial value: -7.0 dB Setting range:-5.0 dB to -10.0 dB, 0 dB Setting 0 dB at Pilot Channel can be performed only by GPIB command. (See para. 2.5.8 of Remote Control volume of this manual.) Resolution: 0.1 dB
[Sync Channel Level] F3:	Sets the level of Sync Channel output from the MT8801C. Initial value: -16.0 dB Setting range:-7.0 dB to -20.0 dB Resolution: 0.1 dB
[Paging Channel Level] F4:	Sets the level of Paging Channel output from the MT8801C. Initial value: -12.0 dB Setting range:-7.0 dB to -20.0 dB (Paging Data Rate: "Full") Resolution: 0.1 dB
[Traffic Channel Level] F5:	Sets the level of Traffic Channel output from the MT8801C. Initial value: -16.0 dB Setting range:-7.0 dB to -20.0 dB (Data Rate: "Full") -10.0 dB to -23.0 dB (Data Rate: "1/2") -13.0 dB to -26.0 dB (Data Rate: "1/4") -16.0 dB to -29.0 dB (Data Rate: "1/8") Resolution: 0.1 dB

2nd page

[Channel] F1:	Sets the Channel number. Initial value: 1 Setting range:1 to 799, 900 to 1023 (Band: 800 MHz)
[Reference Level] F3:	Sets the reference level of signal input to the MT8801C. Initial value: 30 dBm Setting range:42 dBm to -60 dBm (RF Input: Main) 22 dBm to -60 dBm (RF Input: AUX) Resolution: 1 dB

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

- Function keys:

1st page

- | | |
|-------------------------------|---|
| [Window] F7: | Displays a waveform-window setup menu. |
| [Slot] F7: | Displays a waveform corresponding to one slot. |
| [Leading] F9: | Displays a waveform at the leading edge of the burst signal. |
| [Trailing] F10: | Displays a waveform at the trailing edge of the burst signal. |
| [return] F12: | Returns to the previous menu. |
| [Marker] F8: | Displays the Marker menu.
If this key is pressed when Off is selected, Normal is selected. |
| [Normal] F7: | Sets normal marker mode. Enters the marker-position input wait status.
Range: Lower limit to upper limit of horizontal display scale
(unit: symbol)
Resolution: 0.1 symbol
Initial value: Center of the screen |
| [Off] F8: | Sets marker mode to off and clear the marker (initial value). |
| [return] F12: | Returns to the previous menu. |
| [Storage Mode] F9: | Displays the storage mode setup menu.
Either of the following items can be selected: |
| 1st page | |
| [Normal] F7: | Displays the normal waveform storage mode setup menu. |
| [Average] F8: | Sets averaging mode.
Measure mode is set to Single. |
| [Average Count] F9: | Sets the averaging count.
2 to 9,999, Resolution: 1, Initial value: 10 |
| [return] F12: | Returns to the previous menu. |
| 2nd page | |
| [Max Hold] F7: | Compares new and old waveform data items each time a measurement is performed, and displays the larger data item. (Maximum value holding) |
| [Min Hold] F8: | Compares new and old waveform data items each time a measurement is performed, and displays the smaller data item. (Minimum value holding) |
| [Cumulative] F9: | Sets waveform dot data accumulation display mode. |
| [Over Write] F10: | Sets the waveform overwriting mode. |
| [return] F12: | Returns to the previous menu. |
| [Calibration] F10: | Displays the level calibration menu. |
| [Power Meter Calibration] F7: | Performs the level calibration using an internal power meter.
Calibration progress window is displayed during calibration. |
| [Int. Osc. Calibration] F8: | Performs the level calibration using an internal oscillator.
Calibration progress window is displayed during calibration. |
| [Calibration Cancel] F9: | Deletes level calibration data. |
| [return] F12: | Returns to the previous menu. |
| [Adjust Range] F11: | Sets the measurement level ranges (RF power meter range and reference level) to the status appropriate for measurement signals.
(See paragraph 4.3.1 (2)) |
| [Back Screen] (F12): | Displays the previous screen. |

Section 4 Operation

2nd page

[Unit] F9:	Displays the power measurement unit menu.
[dBm] F7:	Sets the power measurement value unit to dBm (initial value)
[nW/ μ W/mW/W] F8:	Switches the power measurement value unit to the watt system.
[return] F12:	Returns to the previous menu.
[Level Rel./Abs.] F10:	Displays the menu for selecting absolute or relative display of the waveform vertical axis scale.
[Relative] F7:	Sets the waveform vertical axis scale to relative display (dB). This function key displays a relative value from the average power at burst-on (initial value).
[Absolute] F8:	Sets the waveform vertical scale to absolute display (dBm). No template is displayed.
[return] F12:	Returns to the previous menu.
[BS Output Level Cal.] F11:	Performs the level calibration of the BS Output Level. During calibration, the output signal becomes un-modulated.
[Back Screen] F12:	Displays the previous screen.

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

(4) Setting the template: Setup Template screen

Sets the template of the Gated output power measurement.

- Display the Setup Template according to the following steps:

Step	Key operation	Description
1.	[Main Func on off] F6	Sets the Main Func on to display the Main Menu on the bottom of the screen.
2.	[TX&RX Tester] F1	Sets TX&RX Tester mode. The Setup Common Parameter screen appears.
3.	[TX Measure] F1	Displays the first page of the TX Measure menu.
4.	Next Menu [▲]	Displays the second page of the TX Measure menu.
5.	[Setup Gated Power Template] F10	Displays the Setup Template screen.

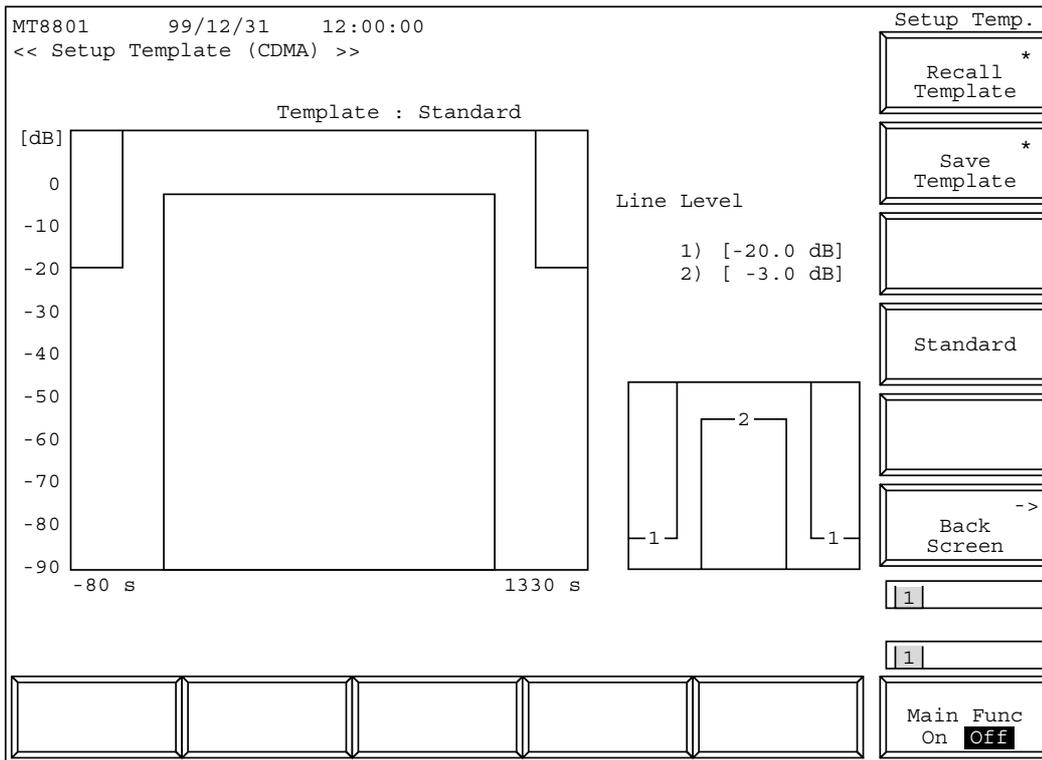


Fig. 4-8 Setup Template Screen (Standard)

Note:

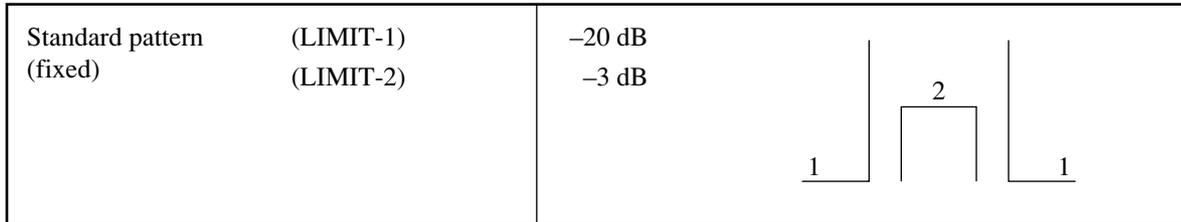
When the template to be called is modified, the template name becomes “Not Selected” indicating that the template is not saved in internal memory.

Section 4 Operation

- Standard template

Limit 1 (off level): -20.0 dB

Limit 2 (on level, lower): -3.0 dB



- Set the following items on the Setup Template screen.

Item	Range	Resolution	Initial value
1	-90.0 dB to 10.0 dB	0.1 dB	Standard value
2	-90.0 dB to 10.0 dB	0.1 dB	Standard value

- Function keys:

Main function key (None)

Function keys

[Recall Template] F7: Recalls the template saved in a floppy disk etc.. (Para. 4.3.9)

[Save Template] F8: Displays the template save menu. (Para. 4.3.9)

[Standard] F10: Sets the standard template.

[Back Screen] F12: Displays the previous screen.

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

(5) Power meter: Power Meter screen

Use the power sensor or IF level meter to measure the average power on the Power Meter screen. When the Call Processing state is the “Loop Back” or “Conversation”, and power meter uses the IF Level Meter; the Tx level of the mobile station can also be measured.

- Display the Power Meter screen according to the following steps:

Step	Key operation	Description
1.	[Main Func on off] F6	Sets the Main Func on to display the Main Menu at the bottom of the screen.
2.	[TX&RX Tester] F1	Sets TX&RX Tester mode. The Setup Common Parameter screen appears.
3.	[TX Measure] F1	Displays the first page of the TX Measure menu.
4.	[Power Meter] F12	Displays the Power Meter screen.

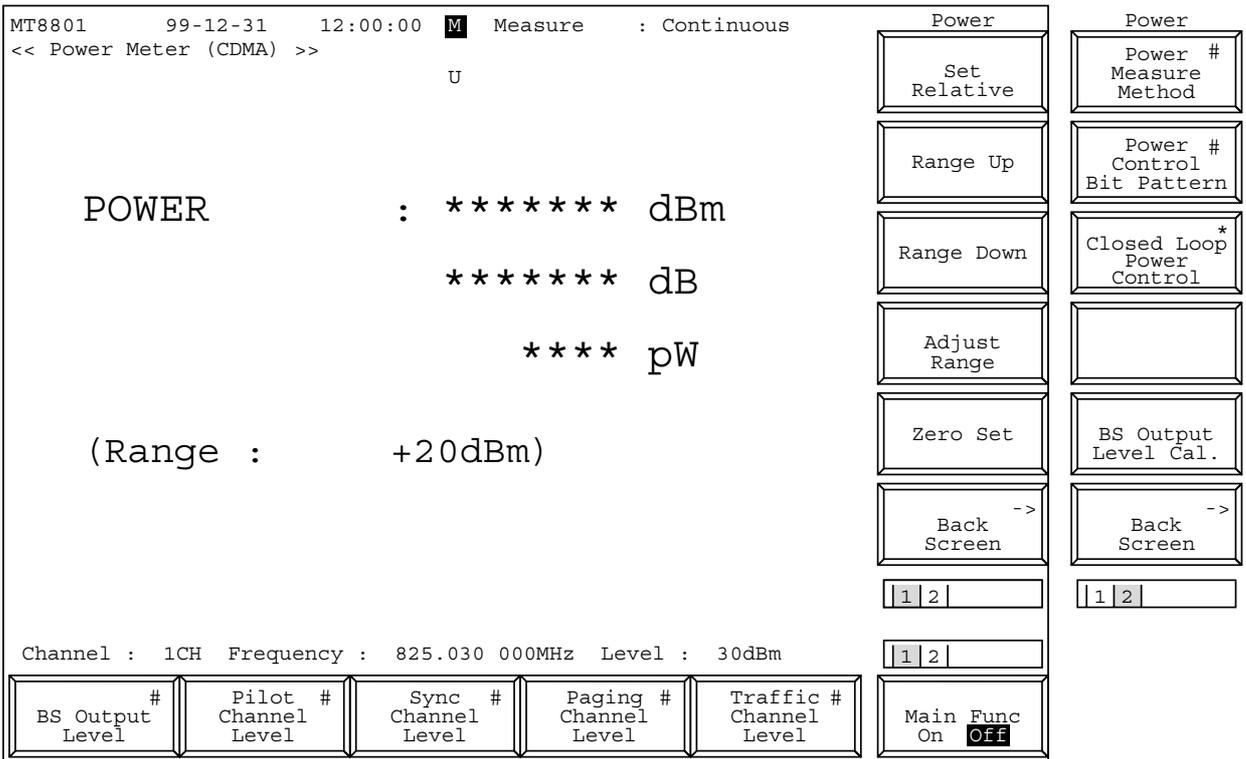
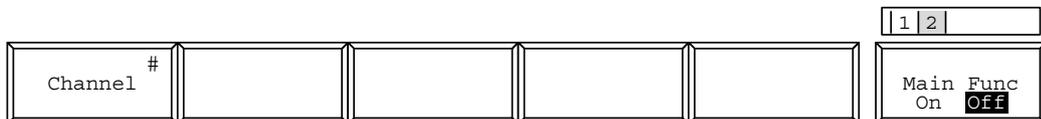


Fig. 4-9 (1/2) Power Meter Screen (using Power Meter)

The 2nd page of main function key on the Power Meter screen (using Power Meter)



Section 4 Operation

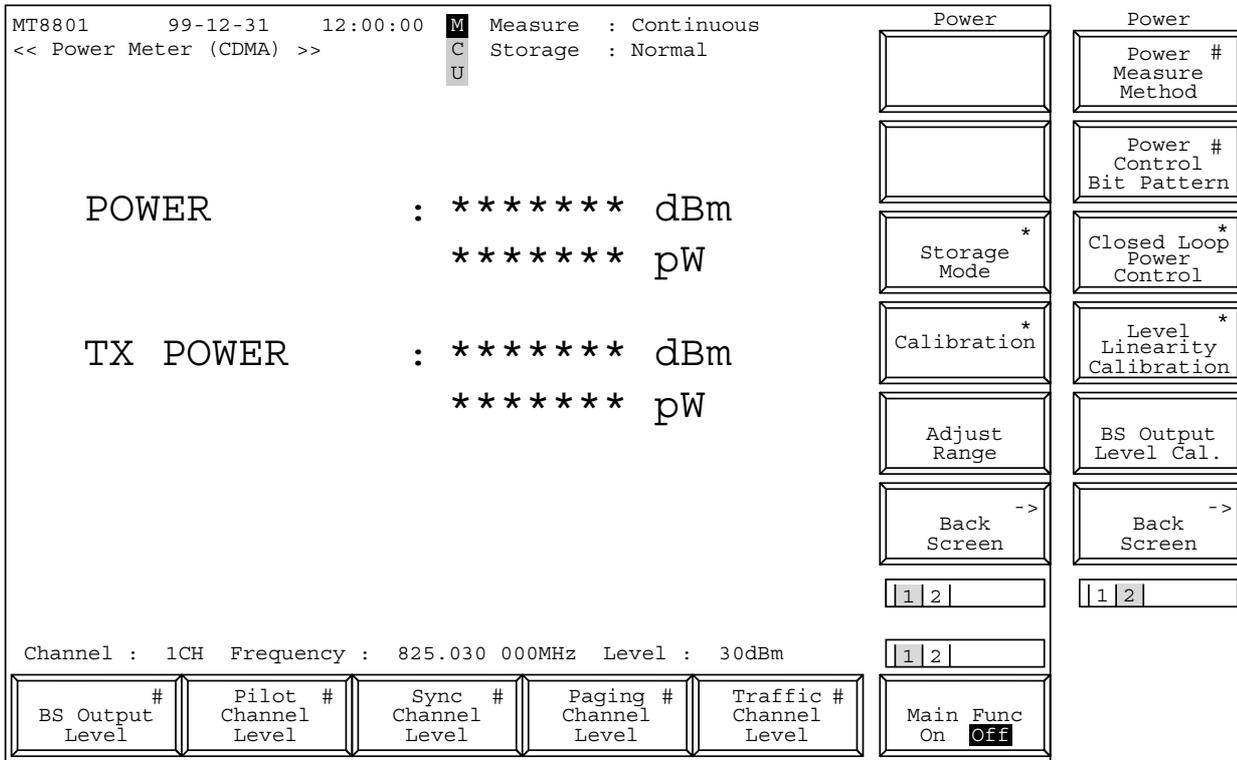
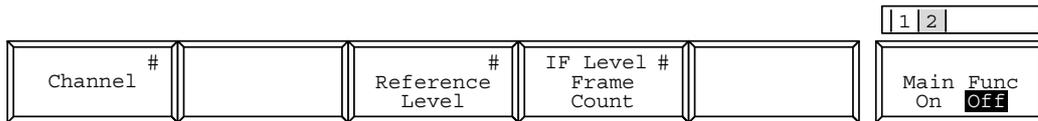


Fig. 4-9 (2/2) Power Meter Screen (using IF Level Meter)

The 2nd page of the main function keys on the Power Meter screen (using IF Level Meter)



Note:

The measured results are displayed in units of dBm/dB (relative display)/W in this order.

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

- Main function keys:

1st page

- [BS Output Level] F1: Sets the level of output from the MT8801C.
Initial value: -55.0 dBm
Setting range: -133.0 dBm to -18.0 dBm (RF Output: Main, AWGN Off)
-133.0 dBm to +2.0 dBm (RF Output: AUX, AWGN Off)
-133.0 dBm to -24.0 dBm (RF Output: Main, AWGN On)
-133.0 dBm to -4.0 dBm (RF Output: AUX, AWGN On)
Resolution: 0.1 dB
- [Pilot Channel Level] F2: Sets the level of Pilot Channel output from the MT8801C.
Initial value: -7.0 dB
Setting range: -5.0 dB to -10.0 dB, 0 dB
Setting 0 dB at Pilot Channel can be performed only by GPIB command. (See para. 2.5.8 of Remote Control volume of this manual.)
Resolution: 0.1 dB
- [Sync Channel Level] F3: Sets the level of Sync Channel output from the MT8801C.
Initial value: -16.0 dB
Setting range: -7.0 dB to -20.0 dB
Resolution: 0.1 dB
- [Paging Channel Level] F4: Sets the level of Paging Channel output from the MT8801C.
Initial value: -12.0 dB
Setting range: -7.0 dB to -20.0 dB (Paging Data Rate: "Full")
Resolution: 0.1 dB
- [Traffic Channel Level] F5: Sets the level of Traffic Channel output from the MT8801C.
Initial value: -16.0 dB
Setting range: -7.0 dB to -20.0 dB (Data Rate: "Full")
-10.0 dB to -23.0 dB (Data Rate: "1/2")
-13.0 dB to -26.0 dB (Data Rate: "1/4")
-16.0 dB to -29.0 dB (Data Rate: "1/8")
Resolution: 0.1 dB

2nd page

- [Channel] F1: Sets the Channel number.
This cannot be set when the Call Processing state is Idle or Idle (Regist).
Initial value: 1
Setting range: 1 to 799, 900 to 1023 (Band: 800 MHz)
- [Reference Level] F3: Sets the reference level of signal input to the MT8801C.
Does not displays function key in Power Meter mode.
Initial value: 30 dBm
Setting range: 42 dBm to -60 dBm (RF Input: Main)
22 dBm to -60 dBm (RF Input: AUX)
Resolution: 1 dB
- [IF Level Frame Count] F4: Sets the number of samples used to calculate power by setting the number of frames (One frame is 20 ms).
Initial Value: 10
Setting Range: 1 to 10
Resolution: 1

Section 4 Operation

- Function keys:

- For Power Meter

1st page

[Set Relative] F7: Enables to display the power measurement result using a relative value. The reference value is the power measurement value immediately before setting the relative value display.

If the Power Meter screen is switched to another screen or the power is turned off, the screen enters absolute value display mode and the set reference value is invalid.

[Range Up] F8: Increases the measurement range.

[Adjust Range] F10: Sets the measurement level ranges (RF power meter range and reference level) to the status appropriate for measurement signal.

(See paragraph 4.3.1, (2))

[Zero Set] F11: Adjusts zero-point of the power meter, as described below.

[Back Screen] F12: Displays the previous screen.

2nd page

[Power Measure Method] F7: Sets the measurement method of Power Measure measurement, selecting Power Meter or IF Level Meter.

[Power Control Bit Pattern] F8: Sets power control bits. (Initial value: Closed Loop)

Closed Loop: Performs power control of the TX level of the mobile station to the desired value using the Closed Loop Power Control Bit.

Alternate : Sets power control bits to 0 or 1, alternately.

All 0 : Sets all power control bits to 0.

All 1 : Sets all power control bits to 1.

Auto: Performs the power control in real time operation.

The setting of this parameter is valid on all screens. This parameter can also be specified in the Power Control Bit Pattern on the Setup TX Measure Parameter screen. (See paragraph 4.3.6, (1).)

[Closed Loop Power Control] F9:

Displays the closed loop power control menu. (Power Control Bit Pattern: Alternate)

[Closed Loop Up] F7: Increases the TX level of the mobile station by 1 dB.

[Closed Loop Down] F8: Decreases the TX level of the mobile station by 1 dB.

[User Define Level] F9: Sets the TX level of the mobile station to the User Define Level value on the Setup TX Measure Parameter screen. In this time, the TX level is measured using the IF Level Meter. So, the Reference Level must be set so that the TX level and User Define Level can be measured.

[return] F12: Returns to the previous menu.

[BS Output Level Cal.] F11: Performs the level calibration of the BS Output Level. During calibration, the output signal becomes un-modulated.

[Back Screen] F12: Displays the previous screen.

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

- For IF Level Meter

1st page

[Storage Mode] F9:	Displays the Storage Mode Setting menu.
[Normal] F7:	Sets normal mode.
[Average] F8:	Sets averaging mode. The Measure mode becomes Single, automatically.
[Average Count] F9:	Sets an averaging count. 2 to 9999, Resolution: 1, Initial value: 10 An averaging count can also be set even if averaging mode is set off.
[Refresh Interval] F10:	Sets the update time for averaged display. Every: After each measurement Once: After measurement with averaging
[return] F12:	Returns to the previous menu.
[Calibration] F10:	Displays the level calibration execution menu.
[Power Meter Calibration] F7:	Performs the level calibration using an internal power meter. Calibration progress window is displayed during calibration.
[Int. Osc. Calibration] F8:	Performs the level calibration using an internal oscillator. Calibration progress window is displayed during calibration.
[Calibration Cancel] F9:	Deletes level calibration data.
[return] F12:	Returns to the previous menu.
[Adjust Range] F11:	Sets the measurement level range (RF power meter range and reference level) to a state appropriate for the measurement signal. (See paragraph 4.3.1 (2))
[Back Screen] F12:	Displays the previous screen.

Section 4 Operation

2nd page

- [Power Measure Method] F7: Sets the measurement method of Power Measure measurement , selecting Power Meter or IF Level Meter.
- [Power Control Bit Pattern] F8: Sets power control bits. (Initial value: Closed Loop)
- Closed Loop: Performs power control of the TX level of the mobile station to the desired value using the Closed Loop Power Control Bit.
 - Alternate : Sets power control bits to 0 or 1, alternately.
 - All 0 : Sets all power control bits to 0.
 - All 1 : Sets all power control bits to 1.
 - Auto: Performs the power control in real time operation.
- This parameter setting affects only on the Power Meter screen.
- [Closed Loop Power Control] F9: Displays the closed loop power control menu. (Power Control Bit Pattern: Alternate)
- [Closed Loop Up] F7: Increases the TX level of the mobile station by 1 dB.
 - [Closed Loop Down] F8: Decreases the TX level of the mobile station by 1 dB.
 - [User Define Level] F9: Sets the TX level of the mobile station to the User Define Level value on the Setup TX Measure Parameter screen. In this time, the TX level is measured using the IF Level Meter. So, the Reference Level must be set so that the TX level and User Define Level can be measured.
 - [return] F12: Returns to the previous menu.
- [Level Linearity Calibration] F10: Displays the level linearity calibration execution menu.
- [Level Linearity Calibration] F7: Performs the level linearity calibration. (See the next page.) Calibration progress window is displayed during calibration.
 - [Calibration Cancel] F8: Deletes the level linearity calibration data.
 - [return] F12: Returns to the previous menu.
- [BS Output Level Cal.] F11: Performs the level calibration of the BS Output Level. During calibration, the output signal becomes un-modulated.
- [Back Screen] F12: Displays the previous screen.
- *1: See paragraph 4.3.5 common parameter function.

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

- Power meter zero calibration

To make accurate RF power measurement in transmitter measurement (TX Measure mode), calibrate the zero position of the power meter as described below.

Step	Key operation	Description
1.		Remove any signal input to the RF input connector (Main).
2.	[Main Func on off] F6	Sets the Main Func on to display the Main Menu at the bottom of the screen.
3.	[TX&RX Tester] F1	Sets the TX&RX Tester mode. The Setup Common Parameter screen appears.
4.		Conform that the Call Proc. state is Stop. When the Call Proc. state is Stop, move to Step 7. When the Call Proc. state is other than Stop, move to Steps 5 and 6 to make the Call Proc. state to Stop.
5.	Next Menu [◀]	The 2nd page of Main Func menu appears.
6.	[Stop] F5	The Call Proc. state becomes Stop.
7.	[TX Measure] F1	Displays the first page of the TX Measure menu.
8.	[Power Meter] F12	Displays the Power Meter screen.
9.	Next Menu [▶]	The 2nd page of the function key menu appears.
10.	[Power Measure Method] F7 Cursor [^] [v] Set	Select Power Meter with Cursor keys, then conform it by pressing Set key.
11.	Next Menu [▶]	The 1st page of the function key menu appears.
12.	[Zero Set] F11	Zero-calibrates the power meter. During zero calibration, the window indicating that calibration is being performed is displayed on the screen.
13.	[Back Screen] F12	Returns to the Setup Common Parameter screen.

Section 4 Operation

- Level linearity calibration for IF level meter

Follow the procedure below for 0-point level linearity calibration to correctly measure a low level using the IF level meter on the Power Meter screen and a low level on the Standby Output Power screen.

Step	Key operation	Description
1.		Remove any signal input to the RF input connector (Main).
2.	[Main Func on off] F6	Sets the Main Func on to display the Main Menu at the bottom of the screen.
3.	[TX&RX Tester] F1	Sets the TX&RX Tester mode. The Setup Common Parameter screen appears.
4.		Conform that the Call Proc. state is Stop. When the Call Proc. state is Stop, move to Step 7. When the Call Proc. state is other than Stop, move to Steps 5 and 6 to make the Call Proc. state to Stop.
5.	Next Menu [◀]	The 2nd page of Main Func menu appears.
6.	[Stop] F5	The Call Proc. state becomes Stop.
7.	[TX Measure] F1	Displays the first page of the TX Measure menu.
8.	[Power Meter] F12	Displays the Power Meter screen.
9.	Next Menu [▶]	The 2nd page of the function key menu appears.
10.	[Power Measure Method] F7 Cursor [^] [v] Set	Select IF Level Meter with Cursor keys, then conform it by pressing Set key.
11.	[Level Linearity Calibration] F10	The level linearity calibration menu appears.
12.	[Level Linearity Calibration] F7	Performs the level linearity calibration. Calibration progress window is displayed during level linearity calibration.
13.	[return] F12 [Back Screen] F12	Returns to the Setup Common Parameter screen.

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

(6) Standby Output Power measurement: Standby Output Power screen

Step	Key operation	Description
1.	[Main Func on off] F6	Sets the Main Func on to display the Main Menu at the bottom of the screen.
2.	[TX&RX Tester] F1	Sets TX&RX Tester mode. The Setup Common Parameter screen appears.
3.	[TX Measure] F1	Displays the first page of the TX Measure menu.
4.	Next Menu [◀]	Displays the second page of the Main Func menu.
5.	[Start] F5	Sets Call Processing state to Idle.
6.	[Standby Output Power] F9	Displays the Standby Power Meter screen.

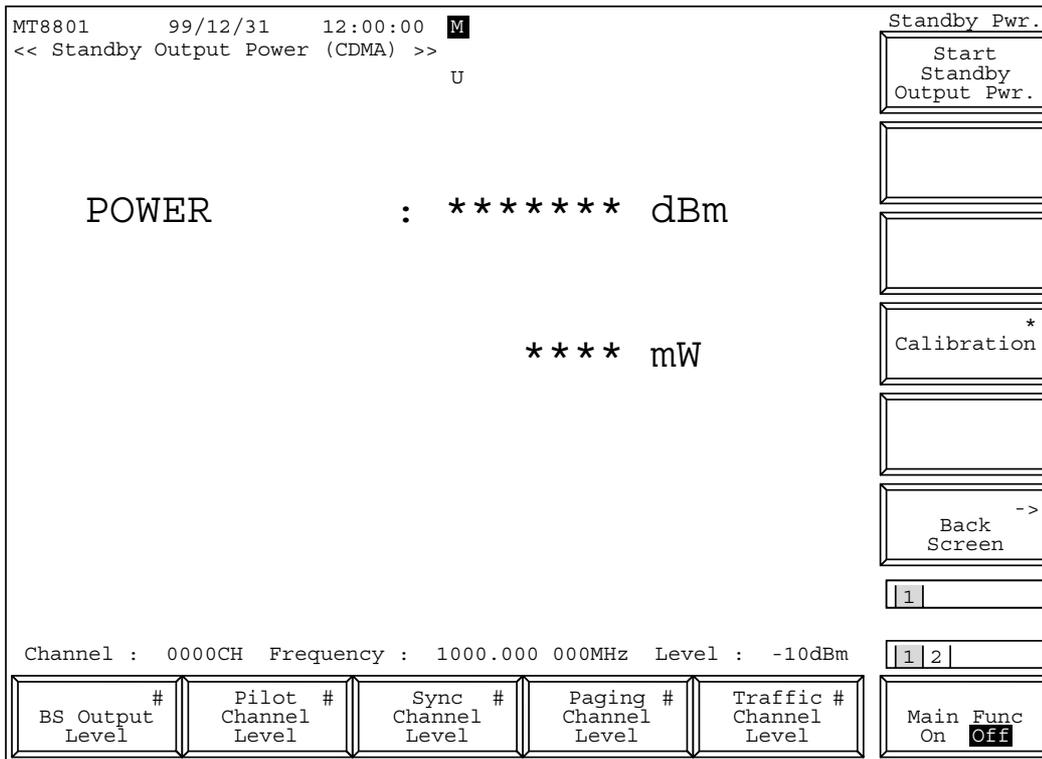


Fig. 4-10 Standby Output Power Screen

The 2nd page of the main function keys on the Standby Output Power screen



Section 4 Operation

- Function keys:

Main function keys

1st page

- [BS Output Level] F1: Sets the level of output from the MT8801C.
Initial value: -55.0 dBm
Setting range: -133.0 dBm to -18.0 dBm (RF Output: Main, AWGN Off)
-133.0 dBm to +2.0 dBm (RF Output: AUX, AWGN Off)
-133.0 dBm to -24.0 dBm (RF Output: Main, AWGN On)
-133.0 dBm to -4.0 dBm (RF Output: AUX, AWGN On)
Resolution: 0.1 dB
- [Pilot Channel Level] F2: Sets the level of Pilot Channel output from the MT8801C.
Initial value: -7.0 dB
Setting range: -5.0 dB to -10.0 dB, 0 dB
Setting 0 dB at Pilot Channel can be performed only by GPIB command. (See para. 2.5.8 of Remote Control volume of this manual.)
Resolution: 0.1 dB
- [Sync Channel Level] F3: Sets the level of Sync Channel output from the MT8801C.
Initial value: -16.0 dB
Setting range: -7.0 dB to -20.0 dB
Resolution: 0.1 dB
- [Paging Channel Level] F4: Sets the level of Paging Channel output from the MT8801C.
Initial value: -12.0 dB
Setting range: -7.0 dB to -20.0 dB (Paging Data Rate: "Full")
Resolution: 0.1 dB
- [Traffic Channel Level] F5: Sets the level of Traffic Channel output from the MT8801C.
Initial value: -16.0 dB
Setting range: -7.0 dB to -20.0 dB (Data Rate: "Full")
-10.0 dB to -23.0 dB (Data Rate: "1/2")
-13.0 dB to -26.0 dB (Data Rate: "1/4")
-16.0 dB to -29.0 dB (Data Rate: "1/8")
Resolution: 0.1 dB

2nd page

- [Reference Level] F3: Sets the reference level of signal input to the MT8801C.
Initial value: 30 dBm
Setting range: 42 dBm to -60 dBm (RF Input: Main)
22 dBm to -60 dBm (RF Input: AUX)
Resolution: 1 dB

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

Function keys

1st page

[Start/Stop] F7:	Starts Standby Output Power measurement. (Note)
[Calibration] F10:	Displays the level calibration execution menu.
[Int. Osc. Calibration] F8:	Performs the level calibration using an internal oscillator. Calibration progress window is displayed during calibration.
[Calibration Cancel] F9:	Cancels the level calibration data.
[return] F12:	Returns to the previous menu.
[Back Screen] F12:	Displays the previous screen.

Note:

Single key or Continuous key can start this measurement, where the Continuous key forcibly makes the single operation. A single measurement measures whichever is smaller, the number of frames set in the Measuring Period or the access probe number set in the Measuring Number (refer to paragraph 4.3.6 (1)).

Section 4 Operation

(7) Access Probe output power measurement: Access Probe Measure screen

- The Access Probe Measure screen appears by the following operation:

Step	Key operation	Description
1.	[Main Func on off] F6	Sets the Main Func on to display the Main Menu at the bottom of the screen.
2.	[TX&RX Tester] F1	Sets TX&RX Tester mode. The Setup Common Parameter screen appears.
3.	[TX Measure] F1	Displays the first page of the TX Measure menu.
4.	Next Menu [◀]	Displays the second page of the Main Func menu.
5.	[Start] F5	Sets Call Processing state to Idle.
6.	[Access Probe Measure] F8	Displays the Access Probe Measure screen.

```

MT8801      99/12/31   12:00:00  M
<< Access Probe Measure (CDMA) >>
                                     U
Measure State : Stop

Measured Level of Access Probes (-- bursts / 999 Frames)
AP  Frame  Level  AP  Frame  Level  AP  Frame  Level
 1  -----  18  -----  35  -----
 2  -----  19  -----  36  -----
 3  -----  20  -----  37  -----
 4  -----  21  -----  38  -----
 5  -----  22  -----  39  -----
 6  -----  23  -----  40  -----
 7  -----  24  -----  41  -----
 8  -----  25  -----  42  -----
 9  -----  26  -----  43  -----
10  -----  27  -----  44  -----
11  -----  28  -----  45  -----
12  -----  29  -----  46  -----
13  -----  30  -----  47  -----
14  -----  31  -----  48  -----
15  -----  32  -----  49  -----
16  -----  33  -----  50  -----
17  -----  34  -----

Channel : 0000CH  Frequency : 1000.000 000MHz  Level : -10dBm
            
```

Access Probe
Start/Stop
Calibration *
Back Screen ->
| 1 | 2 |
| 1 | 2 |
| 1 | 2 |

Access Probe
BS Output Level Cal.
Back Screen ->
| 1 | 2 |

BS Output #
Level

Pilot #
Channel Level

Sync #
Channel Level

Paging #
Channel Level

Traffic #
Channel Level

Main Func
On **Off**

Fig. 4-11 (1/3) Access Probe Measure Screen

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

MT8801 99/12/31 12:00:00 **M**
 << Access Probe Measure (CDMA) >>
 U

Measure State : Running

Measured Level of Access Probes (-- bursts / 999 Frames)

AP	Frame	Level	AP	Frame	Level	AP	Frame	Level
1	-----	18	-----	35	-----			
2	-----	19	-----	36	-----			
3	-----	20	-----	37	-----			
4	-----	21	-----	38	-----			
5	-----	22	-----	39	-----			
6	-----	23	-----	40	-----			
7	-----	24	-----	41	-----			
8	-----	25	-----	42	-----			
9	-----	26	-----	43	-----			
10	-----	27	-----	44	-----			
11	-----	28	-----	45	-----			
12	-----	29	-----	46	-----			
13	-----	30	-----	47	-----			
14	-----	31	-----	48	-----			
15	-----	32	-----	49	-----			
16	-----	33	-----	50	-----			
17	-----	34	-----					

Channel : 0000CH Frequency : 1000.000 000MHz Level : -10dBm

BS Output # Level	Pilot # Channel Level	Sync # Channel Level	Paging # Channel Level	Traffic # Channel Level	Main Func On Off
----------------------	-----------------------------	----------------------------	------------------------------	-------------------------------	----------------------------

Fig. 4-11 (2/3) Access Probe Measure Screen

MT8801 99/12/31 12:00:00 **M**
 << Access Probe Measure (CDMA) >>
 U

Measure State : Stop

Measured Level of Access Probes (25 bursts / 999 Frames)

AP	Frame	Level	AP	Frame	Level	AP	Frame	Level
1	10	-10.2dBm	18	199	-6.9dBm	35		
2	21	-9.2dBm	19	208	-6.0dBm	36		
3	29	-8.0dBm	20	234	-10.1dBm	37		
4	39	-7.1dBm	21	242	-9.1dBm	38		
5	47	-6.0dBm	22	252	-8.0dBm	39		
6	62	-10.3dBm	23	265	-7.1dBm	40		
7	199	-9.1dBm	24	277	-6.2dBm	41		
8	199	-8.1dBm	25	284	-30.5dBm	42		
9	199	-6.9dBm	26	299	-58.2dBm	43		
10	199	-6.0dBm	27	316	-100.1dBm	44		
11	120	-9.9dBm	28	331	-82.7dBm	45		
12	131	-8.9dBm	29			46		
13	143	-8.0dBm	30			47		
14	150	-7.0dBm	31			48		
15	157	-6.1dBm	32			49		
16	170	-10.0dBm	33			50		
17	190	-7.9dBm	34					

Channel : 0000CH Frequency : 1000.000 000MHz Level : -10dBm

BS Output # Level	Pilot # Channel Level	Sync # Channel Level	Paging # Channel Level	Traffic # Channel Level	Main Func On Off
----------------------	-----------------------------	----------------------------	------------------------------	-------------------------------	----------------------------

Fig. 4-11 (3/3) Access Probe Measure Screen

Section 4 Operation

The 2nd page of the main function keys on the Access Probe Measure screen



- Function keys:

Main function key:

1st page

- [BS Output Level] F1: Sets the level of output from the MT8801C.
 Initial value: -55.0 dBm
 Setting range: -133.0 dBm to -18.0 dBm (RF Output: Main, AWGN Off)
 -133.0 dBm to +2.0 dBm (RF Output: AUX, AWGN Off)
 -133.0 dBm to -24.0 dBm (RF Output: Main, AWGN On)
 -133.0 dBm to -4.0 dBm (RF Output: AUX, AWGN On)
 Resolution: 0.1 dB
- [Pilot Channel Level] F2: Sets the level of Pilot Channel output from the MT8801C.
 Initial value: -7.0 dB
 Setting range: -5.0 dB to -10.0 dB, 0 dB
 Setting 0 dB at Pilot Channel can be performed only by GPIB
 command. (See para. 2.5.8 of Remote Control volume of this
 manual.)
 Resolution: 0.1 dB
- [Sync Channel Level] F3: Sets the level of Sync Channel output from the MT8801C.
 Initial value: -16.0 dB
 Setting range: -7.0 dB to -20.0 dB
 Resolution: 0.1 dB
- [Paging Channel Level] F4: Sets the level of Paging Channel output from the MT8801C.
 Initial value: -12.0 dB
 Setting range: -7.0 dB to -20.0 dB (Paging Data Rate: "Full")
 Resolution: 0.1 dB
- [Traffic Channel Level] F5: Sets the level of Traffic Channel output from the MT8801C.
 Initial value: -16.0 dB
 Setting range: -7.0 dB to -20.0 dB (Data Rate: "Full")
 -10.0 dB to -23.0 dB (Data Rate: "1/2")
 -13.0 dB to -26.0 dB (Data Rate: "1/4")
 -16.0 dB to -29.0 dB (Data Rate: "1/8")
 Resolution: 0.1 dB

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

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[Reference Level] F3: Sets the reference level of signal input to the MT8801C.
Initial value: 30 dBm
Setting range: 42 dBm to -60 dBm (RF Input: Main)
22 dBm to -60 dBm (RF Input: AUX)
Resolution: 1 dB

Function keys

1st page

[Start/Stop] F7: Starts the Access Probe Power measurement. (Note)
[Calibration] F10: Displays the level calibration execution menu.
 [Int. Osc. Calibration] F8: Performs the level calibration using an internal oscillator.
 Calibration progress window is displayed during calibration.
 [Calibration Cancel] F9: Cancels the level calibration data.
 [return] F12: Returns to the previous menu.
[Back Screen] F12: Displays the previous screen.

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[BS Output Level Cal.] F7: Performs the level calibration of the BS Output Level.
[Back Screen] F12: Displays the previous screen.

Note:

Single key or Continuous key can start this measurement, where the Continuous key forcibly makes the single operation.
The single measurement measures the number of frames set in Measuring Period. (See paragraph 4.3.6 (1).)

Section 4 Operation

(8) Open Loop Power Control Time Response measurement: Open Loop Time Response screen

• The Open Loop Time Response screen appears by the following operation:

Step	Key operation	Description
1.	[Main Func on off] F6	Sets the Main Func on to display the Main Menu at the bottom of the screen.
2.	[TX&RX Tester] F1	Sets TX&RX Tester mode. The Setup Common Parameter screen appears.
3.	[TX Measure] F1	Displays the first page of the TX Measure menu.
4.	Next Menu [◀]	Displays the second page of the Main Func menu.
5.	[Start] F5	Sets Call Processing state to Idle.
6.	Connect call.	Turn on the power of the mobile station under test. Wait until the Call Processing state becomes Idle (Regist) after Registration.
7.	[NW Originate] F2	Sets Call Processing state to Loop Back.
8.	[Open Loop Power Cont] F10	Displays the Open Loop Time Response screen.

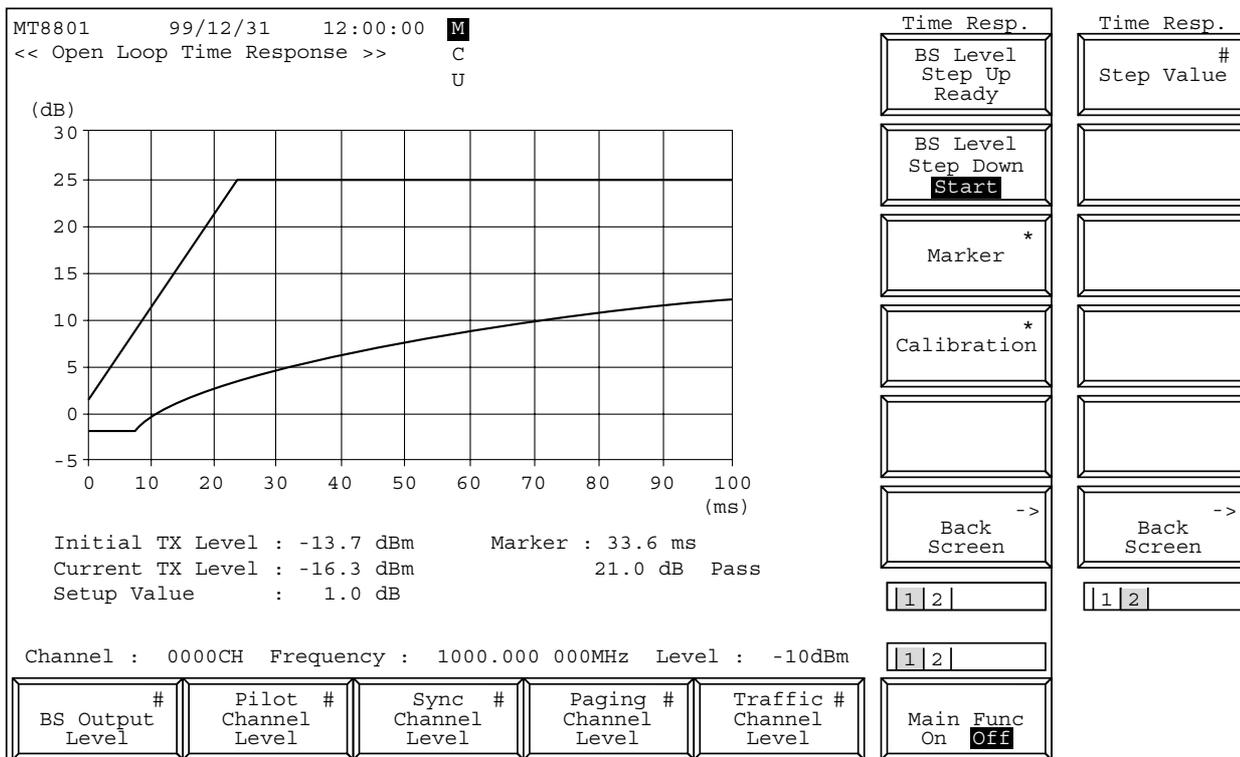


Fig. 4-12 Open Loop Time Response Screen

The 2nd page of the main function keys on the Open Loop Time Response screen



4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

- Function keys:

Main function keys

1st page

- [BS Output Level] F1: Sets the level of output from the MT8801C.
Initial value: -55.0 dBm
Setting range: -133.0 dBm to -18.0 dBm (RF Output: Main, AWGN Off)
-133.0 dBm to +2.0 dBm (RF Output: AUX, AWGN Off)
-133.0 dBm to -24.0 dBm (RF Output: Main, AWGN On)
-133.0 dBm to -4.0 dBm (RF Output: AUX, AWGN On)
Resolution: 0.1 dB
- [Pilot Channel Level] F2: Sets the level of Pilot Channel output from the MT8801C.
Initial value: -7.0 dB
Setting range: -5.0 dB to -10.0 dB, 0 dB
Setting 0 dB at Pilot Channel can be performed only by GPIB command. (See para. 2.5.8 of Remote Control volume of this manual.)
Resolution: 0.1 dB
- [Sync Channel Level] F3: Sets the level of Sync Channel output from the MT8801C.
Initial value: -16.0 dB
Setting range: -7.0 dB to -20.0 dB
Resolution: 0.1 dB
- [Paging Channel Level] F4: Sets the level of Paging Channel output from the MT8801C.
Initial value: -12.0 dB
Setting range: -7.0 dB to -20.0 dB (Paging Data Rate: "Full")
Resolution: 0.1 dB
- [Traffic Channel Level] F5: Sets the level of Traffic Channel output from the MT8801C.
Initial value: -16.0 dB
Setting range: -7.0 dB to -20.0 dB (Data Rate: "Full")
-10.0 dB to -23.0 dB (Data Rate: "1/2")
-13.0 dB to -26.0 dB (Data Rate: "1/4")
-16.0 dB to -29.0 dB (Data Rate: "1/8")
Resolution: 0.1 dB

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- [Channel] F1: Sets the Channel number.
Initial value: 1
Setting range: 1 to 799, 900 to 1023 (Band: 800 MHz)
- [Reference Level] F3: Sets the reference level of signal input to the MT8801C.
Initial value: 30 dBm
Setting range: 42 dBm to -60 dBm (RF Input: Main)
22 dBm to -60 dBm (RF Input: AUX)
Resolution: 1 dB

Section 4 Operation

Function keys

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- [BS Level Step Up Ready] F7: Prepares the Step Up of the BS Output Level. (Initial state) (Note)
- [BS Level Step Up Start] F7: Starts measurement with increasing the MT8801C BS Output Level by a Step value.
- [BS Level Step Down Start] F8: Starts measurement with decreasing the MT8801C BS Output Level by a Step value.
(Initial state) (Note)
- [BS Level Step Down Ready] F8:
Prepares the Step Down of the BS Output Level.
- [Marker] F9:
Displays the Marker menu.
- [Normal] F7:
 Sets normal marker mode.
 Sets the MT8801C to marker position input wait state.
 Range: 0 to 100 ms
 Resolution: 0.1
 Initial value:
- [Off] F8:
 Cancels marker mode and erases the displayed marker. (Initial value)
- [return] F12:
 Returns to the previous menu.
- [Calibration] F10:
Displays the level calibration execution menu.
- [Int. Osc. Calibration] F8:
 Executes level calibration using an internal oscillator.
 During calibration, the window indicating that calibration is being executed is displayed on the screen.
- [Calibration Cancel] F9:
 Deletes level calibration data.
- [return] F12:
 Returns to the previous menu.
- [Back Screen] F12:
Displays the previous screen.

2nd page

- [Step Value] F7:
Sets the step value to increase/decrease the BS Output level.
 Range: 10 to 20 dB
 Resolution: 0.1 dB
 Initial value: 20.0 dB
- [Back Screen] F12:
Displays the previous screen.

Note:

Single key or Continuous key can start this measurement, where the Continuous key forcibly makes the single operation.

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

(9) Measuring the occupied frequency bandwidth: Occupied Bandwidth screen

Use the parameters set on the Setup Common Parameter screen (see paragraph 4.3.5) to measure an occupied frequency bandwidth of a send signal from the transmitter.

- Display the Occupied Bandwidth screen according to the following steps:

Step	Key operation	Description
1.	[Main Func on off] F6	Sets the Main Func on to display the Main Menu at the bottom of the screen.
2.	[TX & RX Tester] F1	Sets TX Tester mode. The Setup Common Parameter screen appears.
3.	[TX Measure] F1	Displays the first page of the TX Measure menu.
4.	[Occupied Bandwidth] F11	Displays the Occupied Bandwidth screen.

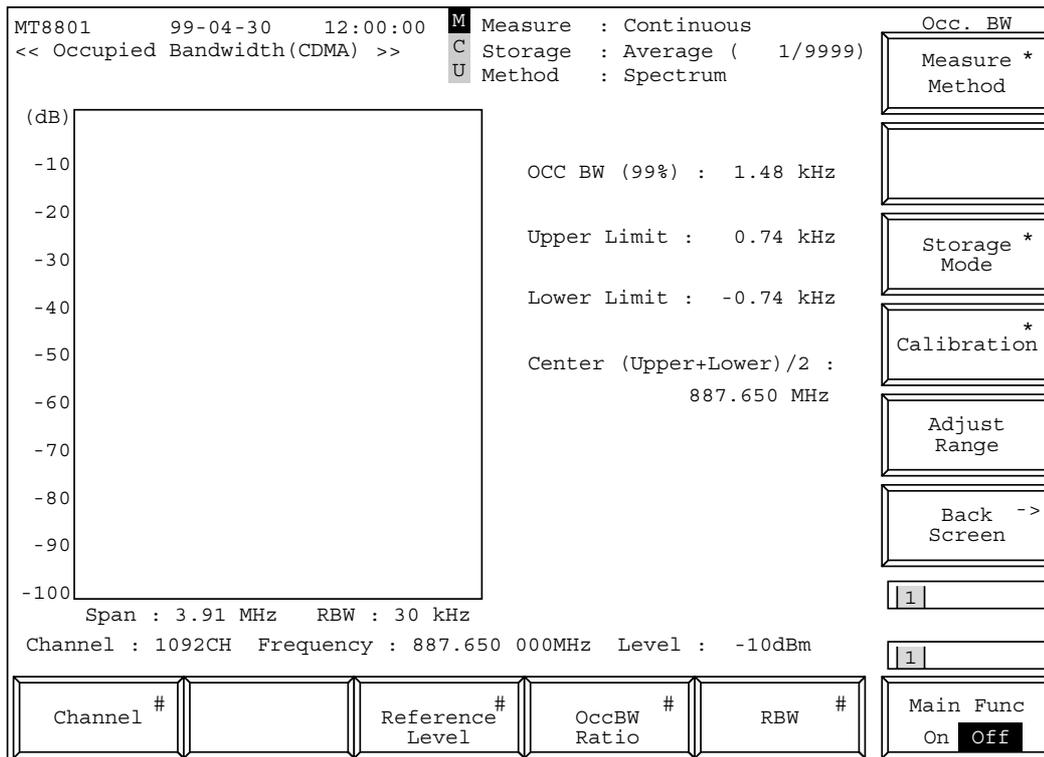


Fig. 4-13 Occupied Bandwidth Screen

Notes:

- A spectrum measurement waveform is displayed in the window.
- The vertical axis scale is fixed to 0 to -100 dB.
- The reference level is that set on the Setup Common Parameter screen. If the set level is significantly different from the input signal level, use the [Adjust Range] (F11) key to make it appropriate, then measure the occupied frequency bandwidth.

Section 4 Operation

- Function keys

Main function keys:

- [Channel] F1: Changes the channel number.
- [Reference Level] F3: Changes the reference level.
- [OccBW Ratio] F4: Sets the percentage of total power that resides in the occupied bandwidth.
 - Initial Value: 99.0 %
 - Range: 80.0 to 99.9 %
 - Resolution: 0.1
- [RBW] F5: Displays the resolution bandwidth (RBW) menu.
 - Range: 10 kHz, 30 kHz (Initial value)

Function keys:

- [Measure Method] F7: Displays the measurement method (99 % method) selection menu.
 - [Spectrum] F7: Measures the occupied frequency bandwidth by using the spectrum analyzer method.
 - VBW: 30 kHz
 - SWP Time: When Data Rate is Full : 100 ms
 - When Data Rate is 1/2 or less : 10 s
 - [FFT] F8: Measures the occupied frequency bandwidth at high speed by using the fast Fourier transform (FFT) method.
 - (Span: 1.95 MHz)
 - [return] F12: Returns to the previous menu.
- [Storage Mode] F9: Displays the storage mode setup menu.
 - [Normal] F7: Sets normal mode (initial value).
 - [Average] F8: Sets averaging mode.
 - The Measure mode is set to Single.
 - [Average Count] F9: Sets the averaging count.
 - 2 to 9999, Resolution: 1, Initial value: 10
 - [return] F12: Returns to the previous menu.
- [Calibration] F10: Displays the level calibration menu.
 - [Manual Calibration] F7: Performs level calibration.
 - During calibration, the window indicating that calibration in progress is displayed on the screen.
 - At Main input: Calibrates using Power Meter and calibration oscillator.
 - [Calibration Cancel] F8: Deletes the level calibration data.
 - [return] F12: Returns to the previous menu.
- [Adjust Range] F11: Sets the measurement level range (RF power meter range and reference level) to the status appropriate for measurement signals.
- [Back Screen] F12: Displays the previous screen.

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

(10) Spurious close to the Carrier measurement: Spurious close to the Carrier screen, Setup Spurious Template screen

Measures adjacent spurious of transmission signal (of transmitter) using parameters set on Setup Common Parameter screen (paragraph 4.3.5).

Also, sets the spurious waveform template (amplitude standard line) at Setup Spurious Template screen, and can save/recall upto 100 types to/from an FD (3.5-inch floppy disk) at Save Spurious Template screen or Recall Spurious Template screen. Note that the template can be displayed only at 5 MHz frequency span.

(a) Measurement of Spurious close to the carrier: Spurious close to the carrier screen

- Display the Spurious close to the Carrier screen according to the following steps:

Step	Key operation	Description
1.	[Main Func on off] F6	Sets the Main Func on to display the Main Menu at the bottom of the screen.
2.	[TX & RX Tester] F1	Sets TX Test mode. The Setup Common Parameter screen appears.
3.	[TX Measure] F1	Displays the first page of the TX Measure menu.
4.	[Next Menu] [▲]	Displays the second page of the TX Measure menu.
5.	[Spurious close to the Carrier] F11	Displays the Spurious close to the Carrier screen.

Section 4 Operation

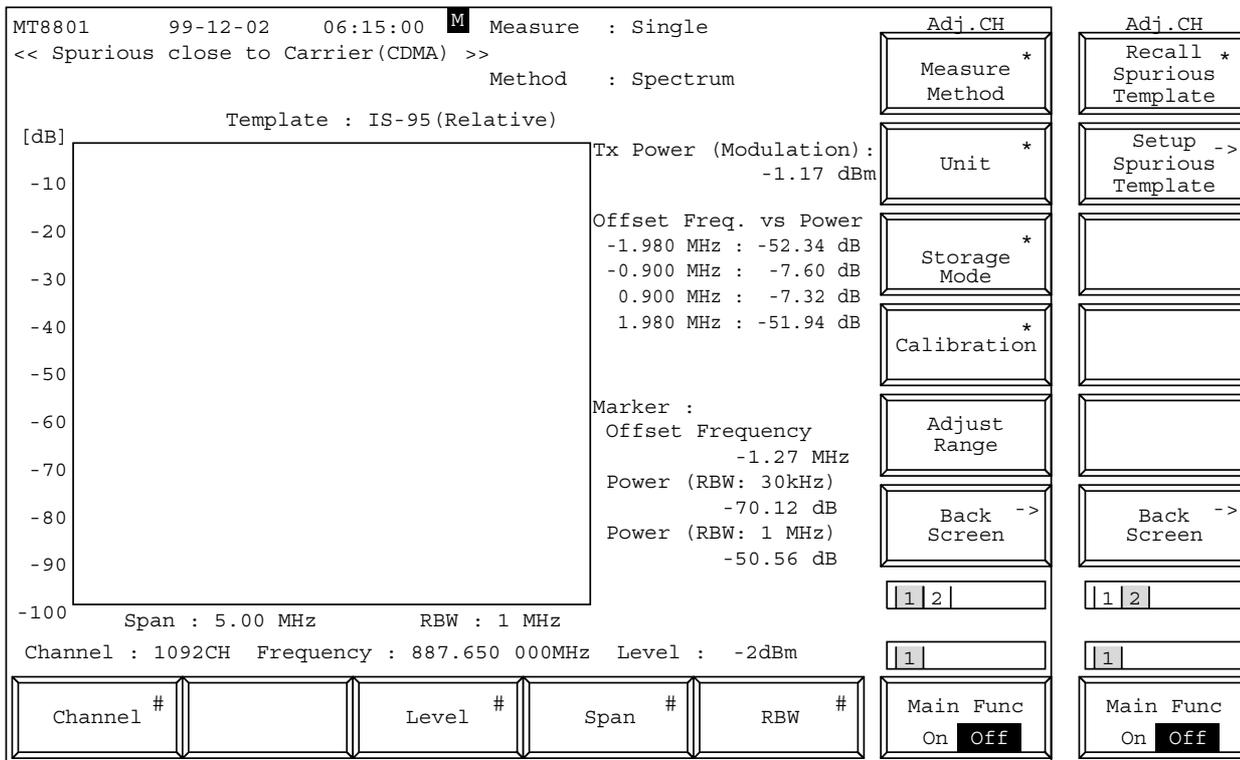


Fig. 4-14 Spurious close to the Carrier Screen (Measurement method: Spectrum, RBW: 1.23 MHz)

Notes:

1. When RBW is 30 kHz, the measurement waveform by spectrum analyzer is displayed.
 When RBW is 1 MHz or 1.23 MHz, the measurement waveform by spectrum analyzer and the accumulated data by digital processing are displayed.
2. Offset Freq. vs Power displays the measured results by the selected RBW.
3. Template judgment is performed for the measured results by the selected RBW.
4. When Data Rate is 1/2, 1/4, or 1/8; Tx Power (Modulation) is displayed.

• Function key

Main function key:

- [Channel] F1: Changes the Channel number.
- [Level] F3: Changes the reference level.
- [Span] F4: Changes the frequency span.
- [RBW] F5: Displays the resolution bandwidth (RBW) menu. 30kHz (Initial value), 1 MHz, 1.23 MHz settings are possible.
 When the frequency span is 25 MHz, this menu is not displayed, and RBW is fixed to 30 kHz.

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

Function key:

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[Measure Method] F7:	Displays the selection menu for the measurement method.
[Spectrum] F7:	Uses the spectrum analyzer method.
[Return] F12:	Returns to the previous menu.
[Unit] F8:	Displays the menu for the power measurement value units.
[dBm] F7:	Sets power measurement unit to dBm. (Initial value)
[mW] F8:	Sets power measurement unit to mW.
[uW] F9:	Sets power measurement unit to uW.
[nW] F10:	Sets power measurement unit to nW.
[dB] F11:	Sets power measurement unit to dB.
[Return] F12:	Returns to the previous menu.
[Storage Mode] F9:	Set-up Menu for Storage Mode is displayed.
[Normal] F7:	Sets Normal Mode. (Initial value)
[Average] F8:	Sets Averaged Mode. Measure Mode becomes Single.
[Average Count] F9:	Sets Averaged Count. 2 to 9999, resolution: 1, initial value: 10
[return] F12:	Returns to the previous menu
[Calibration] F10:	Displays menu for executing the level calibration.
[Manual Calibration] F7:	Executes level calibration. During calibration, a window indicating the execution of calibration is displayed. For Main input: Calibrates by the Power Meter and calibration oscillator.
[Calibration Cancel] F8:	Stops the calibration.
[Return] F12:	Returns to the previous menu.
[Adjust Range] F11:	Sets measurement level ranges (range and reference level of the RF power meter) to optimal ranges.
[Back Screen] F12:	Displays the previous screen.

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[Recall Template] F7:	Displays menu for calling the template to measure spurious emission. (See paragraph 4.3.11)
[Setup Template] F8:	Displays setting screen of the template for spurious emission measurement. (See paragraph 4.3.6 (10) (b)).
[Back Screen] F12:	Displays the previous menu.

Section 4 Operation

(b) Setting spurious template screen: Setup Spurious Template Screen

- Display the Setup Spurious Template Screen in the following operation.

Step	Key operation	Description
1.	[Main Func on off] F6	Turns on the Main Func, and displays the main menu on the bottom of the screen.
2.	[TX & RX Tester] F1	Switches to the TX Tester mode. Displays the Setup Common Parameter Screen.
3.	[TX Measure] F1	Displays the first page of the TX Measure menu.
4.	[Next Menu] [▲]	Displays the second page of the TX Measure menu.
5.	[Spurious close to the Carrier] F11	Displays the Spurious close to the Carrier Screen. Displays the first page of the Spurious close to the Carrier menu.
6.	Next Menu [▲]	Displays the second page of the Spurious close to the Carrier menu.
7.	[Setup Template] F8	Displays the Setup Spurious Template screen.

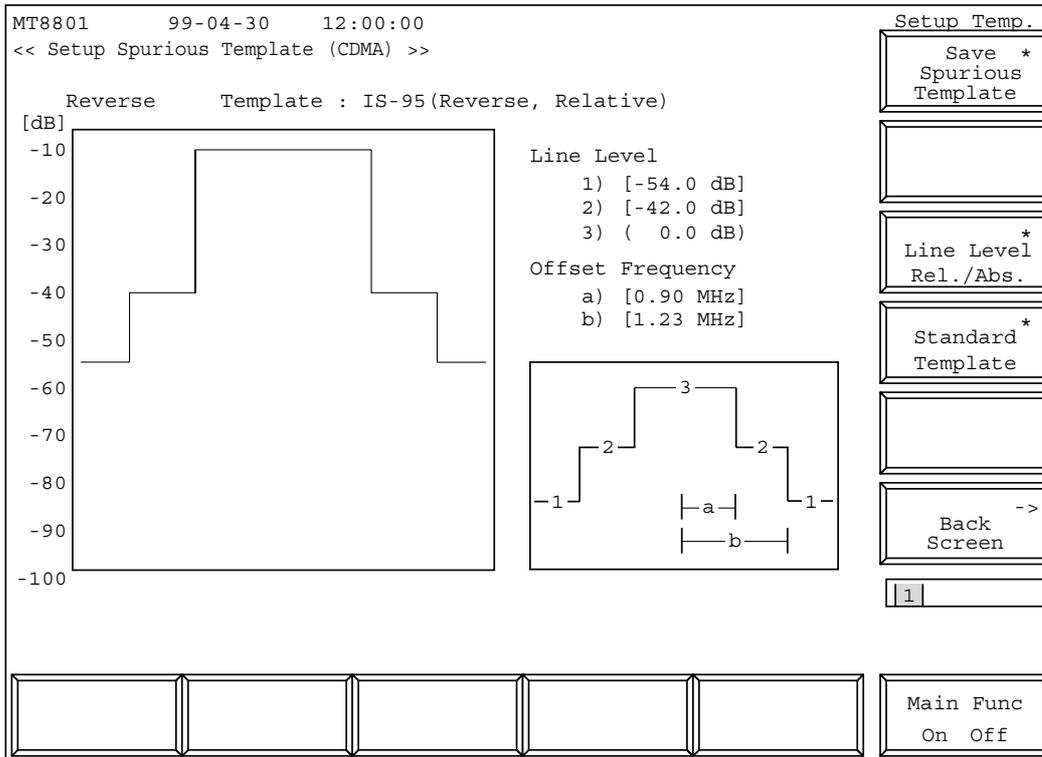


Fig. 4-15 Setup Spurious Template Screen (IS-95 Standard Relative-value display)

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

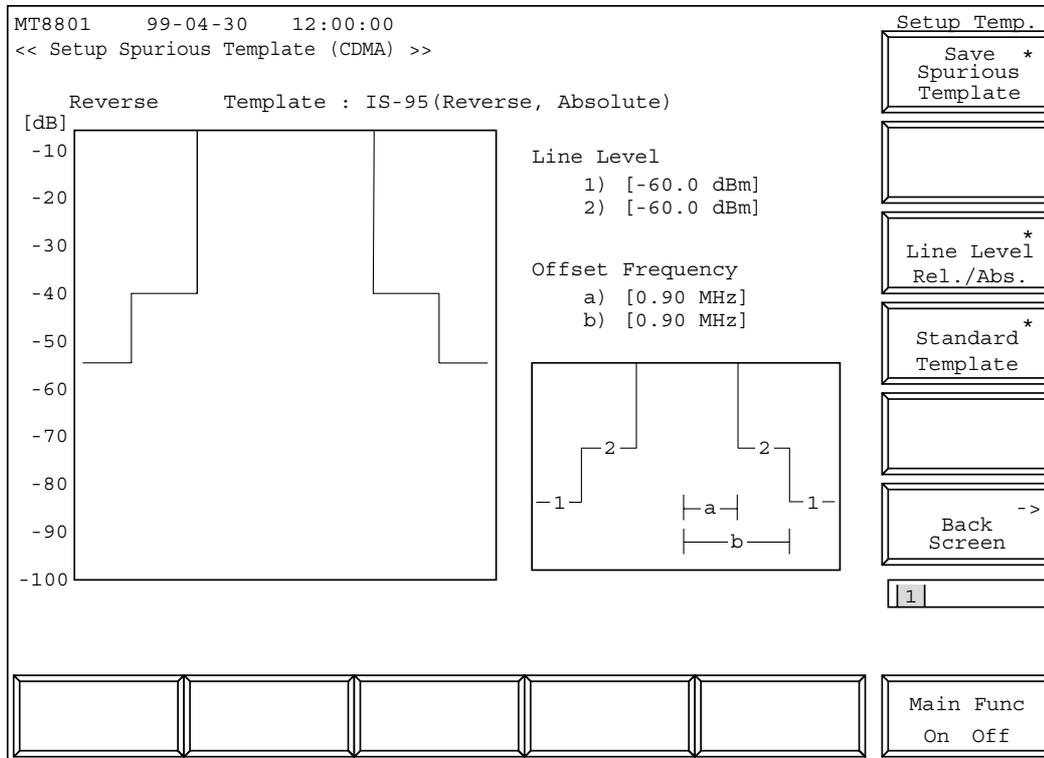


Fig. 4-16 Setup Spurious Template Screen (IS-95 Standard Absolute-value display)

Notes:

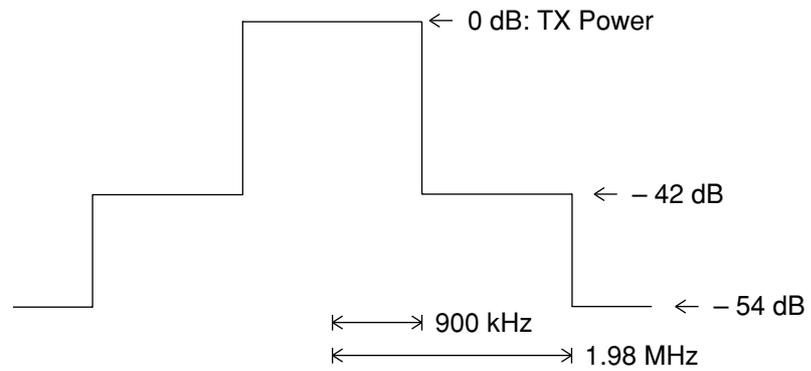
1. If the called template is modified, the name becomes “Not Named”. This denotes that the template is not saved in the internal memory.
2. When the Line Level Rel./Abs. is set to Absolute, Line Level 3 is not displayed.

Section 4 Operation

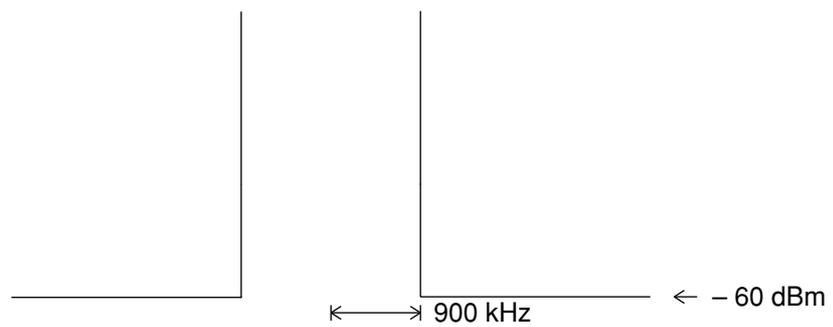
- Standard data of the Template

a) IS-95, ARIB, MKK Standard

- Relative value



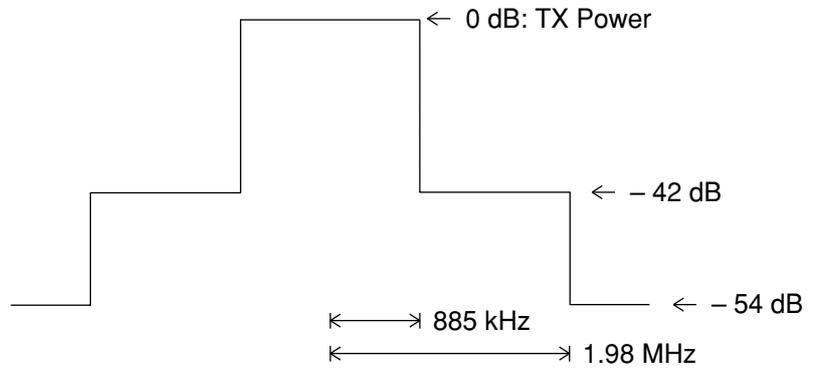
- Absolute value



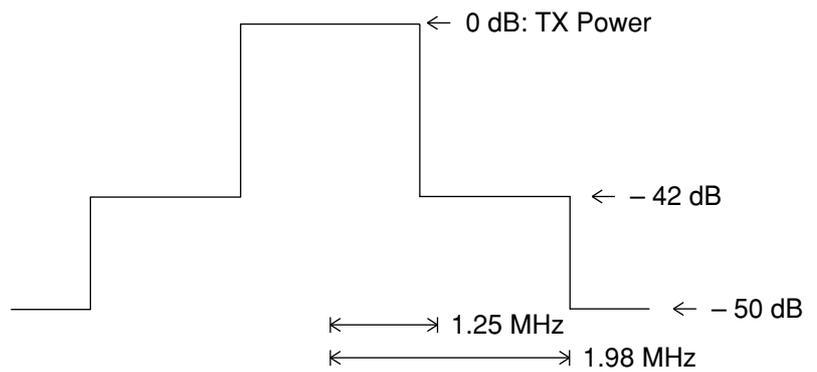
4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

b) IS-95B Standard

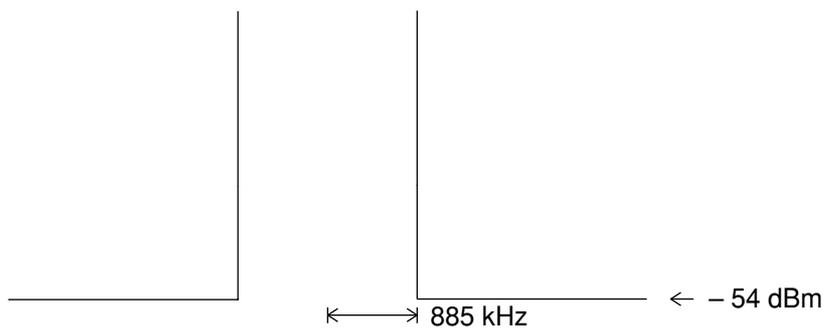
- Relative value (1)



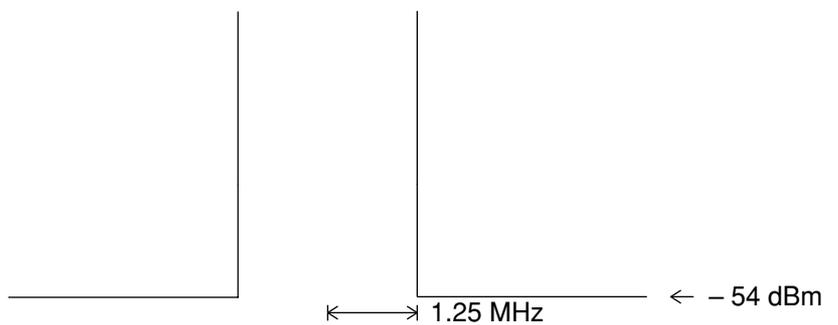
- Relative value (2)



- Absolute value (1)



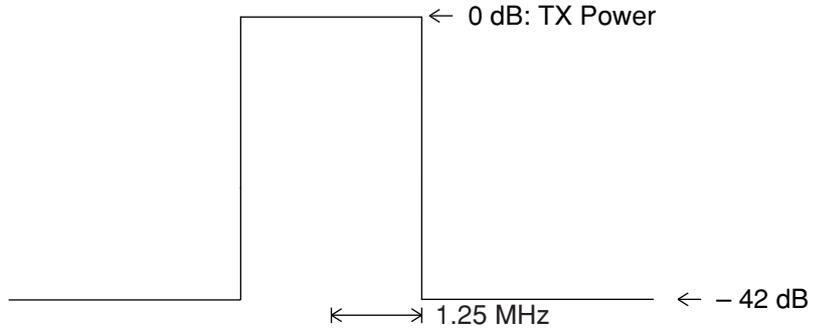
- Absolute value (2)



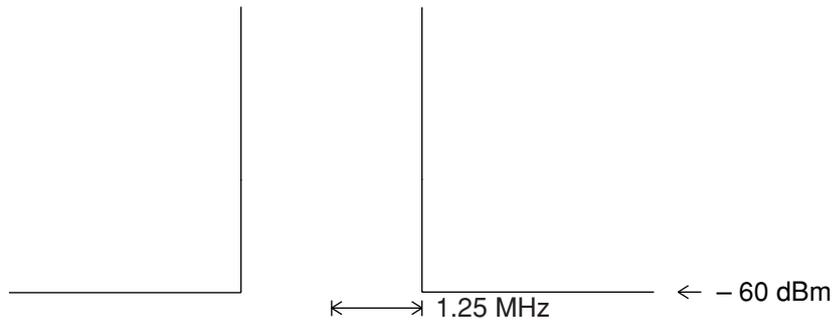
Section 4 Operation

c) J-STD-008 Standard

- Relative value



- Absolute value



- Set items of the Setup Spurious Template Screen are shown below.

Item	Range	Resolution	Initial value
Line Level			
1	-100.0 to (Set value of Line Level 2) dB/dBm	0.1 dB/dBm	IS-95 Standard value
2	(Set value of Line Level 1) to 0.0 dB/dBm	0.1 dB/dBm	IS-95 Standard value
Offset Frequency			
a	0.10 to (Set value of Offset Frequency b) MHz	0.01 MHz	IS-95 Standard value
b	(Set value of Offset Frequency a) to 2.50 MHz	0.01 MHz	IS-95 Standard value
Line Level			
1	-100.0 to (Set value of Line Level 2) dB/dBm	0.1 dB/dBm	IS-95 Standard value
2	(Set value of Line Level 1) to 0.0 dB/dBm	0.1 dB/dBm	IS-95 Standard value
Offset Frequency			
a	0.10 to (Set value of Offset Frequency b) MHz	0.01 MHz	IS-95 Standard value
b	(Set value of Offset Frequency a) to 2.50 MHz	0.01 MHz	IS-95 Standard value

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

- Function key

Main function key:	None
Function key:	
[Save Spurious Template] F7:	Displays the menu for saving the spurious measurement template. (See paragraph 4.3.11)
[Line Level Rel./Abs.] F9:	Displays the menu for absolute/relative selection of the template level.
[Relative] F7:	Sets the template level to relative display (dB). (Initial value)
[Absolute] F8:	Sets the template level to absolute display (dBm).
[return] F12:	Returns to the previous menu.
[Standard Template] F10:	Displays the menu of the standard template selection.
[IS-95] F7:	Displays the menu for selecting IS-95 standard template.
[Relative Template] F7:	Displays the relative display template.
[Absolute Template] F8:	Displays the absolute display template.
[return] F12:	Returns to the previous menu.
[ARIB] F8:	Displays the menu for selecting ARIB standard template.
[Relative Template] F7:	Displays the relative display template.
[Absolute Template] F8:	Displays the absolute display template.
[return] F12:	Returns to the previous menu.
[MKK] F9:	Displays the menu of MKK standard template.
[Relative Template] F7:	Displays the relative display template.
[Absolute Template] F8:	Displays the absolute display template.
[return] F12:	Returns to the previous menu.
[IS-95B] F10:	Displays the menu for selecting IS-95B standard template.
[Relative Template 1] F7:	Displays the relative value (1) template.
[Relative Template 2] F8:	Displays the relative value (2) template.
[Absolute Template 1] F9:	Displays the absolute value (1) template.
[Absolute Template 2] F10:	Displays the absolute value (2) template.
[return] F12:	Returns to the previous menu.
[J-STD-008] F11:	Displays the menu for selecting J-STD-008 standard template.
[Relative Template] F7:	Displays the relative display template.
[Absolute Template] F8:	Displays the absolute display template.
[return] F12:	Returns to the previous menu.
[return] F12:	Returns to the previous menu.
[Back Screen] F12:	Returns to the previous screen.

Section 4 Operation

(11) Spurious measurement: Spurious Emission screen, Setup Frequency Table screen

Measures the specified spurious emission of the signal from the transmitter according to the specified parameter in the Setup Common Parameter Screen (paragraph 4.3.5).

Sets a table of measuring spurious frequency (Setup Frequency Table Screen), and 100 different table saving (Save Frequency Table Screen) and recalling (Recall Frequency Table Screen) can be done in the FD (3.5-inch floppy disk).

(a) Spurious measurement: Spurious Emission Screen

- Display the Spurious Emission Screen in the following operation.

Step	Key operation	Description
1.	[Main Func on off] F6	Turns on the Main Func, and displays the main menu at the bottom of the screen.
2.	[TX & RX Tester] F1	Switches to the TX Tester mode. Displays the Setup Common Parameter Screen.
3.	[TX Measure] F1	Displays the first page of the TX Measure menu.
4.	Next Menu [▲]	Displays the second page of the TX Measure menu.
5.	[Spurious Emission] F12	Displays the Spurious Emission Screen.

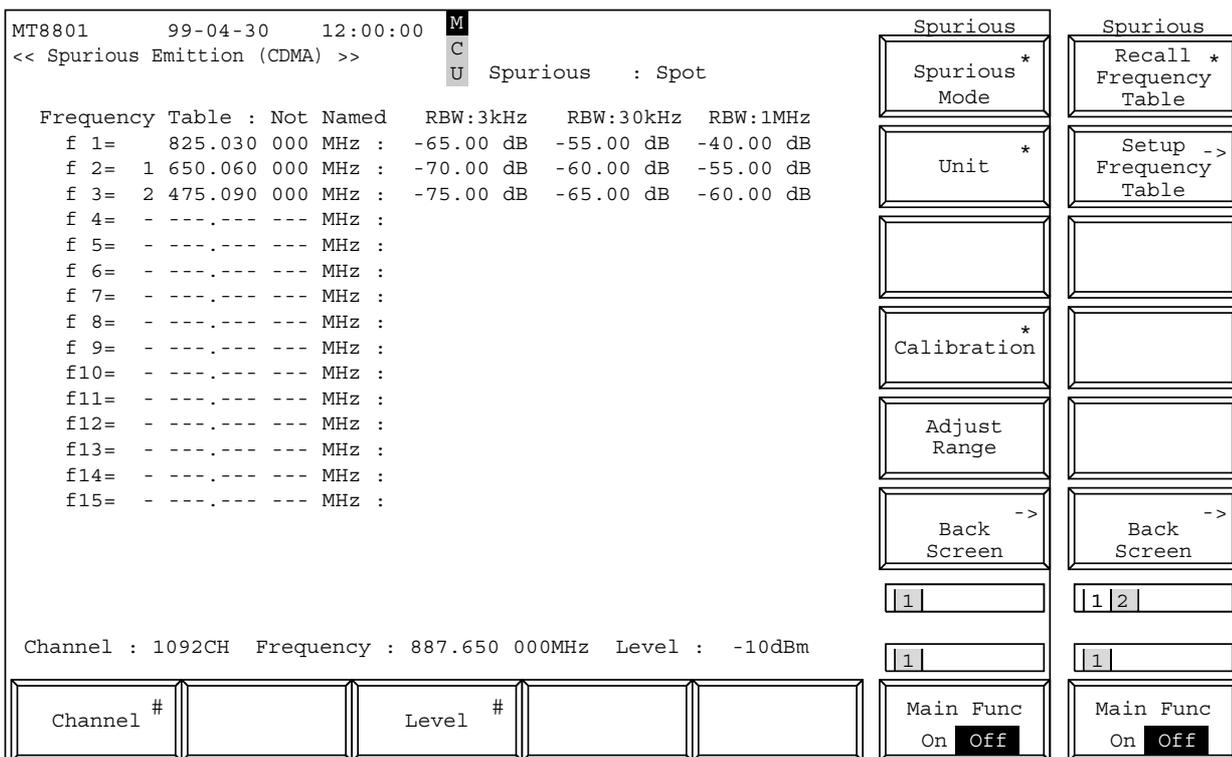


Fig. 4-17 Spurious Emission Screen

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

Notes:

1. Forced to single measurement.
2. For a frequency of 1.6 GHz or more, a high pass filter is used for the measurement.

- Function key

Main function key:

[Channel] F1: Changes the Channel number.

[Level] F3: Changes the reference level.

Function key:

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[Spurious Mode] F7: Displays a selection menu of measurement method.

[Spot] F7: Measures levels based on the frequency table. (Initial value)

[Search] F8: Sweeps ± 500 kHz centering the spurious frequency on the frequency table, then finds and displays the maximum level measured.

[Return] F12: Returns to the previous menu.

[Unit] F8: Displays the menu for the power measurement value units.

[dBm] F7: Sets power measurement unit to dBm. (Initial value)

[mW] F8: Sets power measurement unit to mW.

[uW] F9: Sets power measurement unit to uW.

[nW] F10: Sets power measurement unit to nW.

[dB] F11: Sets power measurement unit to dB.

[Return] F12: Returns to the previous menu.

[Calibration] F10: Displays menu for executing the level calibration.

[Manual Calibration] F7: Executes level calibration.

During calibration, a window indicating the execution of calibration is displayed.

At Main input: Calibrates by the Power Meter and calibration oscillator.

[Calibration Cancel] F8: Stops the calibration.

[Return] F12: Returns to the previous menu.

[Adjust Range] F11: Specifies measurement level ranges (range and reference level of the RF power meter) to optimal ranges.

[Back Screen] F12: Displays the previous screen.

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[Recall Frequency Table] F7: Displays menu for calling the frequency table to measure spurious emission. (See paragraph 4.3.11)

[Setup Frequency Table] F8: Displays setting screen of the frequency table for spurious emission measurement. (See paragraph 4.3.6 (11) (b))

[Back Screen] F12: Displays the previous menu.

Section 4 Operation

(b) Setting of frequency table for spurious measurement: Setup Frequency Table Screen

- Display the Setup Frequency Table Screen as follows.

Step	Key operation	Description
1.	[Main Func on off] F6	Turns on the Main Func and displays the main menu at the bottom of the screen.
2.	[TX & RX Tester] F1	Switches to the TX Tester mode. Displays the Setup Common Parameter Screen.
3.	[TX Measure] F1	Displays the first page of the TX Measure.
4.	Next Menu [▲]	Displays the second page of the TX Measure.
5.	[Spurious Emission] F12	Displays the Spurious Emission Screen. Displays the first page of the Spurious Emission menu.
6.	Next Menu [▲]	Displays the second page of the Spurious Emission menu.
7.	[Setup Frequency table] F8	Displays the Setup Frequency Table Screen.

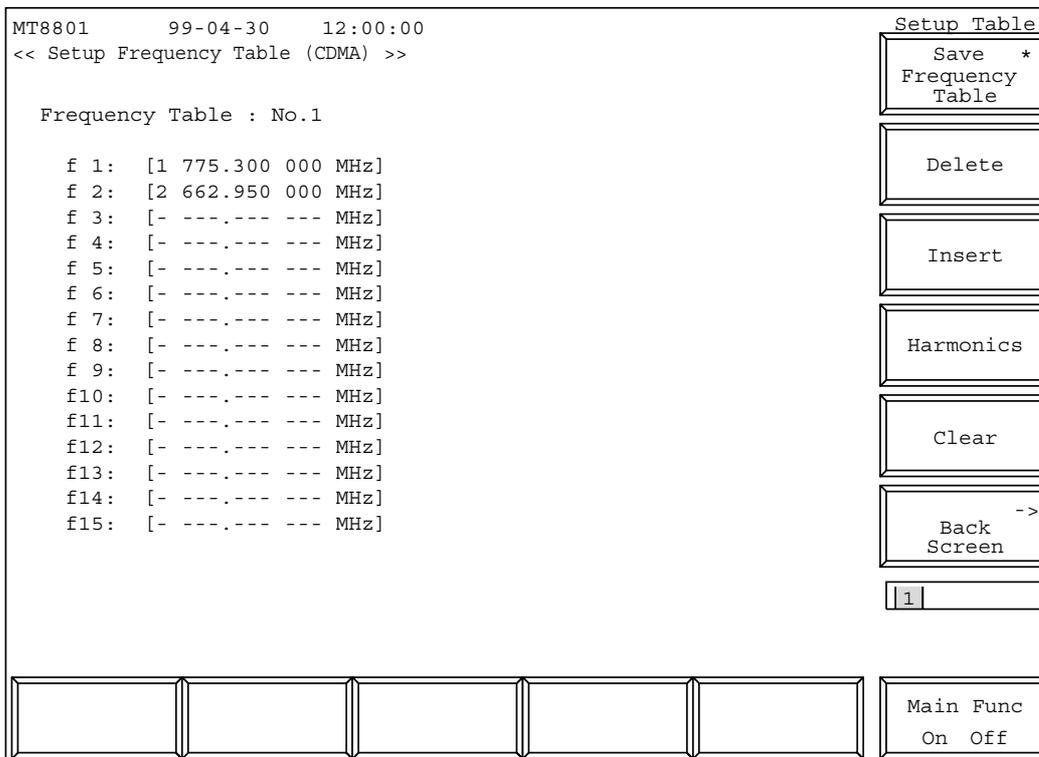


Fig. 4-18 Setup Frequency Table Screen

Note:

If the recalled frequency is modified, the frequency table name becomes “Not Named” to indicate that the table is not saved in the FD.

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

- Items to be set in the Setup Frequency Table Screen are listed below.

Item	Range	Resolution	Initial value
Frequency			
f 1	100 Hz to 3 GHz	1 Hz	1775.300000 MHz
f 2	100 Hz to 3 GHz	1 Hz	2662.950000 MHz
f 3	100 Hz to 3 GHz	1 Hz	——.—— MHz (Undefined)
f 4	100 Hz to 3 GHz	1 Hz	——.—— MHz (Undefined)
f 5	100 Hz to 3 GHz	1 Hz	——.—— MHz (Undefined)
f 6	100 Hz to 3 GHz	1 Hz	——.—— MHz (Undefined)
f 7	100 Hz to 3 GHz	1 Hz	——.—— MHz (Undefined)
f 8	100 Hz to 3 GHz	1 Hz	——.—— MHz (Undefined)
f 9	100 Hz to 3 GHz	1 Hz	——.—— MHz (Undefined)
f10	100 Hz to 3 GHz	1 Hz	——.—— MHz (Undefined)
f11	100 Hz to 3 GHz	1 Hz	——.—— MHz (Undefined)
f12	100 Hz to 3 GHz	1 Hz	——.—— MHz (Undefined)
f13	100 Hz to 3 GHz	1 Hz	——.—— MHz (Undefined)
f14	100 Hz to 3 GHz	1 Hz	——.—— MHz (Undefined)
f15	100 Hz to 3 GHz	1 Hz	——.—— MHz (Undefined)

- Function key

Main function key: None

Function key:

1st page

[Save Frequency Table] F7: Displays the menu for saving frequency table. (See paragraph 4.3.8)

[Delete] F8: Deletes the frequency at cursor position, and scrolls up by one line all frequencies below.

[Insert] F9: Scrolls down by one line all frequencies below cursor and makes one space line for input of frequency data.

[Harmonics] F10: Sets f1, f2, and f3--- to 2, 3, and 4--- times frequency of the Setup Common Parameter Screen. However, frequencies over 3 GHz are not set.

[Clear] F11: Deletes all the displayed frequencies.

[Back Screen] F12: Displays the previous screen.

2nd page

[Recall Frequency Table] F7: Displays the menu for frequency table recall. (See paragraph 4.3.11)

[Back Screen] F12: Displays the previous screen.

Section 4 Operation

(12) Transmitter measurement example

An example of transmitter measurement (modulation analysis and Access Probe output power measurement) using the mobile station of CDMA as the measured equipment is given below.

1. Setup

As described in paragraph 4.3.1 (1), connect the MT8801C to the measured equipment (mobile station).

2. Setting and measurement procedures

Perform transmission measurement (modulation analysis and Access Probe output power measurement) as described below.

Step	Operation
(Checking and setting the measurement interface)	
1.	Press function key F6 (Main Func) to the Main Func “On”.
2.	Press the Next Menu key [◀] and function key F2 (Instrument Setup) in this order to switch to the Instrument Setup screen.
3.	Check that the RF Input/Output item is set to Main. If necessary, change the set value (Note).
4.	Press function key F6 (Main Func) to the Main Func “On”.
5.	Press function key F1 (TX/RX Measure) to enter TX/RX Measure mode (Setup Common Parameter screen).
(Setting the Setup Common Parameter screen)	
6.	Sets the specification using the current specification.
7.	Set the measurement frequency or channel. (Example: Set Band to 800 MHz and Channel to 1CH.)
8.	Set Reference Level and BS Output Level.
9.	For the type of signal of the measuring object, set each the item (Service Option etc.) of the signal.
(Setting the Setup TX Parameter screen)	
10.	Press function key F1 (TX Measure) to enter TX measurement mode.
11.	Press the Next Menu key [▶] and function key F9 (Setup Digital TX Parameter) in this order to switch to the Setup Digital TX Measure Parameter screen.
12.	If necessary, set User Cal Factor. For details of the contents and steps, see paragraph 4.3.1 (3).
13.	Set the Access Parameter, Measuring Period and Measuring Number of the parameters for Access Probe output power measurement. (See paragraph 4.3.6 (1).)
14.	Press function key F12 (Back Screen) to return to the Setup Common Parameter screen. (Setting the Setup Call Processing Parameter screen)
15.	Press function keys F3 (Call Processing) and F9 (Setup Call Proc. Parameter) in this order to switch to the Setup Call Processing Parameter screen.
16.	Set SID, NID, and BASE_ID.
17.	Press function key F12 (Back Screen) to return to the Setup Common Parameter screen.

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

Step	Operation
(Connecting call)	
18.	Press the Next Menu [◀] key and function key F5 (Start) in this order to set the Call Proc. state to Idle.
19.	Turn on the power of the mobile station under test.
20.	Confirm that the Registration is executed for the mobile station and the Idle (Regist) state comes on.
(Setting and measurement on Access Probe Measure screen)	
21.	Press the Next Menu key [◀] and function key F1 (TX Measure) in this order to switch to the TX Measure mode.
22.	Press the Next Menu key [▲] and function key F8 (Access Probe Measure) in this order to move to the Access Probe Measure screen.
23.	Press the function key F7 (Start/Stop) to start the Access Probe measurement. The measurement ends after the set numbers of frames or access probes are measured. Press the function key F7 (Start/Stop) during measurement to stop the measurement. Press the Single key or Continuous key to start the measurement.
24.	After measurement, press the function key F12 (Back Screen) to return to Setup Common Parameter screen.
(Setting and measurement on Modulation Analysis screen)	
25.	Press the Next Menu key [◀] and function key F2 (NW Originate) in this order to set the Call Proc. state to Loop Back.
26.	Press function key F1 (TX Measure), then press function key F8 (Modulation Analysis) in this order to switch to the Modulation Analysis screen.
27.	Press function key F11 (Adjust Range) to optimize the measurement range.
28.	If the Single or Continuous key is pressed after terminating the optimization, the modulation precision is measured and the result is displayed.
29.	If function key F9 (Storage Mode) is pressed, the function keys for measurement mode selection are displayed. The Normal measurement mode (Normal) or average measurement mode (Average) can be selected. If the Single or Continuous key is pressed after the setting, the modulation accuracy is measured again.
30.	After measurement, press the function key F12 (Back Screen) to return to Setup Common Parameter screen.
(Disconnecting call)	
31.	Press the Next Menu key [◀] and function key F2 (NW Release) in this order to set Call Proc. state to Idle (Regist).
32.	Press the function key F5 (Stop) to set Call Proc. state to Stop.

Note:

Use the Main RF signal connector for the measured equipment unless the level range is OK.

4.3.7 Analog transmitter measurement

Set Control Band to A800MHz on the Setup Common Parameter screen, then press the [TX Measure] F1 main function key to set analog transmitter measurement mode. This paragraph describes the following analog transmitter measurement items:

1. Setting parameters (Setup Analog TX Measure Parameter screen)
2. Signal generator + analog transmitter measurement (Analog TX Meas with SG screen)

(1) Setting the parameters: Setup Analog TX Measure parameter screen

Set the Analog transmitter measurement parameters on Setup Analog TX Measure Parameter screen. measurements.

Switch to the Setup Analog TX Measure Parameter screen according to the following steps:

Step	Key operation	Description
1.	[Main Func on off] F6	Sets Main Func on to display the first page of the Main Menu at the bottom of the screen.
2.	[TX&RX Tester] F1	Sets the TX&RX Tester mode. The Setup Common Parameter screen appears.
3.	Cursor [^][v][<][>] [Set] [^][v] [Set]	Move the cursor to Control Band. Select A800 MHz and press the [Set] key to validate it.
4.	[TX Measure] F1	Displays the first page of the TX Measure menu.
5.	Next Menu [▲]	Displays the second page of the TX Measure menu.
6.	[Setup Analog TX Parameter] F9	Displays the Setup Analog TX Measure Parameter screen.

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

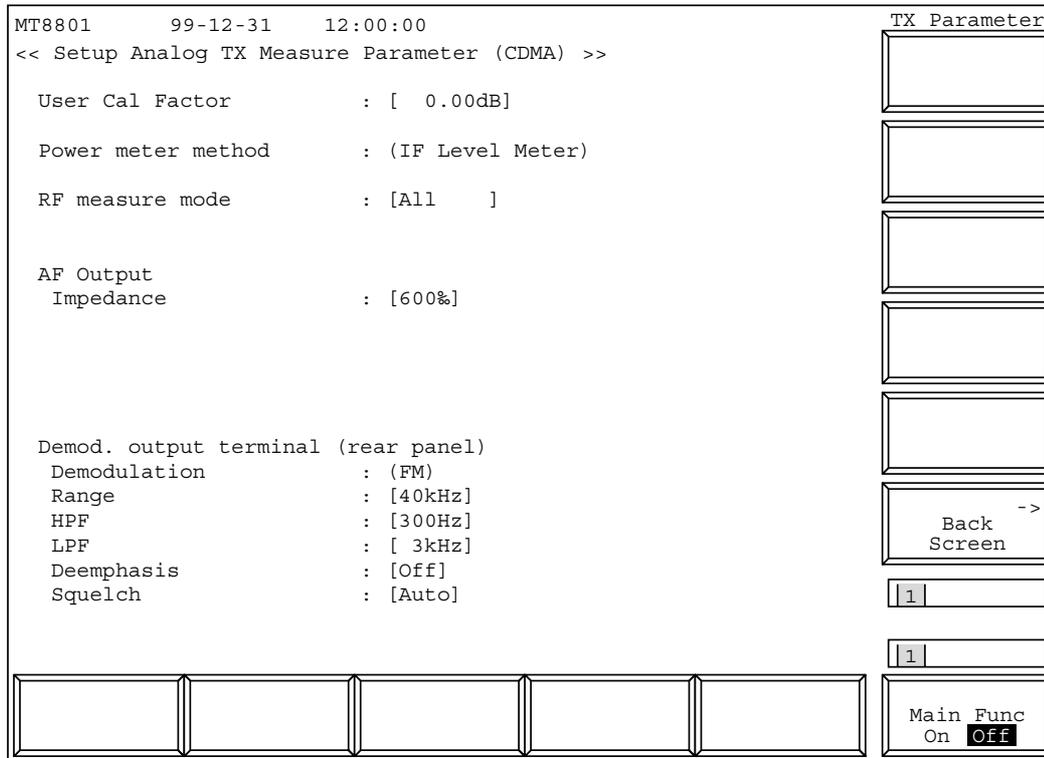


Fig. 4-19 Setup Analog TX Measure Parameter screen

- Set the following items.

Item	Range	Initial value	
User Cal Factor	-30.00 to 30.00 dB, 0.01 dB step	0.00 dB	
RF measure mode	All, RF only	All	Note 2
AF Output Impedance	50 Ω, 600 Ω	600 Ω	
Demod. output terminal			
Range	40 kHz, 4 kHz	40 kHz	
HPF	300 Hz, off	300 Hz	
LPF	3 kHz, off	3 kHz	
De-emphasis	on, off	off	
Squelch	Auto, off	Auto	

Note 1 :

RF Power measurement method is fixed to the IF Level Meter method.

Note 2 :

In the RF Only mode, only both the RF Freq. and RF Power are measured for transmitter measurement.

AF values (Deviation, AF Level, AF Freq., and Distortion) are not measured. These not-measured AF items are indicated by - mark.

- Main-function key: None
- Function key:
[Back Screen] F12 Returns to the Setup Common Parameter screen.

Section 4 Operation

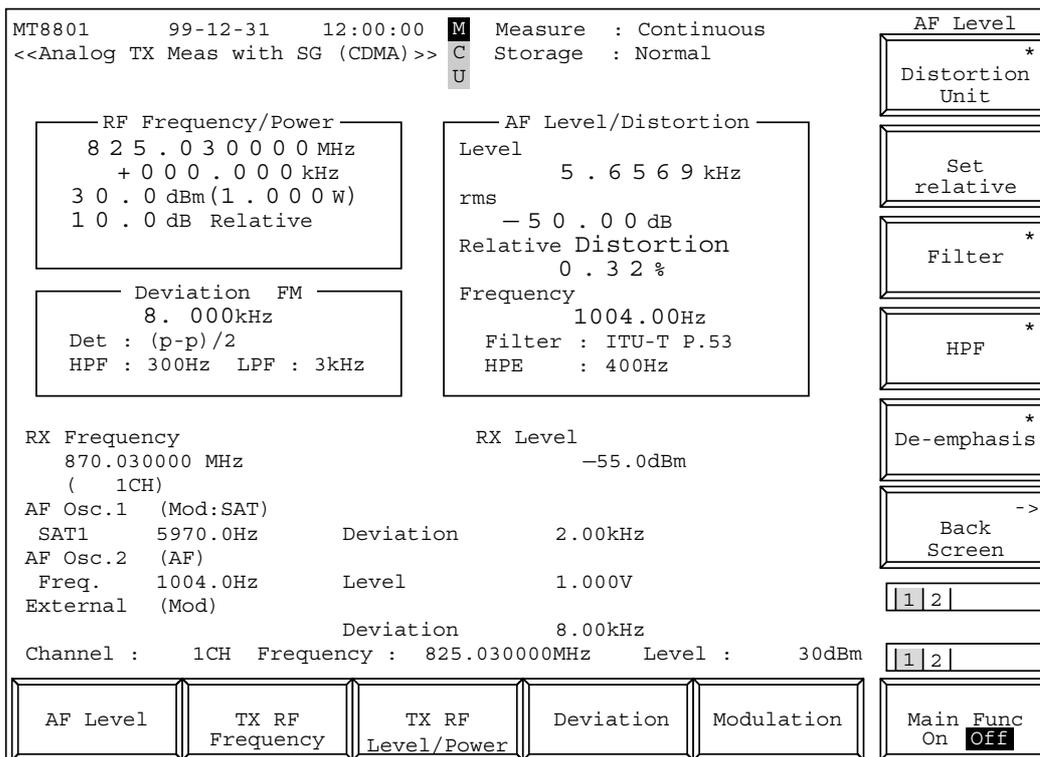
(2) Signal generator + analog transmitter measurement: Analog TX Meas with SG screen

On the Analog TX Meas with SG screen, output an RF signal from the MT8801B and measure the RF signal from the DUT.

AF Osc.2 signal can also be output to the AF output terminal as required.

Switch to the Analog TX Meas with SG screen according to the following steps:

Step	Key operation	Description
1.	[Main Func on off] F6	Sets Main Func on to display the first page of the Main Menu at the bottom of the screen.
2.	[TX&RX Tester] F1	Sets the TX&RX Tester mode. The Setup Common Parameter screen appears.
3.	Cursor [^][v][<][>] [Set] [^][v] [Set]	Move the cursor to Control Band. Select A800 MHz and press the [Set] key to validate it.
4.	Next Menu [◀]	Displays the second page of the Main Func menu.
5.	[Start] F5	Call Proc. State becomes Idle state.
6.	Power On	Turns the power of the MS to on. Wait until the MS is registered and the Call Proc. State becomes Idle (Regist).
7.	[NW Originate] F2	Call Proc. State becomes Conversation.
8.	[TX Measure] F1	Displays the first page of the TX Measure menu.
9.	[Analog TX Meas with SG] F10	Displays the Analog TX Meas with SG screen.



4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

The 2nd page of the main function keys on the Analog TX Meas with SG screen. (Call Proc.: Conversation)



The 2nd page of the main function key on the Analog TX Meas with SG screen. (Call Proc.: Stop)



Note 1:

Relative values (RF Power and AF Level, which are always displayed) are displayed with --. dB until the [Set Relative] F8 key is pressed.

Note 2:

When RF measure mode is RF only mode on the Setup Analog TX Measure Parameter screen, only RF Frequency and RF Power are measured.

Note that - is displayed for the measured values of Deviation and AF Level/ Distortion.

Note 3:

When the Call Proc. State is “conversation,” AF Osc.1 is used for SAT modulation and it cannot be changed.

Section 4 Operation

- Main-function keys:

1st page

- | | |
|------------------------|--|
| [AF Level] F1 | Displays the RX AF Level function keys on F7 to F12.
(Settings for demodulating the RF signal from the transmitter, the same as the 2nd-page F1 key) |
| [TX RF Frequency] F2 | Displays the TX RF Frequency function keys on F7 to F12.
(Only the frequency channel for transmission and reception can be changed.) |
| [TX RF Level/Power] F3 | Displays the TX RF Level/Power function keys on F7 to F12.
(Settings for measuring the RF-signal level/power from the transmitter) |
| [Deviation] F4 | Displays the Deviation function keys on F7 to F12.
(Settings for measuring the FM/øM modulation degree of the RF-signal from the transmitter) |
| [Modulation] F5 | Displays the Modulation function keys on F7 to F12.
(Settings of the modulation degree of the RF signal from the built-in signal generator of the MT8801B, the same as the 2nd-page F5 key) |

2nd page

- | | |
|----------------------|--|
| [AF Level] F1 | Displays the AF Level function keys on F7 to F12.
(Settings for demodulating the RF signal from the transmitter, the same as the 1st-page F1 key) |
| [RX RF Frequency] F2 | Displays the RX RF Frequency function keys on F7 to F12.
(Only the frequency channel for transmission and reception can be changed.) |
| [RX RF Level] F3 | Displays the RX RF Level function keys on F7 to F12.
(Sets the RF signal level from the built-in signal generator of the MT8801B.) |
| [MS Power Level] F4 | Changes the MS (mobile station under test) transmission level. |
| [Modulation] F5 | Displays the Modulation function keys on F7 to F12.
(Settings of the modulation degree of the RF signal from the built-in signal generator of the MT8801C, the same as the 1st-page F5 key) |

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

Function key:

Function keys for 1st page of the main function key— Settings used for TX measurement

- AF Level function keys:

1st page

- | | |
|----------------------|--|
| [Distortion Unit] F7 | Selects the distortion measurement unit of dB or %.
Initial value: % |
| [Set Relative] F8 | Displays the relative value with the reference value that is the measured level when this key is pressed. |
| [Filter] F9 | Selects the estimation filter of ITU-T P.53, C-MESSAGE, 6kHz BPF, or Off.
Initial value: Off |
| [HPF] F10 | Selects the HPF of 400Hz or Off.
Initial value: Off
Note: The HPF of 400 Hz is the filter for tone signal rejection. |
| [De-emphasis] F11 | Selects the De-emphasis of 750 μ s or Off.
Initial value: Off |
| [Back Screen] F12 | Returns to the Setup Common Parameter screen. |

2nd page

- | | |
|--------------------|---|
| [Storage Mode] F9 | Displays the Storage Mode menu for all the measured results on the screen. |
| [Normal] F7 | Sets normal mode. (Initial value) |
| [Average] F8 | Sets average mode. |
| [Average Count] F9 | Sets number of Averaging processings.
$2 \leq \text{Set value} \leq 9999$
Initial value: 10
(In the average mode, the measurement is of single mode, which displays the averaged results in each measurement, and stops measurement when the Average Count reached.) |
| [return] F12 | Returns to the AF Level menu. |
| [Back Screen] F12 | Returns to the Setup Common Parameter screen. |

- TX RF Frequency function keys:

- | | |
|--------------------|---|
| [Frequency] F7 | Changes the RF frequency measured by the transmitter. This parameter cannot be specified when the Call Proc. State is “conversation”. |
| [Channel] F8 | Changes the channel number. (See para. 4.4 for the changing method.) |
| [Back Screen] F12 | Returns to the Setup Common Parameter screen. |

Section 4 Operation

- TX RF Level/Power function keys:

1st page

[Ref Level] F7	Changes the reference level. (See para. 4.4 for the changing method.)
[Set Relative] F8	Displays the relative value with the reference value that is the measured level when this key is pressed.
[Storage Mode] F9	Displays the Storage Mode menu for all the measured results on the screen.
[Normal] F7	Sets normal mode. (Initial value)
[Average] F8	Sets average mode.
[Average Count] F9	Sets number of Averaging processings. $2 \leq \text{Set value} \leq 9999$ Initial value: 10 (In the average mode, the measurement is of single mode, which displays the averaged results in each measurement, and stops measurement when the Average Count reached.)
[return] F12	Returns to the TX RF Level/Power menu.
[Calibration] F10	Displays the level calibration menu. Disappears when the Power measure method is set to Power Meter on the Setup TX Measure Parameter (Analog) screen.
[Manual Calibration] F7	Performs the absolute level calibration, which calibrates the measured results of IF Level Meter using the built-in Power Meter. During calibration, the window indicating calibration in progress is displayed on the screen.
[Calibration Cancel] F8	Deletes level calibration data.
[return] F12	Returns to the TX RF Level/Power menu.
[Adjust Range] F11	Sets the measurement level ranges (RF power meter range and reference level) to the status appropriate for measurement signals.
[Back Screen] F12	Returns to the Setup Common Parameter screen.

2nd page

[Power Meter Zero Set] F11	Calibrates the Power-Meter zero point. (Set the input level of the Main Input/Output connector to 0, then press this key to perform zero-point calibration of the Power Meter, automatically.)
[Back Screen] F12	Returns to the Setup Common Parameter screen.

Note:

When the unit key [dB μ /V] pressed, it is assumed as “dB μ ” for RF level setting, and as “V” for AF level setting.

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

- Deviation function keys:

1st page

[Demod.] F7

Selects the demodulation function of FM (measurement unit: kHz) or ϕM (measurement unit: rad).

Initial value: FM

[Relative On Off] F8

Displays the relative value with the reference value that is the measured level when this key is pressed.

Initial value: Off

[Det Mode] F9

Selects the detection mode of:

1st page: (P-P)/2, +P, -P, RMS

2nd page: (P-P)/2 Hold, +P Hold, -P Hold

Initial value: (P-P)/2

[HPF] F10

Selects the HPF of 300 Hz, 50 Hz, or Off.

Initial value: Off

[LPF] F11

Selects the LPF of 3 kHz, 15 kHz, or Off.

Initial value: Off

[Back Screen] F12

Returns to the Setup Common Parameter screen.

2nd page

[Storage Mode] F9

Displays the Storage Mode menu for all the measured results on the screen.

[Normal] F7

Sets normal mode. (Initial value)

[Average] F8

Sets average mode.

[Average Count] F9

Sets number of Averaging processings.

$2 \leq \text{Set value} \leq 9999$

Initial value: 10

(In the average mode, the measurement is of single mode, which displays the averaged results in each measurement, and stops measurement when the Average Count reached.)

Note that the Power Meter has not the average mode.

[return] F12

Returns to the Deviation menu.

[Back Screen] F12

Returns to the Setup Common Parameter screen.

Section 4 Operation

- Modulation function keys:

1st page -----

AF Osc.1 is used only to modulate (Mod) the internal signal generator (SG) in this device. When the Call Proc. State is “conversation”, it is used for SAT modulation; so, the frequency, deviation, and On/Off setting cannot be changed.

[AF Osc.1 Frequency] F8

Sets AF Osc.1 frequency (modulation frequency of the internal signal generator).

20.0 Hz ≤ Set value ≤ 20 000.0 Hz, 0.1 Hz step

Initial value: 1 004.0 Hz

(When the same frequency as of AF Osc.2 is specified at Mod, the deviation is obtained by the addition of the respective deviation set value.)

[AF Osc.1 Deviation] F9

Sets the FM deviation of the internal signal generator by the AF Osc.1 output. 0.00 kHz ≤ Set value ≤ 40.00 kHz, 0.01 kHz step

Initial value: 8.00 kHz

[AF Osc.1 On Off] F11

Sets the AF Osc.1 output to on and off to set the modulation by AF Osc.1 of the internal signal generator to on and off.

(When the output is off, the [AF Osc.1 Deviation] F9 key is not displayed, and the deviation cannot be specified.)

Initial value: On

[Back Screen] F12

Returns to the Setup Common Parameter screen.

2nd page -----

Sets AF Osc. 1 for modulating (Mod) the built-in signal generator (SG) of the MT8801B, or for AF signal output (AF) from the AF Output connector on the front panel.

[AF Osc.2 Signal] F7 —

Displays the AF Osc.2 Signal menu.

[AF Signal] F7

Selects AF-Osc. 2 signal type of Tone, Noise (ITU-T G.227), or Noise (White).

When Noise is set, displays “Noise (Noise type)” at the frequency display area.

Initial value: Tone

[Output for Mod AF] F8

Selects the AF Osc.2 signal usage for Mod (SG modulation signal) or AF (AF signal output from AF Output connector).

Initial value: Mod

[return] F12

Returns to the Modulation menu.

[AF Osc.2 Frequency] F8

In Mod mode, sets the modulation frequency of SG.

In AF mode, sets the frequency of the AF signal output from the AF Output connector.

When the AF Osc. 2 Signal type is Noise, this item disappears.

20.0 Hz ≤ Set value ≤ 20 000.0 Hz, 0.1 Hz step

Initial value: 1 004.0 Hz

[AF Osc.2 Deviation] F9

In Mod mode, sets the FM deviation of SG.

In AF mode, this item disappears.

0.00 kHz ≤ Set value ≤ 40.00 kHz, 0.01 kHz step

Initial value: 8.00 kHz

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

[AF Osc.2 Level] F10	<p>In AF mode, sets the AF signal output level as shown below. Initial value: 100.0 mV When 600 Ω is set for Impedance of AF Output on the Setup Analog TX Measure Parameter screen:</p> <ul style="list-style-type: none">• For Tone of signal type 0.400 V < Set value \leq 3.000 V, 0.001 V step 40.0 mV < Set value \leq 400.0 mV, 0.1 mV step 4.00 mV < Set value \leq 40.00 mV, 0.01 mV step 0.010 mV < Set value \leq 4.000 mV, 0.001 mV step• For Noise of signal type 0.150 V < Set value \leq 1.500 V, 0.001 V step 15.0 mV < Set value \leq 150.0 mV, 0.1 mV step 1.50 mV < Set value \leq 15.00 mV, 0.01 mV step 0.010 mV < Set value \leq 1.500 mV, 0.001 mV step <p>When 50 Ω is set for Impedance of AF Output on the Setup Analog TX Measure Parameter screen:</p> <ul style="list-style-type: none">• For Tone of signal type 40.0 mV < Set value \leq 400.0 mV, 0.1 mV step 4.00 mV < Set value \leq 40.00 mV, 0.01 mV step 0.010 mV < Set value \leq 4.000 mV, 0.001 mV step• For Noise of signal type 15.0 mV < Set value \leq 150.0 mV, 0.1 mV step 1.50 mV < Set value \leq 15.00 mV, 0.01 mV step 0.010 mV < Set value \leq 1.500 mV, 0.001 mV step <p>In Mod mode, this item disappears.</p>
[AF Osc.2 On Off] F11	<p>In Mod mode, turns on/off the FM deviation of SG by AF Osc. 2. In AF mode, turns on/off the AF output. (When off, the [AF Osc. 2 Deviation] F9 key and [AF Osc. 2 Level] F10 key disappear, and deviation or level cannot be set.) Initial value: Off</p>
[Back Screen] F12	<p>Returns to the Setup Common Parameter screen.</p>
	<p>Note: When the unit key [dBμ/V] pressed, it is assumed as “dBμ” for RF level setting, and as “V” for AF level setting.</p>
3rd page --- External input signal (from the Ext FM Input connector on rear panel) is used for FM modulation of SG.	
[External Deviation] F9	<p>Sets FM deviation of SG using the External FM Input signal. 0.00 kHz \leq Set value \leq 40.00 kHz, 0.01 kHz step Initial value: 8.00 kHz</p>
[External On Off] F11	<p>Turns on/off the External FM Input signal to turn on/off the FM deviation of SG. (When off, the [External Deviation] F9 key disappears, and deviation cannot be set.) Initial value: Off</p>
[Back Screen] F12	<p>Returns to the Setup Common Parameter screen.</p>

Section 4 Operation

Function key:

Function keys for 2nd page of the main function key

- AF Level function key — The same as the AF Level function keys at the 1st page of the main function key
- RX RF Frequency function key:
 - [Incremental Step Value] F7 Sets the step value to up/down the RF frequency of the built-in signal generator (SG) of the MT8801B with [Step] keys.
1 Hz ≤ Set value ≤ 3 GHz, 1 Hz step
Initial value: 1 MHz
 - [Relative On Off] F8 Displays the relative value with the reference value that is the set value when this key is pressed.
Initial value: Off
When the frequency is set with numeric keys in Relative On mode, it becomes the actual output frequency (not relative value).
Relative displayed value = Set value by numeric keys - value when this key is pressed
 - [Channel] F9 Changes the channel number. (See para. 4.4 for changing method.)
 - [Back Screen] F12 Returns to the Setup Common Parameter screen.
- RX RF Level function key:
 - 1st page
 - [Incremental Step Value] F7 Sets the step value to up/down the RF level of signal generator with [Step] keys.
Range: 0.1 dB ≤ Set value ≤ 80.0 dB, 0.1 dB step
Initial value: 1.0 dB
 - [Relative On Off] F8 Displays the relative value with the reference value of 0 dB that is the level when this key is pressed.
Initial value: Off
When the level is set with numeric keys in Relative On mode, it becomes the actual output level (not relative value).
Relative displayed value = Set value by numeric keys - value when this key is pressed
 - [Unit EMF TERM] F10 Selects the RF level unit of the open voltage (EMF, dBμ), terminated voltage (TERM, dBμ).
Level can be set at dBμ display. 30 dBμ EMF = 24 dBμ TERM
Initial value: EMF
 - [Back Screen] F12 Returns to Setup Common Parameter screen.

Note:

When the unit key [dBμ/V] pressed, it is assumed as “dBμ” for RF level setting, and as “V” for AF level setting.

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

2nd page

[Offset Value] F7: Sets an offset value in output level offset display mode.

Range: -55.0 to 55.0 dB

Resolution: 0.1 dB

Initial value: 0 dB

[Offset On Off] F8: Increases or decreases the real output level to display.

Displayed value = Real output level value + Offset value

Range: On, Off

Initial value: Off

Note:

If a level is set using a numeric key when this item is On, the value becomes the displayed value.

Real output level value = Displayed value - Offset value

[Back Screen] F12: Displays the previous screen.

- Modulation function key— The same as the Modulation function keys at the 1st page of the main function key

4.3.8 CDMA Receiver measurement

On the Setup Common Parameter screen; set the Control Band to C800MHz or C1.9GHz, and press the [RX Measure] F2 main function key to set CDMA receiver measurement mode.

This paragraph describes how to set parameters (on the Setup RX Measure Parameter screen) and how to measure the frame error rate (on the Frame Error Rate screen) for CDMA receiver measurement.

(1) Setting the parameters: Setup RX Measure Parameter screen

The following describes how to set parameters (on the Setup RX Measure Parameter screen) for receiver measurement.

Display the Setup RX Measure Parameter screen according to the following steps, then set the RX parameters.

Step	Key operation	Description
1.	[Main Func on off] F6	Sets the Main Func on to display the Main Menu at the bottom of the screen.
2.	[TX&RX Tester] F1	Sets TX&RX Tester mode. The Setup Common Parameter screen appears.
3.	[RX Measure] F2	Displays the first page of the RX Measure menu.
4.	Next Menu [▲]	Displays the second page of the RX Measure menu.
5.	[Setup RX Parameter] F9	Displays the Setup RX Measure Parameter screen.

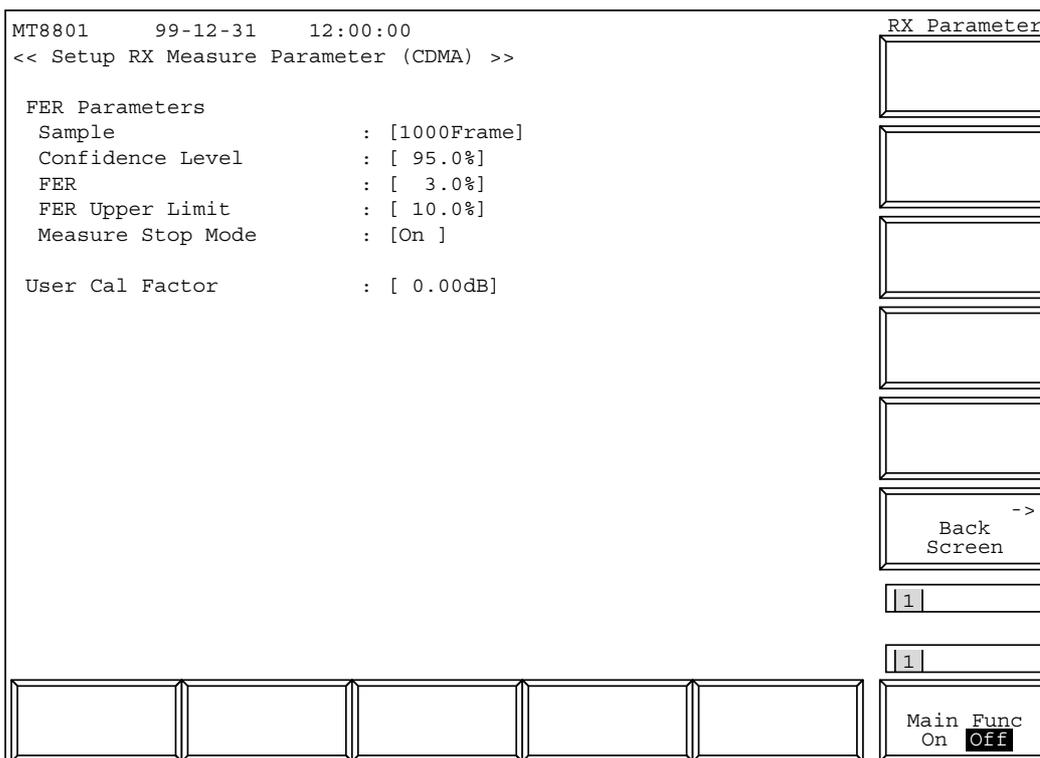


Fig. 4-21 Setup RX Measure Parameter Screen

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

- Set the following items:

Item	Range	Resolution	Initial value	
FER Parameters				
Sample	5 Frame to 10000 Frames	5 Frame	1000 Frames	Note 1
Confidence Level	80.0% to 100.0%	0.1%	95.0%	Note 2
FER	0.0% to 100.0%	0.1%	3.0%	Note 3
FER Upper Limit	0.0% to 100.0%	0.1%	10.0%	Note 4
Measure Stop Mode	On, Off	(None)	On	
User Cal Factor	-55.00 dB to 55.00 dB	0.01 dB	0.00 dB	Note 5

Notes:

1. <Sample>
Sample sets the maximum measuring period in unit of frame.
When the number of the measured frames is reached to the value, the measurement ends.
2. <Confidence Level>
Confidence Level sets the judge threshold for the reliability level.
When the Measure Stop Mode is On and the reliability level is reached to this value, the measurement ends.
3. <FER>
This sets the specification of the FER.
The MT8801C displays the reliability level to this FER value.
4. <FER Upper Limit>
When the Measure Stop Mode is On and the FER is reached to this value, the measurement ends.
5. <User Cal Factor>
When there is a loss in the cable between the mobile-station RF input and the MT8801C RF output, set the User Cal. Factor to convert the BS Output Level to the input level of the mobile station.
For example, when there is a 5-dB loss, set the User Cal. Factor to 5 dB.

- Function key:

Main function key: (None)
Function key:
[Back Screen] F12: Displays the previous screen

Section 4 Operation

(2) Setting signal: Setup Signal screen

Sets the Forward signal at Signal Setup screen.

- The Signal Setup screen appears by the following operation:

Step	Key operation	Description
1.	[Main Func on off] F6	Sets the Main Func on to display the Main Menu at the bottom of the screen.
2.	[TX&RX Tester] F1	Sets TX&RX Tester mode. The Setup Common Parameter screen appears.
3.	[RX Measure] F2	Displays the first page of the RX Measure menu.
4.	Next Menu [▲]	Displays the second page of the RX Measure menu.
5.	[Setup Signal] F10	Displays the Setup Signal screen.

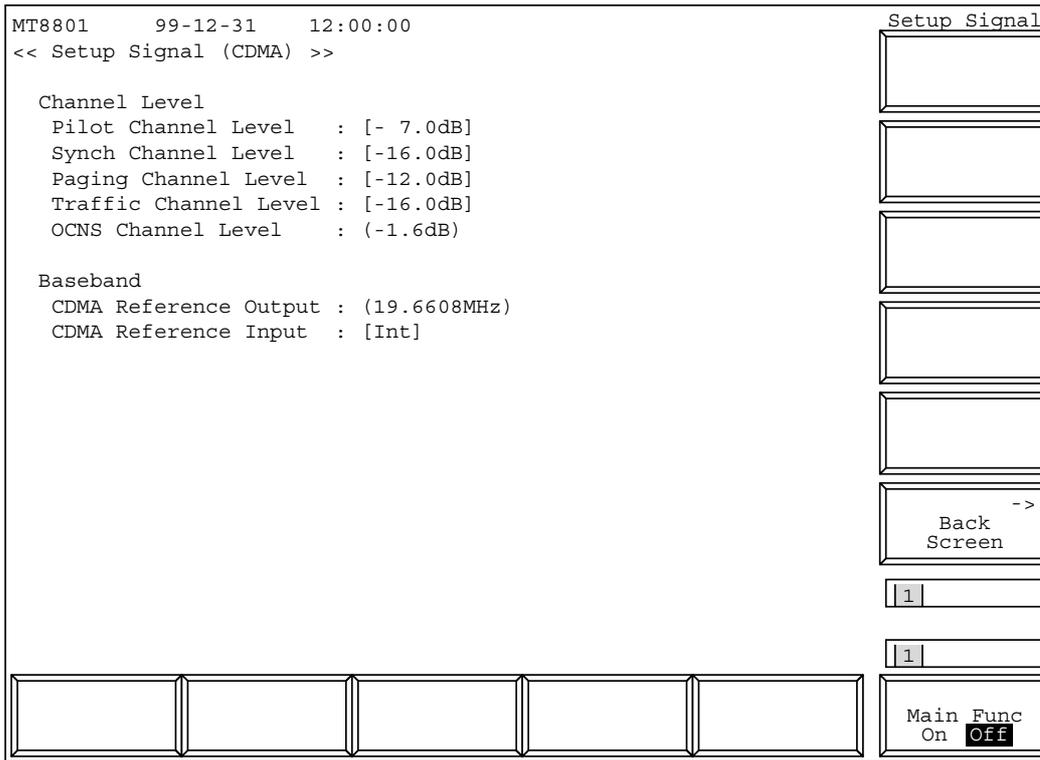


Fig. 4-22 Setup Signal Screen

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

Item	Range	Resolution	Initial value
Channel Level			Note 1
Pilot Channel Level	-5.0 dB to -10.0 dB	0.1 dB	-7.0 dB
Sync Channel Level	-7.0 dB to -20.0 dB	0.1 dB	-16.0 dB
Paging Channel Level	-7.0 dB to -20.0 dB	0.1 dB	-12.0 dB
Traffic Channel Level	-7.0 dB to -20.0 dB (Data Rate: "Full") -10.0 dB to -23.0 dB (Data Rate: "1/2") -13.0 dB to -26.0 dB (Data Rate: "1/4") -16.0 dB to -29.0 dB (Data Rate: "1/8")	0.1 dB	-16.0 dB
Baseband			
CDMA Reference Output	19.6608 MHz	(None)	19.6608 MHz Note 2
CDMA Reference Input	Int	(None)	Int

Notes:

1. <Channel Level>

Channel Level sets the each level of the Pilot, Sync, Paging, and Traffic channels.

Each the set value is the average power per PN chip with the relative value to the total power of the Forward channel.

The average power per bit is the same at -16.0 dB of Data rate 'Full' and -19.0 dB of Data rate '1/2'.

2. <CDMA Reference Output>

Outputs the Baseband Clock of the selected frequency from the CDMA Reference Output connector.

• Function key:

Main function key (None)

Function key

[Back screen] F12: Displays the previous screen.

Section 4 Operation

(3) Measuring the frame error rate (FER): Frame Error Rate screen

The following describes how to measure the frame error rate (on the Frame Error Rate screen) of the receiver by using the parameters set on the Setup Common Parameter, Setup RX Measure Parameter, and Setup Signal screens.

Some set items can be changed by using the function keys.

Displays the Frame Error screen according to the following steps to measure the frame error rate.

Step	Key operation	Description
1.	[Main Func on off] F6	Sets the Main Func on to display the Main Menu at the bottom of the screen.
2.	[TX&RX Tester] F1	Sets TX&RX Tester mode. The Setup Common Parameter screen appears.
3.	[RX Measure] F2	Displays the first page of the RX Measure menu.
4.	Next Menu [◀]	Displays the second page of the Main Func menu.
5.	[Start] F5	Sets Call Processing state to Idle.
6.	Connect call.	Turn on the power of the mobile station under test. Wait until the Call Processing state becomes Idle (Regist) after Registration.
7.	[NW Originate] F2	Sets Call Processing state to Loop Back.
8.	[FER Measure] F7	Displays the Frame Error Rate screen.

The screenshot displays the Frame Error Rate (FER) screen with the following content:

MT8801 99/12/31 12:00:00 M
 << Frame Error Rate (CDMA) >>
 U

FER	Errors	Transmitted / Sample	Confidence Level
2.13%	8	375 / 2000	85.0%

Pass/Fail : Fail

Confidence Level : 95.0 %	Output Level
FER : 0.5 %	BS Output Level : -100.0 dBm
FER Upper Limit : 0.6 %	Pilot Level : -10.5 dB
	Sync Level : -12.5 dB
	Paging Level : -10.0 dB
	Traffic Level : -12.0 dB
	OCNS Level : -55.0 dB
	AWGN Level : -1.0 dB : On
	Abs. AWGN Level : -101.0 dBm

Traffic Channel Data Rate : 1/2

Channel : 0000CH Frequency : 1000.000 000MHz Level : -10dBm

#	#	#	#	#	Main Func On Off
BS Output Level	Pilot Channel Level	Sync Channel Level	Paging Channel Level	Traffic Channel Level	

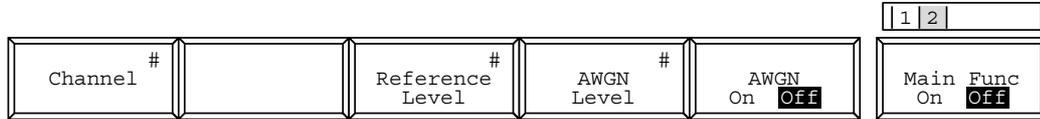
Control Panel (FER Measure):

- Start/Stop
- Sample #
- FER #
- Back Screen
- BS Output Level Cal.
- Back Screen
- 1 | 2
- 1 | 2

Fig. 4-23 Frame Error Rate Screen

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

The 2nd page of the main function keys on the Frame Error Rate screen



- Function keys:

Main function keys

1st page

- [BS Output Level] F1: Sets the level of signal output from the MT8801C.
 Initial value: -55.0 dBm
 Setting range: -133.0 dBm to -18.0 dBm (RF Output: Main, AWGN Off)
 -133.0 dBm to +2.0 dBm (RF Output: AUX, AWGN Off)
 -133.0 dBm to -24.0 dBm (RF Output: Main, AWGN On)
 -133.0 dBm to -4.0 dBm (RF Output: AUX, AWGN On)
 Resolution: 0.1 dB
- [Pilot Channel Level] F2: Sets the level of Pilot Channel output from the MT8801C.
 Initial value: -7.0 dB
 Setting range: -5.0 dB to -10.0 dB, 0 dB
 Setting 0 dB at Pilot Channel can be performed only by GPIB command. (See para. 2.5.8 of Remote Control volume of this manual.)
 Resolution: 0.1 dB
- [Sync Channel Level] F3: Sets the level of Sync Channel output from the MT8801C.
 Initial value: -16.0 dB
 Setting range: -7.0 dB to -20.0 dB
 Resolution: 0.1 dB
- [Paging Channel Level] F4: Sets the level of Paging Channel output from the MT8801C.
 Initial value: -12.0 dB
 Setting range: -7.0 dB to -20.0 dB (Paging Data Rate: "Full")
 Resolution: 0.1 dB
- [Traffic Channel Level] F5: Sets the level of Traffic Channel output from the MT8801C.
 Initial value: -16.0 dB
 Setting range: -7.0 dB to -20.0 dB (Data Rate: "Full")
 -10.0 dB to -23.0 dB (Data Rate: "1/2")
 -13.0 dB to -26.0 dB (Data Rate: "1/4")
 -16.0 dB to -29.0 dB (Data Rate: "1/8")
 Resolution: 0.1 dB

Section 4 Operation

2nd page

[Channel] F1:	Sets the Channel number. Initial value: 1 Setting range:1 to 799, 900 to 1023 (Band: 800 MHz)
[Reference Level] F3:	Sets the reference level of signal input to the MT8801C. Initial value: 30 dBm Setting range:42 dBm to -60 dBm (RF Input: Main) 22 dBm to -60 dBm (RF Input: AUX) Resolution: 1 dB
[AWGN Level] F4:	Sets the level of AWGN signal output from the MT8801C. Initial value: -20.0 dB Setting range:-20.0 dB to 6.0 dB Resolution: 0.1 dB
[AWGN On Off] F5:	Sets whether to output the AWGN signal or not. Initial value: Off Setting range:On, Off Resolution: (None)

Function keys

1st page

[Start/Stop] F7:	Starts or stops Frame Error Rate (FER) measurement.
[Sample] F8:	Sets the number of FER frames to be measured. (Note) Initial value: 1,000 frames Setting range:5 frame to 10000 frames Resolution: 5 frame
[FER] F9:	Sets FER to be the object of Confidence Level measurement. Initial value: 3.0% Setting range:0.0% to 100.0% Resolution: 0.1%
[Back Screen] F12:	Displays the previous screen.

2nd page

[BS Output Level Cal.] F11:	Performs the level calibration of the BS Output Level.
[Back Screen] F12:	Displays the previous screen.

Note:

Single key or Continuous key can start this measurement, where the Continuous key forcibly makes the single operation.

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

(4) Example of receiver measurement (FER measurement)

An example of receiver measurement (FER measurements) on the CDMA mobile station is given below.

1. Setup

As described in paragraph 4.3.1 (1), connect the MT8801C to the measured equipment (mobile station).

2. Measurement Setting Procedure

Set the receiver measurement (FER measurements) of the MT8801C in the following steps:

Step	Operation
(Checking and setting the measurement interface)	
1.	Press function key F6 (Main Func) to turn on the Main Func.
2.	Press the Next Menu key [◀] and function key F2 (Instrument Setup) in this order to switch to the Instrument Setup screen.
3.	Check that the RF Input/Output item is set to "Main."
4.	Press function key F6 (Main Func) to turn on the Main Func.
5.	Press function key F1 (TX/RX Measure) to enter TX/RX Measure mode (Setup Common Parameter screen).
(Setting the Setup Common Parameter screen)	
6.	Sets the specification using the current specification.
7.	Set the measurement frequency or channel. (Example: Set Band to 800 MHz and Channel to 1CH.)
8.	Set the Reference Level and BS Output Level.
9.	For the type of signal of the measuring object, set each the item (Service Option etc.) of the signal.
(Setting the Setup RX Measure Parameter screen)	
10.	Press function key F2 (RX Measure) to enter RX measurement mode.
11.	Press the Next Menu key [▶] and function key F9 (Setup RX Measure Parameter) to switch to the Setup RX Measure Parameter screen.
12.	Set the FER Parameter items. (See paragraph 4.3.7 (1).)
13.	Set the User Cal Factor if required. (See paragraph 4.3.1 (3).)
14.	Press function key F12 (Back Screen) to return to the Setup Common Parameter screen.
(Setting the Setup Call Processing Parameter screen)	
15.	Press function keys F3 (Call Processing) and F9 (Setup Call Proc. Parameter) in this order to switch to the Setup Call Processing Parameter screen.
16.	Set SID, NID, and BASE_ID.
17.	Press function key F12 (Back Screen) to return to the Setup Common Parameter screen.

Section 4 Operation

Step	Operation
(Connecting call)	
18.	Press the Next Menu key [◀] and function key F5 (Start) in this order to set the Call Proc. state to Idle.
19.	Turn on the power of the mobile station under test.
20.	Confirm that the Registration is executed for the mobile station and the Idle (Regist) state comes on.
21.	Press the function key F2 (NW Originate) to set the Call Proc. state to Loop Back.
(FER measurement)	
22.	Press the Next Menu key [◀] and function key F2 (RX Measure) in this order to switch to the RX Measure mode.
23.	Press the Next Menu key [▲] and function key F7 (FER Measure) in this order to switch to the Frame Error Rate screen.
24.	Press the Single key or function key [Start/Stop] to start the FER measurement.
25.	When counting of the specified number of FER measurement data items terminates, read the measured value.
26.	After measurement, press the function key F12 (Back Screen) to return to Setup Common Parameter screen.
(Disconnecting call)	
27.	Press the Next Menu key [◀] and function key F2 (NW Release) in this order to set Call Proc. state to Idle.
28.	Press the function key F5 (Stop) to set Call Proc. state to Stop.

3. Notes on FER measurement

Note the followings when measuring the receiving sensitivity:

3.1 Signal Loss While Changing Output Level

When the output level of the signal generator is changed, the output level is lost at the instant.

3.2 Controlling the FER Measuring Instrument

The following keys are used to control (start, stop) the FER measuring instrument on the front panel:

1) Single and Continuous keys

The Single or Continuous key is used to start usual measurement. When the Single or Continuous key is pressed, the measurement starts. When the number of data reaches the number of FER measurement data items set by [Sample], the measurement stops automatically. If Single or Continuous key is pressed during the measurement, it discards measurements up to this time and starts new measurements.

2) Start/Stop key [F7]

If the Start/Stop key is pressed while the FER measurement is in progress, it stops the measurement.

If the Start/Stop key is pressed when the FER measurement is stopped, it starts the measurement from the beginning.

4.3.9 Analog receiver measurement

Set Control Band to A800MHz on the Setup Common Parameter screen, then press the [RX Measure] F2 main function key to set analog receiver measurement mode.

This paragraph describes how to set parameters (on the Setup Analog RX Measure Parameter screen) and how to measure the analog receiver (on the Analog RX Measure screen) for analog receiver measurement.

(1) Setting the parameters: Setup Analog RX Measure Parameter screen

The following describes how to set parameters (on the Setup Analog RX Measure Parameter screen) for analog receiver measurement.

Display the Setup Analog RX Measure Parameter screen according to the following steps, then set the RX parameters.

Step	key operation	Description
1.	[Main Func on off] F6	Sets the Main Func on to display the first page of the Main Menu at the bottom of the screen.
2.	[TX&RX Tester] F1	Sets TX&RX Tester mode. The Setup Common Parameter screen appears.
3.	Cursor [^][v][<][>] [Set] [^][v] [Set]	Move the cursor to Control Band. Select A800 MHz and press the [Set] key to validate it.
4.	[RX Measure] F2	Displays the first page of the RX Measure menu.
5.	Next Menu [▲]	Displays the second page of the RX Measure menu.
6.	[Setup Analog RX Parameter] F9	Displays the Setup Analog RX Measure Parameter screen.

Section 4 Operation

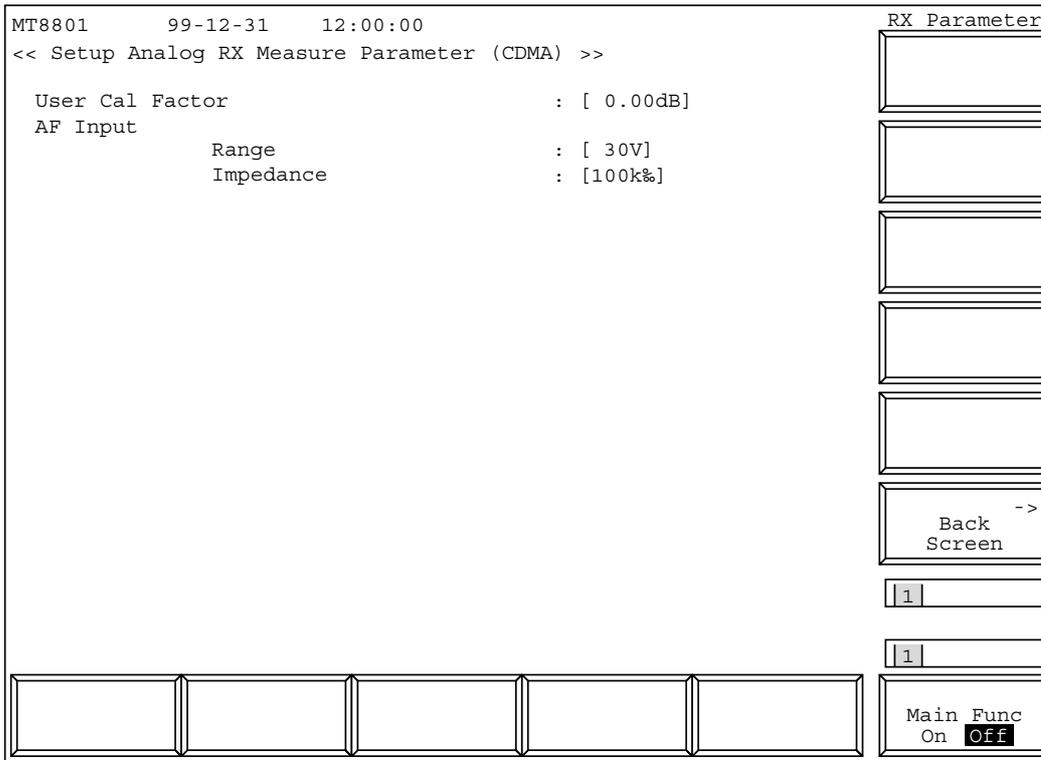


Fig. 4-24 Setup Analog RX Measure Parameter Screen

- Set the following items:

Item	Range	Resolution	Initial value	
User Cal Factor	-55.00 dB to 55.00 dB	0.01 dB	0.00 dB	Note 1
AF Input				
Range	30 V, 4 V, 400 mV, 40 mV		30 V	
Impedance	100 kΩ, 600 Ω		100 kΩ	

Note 1:

<User Cal Factor>

When a loss is between the RF output of this machine and RF input of the mobile station, set a User Cal Factor; the RF level of the signal generator can be converted to the input level of the mobile station.

For example, when a loss (5 dB) is between the RF output of this machine and RF input of the mobile station, set 5 dB to the User Cal Factor.

- Main function key: None
- Function keys:
[Back Screen] F12: Displays the previous screen

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

(2) Analog receiver measurement: Analog RX Measure screen

On the Analog RX Measure screen, output an RF signal from the MT8801B and measure the AF signal from the DUT.

Switch to the Analog RX Measure screen according to the following steps:

Step	Key operation	Description
1.	[Main Func on off] F6	Sets Main Func on to display the first page of the Main Menu at the bottom of the screen.
2.	[TX&RX Tester] F1	Sets the TX&RX Tester mode. The Setup Common Parameter screen appears.
3.	Cursor [\wedge][\vee][<][>] [Set] [\wedge][\vee] [Set]	Move the cursor to Control Band. Select A800 MHz and press the [Set] key to validate it.
4.	Next Menu [\blacktriangleleft]	Displays the second page of the Main Func menu.
5.	[Start] F5	Call Proc. State becomes Idle state.
6.	Power On	Turns the power of the MS to on. Wait until the MS is registered and the Call Proc. State becomes Idle (Regist).
7.	[NW Originate] F2	Call Proc. State becomes Conversation.
8.	[RX Measure] F2	Displays the first page of the RX Measure menu.
9.	[Analog RX Measure] F7	Displays the Analog RX Measure screen.

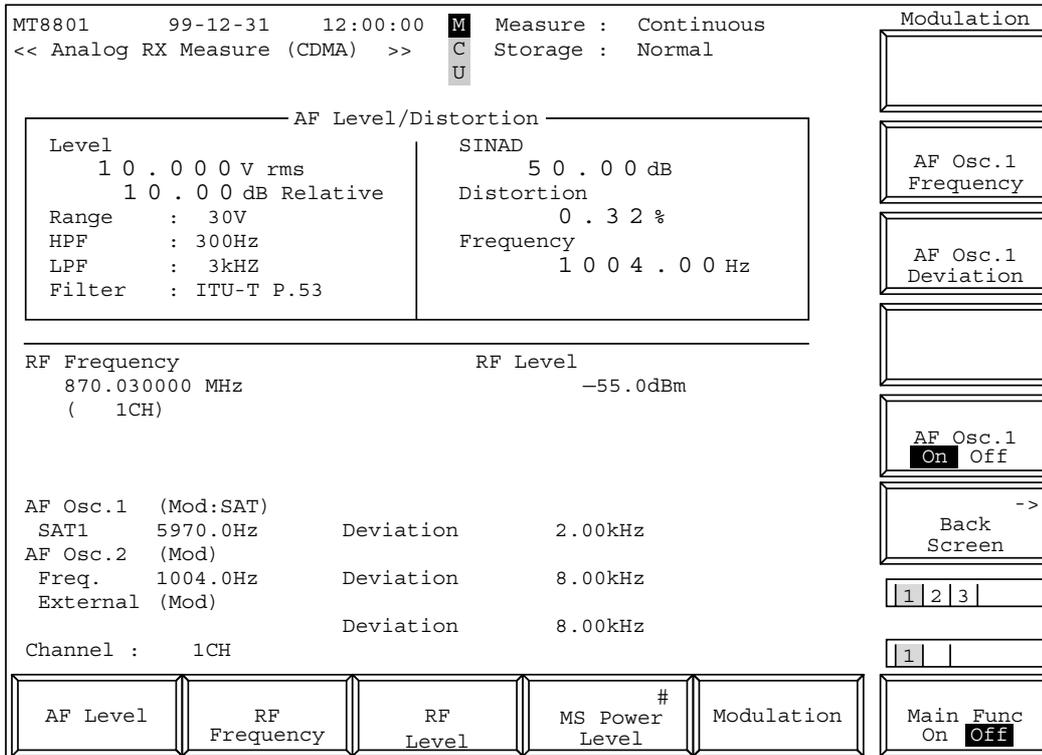


Fig. 4-25 Analog RX Measure screen

Section 4 Operation

The 1st page of the main function key on the Analog RX Measure screen. (Call Proc.: Stop)



Note 1:

Relative value (of AF Level, which is always displayed) is displayed with --. dB until the [Set Relative] F8 key is pressed.

Note 2:

When the Call Proc. State is “conversation,” AF Osc.1 is used for SAT modulation and it cannot be changed.

• Main function keys:

- [AF Level] F1 Displays the AF Level function keys on F7 to F12.
(Settings for measuring AF signal from receiver)
- [RX Frequency] F2 Displays the RF Frequency function keys on F7 to F12.
(When DUT Control is Call Proc, only the frequency channel for transmission and reception can be changed.)
- [RF Level] F3 Displays the RF Level function keys on F7 to F12.
(Setting RF signal level to receiver)
- [MS Power Level] F4 Changes the MS (mobile station under test) transmission level.
- [Modulation] F5 Displays the Modulation function keys on F7 to F12.
(Setting RF signal modulation degree to receiver)

• AF Level function keys:

- 1st page
- [Adjust Range] F7 Sets the AF-measurement level range to the status appropriate for AF-measurement signals.
- [Set Relative] F8 Displays the relative value with the reference value of 0 dB that is the level when this key is pressed.
- [HPF] F9 Selects the HPF of 400Hz, 300Hz, 50Hz, or Off.
Initial value: Off
Note: The HPF of 400 Hz is the filter for tone signal rejection.
- [LPF] F10 Selects the LPF of 3kHz, 15kHz, or Off.
Initial value: Off
- [Filter] F11 Selects the estimation filter of ITU-T P.53, C-MESSAGE, 6kHz BPF, or Off.
Initial value: Off
- [Back Screen] F12 Returns to the Setup Common Parameter screen.

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

2nd page

[Range Up] F7	Up the measurement range of the AF level meter.
[Range Down] F8	Down the measurement range of the AF level meter.
[Storage Mode] F9	Displays the Storage Mode menu for all the measured results on the screen.
[Normal] F7	Sets normal mode. (Initial value)
[Average] F8	Sets average mode.
[Average Count] F9	Sets number of Averaging processings. $2 \leq \text{Set value} \leq 9999$ Initial value: 10 (In the average mode, the measurement is of single mode, which displays the averaged results in each measurement, and stops measurement when the Average Count reached.) Note that the Power Meter has not the average mode.
[return] F12	Returns to the AF Level menu.
[AF Level Unit] F10	Selects the unit of the AF Level measurement value of dBm (valid for 600 Ω of input impedance) or V. Initial value: V When the 100 k Ω of Impedance of AF Level Input is set on the Setup Common Parameter (Analog) screen, this menu is not displayed.
[Distortion Unit] F11	Selects the unit of the distortion measurement value of dB or %. Initial value: %
[Back Screen] F12	Returns to the Setup Common Parameter screen.
• RF Frequency function keys:	
[Incremental Step Value] F7	Sets the step value for up/down the RF frequency by the [Step] keys. $1 \text{ Hz} \leq \text{Set value} \leq 3 \text{ GHz}$, 1 Hz step Initial value: 1 MHz
[Relative On Off] F8	Displays the relative value with the reference value that is the set value when this key is pressed. Initial value: Off When the frequency is set with numeric keys in Relative On mode, it becomes the actual output frequency (not relative value). Relative displayed value = Set value by numeric keys - value when this key is pressed
[Channel] F9	Changes the channel number. (See para. 4.4 for the changing method.)
[Back Screen] F12	Returns to the Setup Common Parameter screen.

Section 4 Operation

- RF Level function keys:

1st page

- [Incremental Step Value] F7 Sets the step value for up/down the RF level by the [Step] keys.
Range: $0.1 \text{ dB} \leq \text{Set value} \leq 80.0 \text{ dB}$, 0.1 dB step
Initial value: 1.0 dB
- [Relative On Off] F8 Displays the relative value with the reference value that is the set value when this key is pressed.
Initial value: Off
When the level is set with numeric keys in Relative On mode, it becomes the actual output level (not relative value).
Relative displayed value = Set value by numeric keys - value when this key is pressed
- [Unit EMF TERM] F10 Selects the RF level unit of open voltage (EMF, dB μ) or termination voltage (TERM, dB μ).
Selectable only when in dB μ display mode. 30 dB μ EMF = 24 dB μ TERM
Initial value: EMF
- [Back Screen] F12 Returns to the Setup Common Parameter screen.

2nd page

- [Offset Value] F7: Sets an offset value in output level offset display mode.
Range: -55.0 to 55.0 dB
Resolution: 0.1 dB
Initial value: 0 dB
- [Offset On Off] F8: Increases or decreases the real output level to display.
Displayed value = Real output level value + Offset value
Range: On, Off
Initial value: Off
- Note:**
If a level is set using a numeric key when this item is On, the value becomes the displayed value.
Real output level value = Displayed value - Offset value
- [Back Screen] F12: Displays the previous screen.

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

- Modulation function keys:

1st page -----	AF Osc.1 is used only to modulate (Mod) the internal signal generator (SG) in this device. When the Call Proc. State is “conversation”, it is used for SAT modulation; so, the frequency, deviation, and On/Off setting cannot be changed.
[AF Osc.1 Frequency] F8	Sets AF Osc.1 frequency (modulation frequency of the internal signal generator). 20.0 Hz ≤ Set value ≤ 20 000.0 Hz, 0.1 Hz step Initial value: 1 004.0 Hz (When the same frequency as of AF Osc.2 is specified at Mod, the deviation is obtained by the addition of the respective deviation set value.)
[AF Osc.1 Deviation] F9	Sets the FM deviation of the internal signal generator by the AF Osc.1 output. 0.00 kHz ≤ Set value ≤ 40.00 kHz, 0.01 kHz step Initial value: 8.00 kHz
[AF Osc.1 On Off] F11	Sets the AF Osc.1 output to on and off to set the modulation by AF Osc.1 of the internal signal generator to on and off. Initial value: On (When the output is off, the [AF Osc.1 Deviation] F9 key is not displayed, and the deviation cannot be specified.)
[Back Screen] F12	Returns to the Setup Common Parameter screen.
2nd page ----	AF Osc.2 is used for the modulation (Mod mode) of the built-in signal generator (SG) in the MT8801B, or AF output signal (AF mode) from the AF Output connector on the front panel.
[AF Osc.2 Signal] F7	Displays the AF Osc.2 Signal menu.
[AF Signal] F7	Selects AF-Osc.2 signal type of Tone, Noise (ITU-T G.227), or Noise (White). When Noise is set, displays “Noise (Noise type)” at the frequency display area. Initial value: Tone
[Output for Mod AF] F8	Selects the AF Osc.2 signal usage for Mod (SG modulation signal) or AF (AF signal output from AF Output connector). Initial value: Mod
[return] F12	Returns to the Modulation menu.
[AF Osc.2 Frequency] F8	In Mod mode, sets the modulation frequency of the signal generator. (When setting the same frequency as AF Osc. 1 in the Mod mode, the deviation becomes the sum of the set values.) In AF mode, sets the frequency of the AF signal output from the AF Output connector. When the AF Osc. 2 Signal type is Noise, this item disappears. 20.0 Hz ≤ Set value ≤ 20 000.0 Hz, 0.1 Hz step Initial value: 1 004.0 Hz
[AF Osc.2 Deviation] F9	In Mod mode, sets the FM deviation of the SG. In AF mode, this item disappears. 0.00 kHz ≤ FM Set value ≤ 40.00 kHz, 0.01 kHz step Initial value: 8.00 kHz
[AF Osc.2 Level] F10	In AF mode, sets the AF signal output level as shown below. Initial value: 100.0 mV When 600 Ω is set for Impedance of AF Output on the Setup Analog TX Measure Parameter screen:

Section 4 Operation

- For Tone of signal type
 - 0.400 V < Set value ≤ 3.000 V, 0.001 V step
 - 40.0 mV < Set value ≤ 400.0 mV, 0.1 mV step
 - 4.00 mV < Set value ≤ 40.00 mV, 0.01 mV step
 - 0.010 mV < Set value ≤ 4.000 mV, 0.001 mV step
 - For Noise of signal type
 - 0.150 V < Set value ≤ 1.500 V, 0.001 V step
 - 15.0 mV < Set value ≤ 150.0 mV, 0.1 mV step
 - 1.50 mV < Set value ≤ 15.00 mV, 0.01 mV step
 - 0.010 mV < Set value ≤ 1.500 mV, 0.001 mV step
- When 50 Ω is set for Impedance of AF Output on the Setup Analog TX Measure Parameter screen:
- For Tone of signal type
 - 40.0 mV < Set value ≤ 300.0 mV, 0.1 mV step
 - 4.00 mV < Set value ≤ 40.00 mV, 0.01 mV step
 - 0.010 mV < Set value ≤ 4.000 mV, 0.001 mV step
 - For Noise of signal type
 - 15.0 mV < Set value ≤ 150.0 mV, 0.1 mV step
 - 1.50 mV < Set value ≤ 15.00 mV, 0.01 mV step
 - 0.010 mV < Set value ≤ 1.500 mV, 0.001 mV step
- In Mod mode, this item disappears.

[AF Osc.2 On Off] F11

In Mod mode, turns on/off the FM deviation of SG by AF Osc. 2.

In AF mode, turns on/off the AF output.

(When off, the [AF Osc.2 Deviation] F9 key disappears, and deviation cannot be set.)

Initial value: Off

[Back Screen] F12

Returns to the Setup Common Parameter screen.

Note:

When the unit key [dBμ/V] pressed, it is assumed as “dBμ” for RF level setting, and as “V” for AF level setting.

3rd page ----

External input signal (from the Ext FM Input connector on the rear panel) is used for FM modulation of the built-in signal generator (SG).

[External Deviation] F9

Sets FM deviation of signal generator using the External FM Input signal.
0.00 kHz ≤ FM Set value ≤ 40.00 kHz, 0.01 kHz step

Initial value: 8.00 kHz

[External On Off] F11

Turns on/off the External FM Input signal to turn on/off the FM deviation of signal generator.

(When off, the [External Deviation] F9 key disappears, and deviation cannot be set.)

Initial value: Off

[Back Screen] F12

Returns to the Setup Common Parameter screen.

4.3.10 Call processing function

On the Setup Common Parameter screen, press the [Call Processing] F3 main function key to set call processing function mode.

This paragraph describes how to set parameters (on the Setup Call Proc. Parameters screen) to conduct the call processing function.

(1) Setting the parameters: Setup Call Proc. Parameters screen

The following describes how to set parameters (on the Setup Call Proc. Parameters screen) to conduct the call processing test.

Display the Setup Call Proc. Parameters screen according to the following steps, then set the parameters.

Step	Key operation	Description
1.	[Main Func on off] F6	Sets the Main Func on to display the Main Menu at the bottom of the screen.
2.	[TX&RX Tester] F1	Sets TX&RX Tester mode. The Setup Common Parameter screen appears.
3.	[Call Processing] F3	Displays the first page of the Call Processing menu.
4.	Next Menu [▲]	Displays the second page of the Call Processing menu.
5.	[Setup Call Proc. Parameter] F9	Displays the Setup Call Processing Parameter screen.

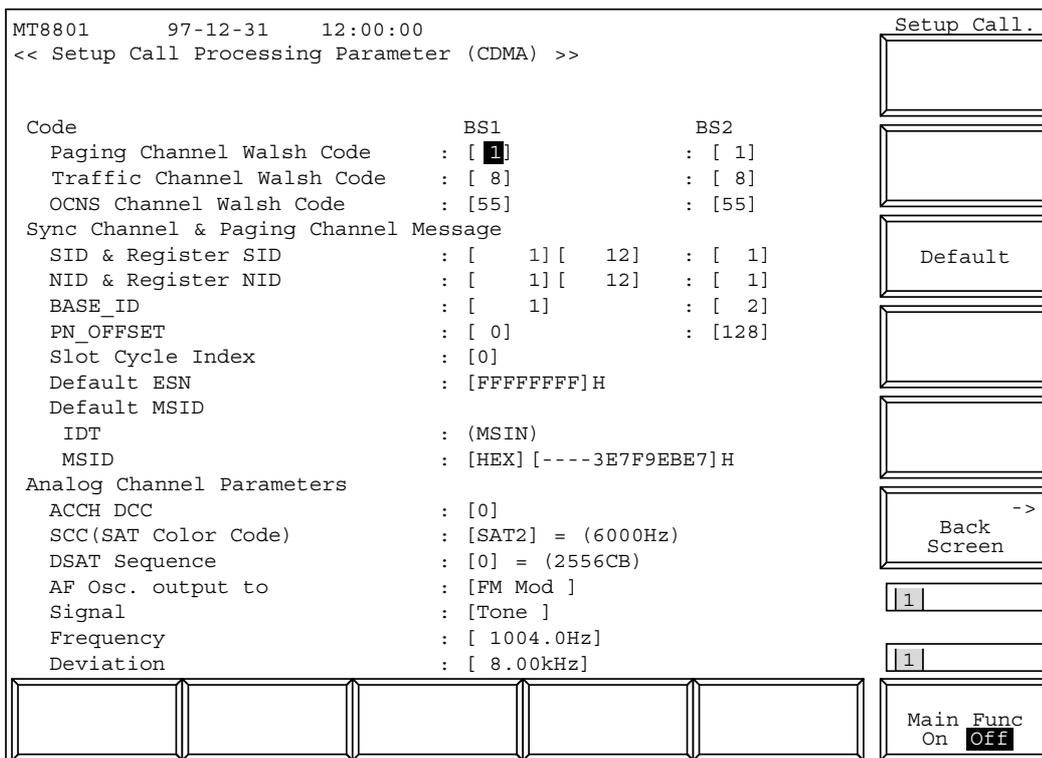


Fig. 4-26 Setup Call Proc. Parameter Screen

Section 4 Operation

- Set the following items: These are settable only when Call. Proc. state is Stop.

Item	Range	Resolution	Initial value	
Paging Channel Walsh Code	1 to 7	1	1	
Traffic Channel Walsh Code	8 to 31, 33 to 63	1	8	
OCNS Channel Walsh Code	1 to 31, 33 to 63	1	63	
SID	0 to 32767	1	7	
Register SID	0 to 32767	1	12	Note 1
NID	0 to 65535	1	1	
Register NID	0 to 65534	1	12	Note 1
BASE_ID	0 to 65535	1	39	
Slot Cycle Index	0 to 7	1	0	Note 2
Default ESN	00000000 (hex) to FFFFFFFF (hex)	1	FFFFFFF (hex)	
IDT (Default MSID)	MSIN	1	34-bit MIN	Note 3
MSID (Default MSID)	See the table below.	1	See the table below.	Note 4
ACCH DCC	0 to 2	1	0	
SCC (SAT Color Code)	SAT1 : 5970 Hz SAT2 : 6000 Hz SAT3 : 6030 Hz	(None)	SAT2	
DSAT Sequence	0 (2556CB) to 6 (2969AB)	1	0 (2556CB)	
AF Osc. output to Signal	FM Mod., Off Tone, Noise (ITU-T G.227), Noise (White)	(None)	FM Mod. Tone	
Frequency	20 Hz to 20 kHz	0.1 Hz	1004.0 Hz	
Deviation	0 to 40 kHz	10 Hz	8.00 kHz	

Correspondence between IDT and MSID (Decimal notation)

IDT	MSIN
Initial value	[DEC][-----0000000000]
Minimum value	[DEC][-----0000000000]
Maximum value	[DEC][-----9999999999]

Correspondence between IDT and MSID (Hex-decimal notation)

IDT	MSIN
Initial value	[HEX][-----3E7F9EBE7]
Minimum value	[HEX][-----0000000000]
Maximum value	[HEX][-----3FFFFFFFFF]

Note:

Setting is enabled only when the Call Processing state is Stop.

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

- Main function key: (None)
- Function keys:
 - [Default] F9: Sets each item to the initial value.
 - [Back Screen] F12: Displays the previous screen (Setup Common Parameter screen).

Note 1:

<Register SID, Register NID>

Register SID and Register NID are set for Forced Registration. Their values should be different from SID and NID, respectively.

Note 2:

<Slot Cycle Index>

This is a parameter to set a periodic time interval for monitoring the paging channel.

Note 3:

<IDT >

This is a parameter to select the input type of the mobile station identification number.

Range: IMSI (International Mobile Station Identification number)

MSIN (Mobile Station Identification number)

Note 4:

<MSID>

This is a parameter to enter the mobile station identification number.

When connecting the mobile station; the entered MSID enables to execute the “NW Originate” in “Idle” state of Call Processing, to shorten the time for becoming the Loop Back state. The “Registration” is not required.

When the “Registration” is performed with the entered MSID, the mobile station identification number is obtained and displayed.

4.3.11 Closed Loop Power Control function

When the following conditions in the table below are satisfied on each the Setup screen, FER screen, Power Meter screen (with IF Level Meter) and Modulation Analysis screen; the Closed Loop Power Control function mode can be obtained. This function controls the Tx power of the mobile station to the desired level using the Closed Loop Power Control Bit.

Item	Selection/Condition
Power Control Bit Pattern	Closed Loop (Initial value)
(Reference Level) Auto Set	On (Initial value)
Call Processing	Loop Back or Conversation

(1) Setting parameter: Each Setup screen, Power Meter screen, Modulation Analysis screen

The parameters of the Closed Loop Power Control function can be set, as described below.

In this description, note that the steps 1 to 7 are not required in Preset Power On mode.

Step	Key operation	Description
1.	[Main Func on off] F6	Sets the Main Func on to display the Main Menu at the bottom of the screen.
2.	[TX&RX Tester] F1	Sets TX&RX Tester mode to display the Setup Common Parameter screen.
3.	[TX Measure] F1	The first page of the TX Measure menu appears.
4.	Next Menu [▲]	The second page of the TX Measure menu appears.
5.	[Setup TX Parameter] F9	The Setup TX Measure Parameter screen appears.
6.	[Power Control Bit Pattern] [Closed Loop] Cursor [∧] [∨] Set	Move the cursor to this item. Selects the Closed Loop, and set. (Reference level) Auto Set becomes ON, automatically.) (* This can be also set on the Power Meter screen and Modulation Analysis screen.)
7.	[Back Screen] F12	The Setup Common Parameter screen appears.
8.	Next Menu [▲]	The second page of the Main Func menu appears.
9.	[Start] F5	The Call Processing state becomes the Idle state.
10.	Connect the call.	Turn on the power of the mobile station. Wait until the Call Processing state becomes the Idle (Regist) state after Registration.
11.	[NW Originate] F2	The Call Processing state becomes the Loop Back state.

4.3.12 Saving and recalling parameter data: Save Parameter screen, Recall Parameter screen

Display the Save Parameter and Recall Parameter screens according to the following steps to save or recall parameters set for the transmitter and receiver test.

Step	Key operation	Description
1.	[Main Func on off] F6	Sets the Main Func on. The first page of the Main Menu appears at the bottom of the screen.
2.	[Recall] F4 [Display Dir.] F8	Sets Recall Parameter mode. The Recall Parameter screen appears. The Recall function key menu appears on F7 to F12.
2'	[Save] F5 [Display Dir.] F8	Sets Save Parameter mode. The Save Parameter screen appears. The Save function key menu appears on F7 to F12.

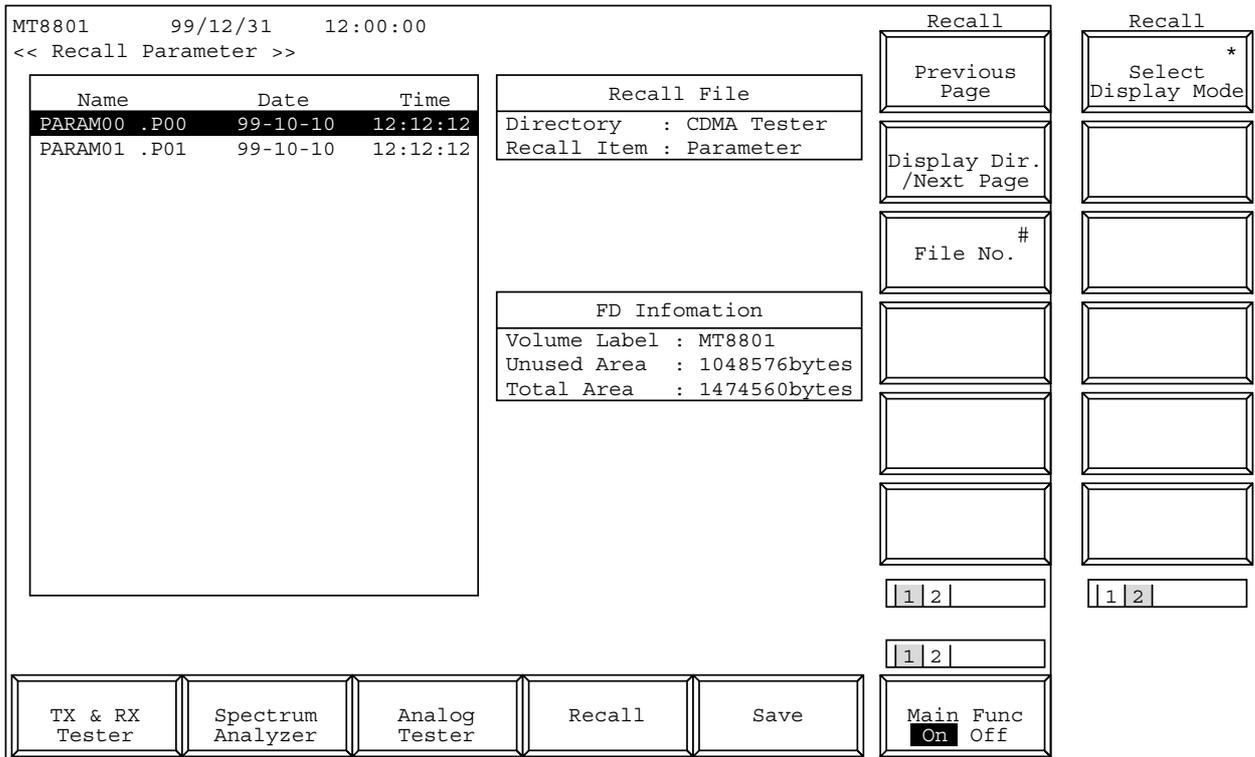


Fig. 4-27 Recall Parameter Screen

Section 4 Operation

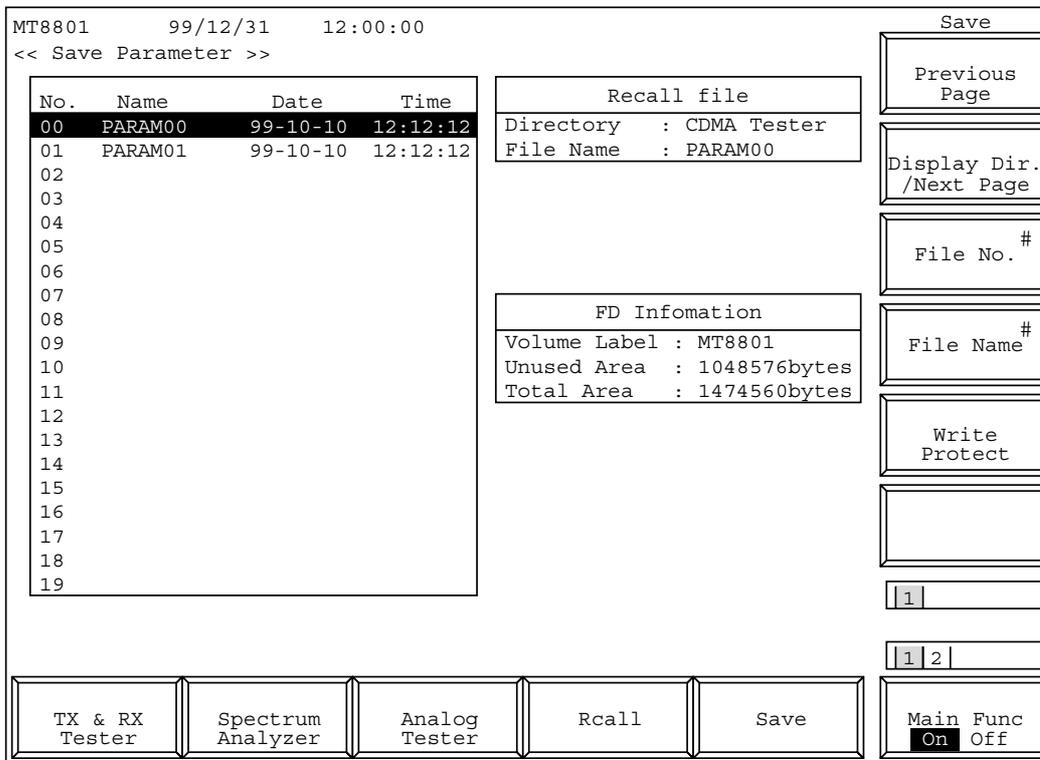


Fig. 4-28 Save Parameter Screen

- Floppy disk to be used:
 For saving and loading parameters and data, use the floppy disk described in Section 3. When the floppy disk is required to be formatted, use the File Operation screen in Paragraph 4.3.10.
- Notes when displaying the Save Parameter screen and Recall Parameter screen:
 Before pressing the [Save] F5 or [Recall] F4 function key, insert a floppy disk (FD) in the FD driver of the MT8801C. Then press the key. The MT8801C automatically starts the FD-driver operation.
- Screen display and function key display:
 Pressing the [Save] F5 or [Recall] F4 function key changes only the display of the F7 to F12 function keys.
 The screens (Figs. 4-27, 4-28) appear when the [Display Dir./Next Page] F8 key is pressed to display the contents of the FD. These screens also display the function keys used to select any directory and any file.
- Information to be saved and recalled:
 - 1) The [Save] and [Recall] keys on the main function keys saves and recalls the measurement parameters except those in paragraphs 2) and 3) below, respectively.
 - 2) The Save Template and Recall Template screens under the Gated Power screen saves and recalls only the template level information, respectively.
 - 3) The Save Pattern and Recall Pattern screens under the Setup RX Measure screen saves and recalls only the pattern information of the measurement test signals, respectively.

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

- Function keys on the Recall Parameter screen

Main function key: None

Recall function keys:

[Display Dir.] F8: Accesses the floppy disk and displays the directory of the parameter data file.
The lower-order Recall menu appears.

** 1st page** (Use the Next Menu [▲] key to scroll the page.)

[Previous Page] F7: Displays the previous page of the directory.

[Display Dir./Next Page] F8: Accesses the floppy disk and displays the next page of the directory.

[File No.] F9: Opens the window for entering the recall position (number) of the setup parameter data file.

0 to 99, Resolution: 1, Initial value: 0

[Back Screen] F12: Displays the previous screen.

** 2nd page ** (Use the Next Menu [▲] key to scroll the page.)

[Select Display Mode] F7: Displays the Display Mode menu to select a display mode.

[Wide] F7: Displays file numbers in ascending order from 0 regardless of whether all files are saved.

[Narrow] F8: Skips the numbers of files not saved and displays only the numbers of saved files in ascending order.

[return] F12: Returns to the previous menu.

[Back Screen] F12: Displays the previous screen.

[File No.] F9: Opens the window for entering the recall position (number) of the setup parameter file.

0 to 99, Resolution: 1, Initial value: 0

[return] F12: Returns to the previous menu.

Section 4 Operation

- Function keys on the Save Parameter screen

Main function key: None

Save function keys:

[Display Dir.] F8: Accesses the floppy disk and displays the directory of the parameter data file.
The low-order Save menu appears.

[Previous Page] F7: Displays the previous page of the directory.

[Display Dir./Next Page] F8: Accesses the floppy disk and displays the next page of the directory.

[File No.] F9: Opens the window for entering the save position (number) of the setup parameter data file.

0 to 99, Resolution: 1, Initial value: 0

[File Name] F10: Opens the window for entering the name of the parameter data file to be saved.
The data file name consists of up to eight characters.

[Write Protect] F11: Write-protects the specified parameter data file.
An asterisk (*) is displayed at the end of the name of the write-protected file.
If the specified parameter data file is already write-protected, this key cancels write protect.

Note:

This function can only be executed through panel operation.

Displays the previous screen.

[File No.] F9: Opens the window for entering the save position (number) of the setup parameter data file.

0 to 99, Resolution: 1, initial value: 0

[return] F12: Returns to the previous menu.

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

- Saving parameters and data

This paragraph describes how to save the measurement parameters of the MT8801C to a floppy disk.

Step	Key operation	Description
A When the [Save] F5 main function key is used		
1.		Insert a saving floppy disk (FD) into the FD driver on the bottom left of the MT8801C.
2.	[Main Func on off] F6	Sets Main Func to on. The Main Menu is displayed on the main function keys.
3.	[Save] F5	Changes to Save parameter mode. Displays the Save function keys in F7 to F12, and then moves to the Save screen for parameter and data. Searches the FD for parameter and data files, and displays them on the screen.
4.		Proceed to Step 5 below.
B When using Save Template of the Setup Template screen for Gated Power measurement		
1.		Insert a saving floppy disk (FD) into the FD driver on the bottom left of the MT8801C.
2.	[Save Template] F7	Displays the Save Template screen. Displays the Save function keys in F7 to F12, then moves to the Save screen for parameter and data.
3.		Searches the FD for parameter and data files, and displays them on the screen.
4.		Proceed to Step 5 below.
C When using Save Pattern of the Setup RX Measure Parameter screen		
1.		Insert a saving floppy disk (FD) into the FD driver on the bottom left of the MT8801C.
2.	[Save Pattern] F8	Changes to the Save Pattern screen. Displays the Save function keys in F7 to F12, then moves to the Save screen for parameter and data.
3.		Searches the FD for parameter and data files, and displays them on the screen.
4.		Proceed to Step 5 below.
(Under state where the Save menu is displayed)		
5.	[Display Dir.] F8	Displays existing files to check the number of the file to be saved.
6.	[File Name] F10	Sets the file name used for save within 8 alphanumeric characters if necessary.
7.		Check the number of the file to be saved and the file status (whether the file exists and whether the file is write-enabled). To write-enable the file, proceed to Steps 8a and later. Otherwise, proceed to Step 9.
8a.	Cursor [] and []	Select the file to be write-enabled.
8b.	[Write Protect] F11	Write-enables the file for over-writing.
9.	[File No.] F9	Specify the number of the file to be saved.
10.	[Set]	Saves the file.

Section 4 Operation

- Write-protecting or write-enabling the file to be saved

This paragraph describes how to write-protect or write-enable the file containing data in the Save screen.

Step	Key operation	Description
1.		Execute the Steps 1 to 4 of the saving procedure in the previous paragraph to display the Save menu.
2.	[Display Dir./Next Page] F8	Displays the existing files. Check the number of the file to be saved.
3.	Cursor [∧], [∨]	Select the file to be write-enabled.
4.	[Write Protect] F11	Write-protects or write-enables the file to be saved.

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

- Recalling parameters and data

This paragraph describes how to recall measurement parameters from the floppy disk.

Step	Key operation	Description
A When the [Recall] F5 main function key is used:		
1.		Insert a recall floppy disk (FD) into the FD driver at the bottom left of the MT8801C.
2.	[Main Func on off] F6	Sets Main Func to on. Displays Main Menu on the main function keys.
3.	[Recall] F4	Changes to Recall Parameter mode. Displays the Recall function keys in F7 to F12, and moves to the Recall screen for parameter and data. Searches the FD for parameter and data files, and displays them on the screen.
4.		Proceed to Step 5 below.
B When [Recall Template] F7 function key of Gated Power Measure screen is used		
1.		Insert a recall FD into the FD driver at the bottom left of the MT8801C.
2.	[Recall Template] F7	Changes to the Recall Template screen. Displays the Recall function keys in F7 to F12, then moves to the Recall screen for parameter and data.
3.		Searches the FD for parameter and data files, and displays them on the screen.
4.		Proceed to Step 5 below.
C When the [Recall Pattern] F7 function key of Setup RX Measure Parameter screen is used		
1.		Insert a recall floppy disk (FD) into the FD driver at the bottom left of the MT8801C.
2.	[Recall Pattern] F7	Changes to the Recall Pattern screen. Displays the recall function keys in F7 to F12, then moves to the Recall screen for parameter and data.
3.		Searches the FD for parameter and data files, and displays them on the screen.
4.		Proceed to Step 5 below.
(Under state where the Recall menu is displayed)		
5.	[Display Dir./Next Page] F8	Displays the directory containing the file to be recalled. Check the file to be recalled.
6.	Cursor [^] [v]	Select the file to be recalled.
7.	[File No.] F9	Sets the number of any file to be recalled. (The file to be recalled can be specified by the file number, too.)
8.	[Set]	Confirms the file to be recalled. The MT8801C reads the specified file. Then, returns to the previous screen automatically.

Section 4 Operation

- Changing the recall-file display format (WIDE/NARROW)

This paragraph describes how to change the recall-file display format (WIDE/NARROW).

Step	Key operation	Description
1.		Execute the Steps 1 to 5 of the recalling procedure in the previous paragraph to display the recalled file.
2.	Next Menu [▲]	Displays the second page of the function keys.
3.	[Select Display Mode] F7	Displays the file display format selection menu.
4.	[Wide] F7 or [Narrow] F8	Specify the display format.
5.	[return] F12	Returns to the previous menu.

4.3.13 Operating the file: File Operation screen

To access the floppy disk and display the parameter file directory, delete or write-protect the parameter file, and initialize the floppy disk; display the File Operation screen according to the following steps.

Note:

This function can only be executed through panel operation.

Step	Key operation	Description
1.	[Main Func on off] F6	Sets the Main Func on. The Main Menu appears at the bottom of the screen
	Next Menu [◀]	Displays the second page of the Main Menu.
2.	[File Operation] F4	Sets File Operation mode. The File Operation screen appears. The File function key menu appears on F7 to F12.

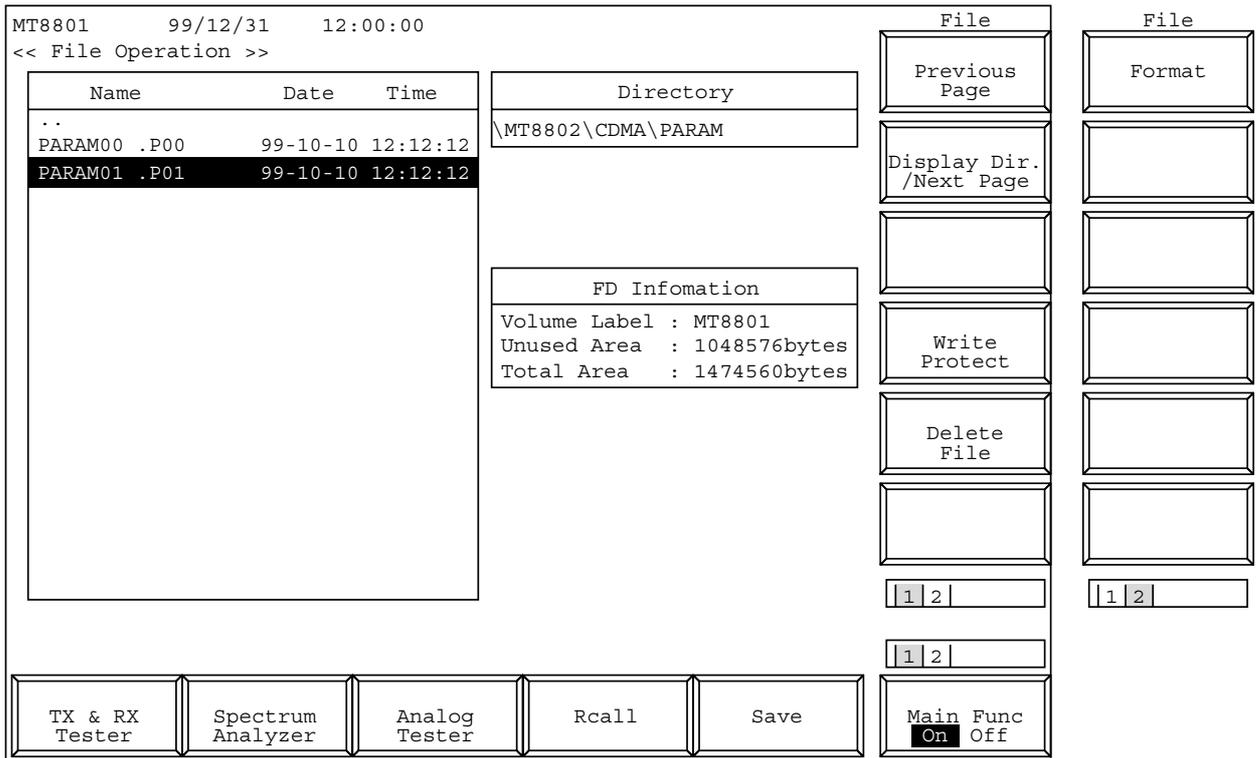


Fig. 4-29 File Operation Screen

Note:

Use the floppy disk described in Section 3.

Section 4 Operation

- Functions keys on the File Operation screen

Main function key: None

Function keys: 2 pages. Use the Next Menu [▲] key to scroll to the next page.

** 1st page **

[Previous Page] F7: Displays the previous page of the directory.

[Display Dir./Next Page] F8: Accesses the floppy disk and displays the next page of the directory.

[Write Protect] F10: Write-protects the specified parameter data file.

An asterisk (*) is displayed at the end of the name of the write-protected file.

If the specified parameter data file is already protected, write protect can be canceled by pressing this key.

Note:

This function can only be executed through panel operation.

[Delete File] F11: Opens the window for entering the position (number) of the parameter data file to be deleted.

Setup range: 0 to 99 (integer)

Initial value: 0

** 2nd page **

[Format] F7: Initializes the floppy disk to the specified type. The initialization format is MS-DOS 1.44 MB or 720 kB.

Note:

The format is MS-DOS 1.44 MB or 720 kB. Use the 2HD or 2DD type of 3.5-inch floppy disk.

4.3 CDMA Transmitter and Receiver Test --- TX and RX Tester Mode

- Displaying files

This paragraph describes how to display the files in FD.

Step	Key operation	Description
1.		Insert a floppy disk (FD) into the FD driver at the bottom left of the MT8801C.
2.	[Main Func on off] F6	Turn the Main Func on to display the main function keys.
3.	Next Menu [◀]	Displays the second page of the main function keys.
4.	[File Operation] F4	Moves to the File Operation screen. Accesses the FD to display the root directory.
5.	Cursor [^] [v]	Specify the directory to be required.
6.	[Set] or [Enter]	Moves to the specified directory to display its contents.
7.		Repeat the Steps 5 and 6 above to display the required directory.

Note:

The sub-directories and file name under the selected directory are displayed in the frame on the left of the screen.

For directories, only their names are displayed in the “Name” field.

For files, Name/Date/Time are displayed.

The Directory field at the upper right of the screen displays the layer and location of the selected directory.

- Write-enabling/write-protecting files

This paragraph describes how to change the file write mode between the write-protected and write-enabled modes.

Step	Key operation	Description
1.		Select the directory of the desired file by the displaying-file procedure above.
2.	Cursor [^] [v]	Specify the file.
3.	[Write Protect] F10	Changes the file write mode.

- Deleting files

This paragraph describes how to delete the parameter/data files.

Step	Key operation	Description
1.		Select the directory of the desired file by the displaying-file procedure above.
2.	Cursor [^] [v]	Specify the file.
3.	[Delete File] F11	Opens the confirmation window.
4.	Cursor [^] [v]	Select Yes or No. “Yes” deletes the specified file.

Note:

Once a file is deleted, it cannot be restored.

Section 4 Operation

- Initializing (formatting) floppy disk

This paragraph describes how to initialize a floppy disk.

Step	Key operation	Description
1.		Insert a floppy disk (FD) into the FD driver at the lower left of the MT8801C. The acceptable FD is the 2HD (1.44 M-bytes) or 2DD (720 k-bytes) type.
2.	Next Menu [▲]	Displays the second page of the function keys.
3.	[Format] F7	Initializes the floppy disk. During initialization, a window indicating initialization appears on the screen.
4.	Next Menu [▲]	Returns to the first page of the function keys.

Note:

Once a floppy disk is initialized, the data recorded on the disk is all lost.

4.3.14 Screen hard copy ... Copy

The copy function transfers a screen display to the printer or floppy disk. Specify a transfer destination and mode on the Instrument Setup screen. Press the Copy key on the front panel to activate the Copy function. While the Copy function is operating, operations (including remote control) such as measurement or internal setting are disabled.

(1) Transfer to the printer

If Copy is set to the printer on the Instrument Setup screen, screen display can be printed via the Parallel interface on the rear panel. Printers using the ESC/P command system can be used.

(2) Transfer to the floppy disk

If Copy is set to BMP on the Instrument Setup screen, the floppy disk driver on the front panel can be used to store data displayed on the screen in the floppy disk. Paragraph 4.3.10 describes the floppy disks that can be used. Data created on the floppy disk is the image file of the monochrome BMP data format. While the Copy is being executed, the name of the created file "RCA_***.BMP" is displayed on the bottom of the screen (***) is a number beginning with 000).

(Reference) Number of storable BMP files

2DD (720 K bytes): Up to 18

2HD (1.44 M bytes):Up to 37

4.3.15 Settings relating to remote control and panel key control

1. Remote control interfaces

The remote control interfaces of the MT8801C are classified into the GPIB interface and serial interface (RS-232C interface). Select an interface used on the Instrument Setup screen (see paragraph 4.3.3).

2. Remote control and panel control keys

The keys and lamps described in this section are assigned on the front panel as exclusive keys and lamps.

1) REMOTE lamp and LOCAL key

The REMOTE lamp indicates that the MT8801C is controlled remotely using the GPIB interface or RS-232C interface. When the MT8801C is controlled remotely from an external controller via the GPIB interface or RS-232C interface, the REMOTE lamp lights. While the REMOTE lamp is on, key entry and rotary knob entry from the front panel are disabled. The LOCAL key is used to cancel the remote control status of the GPIB interface or RS-232C interface. When the LOCAL key is pressed, the REMOTE lamp goes off and key entry and rotary knob entry from the front panel are enabled.

2) PANEL LOCK key

The PANEL LOCK key is used to enable and disable key entry and rotary knob entry from the front panel. Use the PANEL LOCK key to prevent an incorrect operation on the front panel for automatic measurement or status holding. When the panel is locked, the green lamp on the PANEL LOCK key lights.

3. Remote control status

If MT8801C is used for remote control, the REMOTE lamp on the left of the front panel lights. While the REMOTE lamp is on, key entry and rotary knob entry from the front panel are disabled. To change the remote control status to the front panel entry status, execute the following steps:

- 1) Halt the remote control.
- 2) If the REMOTE lamp is on, press the LOCAL key to cancel the REMOTE status.

Section 5 Measurement Examples

This section describes the measurement procedures to perform the performance test of the CDMA mobile station using the MT8801C.

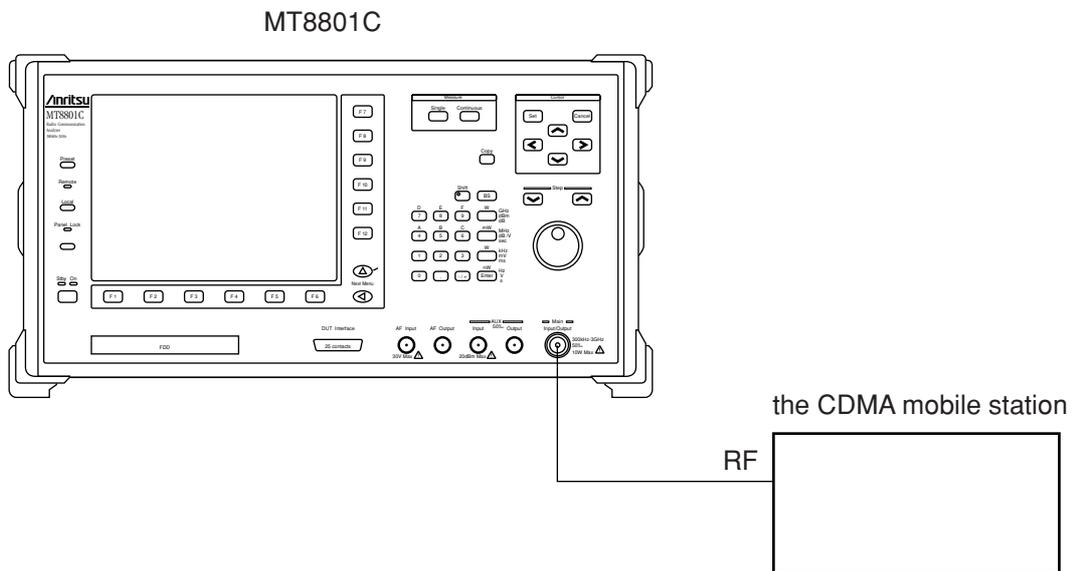
5.1	Preparation for the CDMA Mobile station	
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5.1 Preparation for the CDMA Mobile station Measurement

This section explains the connection method of MT8801C and the CDMA mobile station, and basic settings to test the CDMA mobile station.

5.1.1 Connecting the CDMA mobile station and MT8801C

Connect the CDMA mobile station and MT8801C as shown below:



Note:

Select the Main connector from Main(Input/Output) and AUX (Input and Output) connectors provided by MT8801C to measure RF signals when measuring the CDMA mobile station.

Setting the Main connector

- (1) Press the F6 (Main Func On Off) key to turn On the Main Func.
- (2) Press the ◀ key of Next Menu to display the second page of main function keys (F1 to F5).
- (3) Press the F2 (Instrument Setup) key (to display the Instrument Setup screen).
- (4) Put the cursor on RF Input/Output using the Cursor ^ v keys. Then press the Set key of Cursor.
- (5) Select Main using the Cursor ^ v keys when the setting window is opened. Then press the Set key of Cursor to set it.

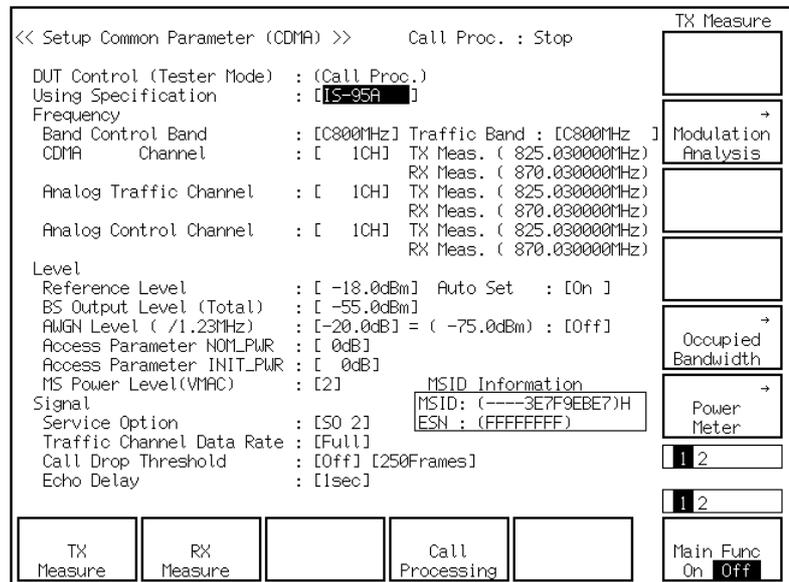
5.1.2 Setting MT8801C and the CDMA mobile station

Setting for the ARIB-T53 system is explained in the following section.

This section explains the common settings to perform measurements described in sections 5.2 “Testing CDMA Mobile station Output” and 5.3 “Testing CDMA Mobile station Input”. These sections are described in the assumption that all the contents described in this section are set except for the test in the analog mode.

Settings of MT8801C

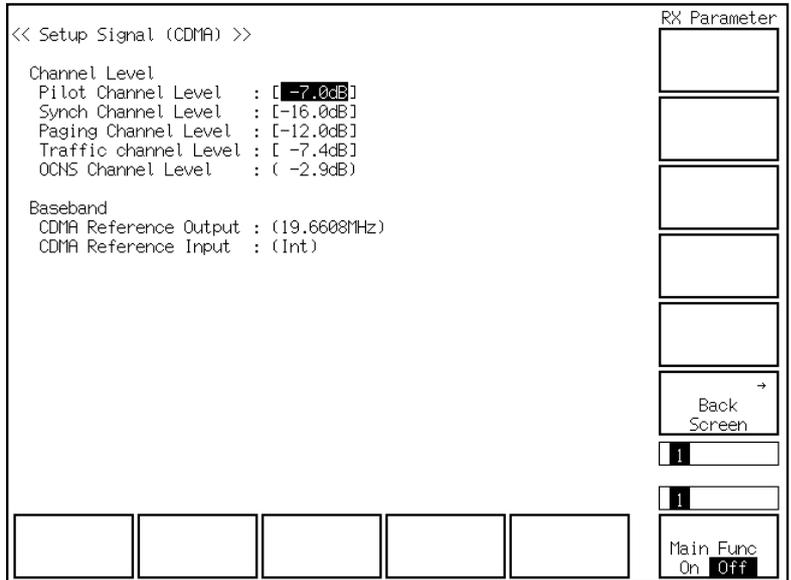
- (1) Turn ON MT8801C power.
- (2) The Setup Common Parameter screen (shown below) is soon displayed.



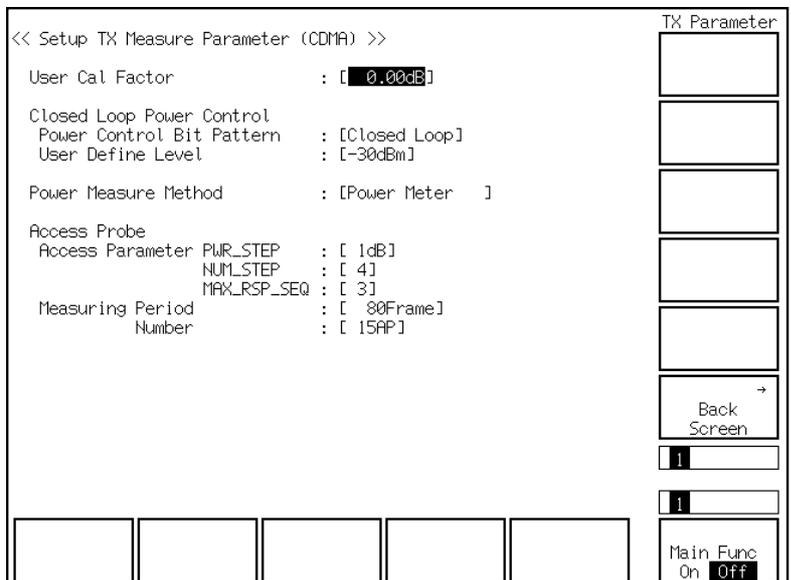
- (3) Put the cursor on Using Specification using the Cursor \wedge \vee keys. Then press the Set key of Cursor. Select ARIB-T53 using the Cursor \wedge \vee keys when the setting window is opened. Then press the Set key of Cursor to set it.
- (4) Similarly put the cursor on Band Control Band and set C800 MHz for Band Control Band when the setting window is opened.
- (5) Similarly put the cursor on the CDMA Channel and set 76 CH for the CDMA Channel using the numeric keypad when the setting window is opened.
- (6) Similarly put the cursor on BS Output Level and set BS Output Level at -75.0 dBm using the numeric keypad when the setting window is opened.
- (7) Press the F12 (Power Meter) key.
- (8) Press the F2 (RX Measure) key.
- (9) Press the \blacktriangle key of Next Menu to display the second page of function keys (F7 to F12).
- (10) Press the F10 (Setup Signal) key.

Section 5 Measurement Examples

(11) The Setup Signal screen (shown below) is displayed.



- (12) Put the cursor on Pilot Channel Level using the Cursor \wedge / \vee keys. Then press the Set key of Cursor. Set Pilot Channel Level at -7.0 dBm using the numeric keypad when the setting window is opened.
- (13) Similarly put the cursor on Traffic Channel Level and set Pilot Channel Level at -7.4 dBm using the numeric keypad when the setting window is opened.
- (14) Press the F12 (Back Screen) key.
- (15) Press the F1 (TX Measure) key.
- (16) Press the \blacktriangle key of Next Menu to display the second page of function keys (F7 to F12).
- (17) Press the F9 (Setup TX Parameter) key.
- (18) The Setup TX Measure Parameter screen (shown below) is displayed.



5.1 Preparation for the CDMA Mobile station Measurement

- (19) Put the cursor on Power Control Bit Pattern using the Cursor $\wedge \vee$ keys. Then press the Set key of Cursor. Select Closed Loop using the Cursor $\wedge \bullet \vee$ keys when the setting window is opened. Then press the Set key of Cursor to set it.
- (20) Press the F6 (Main Func On Off) key to turn On the Main Func.
- (21) Press the F1 (TX&RX Tester) key.
- (22) Press the F1 (TX Measure) key.
- (23) Press the \blacktriangleleft key of Next Menu to display the second page of main function keys (F1 to F5).
- (24) Press the F5 (Start) key. When press the F5 (Start) key, the Call Proc. status becomes the Idle status (shown below) to wait the Reverse Access Channel signal from the CDMA mobile station.

<< Setup Common Parameter (CDMA) >>		Call Proc : Idle	TX Measure
DUT Control (Tester Mode) : (Call Proc.)			
Using Specification : [ARIB-T53]			Access → Probe Measure
Frequency			
Band Control Band	: [C800MHz]	Traffic Band : [C800MHz]	
CDMA Channel	: [76CH]	TX Meas. (915.95000MHz)	
		RX Meas. (860.95000MHz)	
Analog Traffic Channel	: [1CH]	TX Meas. (825.03000MHz)	Standby → Output Power
Analog Control Channel	: [1CH]	RX Meas. (870.03000MHz)	
		TX Meas. (825.03000MHz)	
		RX Meas. (870.03000MHz)	
Level			
Reference Level	: [2.0dBm]	Auto Set : [0n]	
BS Output Level (Total)	: [-75.0dBm]		Occupied → Bandwidth
AWGN Level (/1.23MHz)	: [1.0dB] = (-74.0dBm)	: [0ff]	
Access Parameter NOM_PWR	: [0dB]		Power → Meter
Access Parameter INIT_PWR	: [0dB]		
MS Power Level(VMAC)	: [2]		
Signal		MSID Information	
Service Option	: [S0 2]	MSID: (----3E7F9EBE7)H	
Traffic Channel Data Rate	: [Full]	ESN : (FFFFFFFF)	
Call Drop Threshold	: [0ff] [250Frames]		1 2
Echo Delay	: [1sec]		1 2
	NW Originate	Register	Stop
			Main Func On Off

Section 5 Measurement Examples

- (25) Turn ON the CDMA mobile station power during this status. The CDMA mobile station location is registered and the Call Proc. status changes to Idle (Regist) (shown below) to become the waiting status after the location registration when the CDMA mobile station power is turned ON.

<< Setup Common Parameter (CDMA) >>		Call Proc.: Idle(Regist)	TX Measure
DUT Control (Tester Mode)	: (Call Proc.)		
Using Specification	: [ARIB-T53]		
Frequency			Access → Probe Measure
Band Control Band	: [C800MHz]	Traffic Band : [C800MHz]	
CDMA Channel	: [76CH]	TX Meas. (915.950000MHz)	
		RX Meas. (860.950000MHz)	
Analog Traffic Channel	: [1CH]	TX Meas. (825.030000MHz)	Standby → Output Power
		RX Meas. (870.030000MHz)	
Analog Control Channel	: [1CH]	TX Meas. (825.030000MHz)	
		RX Meas. (870.030000MHz)	
Level			
Reference Level	: [2.0dBm]	Auto Set : [On]	
BS Output Level (Total)	: [-75.0dBm]		
AWGN Level (/1.23MHz)	: [1.0dB] = (-74.0dBm)	: [Off]	Occupied → Bandwidth
Access Parameter NOM_PWR	: [0dB]		
Access Parameter INIT_PWR	: [0dB]		
MS Power Level(VMAC)	: [2]	MSID Information	Power → Meter
Signal		MSID: (---00C565F15)H	
Service Option	: [S0 2]	ESN : (00000000)	
Traffic Channel Data Rate	: [Full]		
Call Drop Threshold	: [Off] [250Frames]		1 2
Echo Delay	: [1sec]		1 2
	NW Originate	Register	Stop
			Main Func On Off

- (26) Press the F2 (NW Originate) key.
- (27) The Call Proc. status becomes Loopback (shown below).

<< Setup Common Parameter (CDMA) >>		Call Proc.: Loopback	TX Measure
DUT Control (Tester Mode)	: (Call Proc.)		
Using Specification	: [ARIB-T53]		
Frequency			
Band Control Band	: [C800MHz]	Traffic Band : [C800MHz]	Modulation → Analysis
CDMA Channel	: [76CH]	TX Meas. (915.950000MHz)	
		RX Meas. (860.950000MHz)	
Analog Traffic Channel	: [1CH]	TX Meas. (825.030000MHz)	Gated Power →
		RX Meas. (870.030000MHz)	
Analog Control Channel	: [1CH]	TX Meas. (825.030000MHz)	
		RX Meas. (870.030000MHz)	
Level			
Reference Level	: [2.0dBm]	Auto Set : [On]	Open Loop → Power Cont.
BS Output Level (Total)	: [-75.0dBm]		
AWGN Level (/1.23MHz)	: [1.0dB] = (-74.0dBm)	: [Off]	Occupied → Bandwidth
Access Parameter NOM_PWR	: [0dB]		
Access Parameter INIT_PWR	: [0dB]		
MS Power Level(VMAC)	: [2]	MSID Information	Power → Meter
Signal		MSID: (---00C565F15)H	
Service Option	: [S0 2]	ESN : (00000000)	
Traffic Channel Data Rate	: [Full]		
Call Drop Threshold	: [Off] [250Frames]		1 2
Echo Delay	: [1sec]		1 2
	NW Release	Stop	Main Func On Off

The basic setting of the MT8801C and the CDMA mobile station has now been completed.

5.2 Testing CDMA Mobile station Output

This section explains the test procedures related to the CDMA mobile station output.

5.2.1 Analyzing modulation

Modulation analysis measures how much error is contained in the digitally modulated signal to be measured in comparison with the ideal signal.

Frequency error, waveform quality, and modulation accuracy are measured as yard sticks.

Measurement procedure

The explanation in this section starts at the completion of the setting explained in section 5.1.2 “Setting MT8801C and the CDMA mobile station”.

- (1) Press the F6 (Main Func On Off) key to turn On the Main Func.
- (2) Press the F1 (TX & RX Tester) key.
- (3) Check whether the Loopback status is displayed on the Setup Common Parameter screen.
- (4) Press the F1 (TX Measure) key.
- (5) Press the F8 (Modulation Analysis) key.
- (6) The Modulation Analysis screen is displayed (shown below).

Measure : Single Storage : Normal		Mod. Anal.
<< Modulation Analysis (CDMA) >>		
Frequency		
Carrier Frequency	: ----- MHz	
Carrier Frequency Error	: ----- kHz	
Waveform Quality		
ρ (Waveform Quality Factor)	: -----	
ϵ (Timing Error)	: ----- μ s	Storage *
Modulation		Mode
RMS Vector Error	: ----- % (rms)	
Peak Vector Error	: ----- %	Calibration *
Phase Error	: ----- deg. (rms)	
Magnitude Error	: ----- % (rms)	
Origin Offset	: ----- dB	Adjust Range
RF Power		
TX Power	: ----- dBm	Back Screen
		1 2
Channel : 76CH	Frequency : 915.950 000MHz	Level : 2dBm
1 2		
BS Output # Level	Pilot # Channel Level	Sync # Channel Level
Paging # Channel Level	Traffic # Channel Level	Main Func On Off

- (7) Press the F9 (Storage Mode) key and F7 (Normal) to set Storage Mode to be Normal.
- (8) Press the F12 (return) key.
- (9) Press the F11 (Adjust Range) key to optimize the measurement range.

Section 5 Measurement Examples

- (10) Press the Single key or the Continuous key to start the modulation analysis. The modulation analysis result is shown below:

<< Modulation Analysis (CDMA) >>		Measure : Single	Mod. Anal.
		Storage : Normal	
Frequency			
Carrier Frequency	:	915.950 020 1 MHz	
Carrier Frequency Error	:	0.020 1 kHz	
Waveform Quality			
ρ (Waveform Quality Factor)	:	0.99071	
ϵ (Timing Error)	:	0.05 μ s	Storage *
Modulation			Mode
RMS Vector Error	:	10.39 % (rms)	Calibration *
Peak Vector Error	:	30.17 %	
Phase Error	:	3.95 deg. (rms)	Adjust Range
Magnitude Error	:	7.79 % (rms)	
Origin Offset	:	-55.13 dB	Back Screen
RF Power			
TX Power	:	1.01 dBm	1 2
Channel : 76CH		Frequency : 915.950 000MHz	Level : 1dBm
#	#	#	#
BS Output	Pilot	Sync	Paging
Level	Channel	Channel	Channel
	Level	Level	Level
			Traffic #
			Channel
			Level
			Main Func
			On Off

5.2.2 Measuring open loop output power

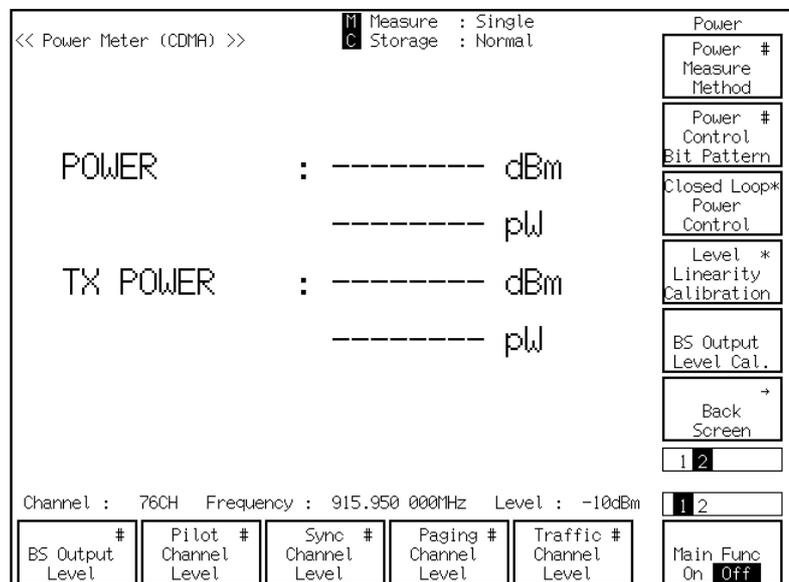
Open loop output power is calculated from the input power of the CDMA mobile station.

$$\begin{aligned}
 &[\text{Output power (dBm)}] \\
 &= - [\text{Input power (dBm)}] -73 \\
 &\quad + [\text{Access Parameter NOM_PWR (dB)}] \\
 &\quad + [\text{Access Parameter INIT_PWR (dB)}]
 \end{aligned}$$

Measurement procedure

The explanation in this section starts at the completion of the setting explained in 5.1.2 “Setting MT8801C and the CDMA mobile station”.

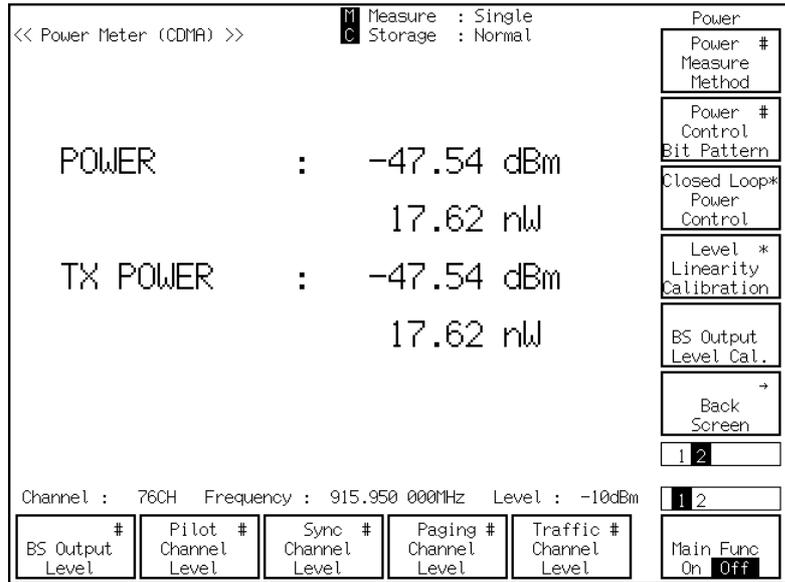
- (1) Press the F6 (Main Func On Off) key to turn On the Main Func.
- (2) Press the F1 (TX & RX Tester) key.
- (3) Check whether the Loopback status is displayed on the Setup Common Parameter screen.
- (4) Set the following item on the Setup Common Parameter screen:
 - ◆ Set BS Output Level at -25.0 dBm.
- (5) Press the F1 (TX Measure) key.
- (6) Press the F12 (Power Meter) key.
- (7) The Power Meter screen is displayed (shown below).



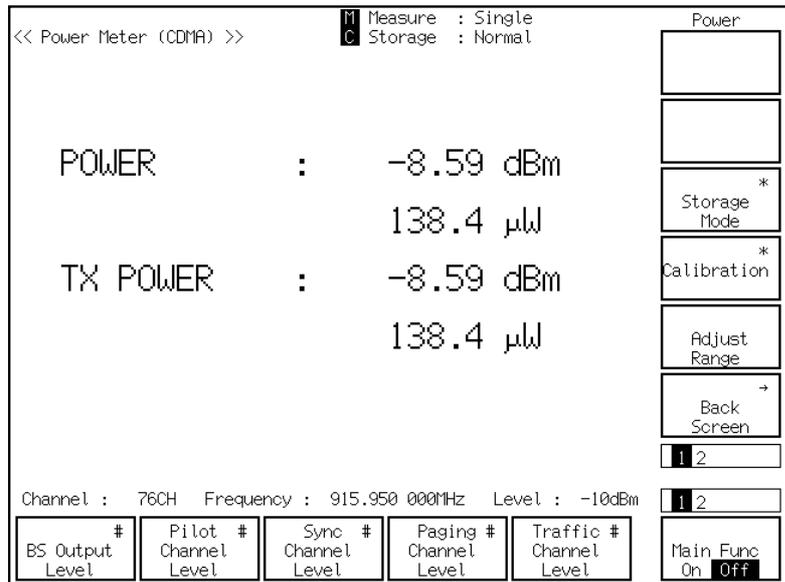
- (8) Press the ▲ key of Next Menu to display the second page of function keys (F7 to F12).
- (9) Press the F8 (Power Control Bit Pattern) key to set Power Control Bit to be Alternate.
- (10) Press the F7 (Power Measure Method) key to set Power Measure Method to be IF Level Meter.
- (11) Press the ▲ key of Next Menu to display the first page of function keys (F7 to F12).

Section 5 Measurement Examples

- (12) Press the F9 (Storage Mode) key and F7 (Normal) to set Storage Mode to be Normal.
- (13) Press the F12 (return) key.
- (14) Press the F11 (Adjust Range) key to optimize the measurement range.
- (15) Press the Single key or the Continuous key to start the open loop output power measurement. The measurement result 1 is shown as follows:



- (16) Press the F1 (BS Output Level) key and set BS Output Level at -65.0 dBm.
- (17) Press the F11 (Adjust Range) key to optimize the measurement range.
- (18) Press the Single key or the Continuous key to start the open loop output power measurement. The measurement result 2 is shown as follows:



5.2 Testing CDMA Mobile station Output

- (19) Press the F1 (BS Output Level) key and set BS Output Level at -104.0 dBm.
- (20) Press the F11 (Adjust Range) key to optimize the measurement range.
- (21) Press the Single key or the Continuous key to start the open loop output power measurement. The measurement result 3 is shown as follows:

<< Power Meter (CDMA) >>		M Measure : Single	Power
		C Storage : Normal	
POWER	:	19.24 dBm	
		83.9 mW	
TX POWER	:	19.24 dBm	Storage *
		83.9 mW	Mode
			Calibration *
			Adjust Range
			Back Screen →
			1 2
Channel : 76CH		Frequency : 915.950 000MHz	Level : 17dBm
1 2			
#	#	#	#
BS Output Level	Pilot Channel Level	Sync Channel Level	Paging Channel Level
			Traffic Channel Level
			Main Func On Off

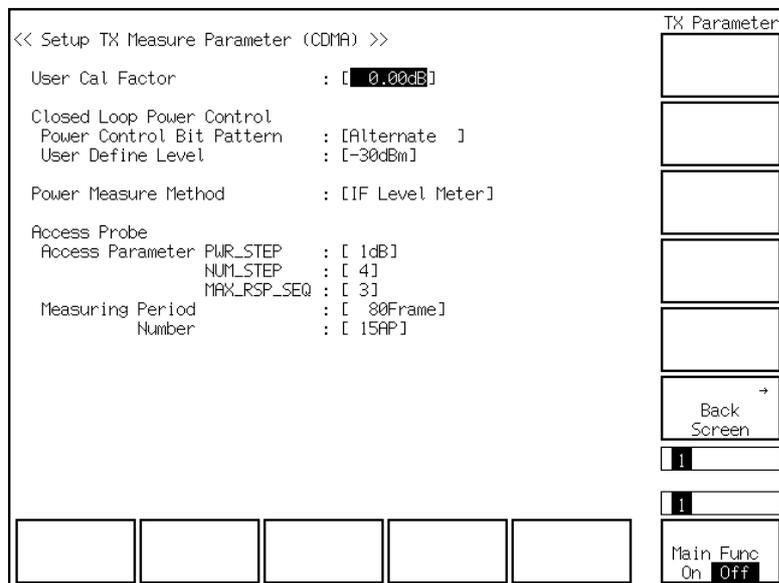
5.2.3 Measuring open loop time response

Open loop time response measures the time response of output power of the CDMA mobile station when the output power of the CDMA base station is changed stepwise. MT8801C is used in place of the CDMA base station.

Measurement procedure

The explanation in this section starts at the completion of the setting explained in 5.1.2 “Setting MT8801C and the CDMA mobile station”.

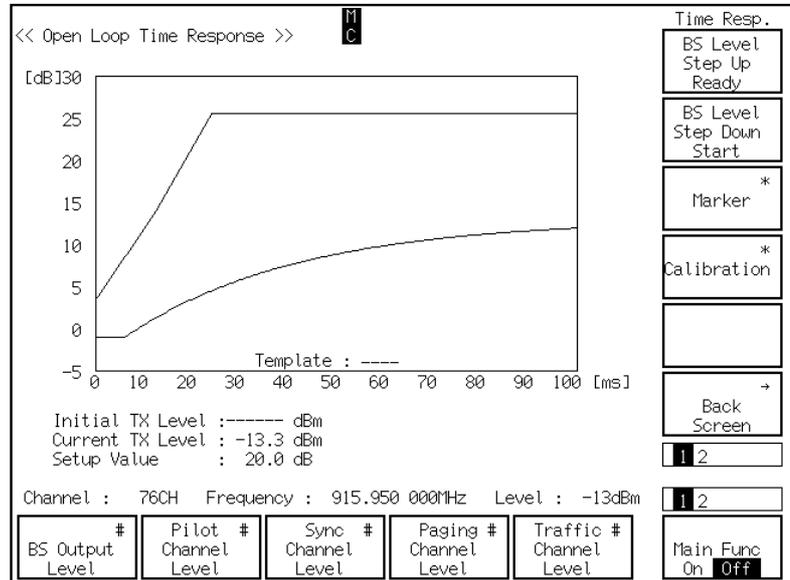
- (1) Press the F6 (Main Func On Off) key to turn On the Main Func.
- (2) Press the F1 (TX & RX Tester) key.
- (3) Check whether the Loopback status is displayed on the Setup Common Parameter screen.
- (4) Set the following item on the Setup Common Parameter screen:
 - ◆ Set BS Output Level at -60.0 dBm.
- (5) Press the F1 (TX Measure) key.
- (6) Press the ▲ key of Next Menu to display the second page of function keys (F7 to F12).
- (7) Press the F9 (Setup TX Parameter) key.
- (8) The Setup TX Measure Parameter screen (shown below) is displayed.



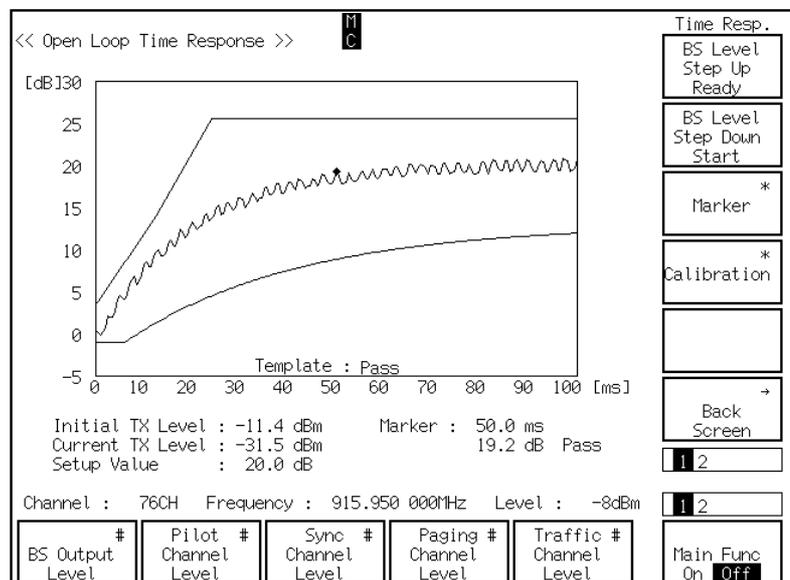
- (9) Set the following item on the Setup TX Measure Parameter screen:
 - ◆ Set Power Control Bit Pattern to be Alternate.
- (10) Press the F6 (Main Func On Off) key to turn On the Main Func.
- (11) Press the F1 (TX&RX Tester) key.
- (12) Press the F10 (Open Loop Power Cont) key.

5.2 Testing CDMA Mobile station Output

- (13) The Open Loop Time Response screen (shown below) is displayed.

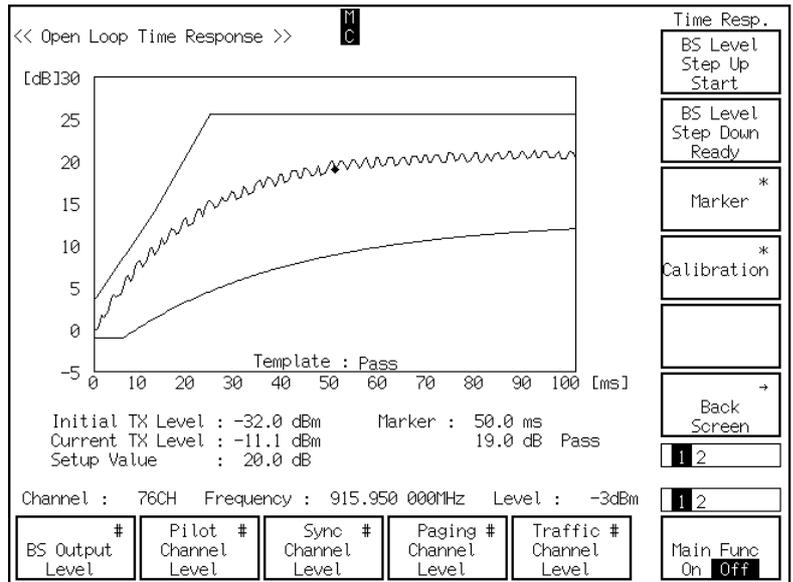


- (14) Press the **▲** key of Next Menu to display the second page of function keys (F7 to F12).
- (15) Press the F7 (Step Value) key and input 20.0 dBm using the numeric keypad.
- (16) Press the **▲** key of Next Menu to display the first page of function keys (F7 to F12).
- (17) Press the F9 (Marker) key and F7 (Normal) key to set Marker to be Normal.
- (18) Press the F12 (return) key.
- (19) Press the F7 (BS Level Step Up Start) key.
- (20) When you press the F7 (BS Level Step Up Start) key, the time response measurement is started for the first transition of the CDMA base station power output. The measurement result during the first transition is shown as follows:



Section 5 Measurement Examples

- (21) Press the F8 (BS Level Step Down Start) key.
- (22) When you press the F8 (BS Level Step Down Start) key, the time response measurement is started for the last transition of the CDMA base station power output. The measurement result during the last transition is shown as follows:



5.2.4 Measuring maximum RF output power

Maximum RF output power is the maximum output power measured at the antenna connector of the CDMA mobile station.

Measurement procedure

The explanation in this section starts at the completion of the setting explained in 5.1.2 “Setting MT8801C and the CDMA mobile station”.

- (1) Press the F6 (Main Func On Off) key to turn the Main Func On.
- (2) Press the F1 (TX & RX Tester) key.
- (3) Press the ◀ key of Next Menu to display the second page of main function keys (F1 to F5).
- (4) Press the F5 (Stop) key (the Call Proc. status becomes the Idle status).
- (5) Turn OFF the CDMA mobile station power (the Loopback status is released).
- (6) Set the following items on the Setup Common Parameter screen:
 - ◆ Set BS Output Level at -104.0 dBm.
 - ◆ Set Access Parameter NOM_PWR at 7 dBm.
 - ◆ Set Access Parameter INIT_PWR at 15 dBm.
- (7) Press the ◀ key of Next Menu to display the first page of main function keys (F1 to F5).
- (8) Press the F1 (TX Measure) key.
- (9) Press the ▲ key of Next Menu to display the second page of function keys (F7 to F12).
- (10) Press the F9 (Setup TX Parameter) key.
- (11) Set the following items on the Setup TX Measure Parameter screen:
 - ◆ Set Access Parameter PWR_STEP at 7 dBm.
 - ◆ Set Access Parameter NUM_STEP at 15.
 - ◆ Set Access Parameter MAX_RSP_SEQ at 15.
 - ◆ Set Power Control Bit Pattern to be ALL0.
- (12) Press the F12 (Back Screen) key.
- (13) Press the ◀ key of Next Menu to display the second page of main function keys (F1 to F5).
- (14) Press the F5 (Start) key. Turn ON the CDMA mobile station power when the Call Proc. status becomes the Idle status.
- (15) Wait until the Call Proc. status becomes the Idle (Regist).
- (16) Press the F2 (NW Originate) key
- (17) Wait until the Call Proc. status becomes Loopback.
- (18) Press the ◀ key of Next Menu to display the first page of main function keys (F1 to F5).
- (19) Press the F1 (TX Measure) key.
- (20) Press the F12 (Power Meter) key.
- (21) Press the ▲ key of Next Menu to display the first page of function keys (F7 to F12).
- (22) Press the F11 (Adjust Range) key to optimize the measurement range.

Section 5 Measurement Examples

- (23) Press the Single key or the Continuous key to start the maximum RF output power measurement. The measurement result is shown as follows:

<< Power Meter (CDMA) >>		M Measure : Single C Storage : Normal	Power
POWER	:	19.31 dBm	
		85.3 mW	
TX POWER	:	19.31 dBm	Storage*
		85.3 mW	Mode
			Calibration*
			Adjust Range
			Back Screen →
			1 2
Channel : 76CH		Frequency : 915.950 000MHz	Level : 42dBm
#	#	#	#
BS Output	Pilot	Sync	Paging
Level	Channel	Channel	Channel
Level	Level	Level	Level
			Main Func
			On Off

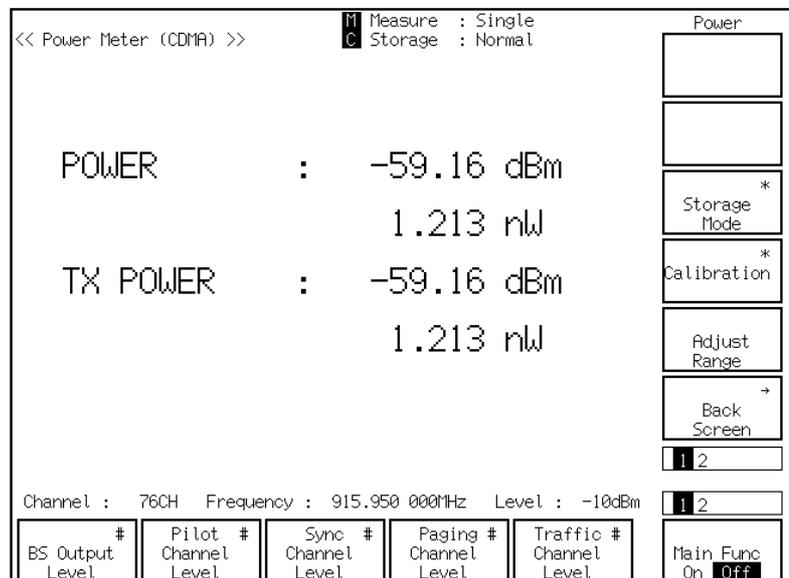
5.2.5 Measuring minimum output power

Minimum output power is the minimum output power of both closed and open loops measured at the antenna connector of the CDMA mobile station.

Measurement procedure

The explanation in this section starts at the completion of the setting explained in “5.1.2 Setting MT8801C and the CDMA mobile station”.

- (1) Press the F6 (Main Func On Off) key to turn On the Main Func.
- (2) Press the F1 (TX & RX Tester) key.
- (3) Check whether the Loopback status is displayed on the Setup Common Parameter screen.
- (4) Press the F1 (TX Measure) key.
- (5) Press the F12 (Power Meter) key.
- (6) Set the following item on the Power Meter screen:
 - ◆ Press F1 (BS Output Level) to set BS Output Level at -25.0 dBm.
- (7) Press the ▲ key of Next Menu to display the second page of function keys (F7 to F12).
- (8) Press the F8 (Power Control Bit Pattern) key to set Power Control Bit to be ALL1.
- (9) Press the F7 (Power Measure Method) key to set Power Measure Method to be IF Level Meter.
- (10) Press the ▲ key of Next Menu to display the first page of function keys (F7 to F12).
- (11) Press the F9 (Storage Mode) key and the F7 (Normal) key to set Storage Mode to be Normal.
- (12) Press the F12 (return) key.
- (13) Press the F11 (Adjust Range) key to optimize the measurement range.
- (14) Press the Single key or the Continuous key to start the minimum output power measurement. The measurement result is shown as follows:



Section 5 Measurement Examples

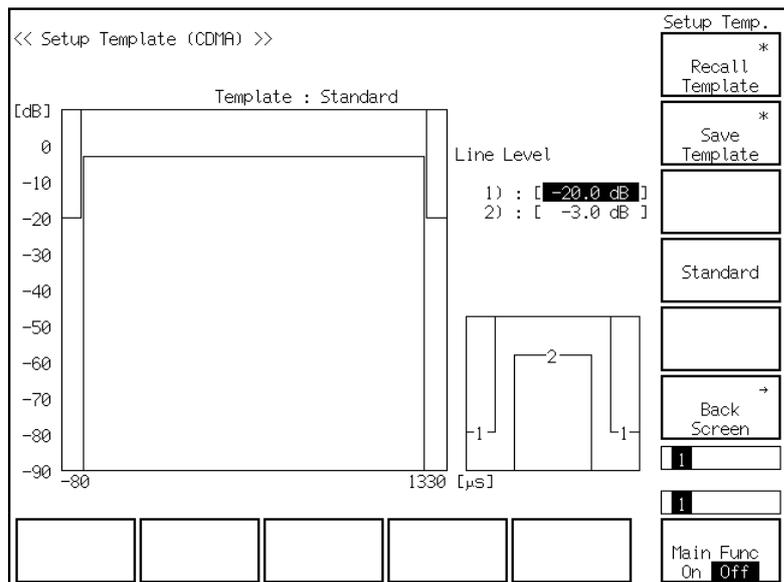
5.2.6 Measuring gated power

Gated power is evaluated by first measuring the time response of average output power of a single 1.25 ms gate-on power control group. Then it is determined whether the time response of burst wave is within the default template.

Measurement procedure

The explanation in this section starts at the completion of the setting explained in “5.1.2 Setting MT8801C and the CDMA mobile station”.

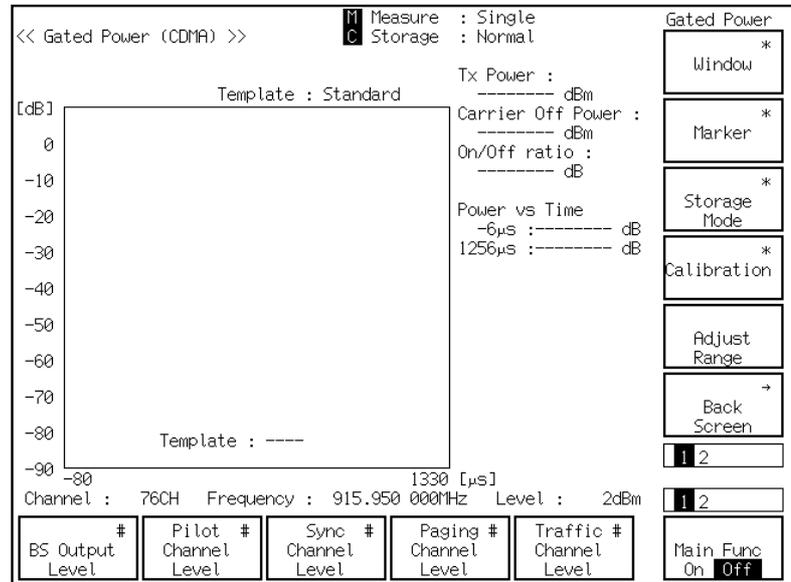
- (1) Press the F6 (Main Func On Off) key to turn On the Main Func.
- (2) Press the F1 (TX & RX Tester) key.
- (3) Press the ◀ key of Next Menu to display the second page of main function keys (F1 to F5).
- (4) Press the F5 (Stop) key to release the Loopback status.
- (5) Turn OFF the CDMA mobile station power.
- (6) Set the following item on the Setup Common Parameter screen:
 - ◆ Set Traffic Channel Data Rate at 1/8.
- (7) Press the F12 (Power Meter) key (the Power Meter screen is displayed).
- (8) Press the ▲ key of Next Menu to display the second page of function keys (F7 to F12).
- (9) Press the F8 (Power Control Bit Pattern) key to set Power Control Bit to be Alternate.
- (10) Press the F12 (Back Screen) key.
- (11) Press the ▲ key of Next Menu to display the second page of function keys (F7 to F12).
- (12) Press F10 (Setup Gated Power Template).
- (13) The Setup Template screen (shown below) is displayed.



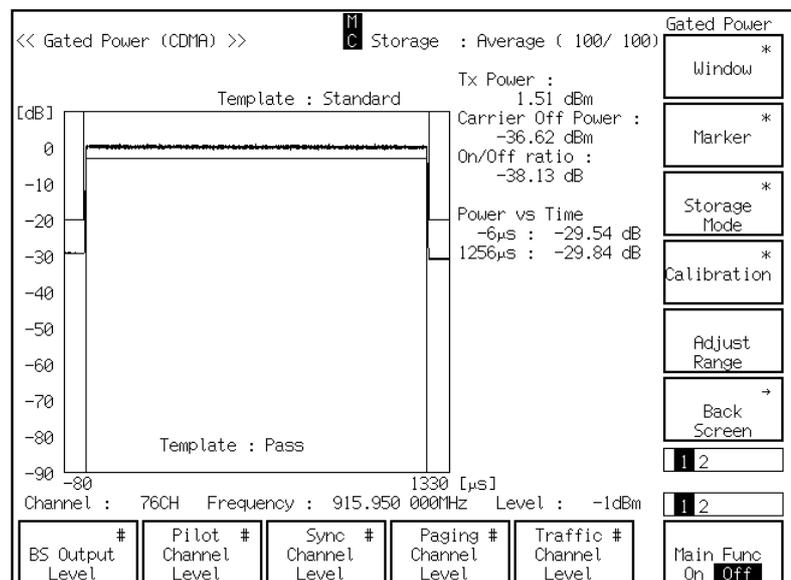
- (14) Press F10 (Standard) to set the template as Standard.
- (15) Press the F6 (Main Func On Off) key to turn On the Main Func.

5.2 Testing CDMA Mobile station Output

- (16) Press the F1 (TX & RX Tester) key.
- (17) Press the F9 (Gated Power) key.
- (18) The Gated Power screen (shown below) is displayed.



- (19) Press the F9 (Storage Mode) key and the F8 (Average) key to set Storage Mode to be Average.
- (20) Press F9 (Average Count) and set the number of average count to be 100 using the numeric keypad.
- (21) Press the F12 (return) key.
- (22) Press the F11 (Adjust Range) key to optimize the measurement range.
- (23) Press the Single key or the Continuous key to start the gated power measurement. The measurement result is shown as follows:



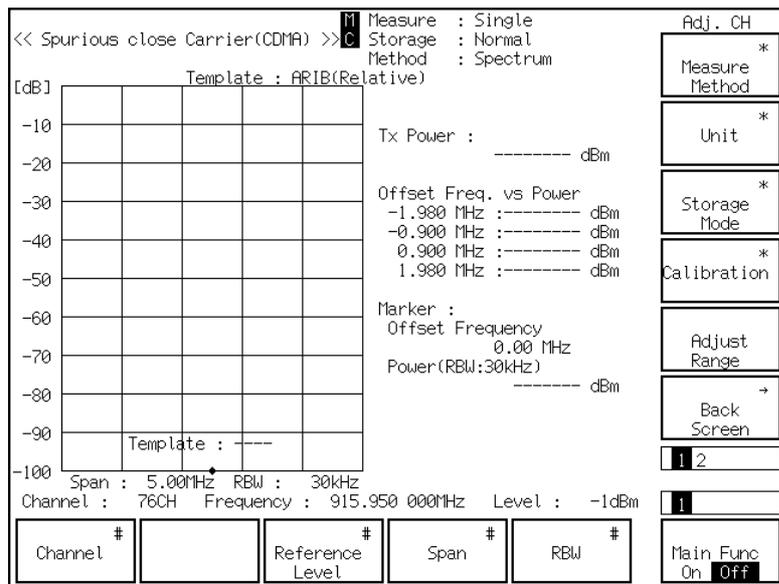
5.2.7 Measuring TX spurious closed to fc

TX spurious close to fc is to check whether both signal and spurious are within the specification value so that the spurious does not affect adjacent channels.

Measurement procedure

The explanation in this section starts at the completion of the setting explained in 5.1.2 “Setting MT8801C and the CDMA mobile station”.

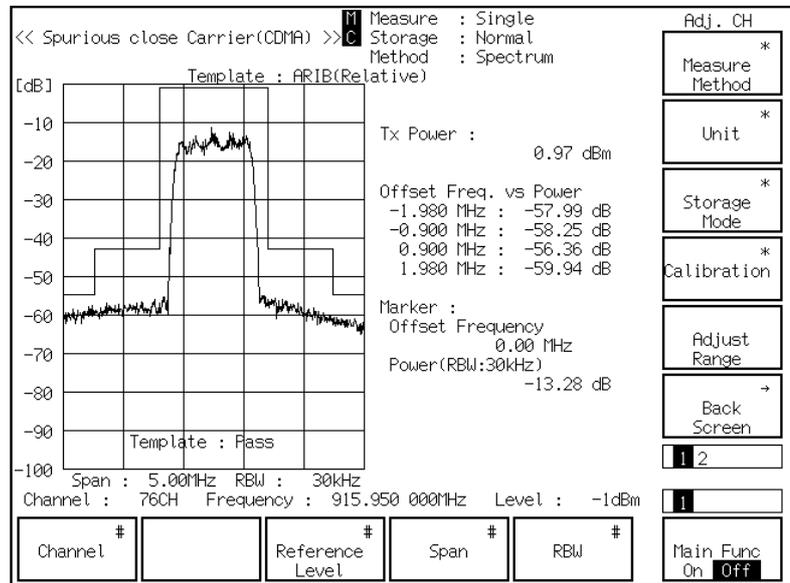
- (1) Check whether the Loopback status is displayed on the Setup Common Parameter screen.
- (2) Press the **▲** key of Next Menu to display the second page of function keys (F7 to F12).
- (3) Press the F11 (Spurious close to the Carrier) key.
- (4) The Spurious close to the Carrier screen (shown below) is displayed.



- (5) Press the F8 (Unit) key and F11 (dB) to set Unit to be dB.
- (6) Press the F12 (return) key.
- (7) Press the F11 (Adjust Range) key to optimize the measurement range.

5.2 Testing CDMA Mobile station Output

- (8) Press the Single key or the Continuous key to start the TX spurious closed to fc measurement. The measurement result is shown as follows:



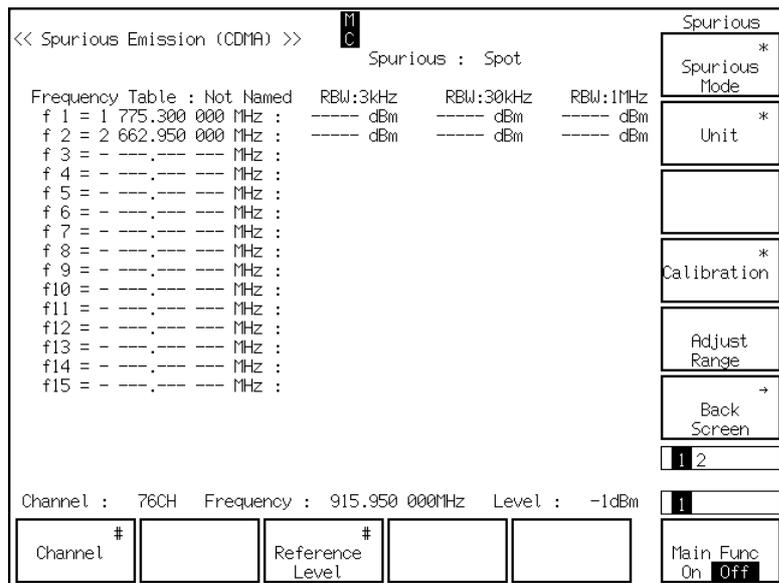
5.2.8 Measuring TX spurious points

TX spurious points measure the spurious effects at the specified frequency.

Measurement procedure

The explanation in this section starts at the completion of the setting explained in 5.1.2 “Setting MT8801C and the CDMA mobile station”.

- (1) Press the F6 (Main Func On Off) key to turn On the Main Func.
- (2) Press the F1 (TX & RX Tester) key.
- (3) Check whether the Loopback status is displayed on the Setup Common Parameter screen.
- (4) Press the F1 (TX Measure) key.
- (5) Press the ▲ key of Next Menu to display the second page of function keys (F7 to F12).
- (6) Press the F12 (Spurious Emission) key.
- (7) The Spurious Emission screen (shown below) is displayed.



- (8) Press the F8 (Unit) key and F11 (dB) to set Unit to be dB.
- (9) Press the F12 (return) key.
- (10) Press the ▲ key of Next Menu to display the second page of function keys (F7 to F12).
- (11) Press the F8 (Setup Frequency Table) key.

5.2 Testing CDMA Mobile station Output

(12) The Setup Frequency Table screen (shown below) is displayed.

<< Setup Frequency Table (CDMA) >>					Setup Table
Frequency Table : Not Named					Save * Frequency Table
f 1 :	[1 775.300 000 MHz]				Delete
f 2 :	[2 662.950 000 MHz]				Insert
f 3 :	[- ----,---- MHz]				Harmonics
f 4 :	[- ----,---- MHz]				Clear
f 5 :	[- ----,---- MHz]				Back Screen →
f 6 :	[- ----,---- MHz]				1 2
f 7 :	[- ----,---- MHz]				1
f 8 :	[- ----,---- MHz]				Main Func On Off
f 9 :	[- ----,---- MHz]				
f10 :	[- ----,---- MHz]				
f11 :	[- ----,---- MHz]				
f12 :	[- ----,---- MHz]				
f13 :	[- ----,---- MHz]				
f14 :	[- ----,---- MHz]				
f15 :	[- ----,---- MHz]				

- (13) Put the cursor on f1 using the Cursor $\wedge \vee$ keys. Then press the Set key of Cursor. Set f1 at 1800 MHz using the numeric keypad. Similarly set f2 at 2700 MHz.
- (14) Press the F12 (Back Screen) key.
- (15) Press the \blacktriangle key of Next Menu to display the first page of function keys (F7 to F12).
- (16) Press the F11 (Adjust Range) key to optimize the measurement range.
- (17) Press the Single key or the Continuous key to start the TX spurious points measurement. The measurement result is shown as follows:

<< Spurious Emission (CDMA) >>					M C	Spurious
Spurious : Spot						Spurious * Mode
Frequency Table : Not Named	RBW:3kHz	RBW:30kHz	RBW:1MHz			Unit *
f 1 = 1 800.000 000 MHz :	-85.06 dB	-75.36 dB	-60.43 dB			Calibration *
f 2 = 2 700.000 000 MHz :	-82.54 dB	-74.65 dB	-59.68 dB			Adjust Range
f 3 = - ----,---- MHz :						Back Screen →
f 4 = - ----,---- MHz :						1 2
f 5 = - ----,---- MHz :						1
f 6 = - ----,---- MHz :						Main Func On Off
f 7 = - ----,---- MHz :						
f 8 = - ----,---- MHz :						
f 9 = - ----,---- MHz :						
f10 = - ----,---- MHz :						
f11 = - ----,---- MHz :						
f12 = - ----,---- MHz :						
f13 = - ----,---- MHz :						
f14 = - ----,---- MHz :						
f15 = - ----,---- MHz :						
Channel :	76CH	Frequency :	915.950 000MHz	Level :	-2dBm	
Channel #		Reference #		Level		

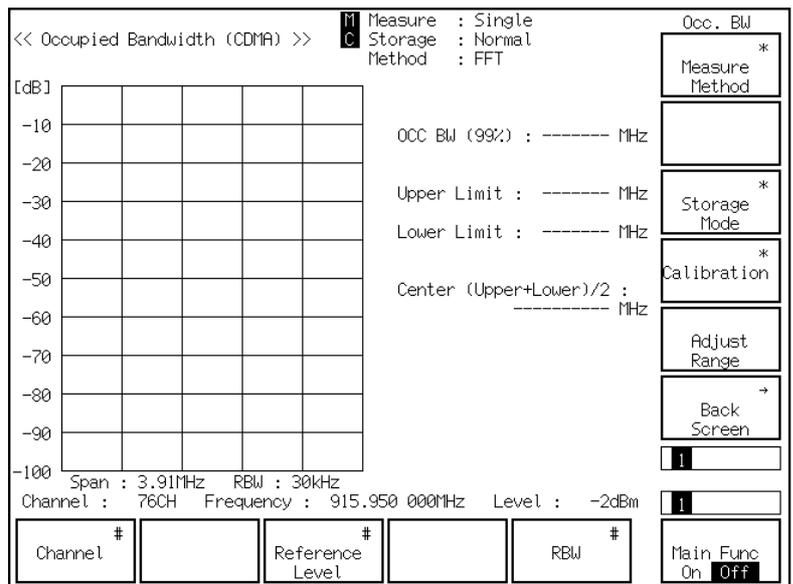
5.2.9 Measuring occupied bandwidth

Occupied bandwidth measures the bandwidth in terms of the upper limit and the lower limit that occupies 0.5% of total average power emitted.

Measurement procedure

The explanation in this section starts at the completion of the setting explained in 5.1.2 “Setting MT8801C and the CDMA mobile station”.

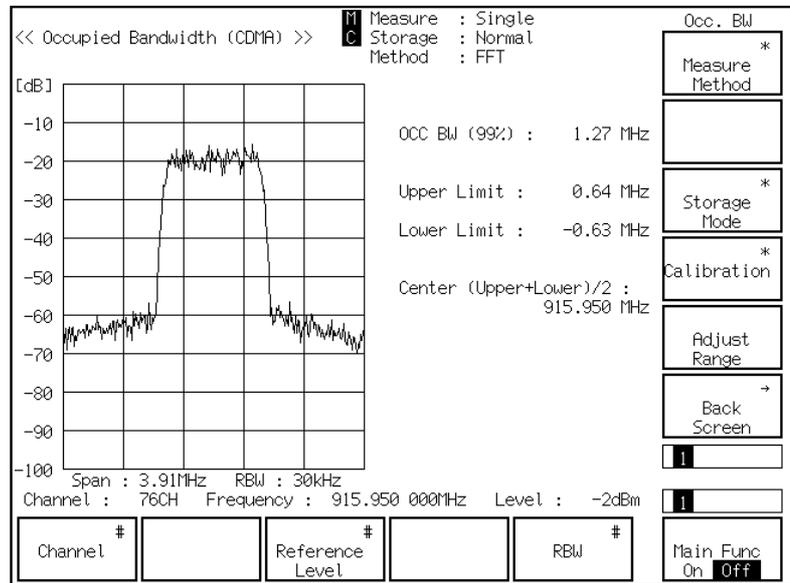
- (1) Press the F6 (Main Func On Off) key to turn On the Main Func.
- (2) Press the F1 (TX & RX Tester) key.
- (3) Check whether the Loopback status is displayed on the Setup Common Parameter screen.
- (4) Press the F11 (Occupied Bandwidth) key.
- (5) The Occupied Bandwidth screen (shown below) is displayed.



- (6) Press the F5 (RBW) key to set RBW at 30 kHz.
- (7) Press the F9 (Storage Mode) key and the F7 (Normal) key to set Storage Mode to be Normal.
- (8) Press the F12 (return) key.
- (9) Press the F11 (Adjust Range) key to optimize the measurement range.

5.2 Testing CDMA Mobile station Output

- (10) Press the Single key or the Continuous key to start the occupied bandwidth measurement. The occupied bandwidth measurement result is shown as follows:



5.2.10 Measuring access probe output power

Access probe output power is one-time access channel output power that consists of the pre-ample and the message. Nominal power offset of access channel output power, initial power offset, power increment in continuous probes, number of probes in one-time access probe sequence, and number of probe sequences in one-time access attempt are measured in this section.

Measurement procedure

The explanation in this section starts at the completion of the setting explained in 5.1.2 “Setting MT8801C and the CDMA mobile station”.

- (1) Press the F6 (Main Func On Off) key to turn On the Main Func.
- (2) Press the F1 (TX & RX Tester) key.
- (3) Press the ◀ key of Next Menu to display the second page of main function keys (F1 to F6).
- (4) Press the F5 (Stop) key to release the Loopback status.
- (5) Turn OFF the CDMA mobile station power.
- (6) Set the following items on the Setup Common Parameter screen:
 - ◆ Set Access Parameter NON_PWR at 0.
 - ◆ Set Access Parameter INIT_PWR at 0 dBm.
- (7) Press the ◀ key of Next Menu to display the first page of main function keys (F1 to F5).
- (8) Press the F1 (TX Measure) key.
- (9) Press the ▶ key of Next Menu to display the second page of function keys (F7 to F12).
- (10) Press the F9 (Setup TX Parameter) key.
- (11) Set the following items on the Setup TX Measure Parameter screen:
 - ◆ Set Access Parameter PWR_STEP at 0 dB.
 - ◆ Set Access Parameter NUM_STEP at 4.
 - ◆ Set Access Parameter MAX_RSP_SEQ at 1.
 - ◆ Set Measuring Period to be 2000 Frame.
 - ◆ Set Measuring Number to be 15AP.
- (12) Press the F6 (Main Func On Off) key to turn On the Main Func.
- (13) Press the F1 (TX & RX Tester) key.
- (14) Press the ◀ key of Next Menu to display the second page of main function keys (F1 to F5).
- (15) Press the F5 (Start) key.
- (16) Turn ON the CDMA mobile station power.
- (17) Wait until the Idle status of Call Proc. becomes the Idle (Regist) status.
- (18) Press the F8 (Access Probe Measure) key.

5.2 Testing CDMA Mobile station Output

(19) The Access Probe Measure screen (shown below) is displayed.

<< Access Probe Measure (CDMA) >>						Access Probe		
Measure State : Stop						Start/Stop		
Measured Level of Access Probes (-- bursts / ---- Frames)								
AP	Frame	Level	AP	Frame	Level	AP	Frame	Level
1	-----		18	-----		35	-----	
2	-----		19	-----		36	-----	
3	-----		20	-----		37	-----	
4	-----		21	-----		38	-----	
5	-----		22	-----		39	-----	
6	-----		23	-----		40	-----	
7	-----		24	-----		41	-----	
8	-----		25	-----		42	-----	
9	-----		26	-----		43	-----	
10	-----		27	-----		44	-----	
11	-----		28	-----		45	-----	
12	-----		29	-----		46	-----	
13	-----		30	-----		47	-----	
14	-----		31	-----		48	-----	
15	-----		32	-----		49	-----	
16	-----		33	-----		50	-----	
17	-----		34	-----			-----	
Channel : 76CH Frequency : 915.950 000MHz Level : 2dBm								
#	Pilot #	Sync #	Paging #	Traffic #				
Level	Channel	Channel	Channel	Channel	Channel			
Level	Level	Level	Level	Level	Level			
						Main Func		
						On Off		

(20) Press the F10 (Calibration) key and the F8 (Int. Osc.) key to perform the calibration using the internal oscillator.

(21) Press the Single key or the Continuous key to start the access probe output power measurement. The measurement result 1 is shown as follows:

<< Access Probe Measure (CDMA) >>						Access Probe		
Measure State : Stop						Start/Stop		
Measured Level of Access Probes (5 bursts / 2000 Frames)								
AP	Frame	Level	AP	Frame	Level	AP	Frame	Level
1	158	2.2dBm	18			35		
2	262	2.1dBm	19			36		
3	392	2.1dBm	20			37		
4	522	2.0dBm	21			38		
5	652	1.9dBm	22			39		
6			23			40		
7			24			41		
8			25			42		
9			26			43		
10			27			44		
11			28			45		
12			29			46		
13			30			47		
14			31			48		
15			32			49		
16			33			50		
17			34					
Channel : 76CH Frequency : 915.950 000MHz Level : 2dBm								
#	Pilot #	Sync #	Paging #	Traffic #				
Level	Channel	Channel	Channel	Channel	Channel			
Level	Level	Level	Level	Level	Level			
						Main Func		
						On Off		

(22) Then change parameters to perform the similar test.

(23) Press the F6 (Main Func On Off) key to turn On the Main Func.

(24) Press the F1 (TX & RX Tester) key.

(25) Set the following items on the Setup Common Parameter screen:

- ◆ Set Access Parameter NON_PWR at 3.
- ◆ Set Access Parameter INIT_PWR at 3.

(26) Press the F1 (TX Measure) key.

Section 5 Measurement Examples

- (27) Press the ▲ key of Next Menu to display the second page of function keys (F7 to F12).
- (28) Press the F9 (Setup TX Parameter) key.
- (29) Set the following items on the Setup TX Measure Parameter screen:
 - ◆ Set Access Parameter PWR_STEP at 1.
 - ◆ Set Access Parameter MAX_RSP_SEQ at 3.
- (30) Press the F6 (Main Func On Off) key to turn On the Main Func.
- (31) Press the F1 (TX & RX Tester) key.
- (32) Press the F8 (Access Probe Measure) key.
- (33) The Access Probe Measure screen is displayed.
- (34) Press the Single key or the Continuous key to start the access probe output power measurement. The measurement result 2 is shown as follows:

<< Access Probe Measure (CDMA) >>
M
C
Access Probe

Measure State : Stop

Measured Level of Access Probes (15 bursts / 1704 Frames)

AP	Frame	Level	AP	Frame	Level	AP	Frame	Level
1	40	2.1dBm	18			35		
2	170	3.1dBm	19			36		
3	274	3.9dBm	20			37		
4	378	4.9dBm	21			38		
5	482	5.9dBm	22			39		
6	586	2.0dBm	23			40		
7	716	3.0dBm	24			41		
8	820	3.9dBm	25			42		
9	950	4.9dBm	26			43		
10	1080	5.9dBm	27			44		
11	1210	2.0dBm	28			45		
12	1340	3.0dBm	29			46		
13	1444	3.9dBm	30			47		
14	1548	4.9dBm	31			48		
15	1678	5.9dBm	32			49		
16			33			50		
17			34					

Channel : 76CH Frequency : 915.950 000MHz Level : 2dBm

#	#	#	#	#
BS Output	Pilot	Sync	Paging	Traffic
Level	Channel	Channel	Channel	Channel
Level	Level	Level	Level	Level

1 2
1 2
Main Func
On Off

5.2.11 Measuring standby output power

Standby output power is the output power in the waiting status after the completion of the CDMA mobile station location registration.

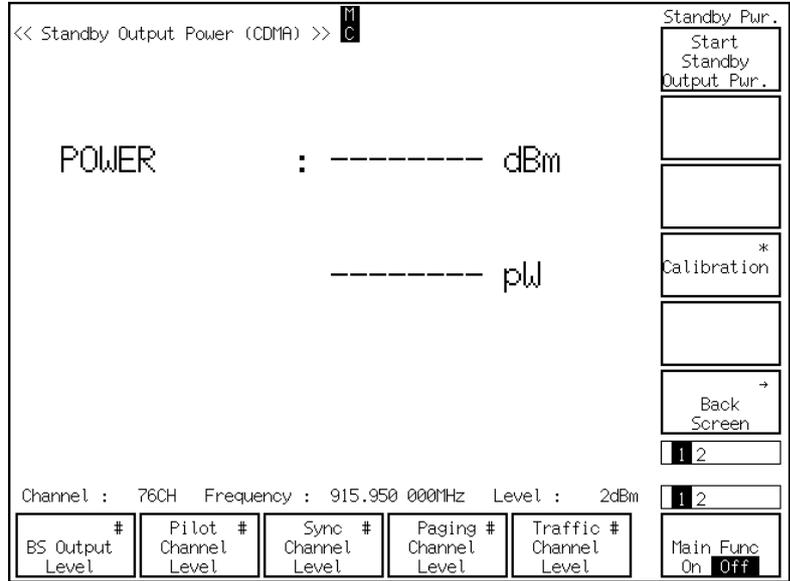
Measurement procedure

The explanation in this section starts at the completion of the setting explained in 5.1.2 “Setting MT8801C and the CDMA mobile station”.

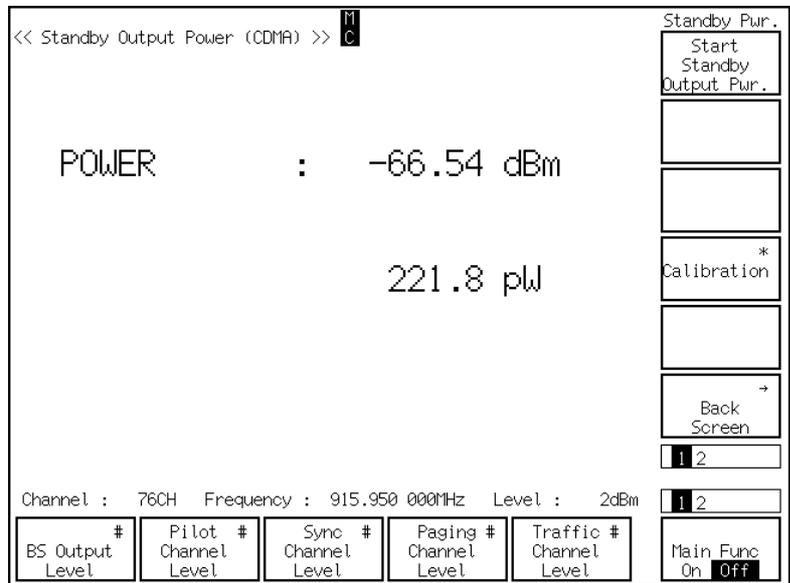
- (1) Press the F6 (Main Func On Off) key to turn On the Main Func.
- (2) Press the F1 (TX & RX Tester) key.
- (3) Press the ◀ key of Next Menu to display the second page of main function keys (F1 to F6).
- (4) Press the F5 (Stop) key to release the Loopback status.
- (5) Turn OFF the CDMA mobile station power.
- (6) Press the F5 (Start) key.
- (7) Turn ON the CDMA mobile station power.
- (8) Wait until the Call Proc. status becomes the Idle (Regist) status.
- (9) Press the ◀ key of Next Menu to display the first page of main function keys (F1 to F6).
- (10) Press the F1 (TX Measure) key.
- (11) Press the ▲ key of Next Menu to display the second page of function keys (F7 to F12).
- (12) Press the F9 (Setup TX Parameter) key.
- (13) Set the following item on the Setup TX Measure Parameter screen:
 - ◆ Set PCB Pattern to be Alternate.
- (14) Press the F12 (Back Screen) key.
- (15) Press the ▲ key of Next Menu to display the first page of main function keys (F7 to F12).
- (16) Press the F9 (Standby Output Power) key.

Section 5 Measurement Examples

(17) The Standby Output Power screen (shown below) is displayed.



- (18) Press the F10 (Calibration) key and the F8 (Int. Osc. Calibration) key to perform the internal oscillator calibration.
- (19) Press the Single key or the Continuous key to start the standby output power measurement. The measurement result is shown as follows:



5.3 Testing CDMA Mobile station Input

This section explains the test procedures related to the CDMA mobile station input.

5.3.1 Measuring frame error rate under AWGN

Frame error rate of signal input is measured in the artificial noise environment created by the built-in AWGN.

Measurement procedure

The explanation in this section starts at the completion of the setting explained in 5.1.2 “Setting MT8801C and the CDMA mobile station”.

- (1) Press the F6 (Main Func On Off) key to turn On the Main Func.
- (2) Press the F1 (TX & RX Tester) key.
- (3) Check whether the Loopback status is displayed on the Setup Common Parameter screen.
- (4) Set the following items on the Setup Common Parameter screen:
 - ◆ Set BS Output Level at -55.0 dB.
 - ◆ Set AWGN Level at 1.0 dB.
 - ◆ Set Data Rate to be Full.
- (5) Press the F2 (RX Measure) key.
- (6) Press the F7 (FER Measure) key.
- (7) The Frame Error Rate screen (shown below) is displayed.

<< Frame Error Rate (CDMA) >>				M C	FER Measure
FER	Errors	Transmitted / Sample	Confidence Level		Start/Stop
-----%	-----	-----	-----%		Sample #
Pass/Fail : ----					FER #

Confidence Level :	95.0 %	Output Level			
FER :	3.0 %	BS Output Level :	-55.0 dBm		
FER Upper Limit :	10.0 %	Pilot Level :	(-7.0 dB)		
		Sync Level :	(-16.0 dB)		
		Paging Level :	(-12.0 dB)		
		Traffic Level :	(-7.4 dB)		
		OCNS Level :	(-2.9 dB)		
		AWGN Level :	(1.0 dB): (Off)		
		Abs. AWGN Level :	(-54.0 dBm)		
Traffic Channel Data Rate : Full					Back Screen
					1 2
Channel : 76CH Frequency : 915.950 000MHz Level : -18dBm					1 2
#	#	#	#	#	Main Func
BS Output Level	Pilot Channel Level	Sync Channel Level	Paging Channel Level	Traffic Channel Level	On Off

- (8) Press the F5 (Traffic Channel Level) key to set Traffic Channel Level at -16.3 dB.
- (9) Press the F12 (Back Screen) key.
- (10) Press the \blacktriangle key of Next Menu to display the second page of function keys (F7 to F12).
- (11) Press the F9 (Setup RX Parameter) key.

Section 5 Measurement Examples

- (12) Set the following items on the Setup RX Measure Parameter screen:
 - ◆ Set Sample to be 100 Frame.
 - ◆ Set FER at 3.0 %.
 - ◆ Set FER Upper Limit at 3.0 %.
- (13) Press the F12 (Back Screen) key.
- (14) Press the **▲** key of Next Menu to display the first page of function keys (F7 to F12).
- (15) Press the F7 (FER Measure) key (to display the Frame Error Rate screen).
- (16) Press the **◀** key of Next Menu to display the second page of main function keys (F1 to F5).
- (17) Press the F5 (AWGN On Off) key to turn On AWGN.
- (18) Press the Single key or the Continuous key to start the frame error rate measurement under AWGN. The measurement result is shown as follows:

<< Frame Error Rate (CDMA) >>				FER Measure
FER	Errors	Transmitted / Sample	Confidence Level	Start/Stop
0.00%	0	100 / 100	95.0%	#
Pass/Fail : Pass				Sample
-----				FER #
Confidence Level :	95.0 %	Output Level		Back Screen →
FER :	3.0 %	BS Output Level :	-55.0 dBm	1 2
FER Upper Limit :	3.0 %	Pilot Level :	(-7.0 dB)	1 2
		Sync Level :	(-16.0 dB)	Main Func
		Paging Level :	(-12.0 dB)	On Off
		Traffic Level :	(-16.3 dB)	
		OCNS Level :	(-1.6 dB)	
		AWGN Level :	(1.0 dB) : (On)	
		Abs. AWGN Level :	(-54.0 dBm)	
Traffic Channel Data Rate : Full				
Channel : 76CH Frequency : 915.950 000MHz Level : -18dBm				
Channel #	Reference #	AWGN Level #	AWGN On Off	Main Func On Off

5.3.2 Measuring RX sensitivity

RX sensitivity is the minimum input power measured while the frame error rate (FER) does not exceed 0.005.

Measurement procedure

The explanation in this section starts at the completion of the setting explained in 5.1.2 “Setting MT8801C and the CDMA mobile station”.

- (1) Press the F6 (Main Func On Off) key to turn On the Main Func.
- (2) Press the F1 (TX & RX Tester) key.
- (3) Check whether the Loopback status is displayed on the Setup Common Parameter screen.
- (4) Press the F2 (RX Measure) key.
- (5) Press the F7 (FER Measure) key.
- (6) Check whether AWGN is set to Off on the Frame Error Rate screen.
- (7) Set the following items on the Frame Error Rate screen:
 - ◆ Set BS Output Level at -104.0 dB.
 - ◆ Set Traffic Channel Level at -15.6 dB.
- (8) Press the F12 (Back Screen) key.
- (9) Press the ▲ key of Next Menu to display the second page of function keys (F7 to F12).
- (10) Press the F9 (Setup RX Parameter) key.
- (11) Set the following items on the Setup RX Measure Parameter screen:
 - ◆ Set Sample to be 1000 Frame.
 - ◆ Set FER at 0.5 %.
 - ◆ Set FER Upper Limit at 0.5 %.
- (12) Press the F12 (Back Screen) key.
- (13) Press the ▲ key of Next Menu to display the first page of function keys (F7 to F12).
- (14) Press the F7 (FER Measure) key (to display the Frame Error Rate screen).

Section 5 Measurement Examples

- (15) Press the Single key or the Continuous key to start the RX sensitivity measurement. The measurement result is shown as follows:

<< Frame Error Rate (CDMA) >>				M	FER Measure
FER	Errors	Transmitted / Sample	Confidence Level		Start/Stop
0.00%	0	600 / 1000	95.0%		Sample #
Pass/Fail : Pass					FER #

Confidence Level :	95.0 %	Output Level			
FER :	0.5 %	BS Output Level :	-55.0 dBm		
FER Upper Limit :	0.5 %	Pilot Level :	(-7.0 dB)		
		Sync Level :	(-16.0 dB)		
		Paging Level :	(-12.0 dB)		
		Traffic Level :	(-15.4 dB)		
		OCNS Level :	(-1.7 dB)		
		AWGN Level :	(1.0 dB) : (Off)		
		Abs. AWGN Level :	(-54.0 dBm)		Back Screen
Traffic Channel Data Rate : Full					1 2
Channel : 76CH Frequency : 915.950 000MHz Level : -18dBm					1 2
#	#	#	#	#	Main Func
BS Output Level	Pilot Channel Level	Sync Channel Level	Paging Channel Level	Traffic Channel Level	On Off

5.3.3 Measuring dynamic range

Dynamic range is the input power range where FER (Frame Error Rate) does not exceed the specified value (0.5).

Measurement procedure

The explanation in this section starts at the completion of the setting explained in 5.1.2 “Setting MT8801C and the CDMA mobile station”.

- (1) Press the F6 (Main Func On Off) key to turn On the Main Func.
- (2) Press the F1 (TX & RX Tester) key.
- (3) Check whether the Loopback status is displayed on the Setup Common Parameter screen.
- (4) Press the F2 (RX Measure) key.
- (5) Press the F7 (FER Measure) key.
- (6) Check whether AWGN is set to Off on the Frame Error Rate screen.
- (7) Set the following items on the Frame Error Rate screen:
 - ◆ Set BS Output Level at -104.0 dBm.
 - ◆ Set Traffic Channel Level at -15.6 dB.
- (8) Press the F12 (Back Screen) key.
- (9) Press the  key of Next Menu to display the second page of function keys (F7 to F12).
- (10) Press the F9 (Setup RX Parameter) key.
- (11) Set the following items on the Setup RX Measure Parameter screen:
 - ◆ Set Sample to be 1000 Frame.
 - ◆ Set FER at 0.5 %.
 - ◆ Set FER Upper Limit at 0.5 %.
- (12) Press the F12 (Back Screen) key.
- (13) Press the  key of Next Menu to display the first page of function keys (F7 to F12).
- (14) Press the F7 (FER Measure) key (to display the Frame Error Rate screen).

Section 5 Measurement Examples

- (15) Press the Single key or the Continuous key to start the dynamic range measurement 1. The measurement result is shown as follows:

<< Frame Error Rate (CDMA) >>				M	C	FER Measure
FER	Errors	Transmitted / Sample	Confidence Level			Start/Stop
0.00%	0	600 / 1000	95.0%			Sample #
Pass/Fail : Pass						FER #

Confidence Level :	95.0 %	Output Level				
FER :	0.5 %	BS Output Level :	-104.0 dBm			
FER Upper Limit :	0.5 %	Pilot Level :	(-7.0 dB)			
		Sync Level :	(-16.0 dB)			
		Paging Level :	(-12.0 dB)			
		Traffic Level :	(-15.6 dB)			
		OCNS Level :	(-1.7 dB)			
		AWGN Level :	(1.0 dB) : (Off)			
		Abs. AWGN Level :	(-103.0 dBm)			Back Screen
Traffic Channel Data Rate : Full						1 2
Channel : 76CH Frequency : 915.950 000MHz Level : 31dBm						1 2
#	#	#	#	#		Main Func
BS Output Level	Pilot Channel Level	Sync Channel Level	Paging Channel Level	Traffic Channel Level		On Off

- (16) Press the F1 (BS Output Level) key and set BS Output Level at -25.0 dBm.
- (17) Press the Single key or the Continuous key to start the dynamic range measurement 2. The measurement result is shown as follows:

<< Frame Error Rate (CDMA) >>				M	C	FER Measure
FER	Errors	Transmitted / Sample	Confidence Level			Start/Stop
0.00%	0	600 / 1000	95.0%			Sample #
Pass/Fail : Pass						FER #

Confidence Level :	95.0 %	Output Level				
FER :	0.5 %	BS Output Level :	-25.0 dBm			
FER Upper Limit :	0.5 %	Pilot Level :	(-7.0 dB)			
		Sync Level :	(-16.0 dB)			
		Paging Level :	(-12.0 dB)			
		Traffic Level :	(-15.6 dB)			
		OCNS Level :	(-1.7 dB)			
		AWGN Level :	(1.0 dB) : (Off)			
		Abs. AWGN Level :	(-24.0 dBm)			Back Screen
Traffic Channel Data Rate : Full						1 2
Channel : 76CH Frequency : 915.950 000MHz Level : -48dBm						1 2
#	#	#	#	#		Main Func
BS Output Level	Pilot Channel Level	Sync Channel Level	Paging Channel Level	Traffic Channel Level		On Off

Section 6 Performance Tests

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6.1 Requirements for Performance Tests

The performance tests are carried out as a part of preventive maintenance to prevent deterioration of the MT8801C performance.

Use the performance test procedure during acceptance inspection, periodic inspection, and after repair to check the MT8801C performance. The items which is regarded important should be tested periodically as preventive maintenance. This section explains the following test procedures:

- Reference oscillator frequency stability
- Frequency/waveform quality
- Relative level accuracy of signal generator
- Waveform quality of signal generator
- Power meter (IF Level Meter) measurement accuracy
- Power meter (Power Meter) measurement accuracy
- Neighboring spurious measurement
- Spurious measurement

For the analog measurement performance test, see Section 5 “Performance Test” of the manual of the MT8801C main unit.

The performance is recommended to inspect regularly once or twice a year. If the specifications are not met in the performance tests, contact the Service Department of Anritsu Corporation.

6.2 Instruments Required for Performance Test

The instruments required for performance test are shown below.

Instruments Required for Performance Test

Recommended instrument name (model name)	Required performance	Test item
Synthesized signal generator (MG3633A)	<ul style="list-style-type: none"> Frequency range: 100 MHz to 2 GHz 1-Hz resolution available Output level range: -20 to +10 dBm 0.1-dB resolution available SSB phase noise: Maximum -130 dBc/Hz (at 10 kHz offset) Second harmonics: Maximum -30 dBc External reference input: (10 MHz available) 	IF Level Meter measurement accuracy
Intelligent RF signal generator (HP8665B)	<ul style="list-style-type: none"> Frequency range: 100 kHz to 3000 MHz 0.01-Hz resolution available Output level range: -139.9 to +13 dBm 0.1-dB resolution available SSB phase noise: Maximum -117 dBc/Hz (at 20 kHz offset) Second harmonics: Maximum -30 dBc 	IF Level Meter measurement accuracy Power Meter measurement accuracy
Digital modulation signal generator (MG3670B) + CDMA modulation unit (MG0310A)	<ul style="list-style-type: none"> Frequency range: 300 MHz to 2250 MHz 1-Hz resolution available Output level range: -143 to +13 dBm 0.1-dB resolution available SSB phase noise: Maximum -120 dBc/Hz (at 100 kHz offset) Second harmonics: Maximum -30 dBc External reference input: 10 MHz or 13 MHz 	Frequency/waveform quality Neighboring spurious measurement Spurious measurement
Power meter (ML4803A)	<ul style="list-style-type: none"> Main unit accuracy: ± 0.02 dB Frequency range: 100 MHz to 8.5 GHz (depending on the power sensor in use) 	Relative level accuracy of signal generator IF Level Meter measurement accuracy Power Meter measurement accuracy
Power sensor (MA4601A)	<ul style="list-style-type: none"> Frequency range: 10 MHz to 3 GHz Measurement power range: -30 to +20 dBm Input connector: N-type 	Relative level accuracy of signal generator IF Level Meter measurement accuracy Power Meter measurement accuracy
Receiver for calibration (ML2530A)	<ul style="list-style-type: none"> Frequency range: 0.1 to 3000 MHz Level range: +20 to -140 dBm 	IF Level Meter measurement accuracy
Programmable attenuator (MN63A)	<ul style="list-style-type: none"> Frequency range: DC to 2 GHz Maximum attenuation: 100 dB (Attenuation width: 10 dB and 1 dB) Maximum input: 0.25 W (+24 dB) 	IF Level Meter measurement accuracy
Digital mobile radio transmission tester (MS8606A)	<ul style="list-style-type: none"> Vector error: Maximum 1.8% rms 	Waveform quality of signal generator

Section 6 Performance Tests

Recommended instrument name (model name)	Required performance	Test item
Frequency counter (MF1603A)	<ul style="list-style-type: none"> • 100 kHz to 3 GHz • Number of display digits: 10 • Resolution: 1 Hz • External reference input: (10 MHz) possible 	Reference oscillator frequency accuracy
Frequency standard	<ul style="list-style-type: none"> • Frequency: 10 MHz • Stability: $\leq 1 \times 10^{-9}$ 	Reference-oscillator frequency stability
Fixed attenuator (MP721A)	<ul style="list-style-type: none"> • Attenuation quantity: 3 dB • VSWR: Maximum 1.2 	Power Meter measurement accuracy

†:Performances are partially extracted that can cover the measurement range of test items.

6.3 Performance Tests

Make sure to have the equipment to be tested and the measuring instruments have warmed up and completely stabilized for at least 30 minutes before starting the test unless otherwise specified. To perform the most accurate measurement, it is also necessary to test under the room temperature, obtain minimum fluctuation of AC supply voltage, and have no problem such as noise, vibration, dust and humidity.

6.3.1 Reference oscillator frequency stability

This test tests the frequency stability of the 10 MHz crystal oscillator used as the reference oscillator. Measure the frequency changes after 24-hour operation at 25°C (aging rate) and at 0 and 50°C (temperature characteristics).

(1) Specifications

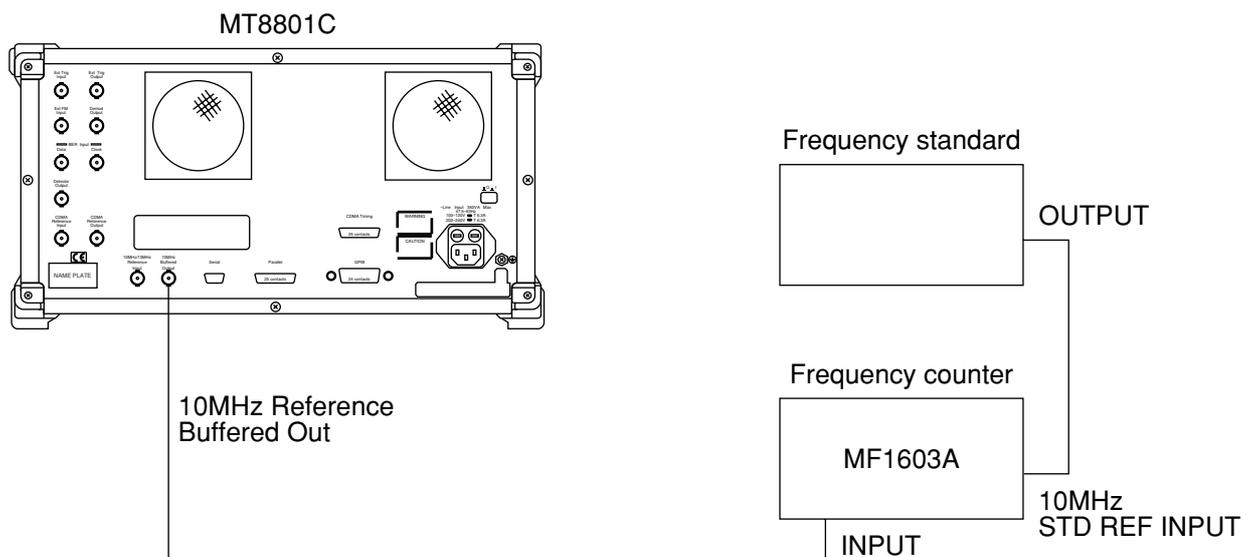
Reference oscillator

- Frequency: 10 MHz
- Aging rate: $\leq 2 \times 10^{-8}$ /day (After 24-hour operation, 25°C \pm 5°C)
- Temperature stability: $\pm 5 \times 10^{-8}$ (0°C to 50°C, reference at 25°C)

(2) Test instruments

- Frequency counter: MF1603A
- Frequency standard: with stability of $\leq \pm 1 \times 10^{-9}$

(3) Setup



Section 6 Performance Tests

(4) Procedure

Agin rate: Test this at an ambient temperature change less than $\pm 2^{\circ}\text{C}$ in a vibration-free place.

Step	Procedure
1.	Set the reference signal changeover switch (FREQ STD:INT/EXT) on the MF1603A rear panel to EXT.
2.	Set the power supply switch on the MT8801C rear panel to On. Then, set the Power switch on the MT8801C front panel to On.
3.	Measure the frequency of the output from the 10 MHz Reference Buffered Out connector using the MF1603A after 24-hour operation with 0.1 Hz digit resolution.
4.	Measure the frequency of the same output using the MF1603A after 24 hours from the measurement in step 3.
5.	Calculate the stability using the following equation

$$\text{Frequency stability} = \frac{(\text{MF1603A reading in step 4}) - (\text{MF1603A reading in step 3})}{(\text{MF1603A reading in step 3})}$$

Temperature stability: Test this in a vibration-free constant-temperature chamber.

Step	Procedure
1.	Set up the MT8801C in a constant-temperature chamber at 25°C .
2.	Set the Power switches on the MT8801C rear and front panels to On, and wait until the MT8801C internal temperature stabilizes, and wait approx. 1.5 hours after the chamber temperature stabilizes.
3.	When the internal temperature stabilizes, measure the frequency of the output from the 10 MHz Reference Buffered Out connector of the MT8801C using the MF1603A with 0.1 Hz digit resolution.
4.	Change the chamber temperature to 50°C .
5.	When the chamber temperature and the MT8801C internal temperature re-stabilize, measure the frequency using the MF1603A.
6.	Calculate the stability using the following equation:

$$\text{Frequency stability} = \frac{(\text{MF1603A reading at } 50^{\circ}\text{C}) - (\text{MF1603A reading at } 25^{\circ}\text{C})}{(\text{MF1603A reading at } 25^{\circ}\text{C})}$$

7. Change the chamber temperature to 0°C and repeat steps 5 and 6

Reference oscillator frequency stability

	Effective lower limit	stability	Effective lower limit	Effective upper limit
Agin rate	-1.9×10^{-8}	_____	$+1.9 \times 10^{-8}$	$\pm 1 \times 10^{-9}$
Temperature stability	-4.9×10^{-8}	_____	$+4.9 \times 10^{-8}$	

6.3.2 Frequency/waveform quality

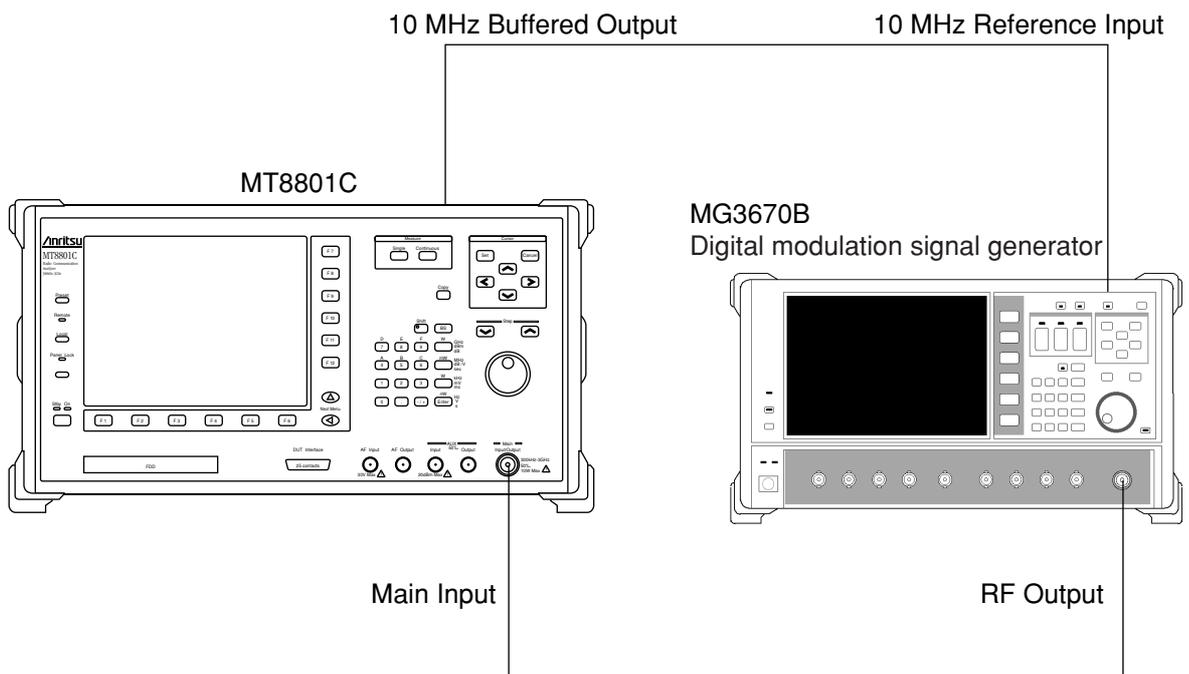
(1) Specifications

- Frequency measurement: Measurement error: Reference ± 10 Hz
- Waveform quality: Measurement range: 0.9 to 1.0
Measurement error: ± 0.003
- Residual vector error: $< 5\%$
(The above specifications are guaranteed after the Adjust Range execution.)

(2) Test instrument

- Digital modulation signal generator: MG3670B or the equivalent

(3) Setup



Section 6 Performance Tests

(4) Test procedures: Frequency/waveform quality

Step	Procedure
1.	Initialize the MT8801C and the signal generator.
2.	Set the MT8801C as follows: RF Input/Output: Main Set it on the Instrument Setup screen. Using Specification: IS-95A Set it on the Setup Common Parameter screen. CDMA Channel: 340 Ch Set it on the Setup Common Parameter screen.
3.	Display the Modulation Analysis screen of MT8801C:
4.	Set the signal generator as follows: System: IS-95 Output Level: 0 dBm Modulation: On Simulation Link: Reverse Filter: SPEC1 CH1 (Channel Assign): Traffic CH2 to CH4: Off
5.	Execute “Measure Single” after the “Adjust Range” execution of MT8801C
6.	Read the measured value as shown in the table below, and check whether it is within the specification value.
7.	Change the settings as “Using Specification: J-STD-008” and “CDMA Channel: 600” and perform the measurement as same as above to read the result.

Frequency/waveform quality

	340 CH (835.2 MHz)	600 CH (1880 MHz)	Measurement uncertainty	Effective lower limit	Effective upper limit
Carrier frequency error	_____ kHz	_____ kHz	±0.1 Hz	-9.9 Hz	+9.9 Hz
ρ (Waveform quality factor)	_____	_____	< 0.008	0.997	_____
RMS vector error	_____ %	_____ %	2.5 %	_____	5 %

6.3.3 Relative level accuracy of signal generator

Output level accuracy of output RF signal is measured during the open loop time response.

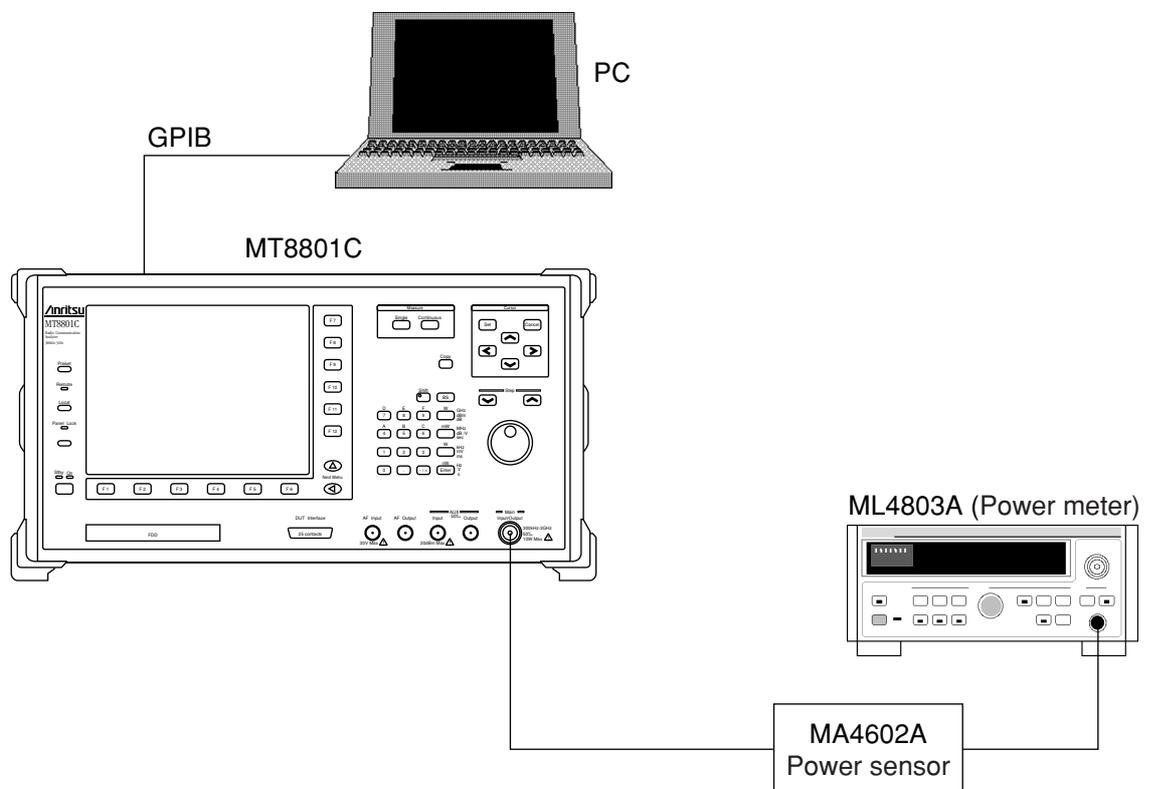
(1) Specifications

- Relative level accuracy: ± 0.2 dB/20 dB
(when the level is variable in the time response measurement of open loop power control at 18 to 28 °C)

(2) Test instruments

- Power meter: ML4803A or the equivalent
- Power sensor: MA4602A or the equivalent
- 30-dB attenuator for sensitivity adjustment: MP47A or the equivalent
- PC

(3) Setup



Section 6 Performance Tests

(4) Test procedures: Relative level accuracy of signal generator

Step	Procedure
1.	Initialize the MT8801C and the power meter.
2.	Set the MT8801C as follows: RF Input/Output: Main Set it on the Instrument Setup screen. Using Specification: IS-95A Set it on the Setup Common Parameter screen. CDMA Channel: 340 Ch Set it on the Setup Common Parameter screen. BS Output Power Level: -33 dBm Set it on the Setup Common Parameter screen. AWGN Level: Off Set it on the Setup Common Parameter screen.
3.	Execute Start on the Setup Common Parameter screen of MT8801C. When “Call Proc. status: Idle” is displayed, set the Loop mode using the GPIB command. Command: TESTMODE INSPECLOOPBACK
4.	Set the Pilot signal generation mode using the GPIB command. Command: TESTPILOTCH ON
5.	Execute BS Output Power Cal. using the GPIB command.
6.	Press the Local key (release the external control) of MT8801C to display the Open Loop Time Response screen.
7.	Read the value (X) indicated on the power meter (about -33-dBm value indicated).
8.	Set Step Value at 20 dB.
9.	Press the BS Level Step Down Start key to reduce the output level by about 20 dB.
10.	Read the value (Y) indicated on the power meter (about -53-dBm value indicated).
11.	Change the settings as “Using Specification: J-STD-008” and “CDMA Channel: 600” and perform the measurement as same as above to read the result.

Relative level accuracy of signal generator

	340 CH (880.2 MHz)	600 CH (1960 MHz)
X	_____ dBm	_____ dBm
Y	_____ dBm	_____ dBm
Y-X	_____ dB	_____ dB
Relative Level Accuracy (Y-X+20)	_____ dB	_____ dB
Measurement uncertainty	±0.03 dB	
Effective lower limit	-0.17 dB	
Effective upper limit	+0.17 dB	

6.3.4 Waveform quality of signal generator

Waveform quality of the CDMA modulation signal of MT8801C is measured.

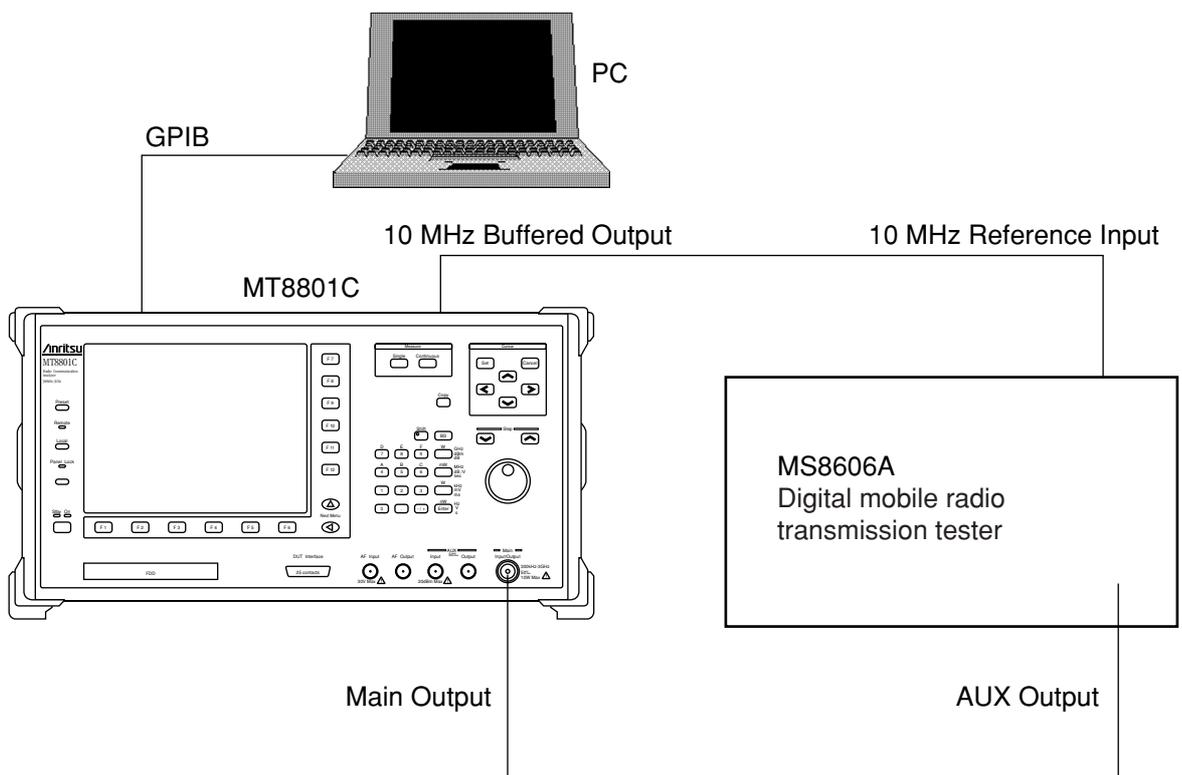
(1) Specifications

- $\rho > 0.99$ (Pilot channel: 0 dB)

(2) Test instruments

- Digital mobile radio transmission tester: MS8606A or the equivalent
- AUX conversion connector
- PC

(3) Setup



Section 6 Performance Tests

(4) Test procedures: Waveform quality of signal generator

Step	Procedure	
1.	Initialize the MT8801C and the transmitter tester.	
2.	Set the MT8801C as follows:	
	RF Input/Output: Main	Set it on the Instrument Setup screen.
	Using Specification: IS-95A	Set it on the Setup Common Parameter screen.
	CDMA Channel: 340 Ch	Set it on the Setup Common Parameter screen.
	Ref Level Auto Set: On	Set it on the Setup Common Parameter screen.
	BS Output Power: -20 dBm	Set it on the Setup Common Parameter screen.
	AWGN Level: Off	Set it on the Setup Common Parameter screen.
3.	Set the transmitter tester as follows:	
	RF Input: Aux	Set it on the Instrument Setup screen.
	Measuring Object: Forward	Set it on the Setup Common Parameter screen.
	Data Rate: 9600 bps	Set it on the Setup Common Parameter screen.
	Modulation Analysis Length:	
	24	Set it on the Setup Common Parameter screen.
	Filter: Filter + EQ	Set it on the Setup Common Parameter screen.
	PN Synchronization: PN Search	Set it on the Setup Common Parameter screen.
	PN Offset: 0	Set it on the Setup Common Parameter screen.
	Tau Reference: Nothing	Set it on the Setup Common Parameter screen.
	Frequency: 835.2 MHz (IS-95A)/1880 MHz (J-STD-008)	
	Reference Level: -20 dBm	
4.	Execute Start on the Setup Common Parameter screen of MT8801C. When “Call Proc. status: Idle” is displayed, set the Loop mode using the GPIB command. Command: TESTMODE INSPECLOOPBACK	
5.	Set the Pilot signal generation mode using the GPIB command. Command: TESTPILOTCH ON	
6.	Measure ρ of RF signal and read the result using the modulation analysis function of transmitter tester.	
7.	Change the settings as “Using Specification: J-STD-008” and “CDMA Channel: 600” and perform the measurement as same as above to read the result.	

Waveform quality of signal generator

	340 CH (880.2 MHz)	600 CH (1960 MHz)
Waveform quality	_____	_____
Measurement uncertainty	<0.001	
Effective lower limit	0.99	

6.3.5 Power meter (IF Level Meter) measurement accuracy

The accuracy of IF level meter of MT8801C is measured.

(1) Specifications

- ± 0.4 dB (+40 to 0 dBm after the Power Meter Calibration execution)
- ± 0.4 dB (+40 to -10 dBm after the Power Meter Calibration execution at 18 to 28 °C)
- ± 0.7 dB (+40 to -10 dBm after the Internal OSC Calibration execution at 18 to 28 °C)
- Linearity (-10 dBm Ref.Level or larger as reference)
 - 0 to 10 dB: ± 0.1 dB
 - -10 to -20 dB: ± 0.2 dB
 - -20 to -40 dB: ± 0.5 dB

(2) Test instruments

“Linearity measurement”

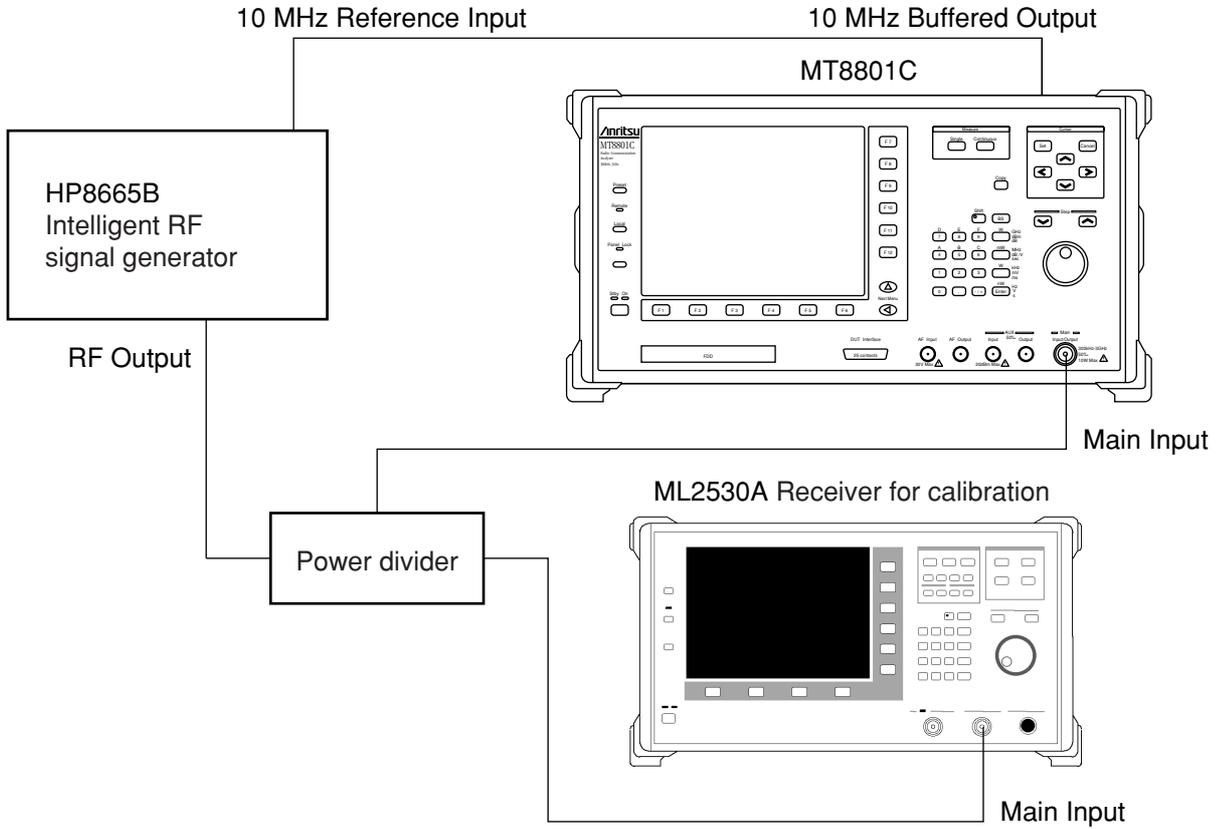
- Receiver for calibration: ML2530A or the equivalent
- Intelligent RF signal generator: HP8665B or the equivalent
- Power divider

Measurement accuracy (INT OSC Calibration, Power Meter Calibration)”

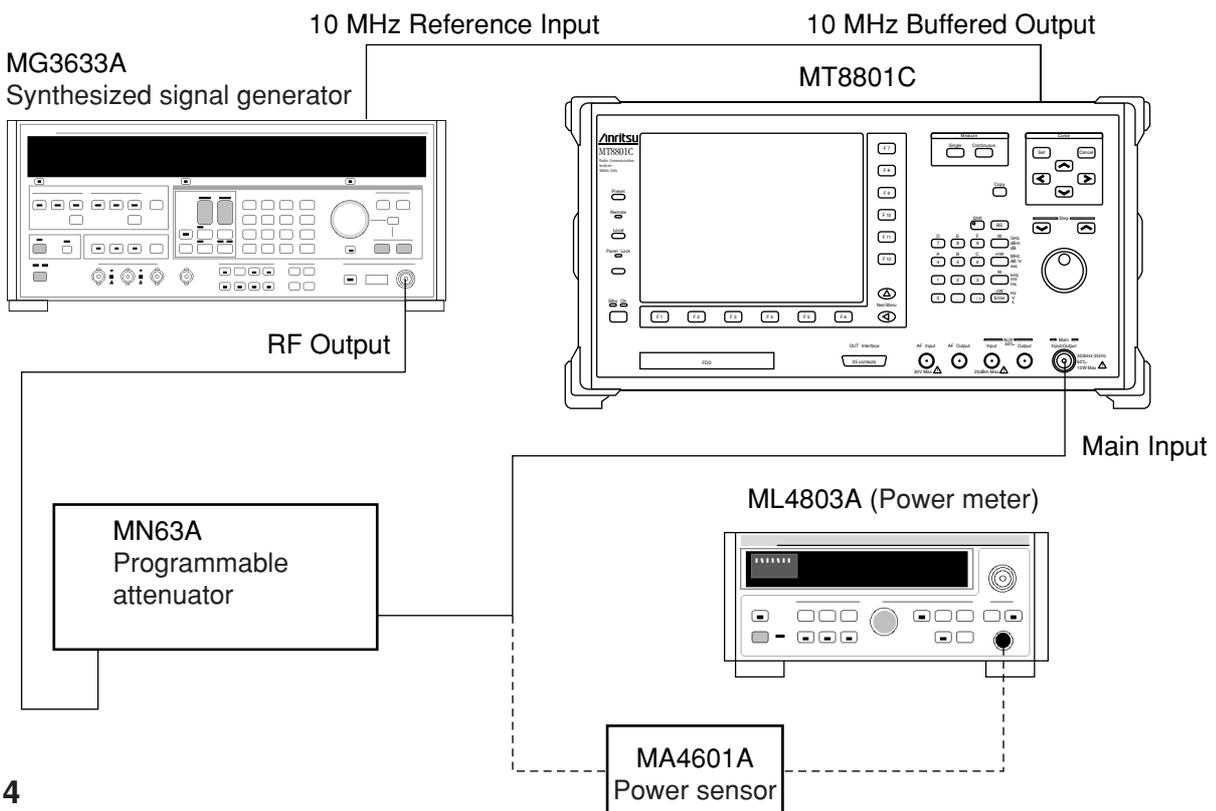
- Intelligent RF signal generator: HP8665B or the equivalent
- Programmable attenuator: MN63A or the equivalent
- Power meter: ML4803A or the equivalent
- Power sensor: MA4601A or the equivalent
- 30-dB attenuator for sensitivity adjustment: MP47A or the equivalent
- N-f to N-f adapter

Section 6 Performance Tests

(3) Setup 1 (linearity measurement)



(4) Setup 2 (Internal OSC Calibration, Power Meter Calibration measurement accuracy)



(5) Test procedures: Power meter (IF Level Meter) measurement accuracy

Step	Procedure
“Linearity measurement”	
1.	Set the MT8801C as follows: RF Input/Output: Main Set it on the Instrument Setup screen. Power Meter Method: IF Level Meter Set it on the Setup TX Measure Parameter screen. Using Specification: IS-95A Set it on the Setup Common Parameter screen. CDMA Channel: 340 Ch Set it on the Setup Common Parameter screen.
2.	Display the Power Meter screen.
3.	Configure the setup 1 measurement system.
4.	Set the measurement frequency for the MT8801C and the signal generator. Set the level (+10 dBm) for the signal generator and set 0 dB for the receiver for calibration.
5.	Execute “Internal OSC Calibration” and “Adjust Range” of MT8801C.
6.	Execute “Measure Single” of MT8801C to read and record the measurement result.
7.	Set the signal generator level at –10 dB, read the measurement result (P1) after the “Measure Single” sweep, and read the calibrated value (P0) of the receiver for calibration.
8.	Calculate the measurement accuracy (P1 – P0) and check whether the result is within the specification value.
9.	Change the signal generator level from –20 to –40 dB at the 10-dB interval and perform the measurement as same as the step 8.
10.	Repeat the above measurement steps 4 to 10 for every measurement frequencies.
“Internal OSC Calibration accuracy measurement”	
11.	Configure the setup 2 measurement system.
12.	Set the attenuation quantity of programmable attenuator at 0 dB.
13.	Perform the setting as same as the step 1.
14.	Calibrate the output level (–10 dBm) of signal generator using the power meter.
15.	Set the calibrated +10 dBm for the signal generator and execute “Internal OSC Calibration” and “Adjust Range” of MT8801C.
16.	Read the measurement result of MT8801C after the “Measure Single” sweep and check whether the result is within the specification value.
17.	Perform the similar measurement with the calibrated 0 dBm and –10 dBm setting level of signal generator.
18.	Repeat the above measurement steps 15 to 17 for every measurement frequencies.

Section 6 Performance Tests

Step	Procedure
“Power Meter Calibration accuracy measurement”	
19.	Perform the setting as same as the step 1.
20.	Set the calibrated +10 dBm for the signal generator and turn Off the output.
21.	Set “Power Meter Method” as “Power Meter” and execute “Zero Set”.
22.	Return “Power Meter Method” to “IF Level Meter” and turn On the signal generator output.
23.	Execute “Adjust Range” and “Manual Calibration” of MT8801C. Read the measurement result after the “Measure Single” sweep and check whether the result is within the specification value.
24.	Perform the similar measurement with the calibrated 0 dBm and –10 dBm setting level of signal generator.
25.	Repeat the above measurement steps 21 to 24 for every measurement frequencies.
26.	Change the settings as “Using Specification: J-STD-008” and “CDMA Channel: 600” and perform the measurement as same as above.

Linearity measurement

Linearity	340 CH (835.2 MHz)	600 CH (1880 MHz)	Measurement uncertainty	Effective lower limit	Effective upper limit
0 dB	0 dB	0 dB		–	–
–10 dB	_____ dB	_____ dB	±0.03 dB	–0.07 dB	+0.07 dB
–20 dB	_____ dB	_____ dB		–0.17 dB	+0.17 dB
–30 dB	_____ dB	_____ dB		–0.47 dB	+0.47 dB
–40 dB	_____ dB	_____ dB		–0.47 dB	+0.47 dB

Measurement accuracy (INT OSC Calibration)

Accuracy	340 CH (835.2 MHz)	600 CH (1880 MHz)	Measurement uncertainty	Effective lower limit	Effective upper limit
–10 dBm	_____ dB	_____ dB	±0.16 dB	–0.54 dB	+0.54 dB
0 dBm	_____ dB	_____ dB			
+10 dBm	_____ dB	_____ dB			

Measurement accuracy (Power Meter Calibration)

Accuracy	340 CH (835.2 MHz)	600 CH (1880 MHz)	Measurement uncertainty	Effective lower limit	Effective upper limit
–10 dBm	_____ dB	_____ dB	±0.16 dB	–0.24 dB	+0.24 dB
0 dBm	_____ dB	_____ dB			
+10 dBm	_____ dB	_____ dB			

6.3.6 Power meter (Power Meter) measurement accuracy

(1) Specifications

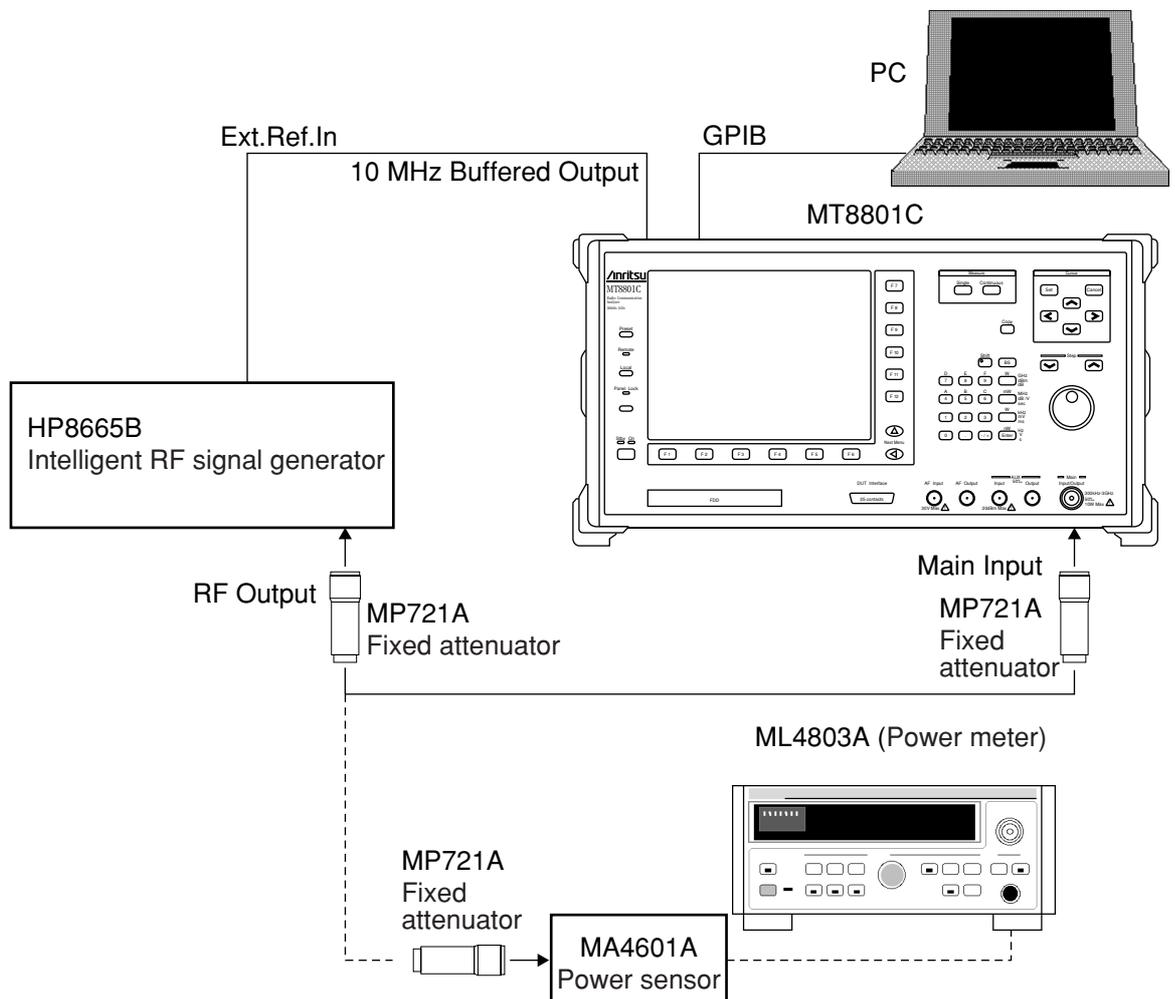
- $\pm 10\%$ (0 to 50 °C, 0 to +40 dBm, Main connector)
- $\pm 10\%$ (18 to 28 °C, -10 to +40 dBm, averaged, Main connector)
- $\pm 10\%$ (18 to 28 °C, -20 to +20 dBm, AUX connector)

However, the output level of signal generator is -53 dBm after the zero-point calibration.

(2) Test instruments

- Synthesized signal generator: HP8665B or the equivalent
- Power meter: ML4803A or the equivalent
- Power sensor: MA4601A or the equivalent
- Fixed attenuator: MP721A or the equivalent
- PC

(3) Setup



Section 6 Performance Tests

(4) Test procedures: Power meter (Power Meter) measurement accuracy

Step	Procedure
1.	Obtain the calibration data of signal generator (for the obtained data of signal generator, see the table below).
2.	Initialize the measurement system.
3.	Set the MT8801C as follows: RF Input/Output: Main Set it on the Instrument Setup screen. Power Meter Method: Power Meter Set it on the Setup TX Measure Parameter screen. Using Specification: IS-95A Set it on the Setup Common Parameter screen.
4.	Display the Power Meter screen. Execute “Zero Set”.
5.	Set the frequency of the table below for the MT8801C using the GPIB command: Command: TXFREQ #####MHZ (* ##### is the frequency value to be set in the table below.)
6.	Set the above measurement frequency for the signal generator. In addition, set the +10-dBm (P0) output level calibrated by the power meter for the signal generator.
7.	Connect the RF output of signal generator to the main input/output of MT8801C.
8.	Execute “Adjust Range” of MT8801C and read the measurement result (P1) after the “Measure Single” sweep.
9.	Repeat the steps 4 to 8 to obtain data for the output levels 0 dBm and –10 dBm.
10.	Repeat the above measurement steps 4 to 9 for every measurement frequencies.
11.	Set the MT8801C to RF Input/Output: Aux, then perform the measurement as described above.

Power meter (Power Meter) measurement accuracy

Main

Freq. Level	10 MHz		800 MHz		1.9 GHz		3 GHz		Measurement uncertainty	Effective lower limit	Effective upper limit
	Error (dB) (P1 – P0)	Error (%)	Error (dB) (P1 – P0)	Error (%)	Error (dB) (P1 – P0)	Error (%)	Error (dB) (P1 – P0)	Error (%)			
-10 dBm									±3.6 %	-6.4 %	+6.4 %
0 dBm											
+10 dBm											

Aux

Freq. Level	10 MHz		800 MHz		1.9 GHz		3 GHz		Measurement uncertainty	Effective lower limit	Effective upper limit
	Error (dB) (P1 – P0)	Error (%)	Error (dB) (P1 – P0)	Error (%)	Error (dB) (P1 – P0)	Error (%)	Error (dB) (P1 – P0)	Error (%)			
-20 dBm									±3.6 %	-6.4 %	+6.4 %
-10 dBm											
0 dBm											
+10 dBm											

* Error (%) is calculated using the following expression:

$$\text{Expression: Error (\%)} = \cdot 10^{(P1-P0)/10} - 1 \cdot \times 100$$

6.3.7 Neighboring spurious measurement

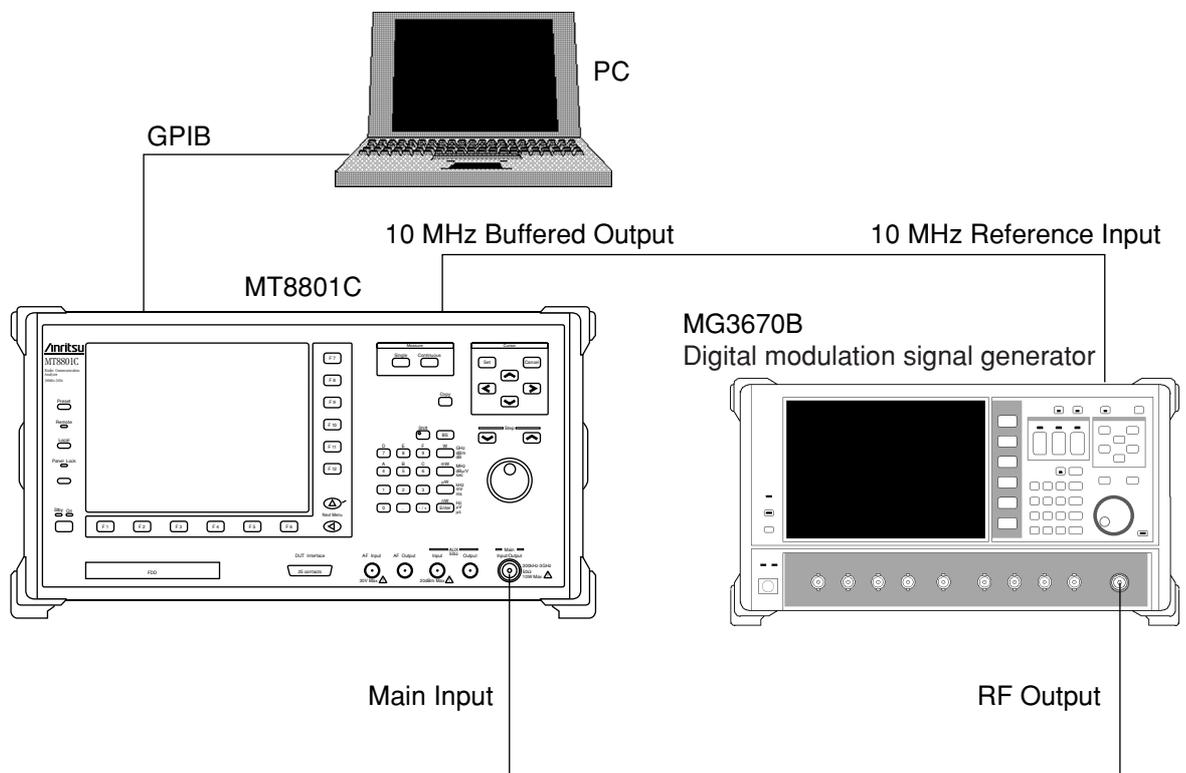
(1) Specifications

- 900 KHz detuning: ≥ 50 dB
- 1.98 MHz detuning: ≥ 60 dB

(2) Test instruments

- Digital modulation signal generator: MG3670B or the equivalent
- PC

(3) Setup



Section 6 Performance Tests

(4) Test procedures: Neighboring spurious measurement

Step	Procedure
1.	Initialize the MT8801C and signal generator.
2.	Set the MT8801C as follows: RF Input/Output: Main Set it on the Instrument Setup screen. Using Specification: IS-95A Set on Setup Common Parameter screen. Reference Level: 0 dBm Set it on the Setup Common Parameter screen. CDMA Channel: 1 CH Set it on the Setup Common Parameter screen.
3.	Press Next Menu [◀] and [Start] F5 key on the Setup Common Parameter screen of MT8801C to start Call Processing. Set the Loop mode using the GPIB command when “Call Proc. status: Idle” is displayed. Command: TESTMODE INSPECLOOPBACK Then press the Local key (to release the external control) to display the “Spurious closed to carrier” screen.
4.	Set the signal generator as follows: Modulation: On System: IS-95 Output Level: 0 dBm Simulation Link: Reverse Filter: SPEC1 Channel: CH1 Channel Assign: Traffic Long Code Mask: 0000000000 Frame Type: Type1 Data: USER PTN (0000)
5.	Set Off “Channel Assign” of “Channel: 2 to 4” of signal generator.
6.	Set the frequency of the table below for the MT8801C using the GPIB command: Command: TXFREQ #####MHZ (* ##### is the frequency value to be set in the table below.)
7.	Set the above measurement frequency for the signal generator. Execute “Adjust Range” and then “Measure Single”.
8.	Set the marker for each offset frequency point. Read the measurement result. Check whether the result is larger than or equal to the specification value.
9.	Change the measurement frequency and repeat the above measurement steps 6 to 8.

Neighboring spurious measurement

	20 MHz	900 MHz	1.9 GHz	2.2 GHz	Measurement uncertainty	Effective lower limit
-1.98 MHz	_____ dB	_____ dB	_____ dB	_____ dB	±1 dB	61 dB
-900 kHz	_____ dB	_____ dB	_____ dB	_____ dB		51 dB
+900 kHz	_____ dB	_____ dB	_____ dB	_____ dB		51 dB
+1.98 MHz	_____ dB	_____ dB	_____ dB	_____ dB		61 dB

6.3.8 Spurious measurement

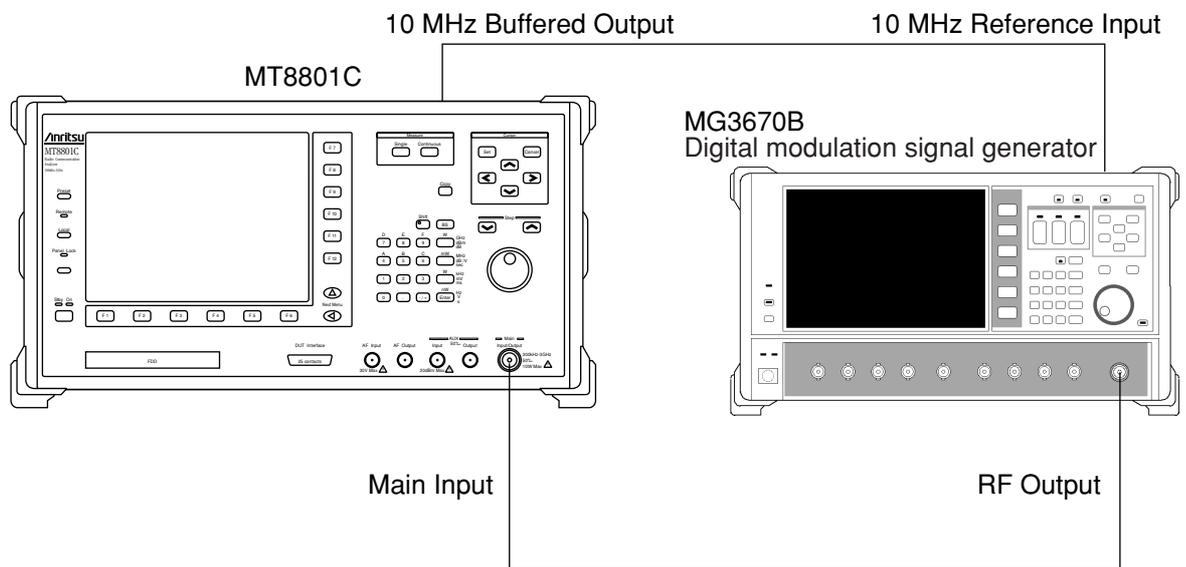
(1) Specifications

- ≥ 60 dB

(2) Test instruments

- Digital modulation signal generator: MG3670B or the equivalent

(3) Setup



Section 6 Performance Tests

(4) Test procedures: Spurious measurement

Step	Procedure
1.	Initialize the MT8801C and signal generator.
2.	Set the MT8801C as follows: RF Input/Output: Main Set it on the Instrument Setup screen. Using Specification: IS-95A Set on Setup Common Parameter screen. Reference Level: 0 dBm Set it on the Setup Common Parameter screen. CDMA Channel: 1 CH Set it on the Setup Common Parameter screen.
3.	Set the signal generator including the frequency as follows: Modulation: On System: IS-95 Frequency: 825.03 MHz Output Level: 0 dBm Simulation Link: Reverse Filter: SPEC1 Channel: CH1 Channel Assign: Traffic (* “Channel Assigns” of channels 2 to 4 are set to Off.) Long Code Mask: 00000000000 Frame Type: Type1 Data: USER PTN (0000)
4.	Switch the Setup Common Parameter screen to “Spurious Emission” and to “Set Frequency Table” screen of MT8801C. Set the measurement frequencies from 200 MHz to 3000 MHz at the 200-MHz interval.
5.	Return to the Spurious Emission screen and set as “Unit: dB”.
6.	Execute “Adjust Range” and then “Measure Single”. Read the measurement result. Check whether the result is larger than or equal to the specification value (the value of RBW = 30 KHz).

Spurious measurement

MEAS Freq	Main	Measurement uncertainty	Effective lower limit
200 MHz	_____ dB	±1 dB	61 dB
400 MHz	_____ dB		
600 MHz	_____ dB		
800 MHz	_____ dB		
1000 MHz	_____ dB		
1200 MHz	_____ dB		
1400 MHz	_____ dB		
1600 MHz	_____ dB		
1800 MHz	_____ dB		
2000 MHz	_____ dB		
2200 MHz	_____ dB		
2400 MHz	_____ dB		
2600 MHz	_____ dB		
2800 MHz	_____ dB		
3000 MHz	_____ dB		

Section 6 Performance Tests

6.3.9 Example of performance test result entry sheet

This paragraph gives an example of sheets used to summarize the test results before conducting the performance test of the MT8801C radio communication analyzer.
Use a copy of this sheet for the performance test.

Test location _____ Report No. _____
 _____ Date _____
 _____ Person in charge of the test _____

Instrument name: MT8801C Radio Communication Analyzer
 Option 12 CDMA Measurement Software

Manufacturing No. _____ Ambient temperature _____ °C
 Power frequency _____ Hz Relative humidity _____ %
 Remarks _____

1. Reference oscillator frequency stability

	Effective lower limit	stability	Effective lower limit	Effective upper limit
Agin rate	-1.9×10^{-8}	_____	$+1.9 \times 10^{-8}$	$\pm 1 \times 10^{-9}$
Temperature stability	-4.9×10^{-8}	_____	$+4.9 \times 10^{-8}$	

2. Frequency/waveform quality

	340 CH (835.2 MHz)	600 CH (1880 MHz)	Measurement uncertainty	Effective lower limit	Effective upper limit
Carrier frequency error	_____ kHz	_____ kHz	± 0.1 Hz	-9.9 Hz	+9.9 Hz
ρ (Waveform quality factor)	_____	_____	< 0.008	0.997	_____
RMS vector error	_____ %	_____ %	2.5 %	_____	5 %

3. Relative level accuracy of signal generator

	340 CH (880.2 MHz)	600 CH (1960 MHz)
X	_____ dBm	_____ dBm
Y	_____ dBm	_____ dBm
Y-X	_____ dB	_____ dB
Relative Level Accuracy (Y-X+20)	_____ dB	_____ dB
Measurement uncertainty	± 0.03 dB	
Effective lower limit	-0.17 dB	
Effective upper limit	+0.17 dB	

4. Waveform quality of signal generator

	340 CH (880.2 MHz)	600 CH (1960 MHz)
Waveform quality	_____	_____
Measurement uncertainty	<0.001	
Effective lower limit	0.99	

5. Power meter (IF Level Meter) measurement accuracy

Linearity measurement

Linearity	340 CH (835.2 MHz)	600 CH (1880 MHz)	Measurement uncertainty	Effective lower limit	Effective upper limit
0 dB	0 dB	0 dB	± 0.03 dB	–	–
–10 dB	_____ dB	_____ dB		–0.07 dB	+0.07 dB
–20 dB	_____ dB	_____ dB		–0.17 dB	+0.17 dB
–30 dB	_____ dB	_____ dB		–0.47 dB	+0.47 dB
–40 dB	_____ dB	_____ dB		–0.47 dB	+0.47 dB

Measurement accuracy (INT OSC Calibration)

Accuracy	340 CH (835.2 MHz)	600 CH (1880 MHz)	Measurement uncertainty	Effective lower limit	Effective upper limit
–10 dBm	_____ dB	_____ dB	± 0.16 dB	–0.54 dB	+0.54 dB
0 dBm	_____ dB	_____ dB			
+10 dBm	_____ dB	_____ dB			

Measurement accuracy (Power Meter Calibration)

Accuracy	340 CH (835.2 MHz)	600 CH (1880 MHz)	Measurement uncertainty	Effective lower limit	Effective upper limit
–10 dBm	_____ dB	_____ dB	± 0.16 dB	–0.24 dB	+0.24 dB
0 dBm	_____ dB	_____ dB			
+10 dBm	_____ dB	_____ dB			

Section 6 Performance Tests

6. Power meter (Power Meter) measurement accuracy

Main

Freq. Level	10 MHz		800 MHz		1.9 GHz		3 GHz		Measurement uncertainty	Effective lower limit	Effective upper limit
	Error (dB) (P ₁ – P ₀)	Error (%)	Error (dB) (P ₁ – P ₀)	Error (%)	Error (dB) (P ₁ – P ₀)	Error (%)	Error (dB) (P ₁ – P ₀)	Error (%)			
-10 dBm									±3.6 %	-6.4 %	+6.4 %
0 dBm											
+10 dBm											

Aux

Freq. Level	10 MHz		800 MHz		1.9 GHz		3 GHz		Measurement uncertainty	Effective lower limit	Effective upper limit
	Error (dB) (P ₁ – P ₀)	Error (%)	Error (dB) (P ₁ – P ₀)	Error (%)	Error (dB) (P ₁ – P ₀)	Error (%)	Error (dB) (P ₁ – P ₀)	Error (%)			
-20 dBm									±3.6 %	-6.4 %	+6.4 %
-10 dBm											
0 dBm											
+10 dBm											

7. Neighboring spurious measurement

	20 MHz	900 MHz	1.9 GHz	2.2 GHz	Measurement uncertainty	Effective lower limit
-1.98 MHz	_____ dB	_____ dB	_____ dB	_____ dB	±1 dB	61 dB
-900 kHz	_____ dB	_____ dB	_____ dB	_____ dB		51 dB
+900 kHz	_____ dB	_____ dB	_____ dB	_____ dB		51 dB
+1.98 MHz	_____ dB	_____ dB	_____ dB	_____ dB		61 dB

8. Spurious measurement

MEAS Freq	Main	Measurement uncertainty	Effective lower limit
200 MHz	_____ dB	±1 dB	61 dB
400 MHz	_____ dB		
600 MHz	_____ dB		
800 MHz	_____ dB		
1000 MHz	_____ dB		
1200 MHz	_____ dB		
1400 MHz	_____ dB		
1600 MHz	_____ dB		
1800 MHz	_____ dB		
2000 MHz	_____ dB		
2200 MHz	_____ dB		
2400 MHz	_____ dB		
2600 MHz	_____ dB		
2800 MHz	_____ dB		
3000 MHz	_____ dB		

6.4 About Service

If the equipment is fractured or does not operate as specified, contact the head office, a branch office, a sales office, a local office, or Customer Service Department of Anritsu Corporation to ask the repair. Addresses and telephone numbers are described on the back cover.

Provide the following information when asking the repair:

- (a) Machine name and number described on the back panel.
- (b) Malfunction status
- (c) Contact person to check the malfunction contents or to inform the repair completion.

Section 7 Calibration

This section describes the measuring instruments required to calibrate the MT8801C, and the setup and calibration method for these instruments.

7.1	Calibration Requirements	7-2
7.2	Equipment Required for Calibration	7-2
7.3	Calibration	7-3
7.3.1	Calibrating the reference crystal oscillator	7-3

7.1 Calibration Requirements

Calibration is done to help maintain the MT8801C’s performance.

Calibration should be performed periodically even if the MT8801C is operating normally.

We recommend that the MT8801C be calibrated once or twice a year.

Contact the Service Department of Anritsu Corporation if the MT8801C fails to meet the specifications during calibration.

7.2 Equipment Required for Calibration

The table below shows the equipment required to calibrate each item.

Table 7-1 Equipment Required for Calibration

Recommended equipment	Required performance†	Calibration item
Frequency counter (MF1603A)	<ul style="list-style-type: none">• 100 KHz to 3 GHz• Resolution: 1 Hz• External reference input: 10 MHz	Frequency accuracy of reference
Frequency standard	Standard radio-wave receiver or equipment having equivalent function (accuracy better than 1×10^{-9})	Frequency accuracy of reference crystal oscillator

Note:

Extracts part of performance which can cover the measurement range of the test item.

7.3 Calibration

Do not start the performance tests until the MT8801C and measuring instruments have warmed up for at least 24 hours and they have stabilized completely. To obtain the best measurement accuracy, do the calibration at room temperature. Keep AC power voltage fluctuations, noise, vibration, dust, humidity, and any other factors which can affect results to a minimum.

7.3.1 Calibrating the reference crystal oscillator

The stability of the MT8801C reference crystal oscillator is $\pm 2 \times 10^{-8}$ /day. Calibrate the frequency of the reference crystal oscillator by using a reference signal generator generating a reference signal that is either locked to a standard wave or to the sub-carrier of a TV broadcast on a color TV (the sub-carrier will be locked to a rubidium atomic standard).

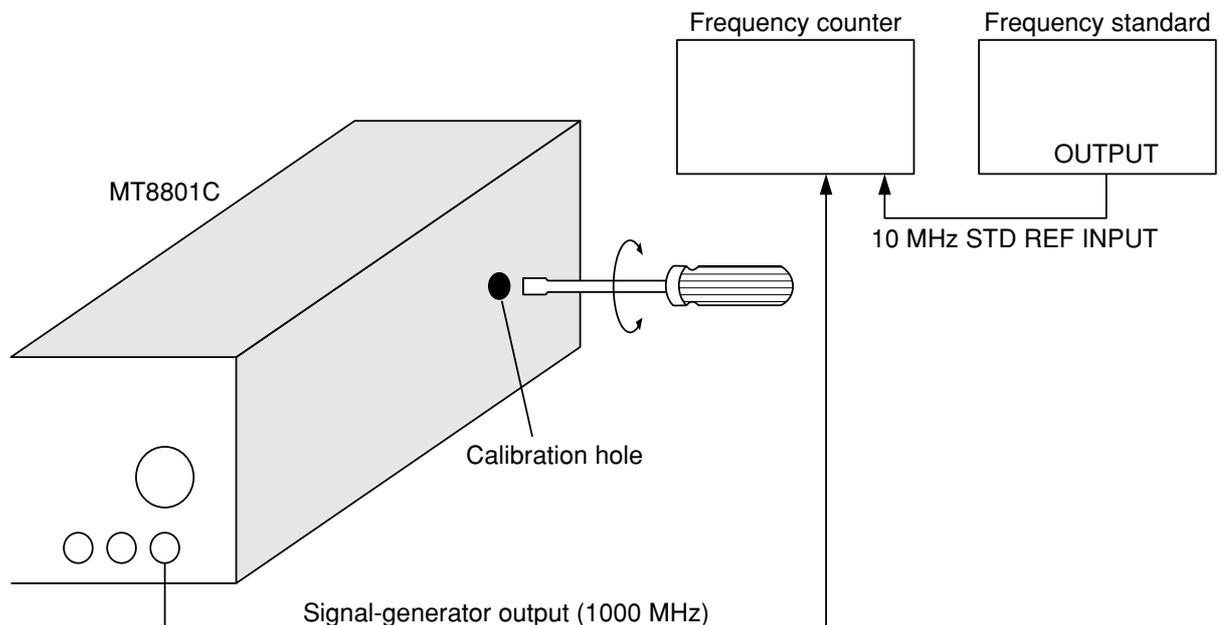
(1) Specifications

Reference oscillator	Frequency	Aging rate	Temperature characteristics
Standard type (after 24-hour operation)	10 MHz	2×10^{-8} /day	$\pm 5 \times 10^{-8}$ (0 to 50 °C)

(2) Instruments required for calibration

- Frequency counter: 10 MHz external reference input, resolution: 1 Hz
- Frequency standard: Standard radio-wave receiver or equipment having equivalent function
(accuracy better than 1×10^{-9})

(3) Setup



Section 7 Calibration

(4) Calibration procedure

Step	Procedure
1.	Setup the equipment as shown in the figure above. The ambient temperature must be $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$.
2.	Set the Power switch on the rear panel to On and the Power switch on the front panel to the Standby position. Then, allow the MT8801C reference crystal oscillator to warm-up for 24 hours.
3.	Set the Power switch on the MT8801C front panel to On.
4.	Apply the standard frequency signal to the external reference input of the frequency counter.
5.	Move to the RX Measure screen in the Analog Tester mode on the MT8801C.
6.	Set the frequency of the signal generator of the MT8801C to 1 000.000 000 MHz, the level to -28 dBm, and the modulation to off.
7.	Adjust the calibration trimmer of the crystal oscillator so that the frequency-counter reading is 1 000.000 000 MHz ± 10 Hz.

Section 8 Storage and Transportation

This section describes the long-term storage, repacking, and transportation of the MT8801C and the regular maintenance procedures.

8.1	Cleaning the Cabinet	8-2
8.2	Storage Precautions	8-2
8.2.1	Precautions before storage	8-2
8.2.2	Recommended storage conditions	8-2
8.3	Repacking and Transportation	8-3
8.3.1	Repacking	8-3
8.3.2	Transportation	8-3

8.1 Cleaning the Cabinet

Always turn the MT8801C power switch OFF and disconnect the power plug from the AC power inlet before cleaning the cabinet. To clean the external cabinet:

- Use a soft, dry cloth.
- Use a cloth moistened with diluted neutral cleaning liquid if the instrument is very dirty or before long-term storage. Then, use a soft, dry cloth to wipe the instrument dry.
- If loose screws are found, tighten them with the appropriate tools.

CAUTION

Never use benzine, thinner, or alcohol to clean the cabinet; these chemicals may damage the coating or cause deformation or discoloration.

8.2 Storage Precautions

This paragraph describes the procedures for long-term storage of the MT8801C.

8.2.1 Precautions before storage

- (1) Before storage, wipe dust, finger-marks, and other contaminants off the MT8801C.
- (2) Avoid storing the MT8801C where it may be exposed to:
 - (a) Direct sunlight or high dust levels.
 - (b) High humidity.
 - (c) Active gasses or acid.
 - (d) The following temperatures or humidity:
 - Temperature: $>60^{\circ}\text{C}$, $\leq 20^{\circ}\text{C}$
 - Humidity: $\geq 90\%$

8.2.2 Recommended storage conditions

The recommended storage conditions are as follows:

- Temperature: 0 to 30°C
- Humidity: 40% to 80%
- Stable temperature and humidity over a 24-hour period.

8.3 Repacking and Transportation

Take the following precautions if the MT8801C must be returned to Anritsu Corporation for servicing.

8.3.1 Repacking

Use the original packing materials. If the MT8801C is packed in other materials, observe the following packing procedure:

- (1) Wrap the MT8801C in a plastic sheet or similar material.
- (2) Use a cardboard box, wooden box, or aluminum case which allows shock-absorbing material to be inserted on all sides of the MT8801C.
- (3) Use enough shock-absorbing material to protect the MT8801C during transportation and to prevent it from moving in the container.
- (4) Secure the container with packing straps, adhesive tape, or bands.

8.3.2 Transportation

Do not subject the MT8801C to severe vibration during transport. Also, transport under the storage conditions recommended in paragraph 7.2.

Section 8 Storage and Transportation

Appendixes

Appendix A Screen and Function Key Transition Diagrams ..	A-1
Appendix B Initial Values	B-1
Appendix C Index	C-1

Appendix A Screen and Function Key Transition Diagrams

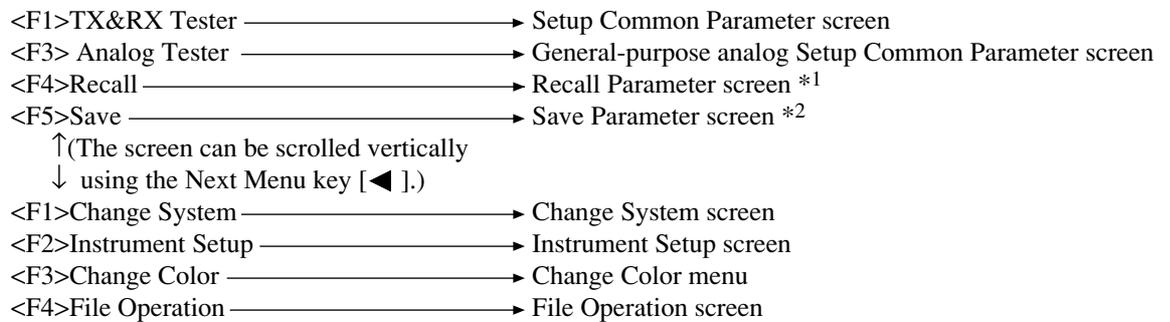
This appendix gives the screen and function-keys transition diagrams.

[Screen transitions] See Paragraph 3.2.

- On any type of screen, the main menu shown below can be displayed by turning the [Main Func On Off] (F6) key to On. When main function keys F1 to F5 and Next Menu key [◀] are used to select a main menu item, the screen transits to the corresponding screen or key menu.

Note:

Change Color is a function key menu, so there is no corresponding screen.

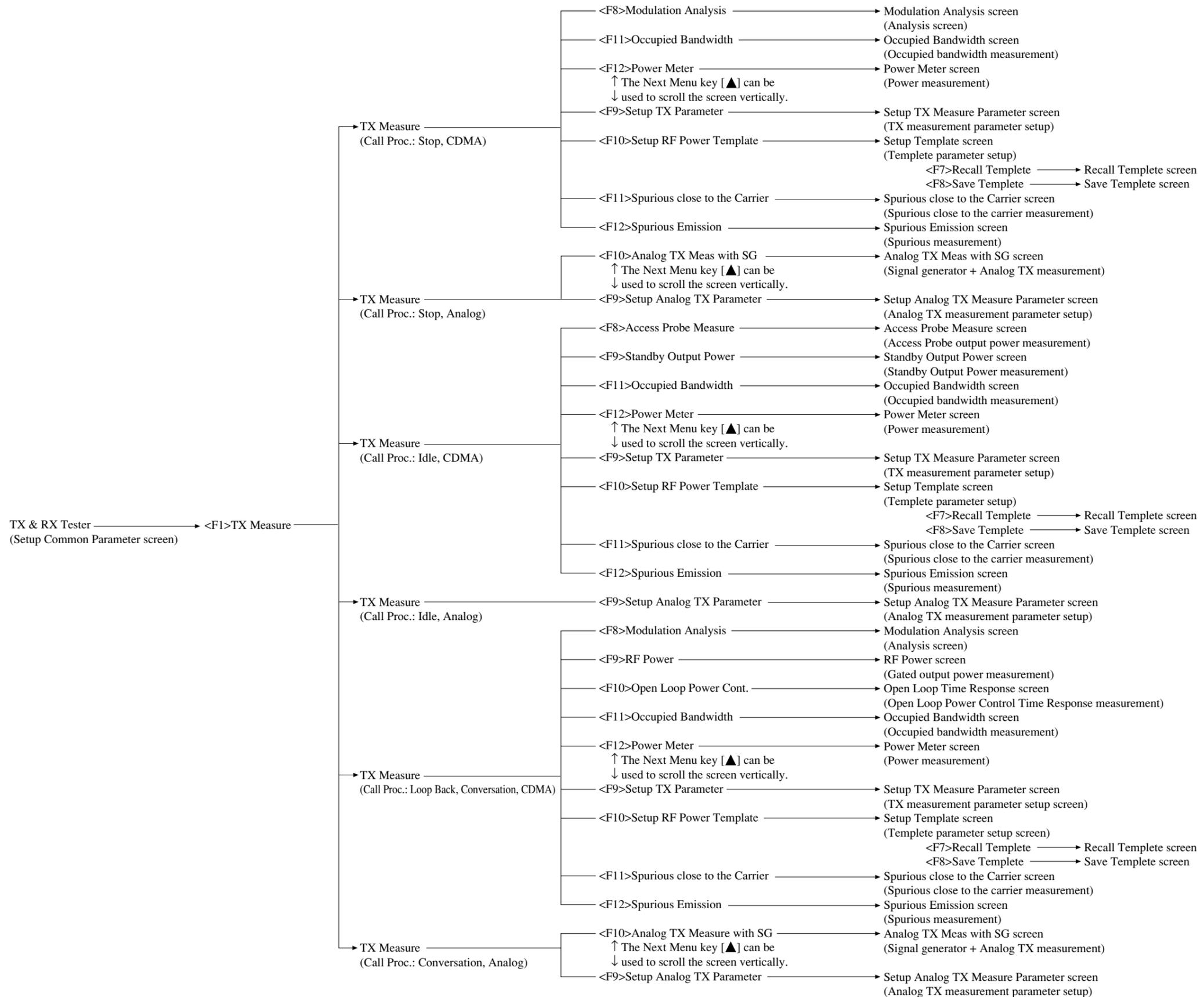


***1**

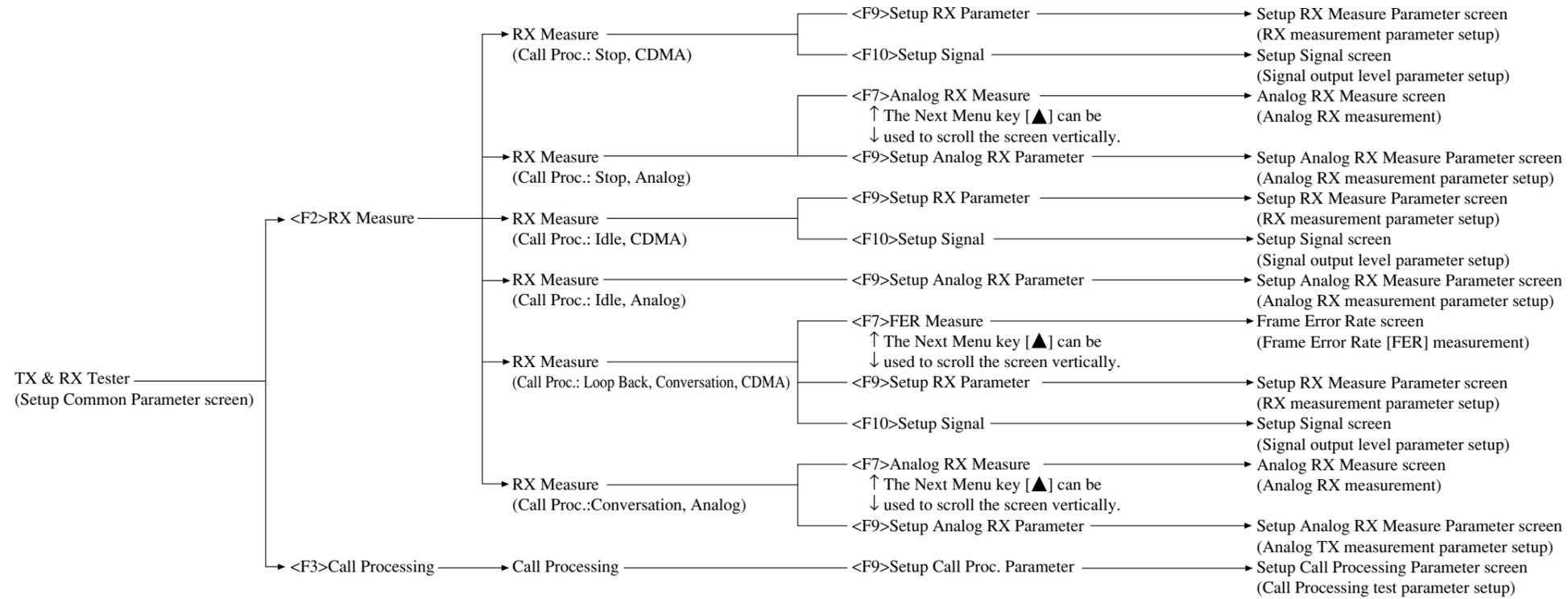
Press the [Recall] F4 key and the [Display Dir.] F8 key to move to “Recall Parameter Screen”.

***2**

Press the [Save] F5 key and the [Display Dir.] F8 key to move to “Save Parameter Screen”.



Appendix A Screen and Function Key Transition Diagrams



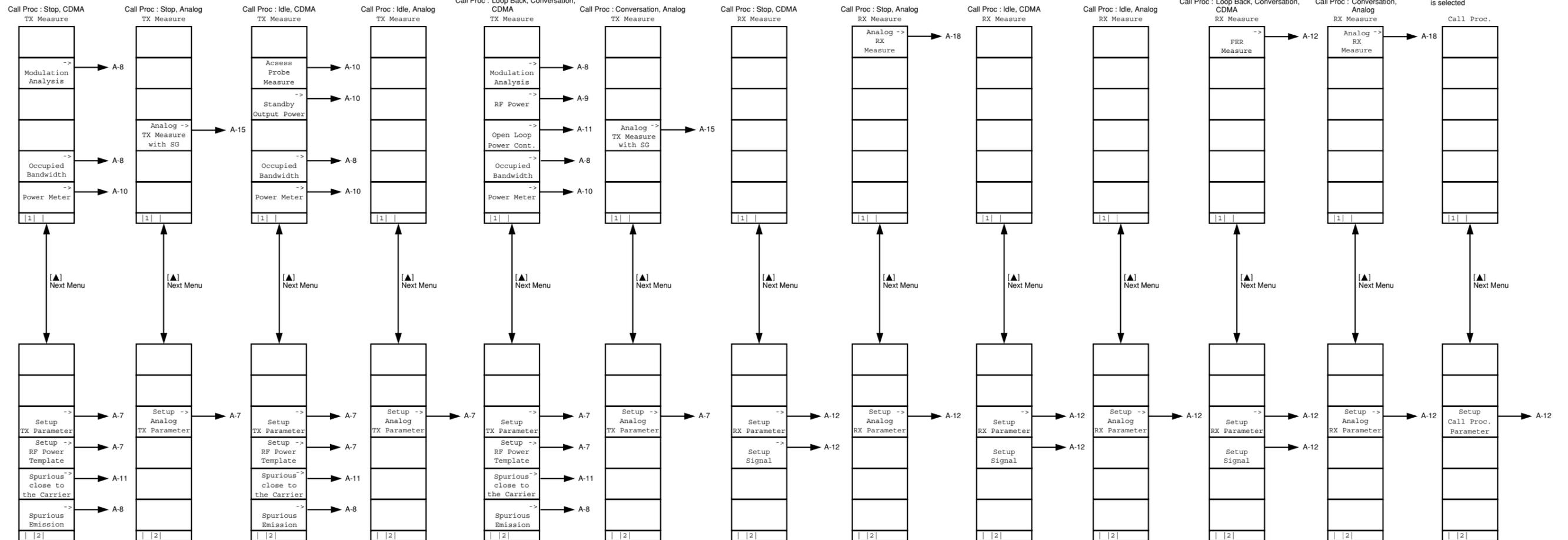
[Function key transitions on various screens]

Note:

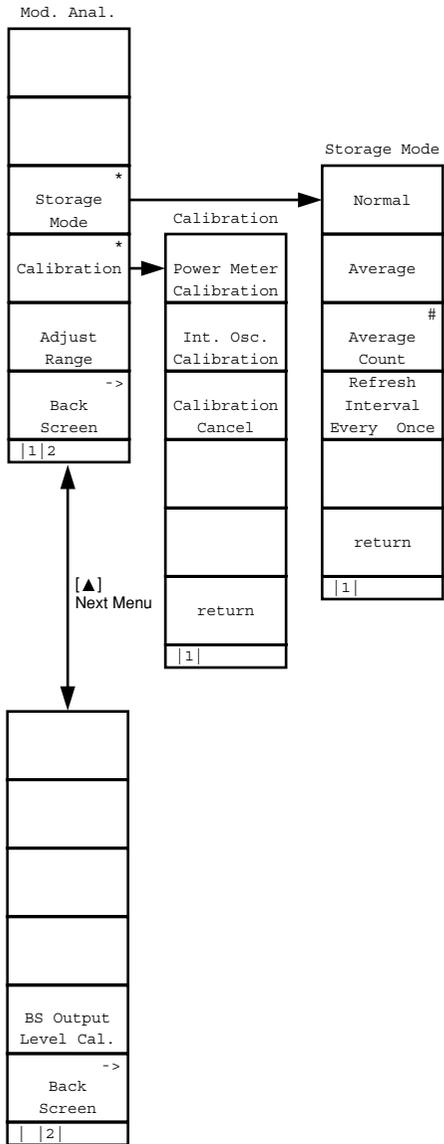
If [F12] ([Back Screen] or [return]) displayed at the bottom of the function key is selected, the screen returns to the upper hierarchy.

Setup Common Parameter screen

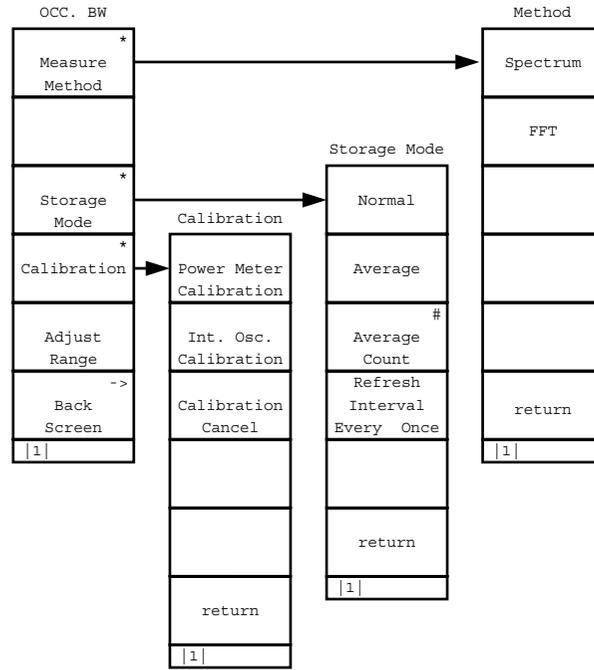
When "<F1>TX Measure" is selected



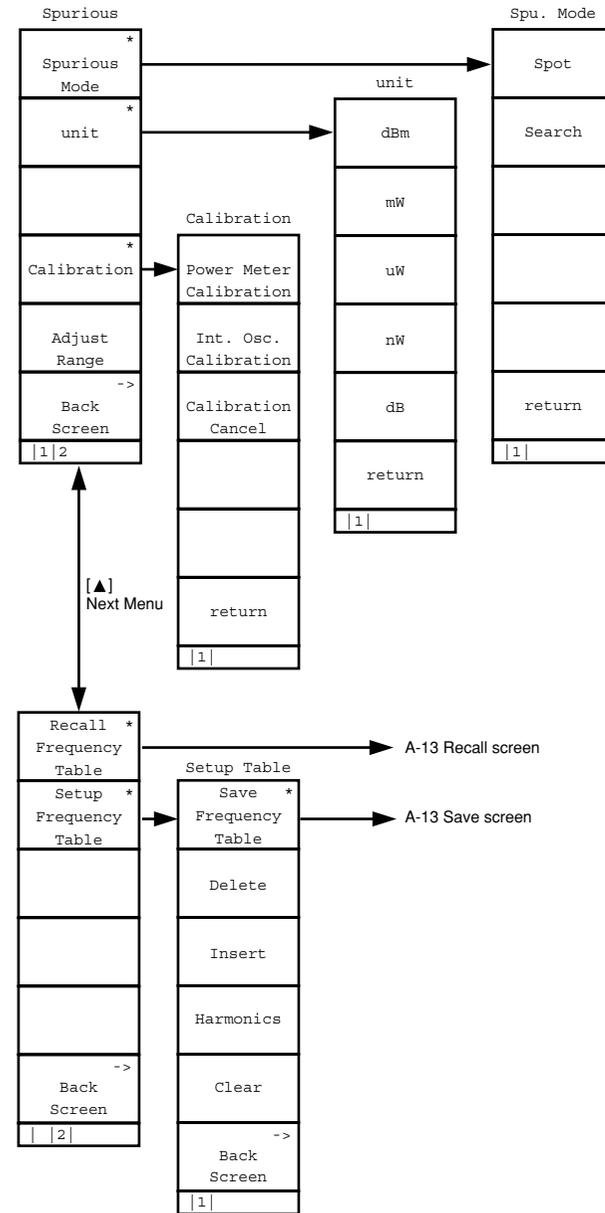
Modulation Analysis screen



Occupied Bandwidth screen

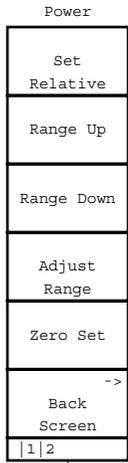


Spurious Emission screen

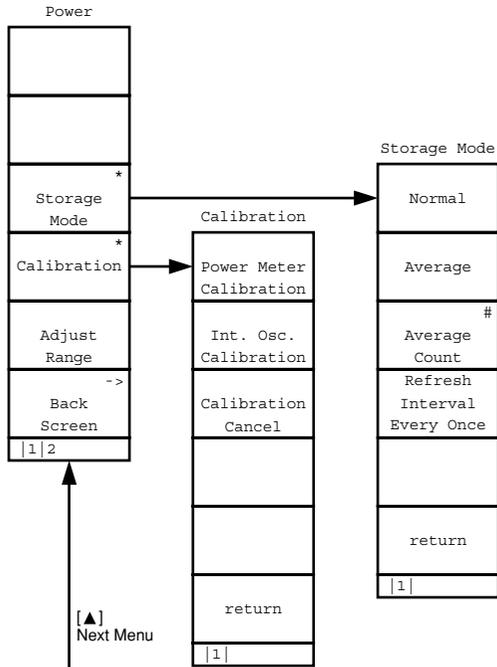


Power Meter screen

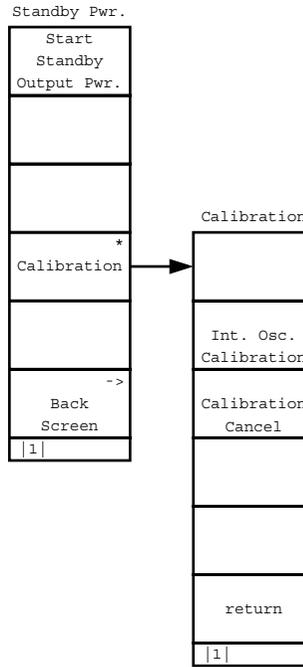
When "Power Meter" is selected



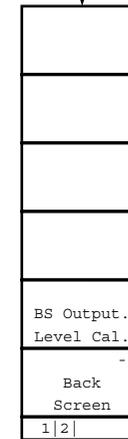
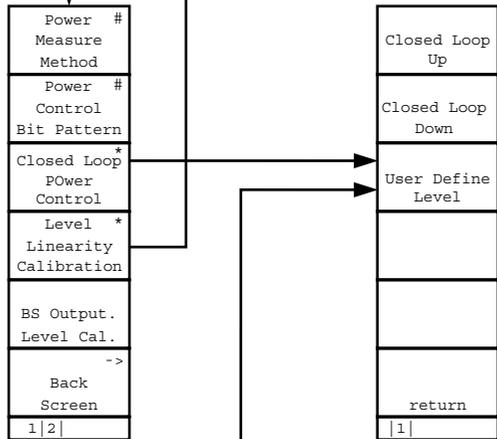
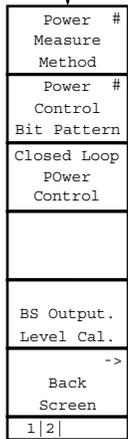
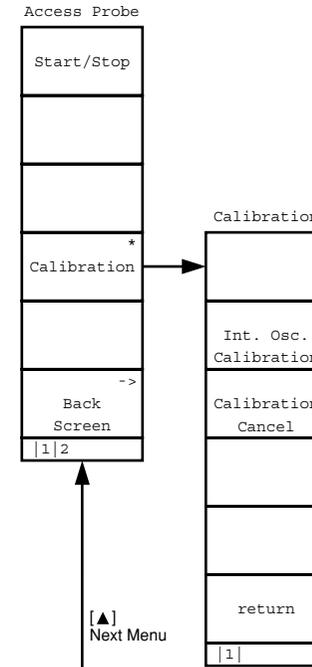
When "IF Level Meter" is selected



Standby Output Power screen



Access Probe Measure screen

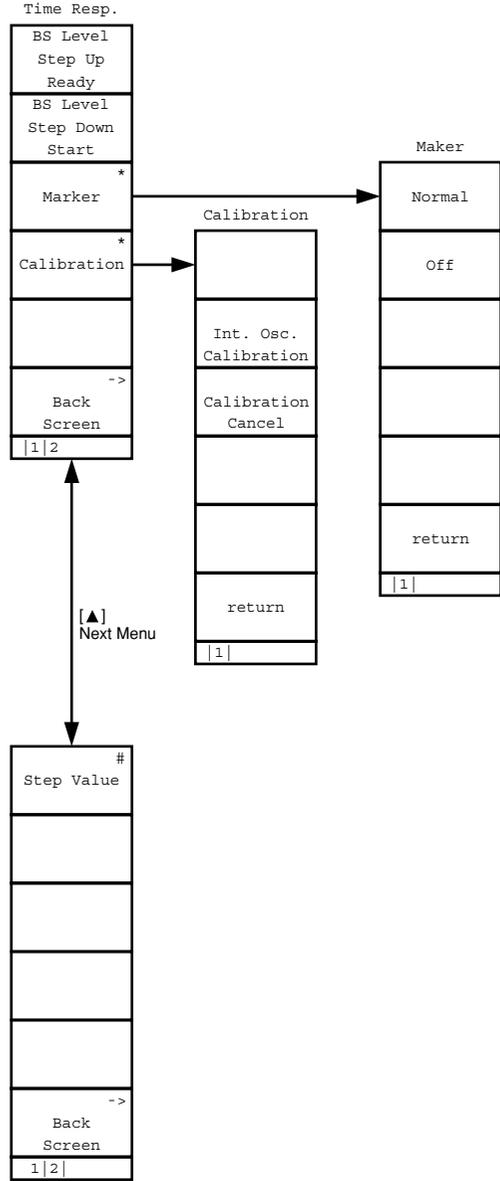


[▲] Next Menu

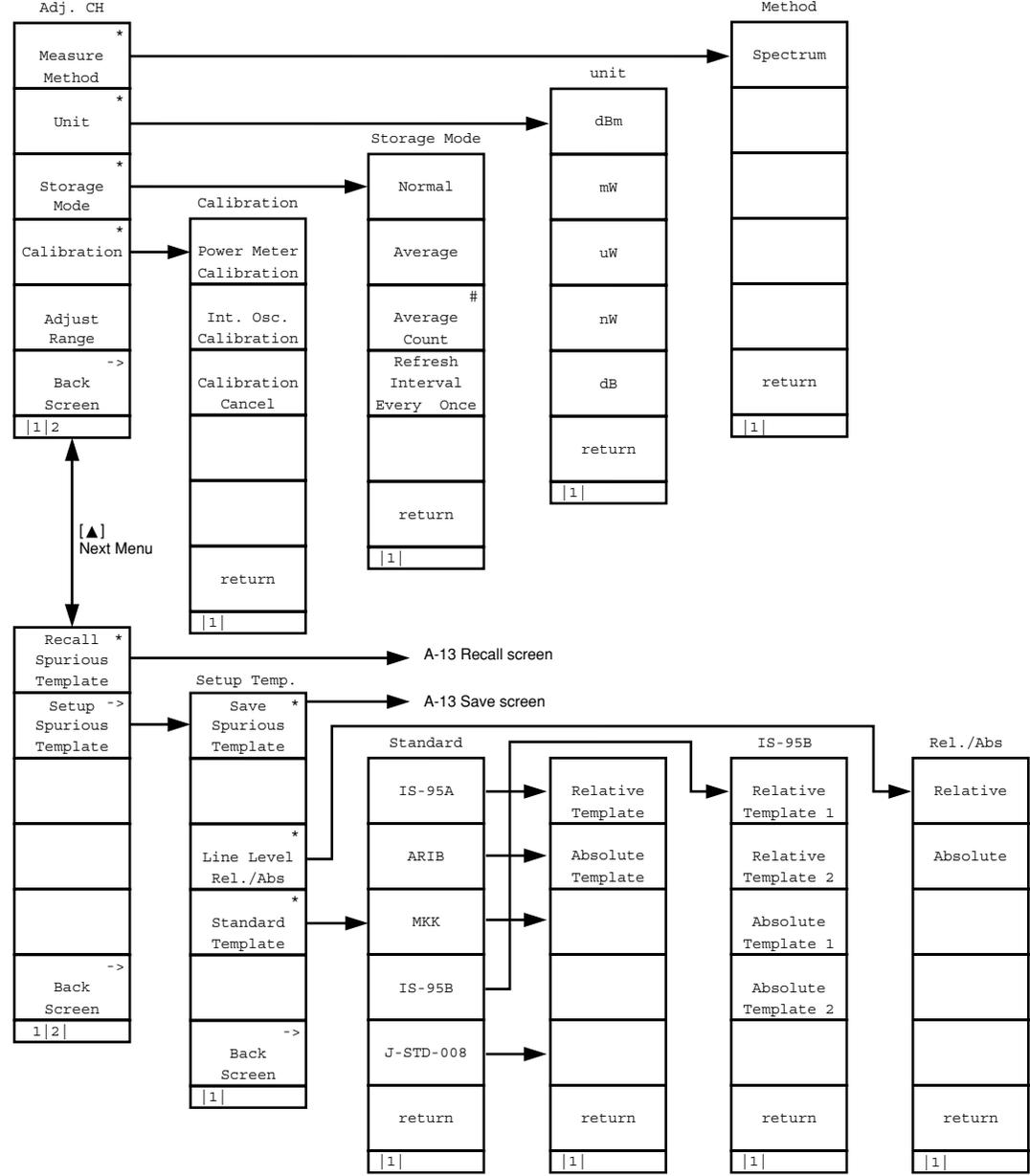
[▲] Next Menu

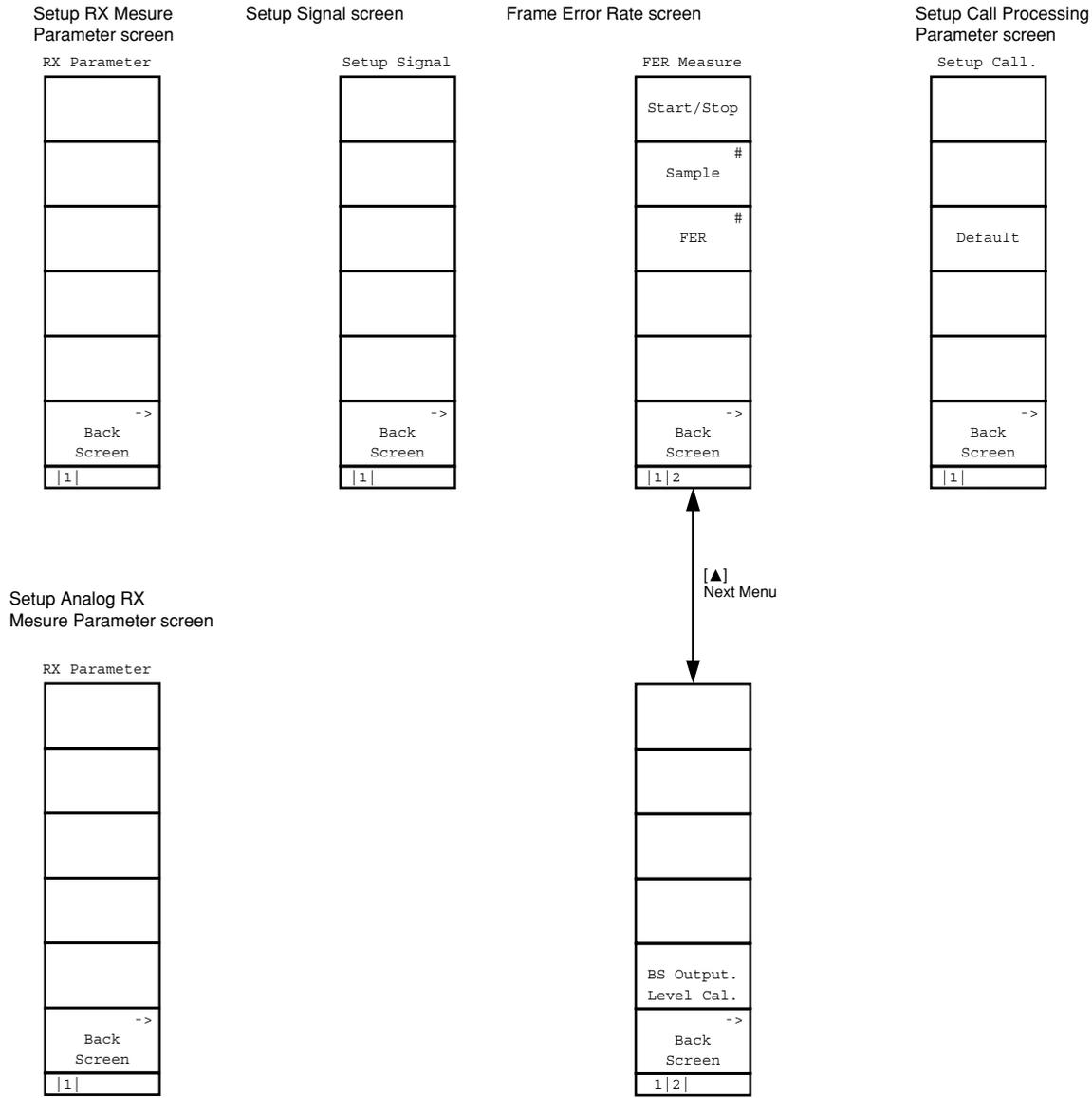
[▲] Next Menu

Open Loop Power Cont. screen

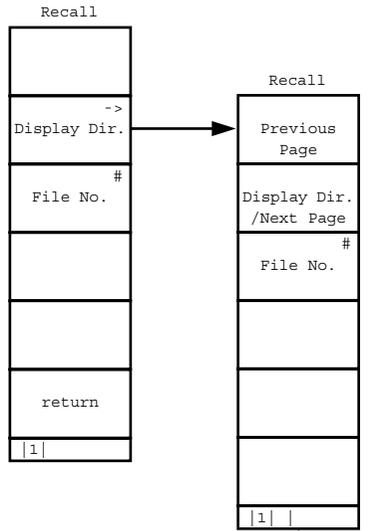


Spurious close to the Carrier screen

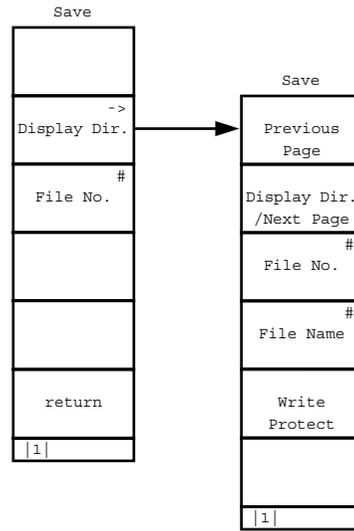




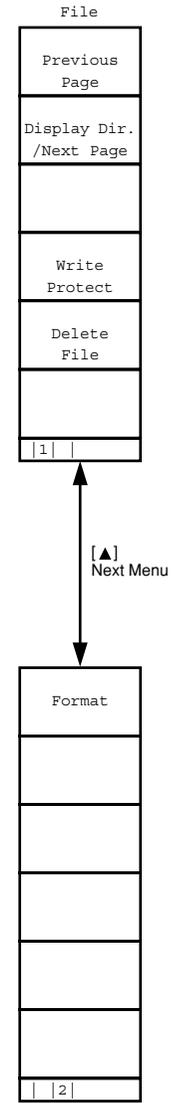
Recall screen



Save screen

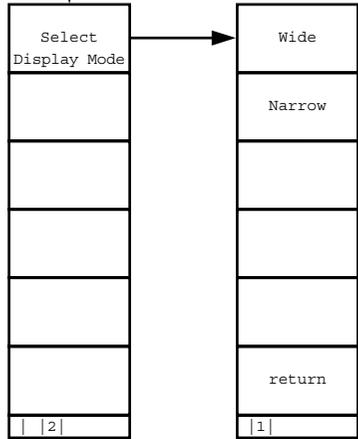


File Operation screen

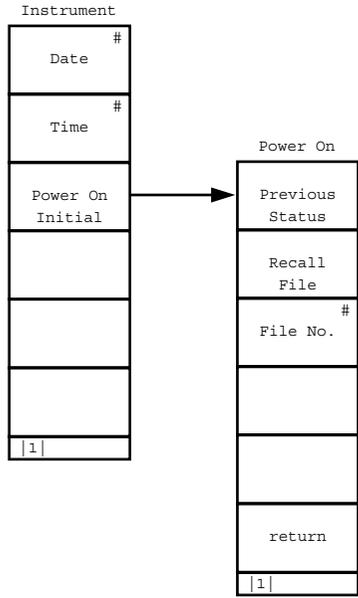


[▲]
Next Menu

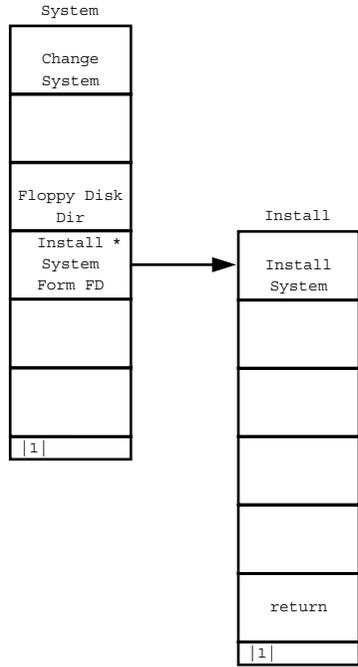
Display Mode



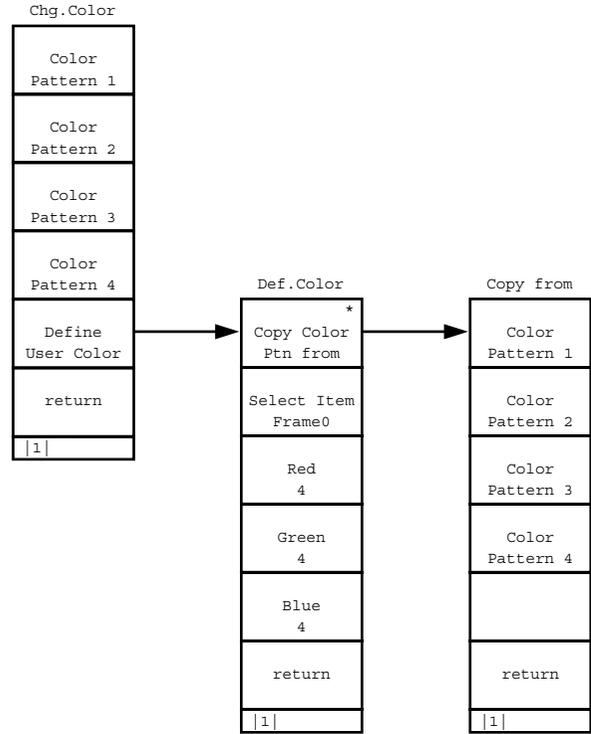
Instrument Setup screen



Change System screen



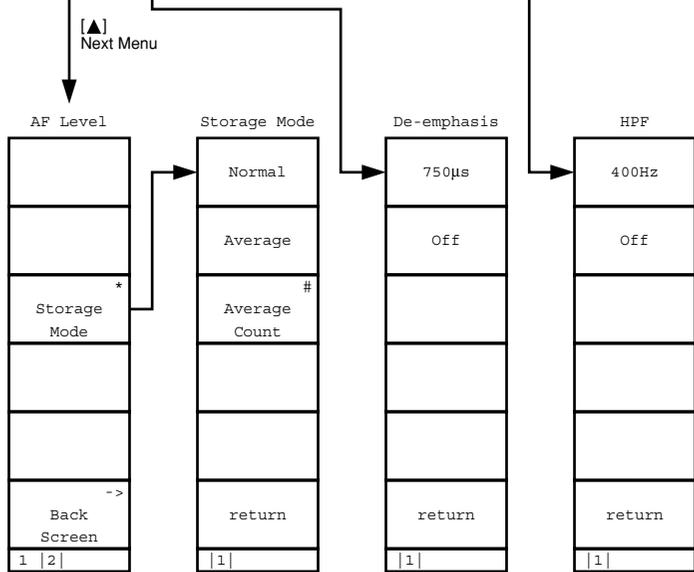
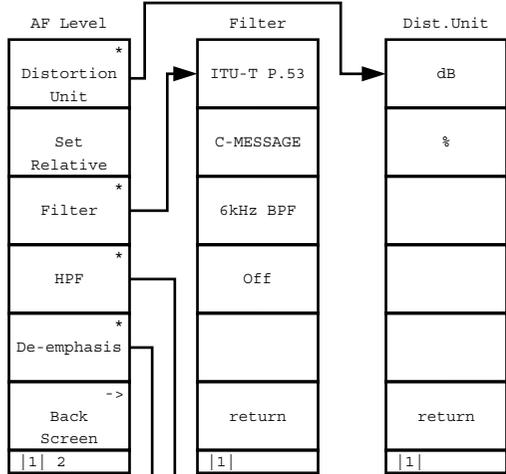
Change Color menu



Analog TX Measurement with SG screen

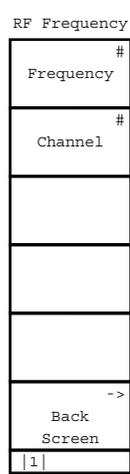
First page or second page

If (F1) AF Level is selected

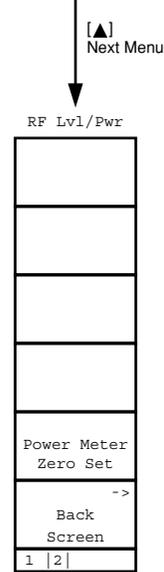
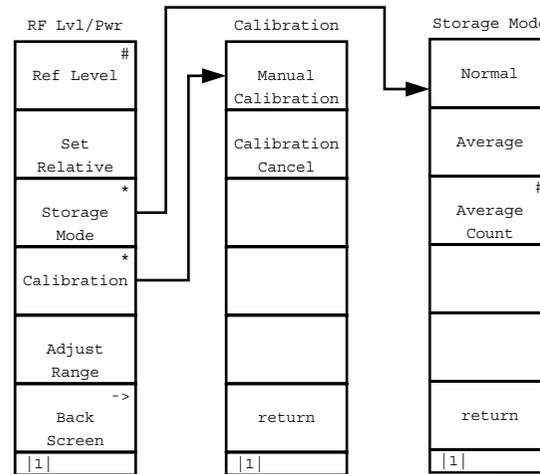


First page (Press the Next Menu key [▲] to change to the second page.)

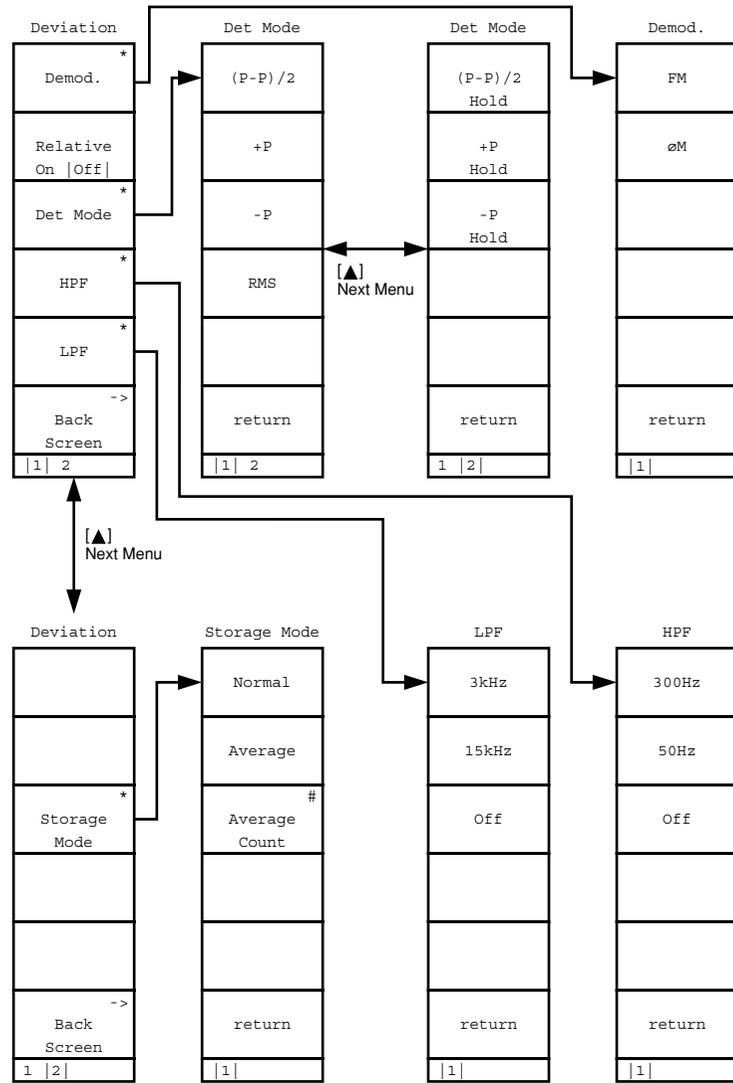
If (F2) TX RF Frequency is selected



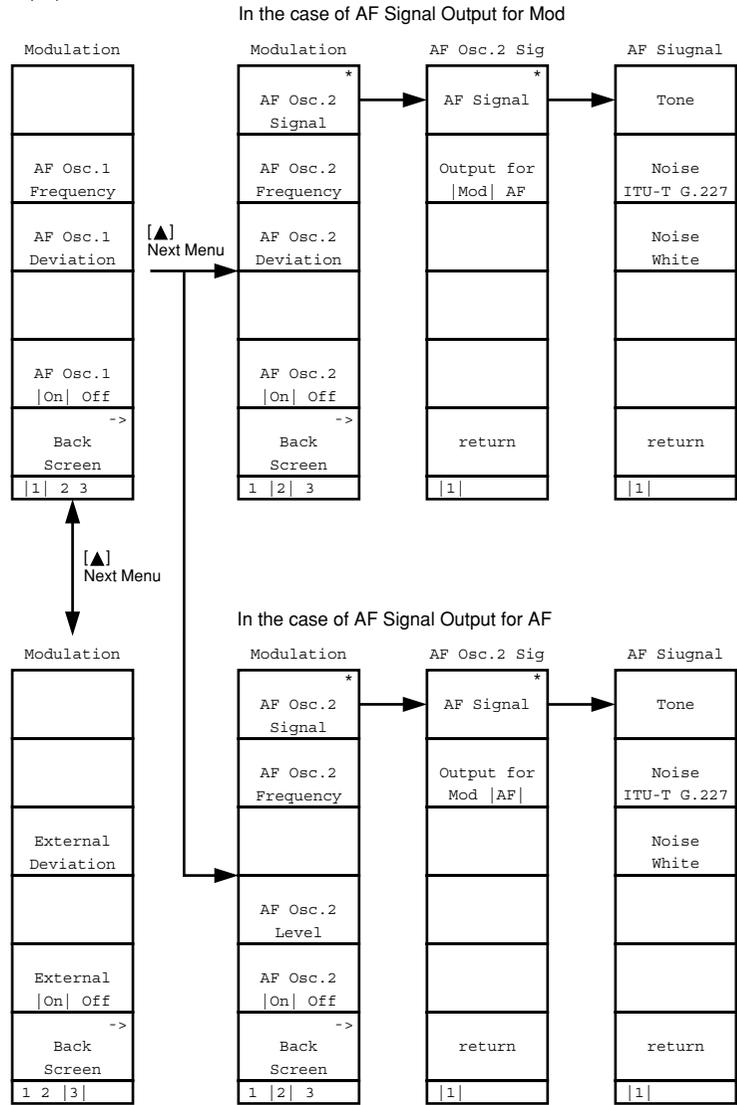
If (F3) TX RF Level/Power is selected



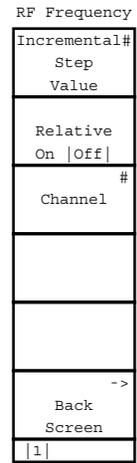
Analog TX Measurement with SG screen
 First page (Press the Next Menu key [▲] to change to the second page.)
 If (F4) Deviation is selected



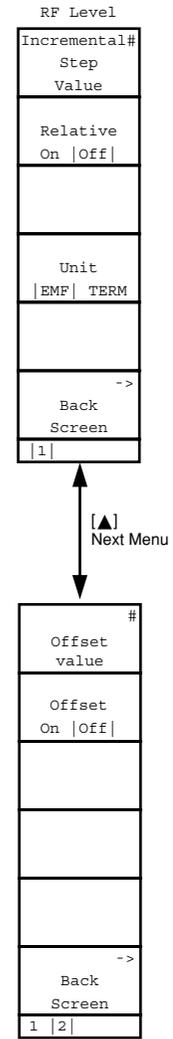
First page or second page
 If (F5) Modulation is selected



Analog TX Measurement with SG screen
 Second page (Press the Next Menu key [▲] to change to the first page.)
 If (F2) RX RF Frequency is selected

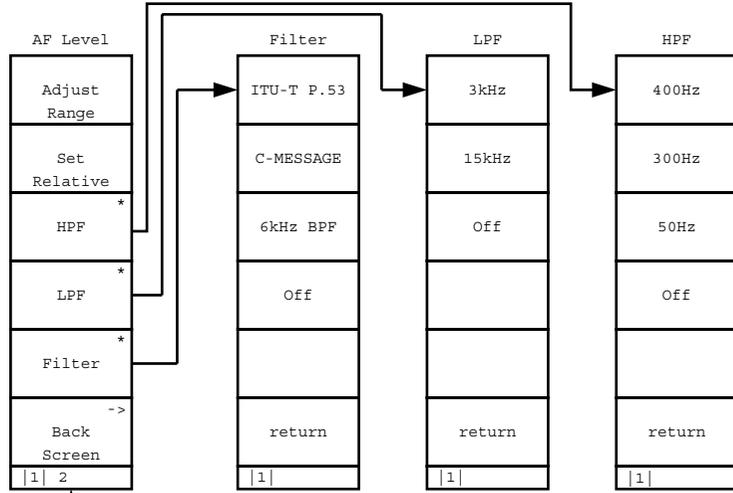


If (F3) RX RF Level is selected

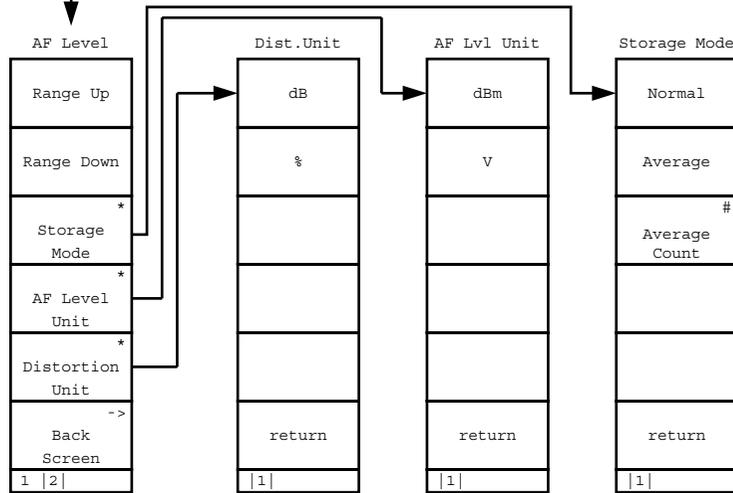


Analog RX Measurement screen

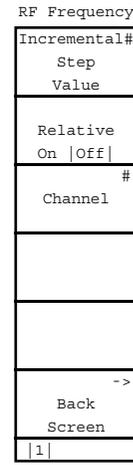
If (F1) AF Level is selected



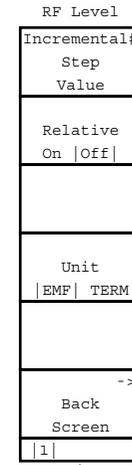
[▲] Next Menu



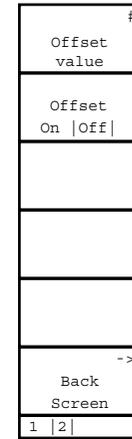
If (F2) RF Frequency is selected



If (F3) RF Level is selected

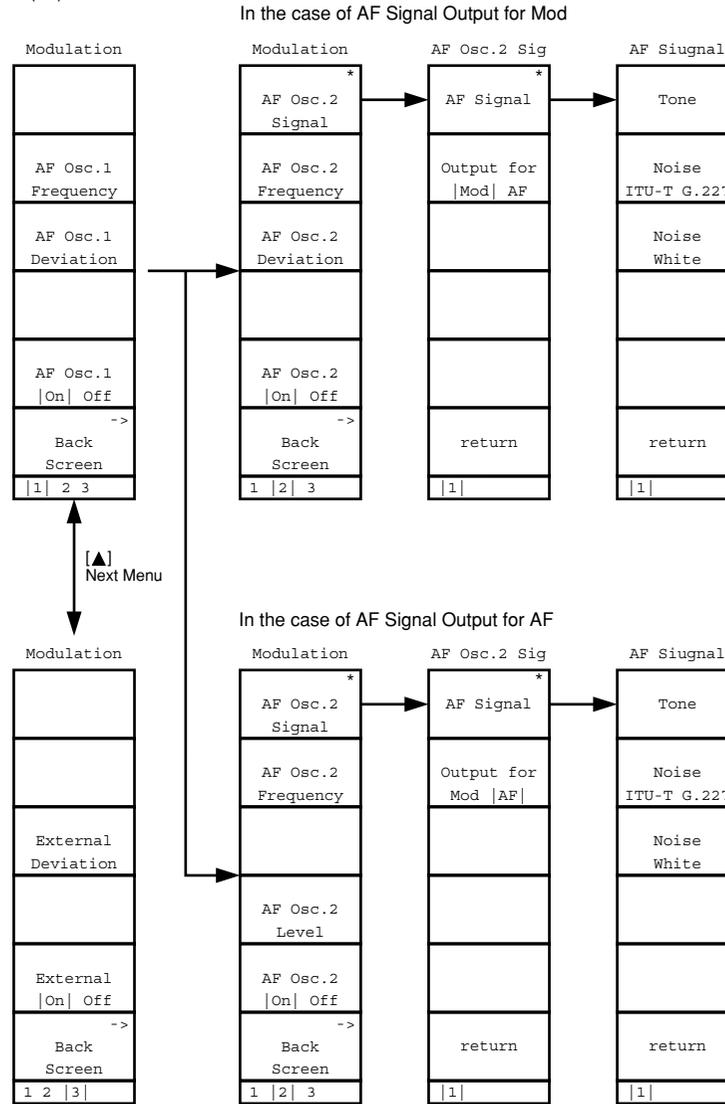


[▲] Next Menu



Analog RX Measurement screen

If (F5) Modulation is selected



Appendix B Initial Values

- The initial value is the value set at factory shipping.
- Items marked with an asterisk (*) is not displayed or selected by default.
- “PS” in the “Initialization” column on the rightmost on the table indicates the item that is initialized with the [Preset] key on the front panel or PRE/INI of the remote control commands.
“PW” indicates the item initialized with the *RST of the remote control command.
Items initialized with the PRE/INI commands can also be initialized with the *RST command.
- Items not initialized with those commands above are indicated as “NO.”

- Change System screen

No initial values

- Instrument Setup screen

Item	Initial value	Initialization
Frequency		
Reference Frequency	10 MHz	PW
RF Input/Output	Main	PW
Display		PW
Display Title	User Define	PW
Clock Display	YY/MM/DD (Year, Month, Day)	PW
Interface		
Connect to Controller	GPIB	No
GPIB		
Address	01	No
RS232C		
Baud Rate	2400 bps	No
Parity	Even	No
Data Bit	8 bits	No
Stop Bit	1 bit	No
Hard Copy		
Output Device	Printer (Parallel)	PW
Type	ESC/P	PW
Alarm	On	PW
[Power On Initial] F9:	Previous Status	No
[File No.] F9	0	No

- Change Color menu

Item	Initial value	Initialization
Change Clr. menu	Color Pattern 1	No
[Define User Color] F11		No

Appendix B Initial Values

- Setup Common Parameter screen

Item	Initial value	Initialization
Call Proc.	Stop	PW
DUT Control	Call Proc.	PW
Using Specification	IS-95A	PW
Frequency		
Band	800 MHz	PW
Channel	1	PW
TX Meas. frequency	825.030 MHz	PW
RX Meas. frequency	870.030 MHz	PW
Channel Spacing	30.000 kHz	PW
Level		
Reference Level	30 dBm	PW
Auto Set	Off	PW
BS Output Level	-55.0 dBm	PW
Cal Mode	Manual	PW
AWGN Level	-20.0 dB	PW
AWGN On,Off	Off	PW
NOM_PWR	0 dB	PW
INIT_PWR	0 dB	PW
Signal		
Service Option	SO2	PW
Traffic Channel Data Rate	Full	PW

- Setup TX Measure Parameter screen

Item	Initial value	Initialization
User Cal Factor (TX)	0.00 dB	PW
Power Measure Method	Power Meter	PW
PWR_STEP	1 dB	PW
NUM_STEP	4	PW
MAX_RSP_SEQ	3	PW
Measuring Period	80 Frame	PW
Measuring Number	15 AP	PW

- Modulation Analysis screen

Item	Initial value	Initialization
[10 Burst Average] F8:	Off	PS
[Storage Mode] F9:	Normal mode	PS
[Average Count] F9	10	PS
[Refresh Interval] F10:	Every	PS

• RF Power screen

Item	Initial value	Initialization
1st pager		
[Window] F7	Slot	PS
[Marker] F8	Off mode	PS
[Normal] F7	The screen center: 700.00 μ s	PS
[Storage Mode] F9	Normal mode	PS
[Average Count] F9	10	PS

2nd page		
[Unit] F9	dB	PS
[Level Rel./Abs.] F10	Relative	PS

• Setup Template screen

Item	Initial value	Initialization
Line Level		
1	-20.0 dB	PW
2	-3.0 dB	PW
[Recall Template] F7		PS
[File No.] F9	0	-
[Save Template] F8		
[File No.] F9	0	-

• Power Meter screen

Item	Initial value	Initialization
Power Measure Method is Power Meter.		
2nd page		
[Power Measure Method] F7	Power Meter	PS
[Power Control Bit Pattern] F8	Alternate	PS
Power Measure Method is IF Level Meter.		
1st page		
[Storage Mode] F9	Normal mode	PS
[Average Count] F9	10	PS
[Refresh Interval] F10	Every	PS
2nd page		
[Power Measure Method] F7	Power Meter	PS
[Power Control Bit Pattern] F8	Alternate	PS

Appendix B Initial Values

- Standby Output Power screen
No initial values.

- Access Probe Measure screen
No initial values.

- Open Loop Time Response screen
Power Meter screen

Item	Initial value	Initialization
1st page		
[Marker] F9	Off mode	PS
[Normal] F7	The screen center: 50.0 ms	PS

- Setup Analog TX Measure Parameter screen

Item	Initial value	Initialization
User Cal Factor	0.00 dB	PW
RF measure mode	All	PW
Demod output terminal (real panel)		
Range	40 kHz	PW
HPF	300 Hz	PW
LPF	3 kHz	PW
De-emphasis	Off	PW
Squelch	Auto	PW

- Analog TX Measure with SG screen

Item	Initial value	Initialization
• Main function key :		
Second page		
[RX RF Level On Off]F4	Off	PS
• AF Level function key :		
First page		
[Distortion Unit]F7	%	PS
[Filter]F9	Off	PW
[HPF]F10	Off	PW
[De-emphasis]F11	Off	PW
Second page		
[Strage Mode]F9	Normal	PS
[Average Count]F9	10	PS
• TX RF Frequency function key :		
[Frequency]F7	825.030000 MHz	PW
[Channel]F8	1 CH	PW

Appendix B Initial Values

Item	Initial value	Initialization
• TX RF Level/Power function key :		
First page		
[Ref level]F7	(MAIN) 30.0 dBm	PW
	(AUX) 22.0 dBm	PW
[Strage Mode]F9	Normal	PS
[Average Count]F9	10	PS
• Deviation function key :		
First page		
[Demod.]F7	FM	PW
[Relative On Off]F8	Off	PS
[Det Mode]F9	(P-P)/2	PW
[HPF]F10	Off	PW
[LPF]F11	Off	PW
Second page		
[Strage Mode]F9	Normal	PS
[Average Count]F9	10	PS
• Modulation function key :		
[AF Osc.1 Frequency]F8	1.0040 kHz	PW
[AF Osc.1 Deviation]F9	8.00 kHz	PW
[AF Osc.1 On Off]F11	On	PS
Second page		
[AF Osc.2 Signal]F7		
[AF Signal]F7	Tone	PW
[Output for Mod AF]F8	Mod	PW
[AF Osc.2 Frequency]F8	1.0040 kHz	PW
[AF Osc.2 Deviation]F9	8.00 kHz (only for AF Osc.2 Signal=Mod)	PW
[AF Osc.2 Level]F10	100.0 mV (only for AF Osc.2 Signal=AF)	PW
[AF Osc.2 On Off]F11	Off	PS
Second page		
[External Deviation]F9	8.00 kHz	PW
[External On Off]F11	Off	PS
• RX RF Frequency function key :		
[Incremental Step Value]F7	1.000 000 MHz	PS
[Relative On Off]F8	Off	PS
[Channel]F9	1 CH	PW
• RX RF Level function key :		
[Incremental Step Value]F7	1.0 dB	PS
[Relative On Off]F8	Off	PS
[Unit EMF TERM]F10	EMF	PS

Appendix B Initial Values

- Setup RX Measure Parameter screen

Item	Initial value	Initialization
FER Parameters		
Sample	1000 frames	PW
Confidence Level	95.0%	PW
FER	3.0%	PW
FER Upper Limit	10.0%	PW
Measure Stop Mode	On	PW
User Cal Factor	0.00 dB	PW

- Setup Signal screen

Item	Initial value	Initialization
Channel Level		
Pilot Channel Level	-7.0 dB	PW
Sync Channel Level	-16.0 dB	PW
Paging Channel Level	-12.0 dB	PW
Traffic Channel Level	-16.0 dB	PW
Baseband		
CDMA Reference Output	19.6608 MHz	PW
CDMA Reference Input	Int	PW

- Frame Error Rate screen

Item	Initial value	Initialization
1st page		
[Sample] F8	1000 frames	PS
[FER] F9	3.0%	PS

- Setup Analog RX Measure Parameter screen

Item	Initial value	Initialization
User Cal Factor	0.00 dB	PW
AF Input		
Range	30 V	PW
Impedance	100 k Ω	PW

• Analog RX Measure screen

Item	Initial value	Initialization
• Main function key :		
First page		
[RF Level On Off]F4	Off	PS
• AF Level function key :		
First page		
[HPF]F9	Off	PW
[LPF]F10	Off	PW
[Filter]F11	Off	PW
Second page		
[Strage Mode]F9	Normal	PS
[Average Count]F9	10	PS
[AF Level Unit]F10	V	PS
[Distortion Unit]F11	%	PS
• RF Frequency function key :		
[Incremental Step Value]F7	1.000 000 MHz	PS
[Relative On Off]F8	Off	PS
[Channel]F9	1 CH	PW
• RF Level function key :		
[Incremental Step Value]F7	1.0 dB	PS
[Relative On Off]F8	Off	PS
[Unit EMF TERM]F10	EMF	PS
• Modulation function key :		
First page		
[AF Osc.1 Frequency]F8	1.0040 kHz	PW
[AF Osc.1 Deviation]F9	8.00 kHz	PW
[AF Osc.1 On Off]F11	On	PS
Second page		
[AF Osc.2 Signal]F7		
[AF Signal]F7	Tone	PW
[Output for Mod AF]F8	Mod	PW
[AF Osc.2 Frequency]F8	1.0040 kHz	PW
[AF Osc.2 Deviation]F9	8.00 kHz (only for AF Osc.2 Signal=Mod)	PW
[AF Osc.2 Level]F10	100.0 mV (only for AF Osc.2 Signal=AF)	PW
[AF Osc.2 On Off]F11	Off	PS
Third page		
[External Deviation]F9	8.00 kHz	PW
[External On Off]F11	Off	PS

Appendix B Initial Values

- Setup Call Proc. Parameter screen

Item	Initial value	Initialization
Paging Channel Walsh Code	1	PW
Traffic Channel Walsh Code	8	PW
OCNS Channel Walsh Code	63	PW
SID	7	PW
Register SID	12	PW
NID	1	PW
Register NID	12	PW
BASE_ID	39	PW
Default ESN	FFFFFFFF (hex)	PW
IDT (Default MSID)	MSIN	PW
MSID (Default MSID)	DEC 00000000	PW

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- Numbers on the right indicate section and paragraph numbers in this operation manual.

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MT8801C

Option 12: CDMA Measurement Operation Manual (Remote Control)

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Section 1 General

This section outlines the Remote Control functions of the MT8801C Radio Communication Analyzer.

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1.2	Remote Control Functions	1-2
1.3	Example of System Configuration Using RS-232C/GPIB	1-3
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1.1 General Description

The MT8801C Radio Communication Analyzer, when combined with an external controller, can automate your measurement system. For this purpose, the MT8801C is equipped with an RS-232C interface port and a GPIB interface bus (IEEE Std 488.2-1987) as a standard feature.

1.2 Remote Control Functions

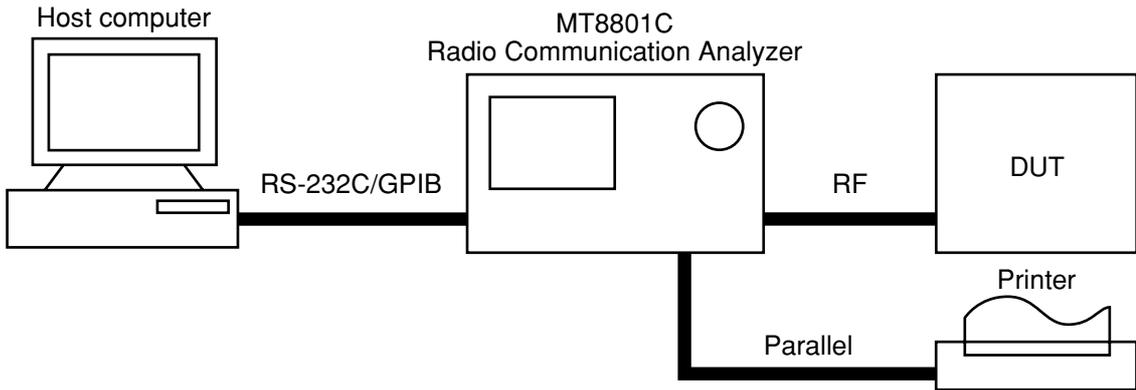
The Remote Control functions of the MT8801C are as follows:

- (1) Controls all functions except the power switch, floppy disk unloading, and some keys including the [Local] key
- (2) Reads out all setting conditions
- (3) Sets the RS-232C interface conditions and GPIB address from the panel
- (4) Executes interrupts and serial polling

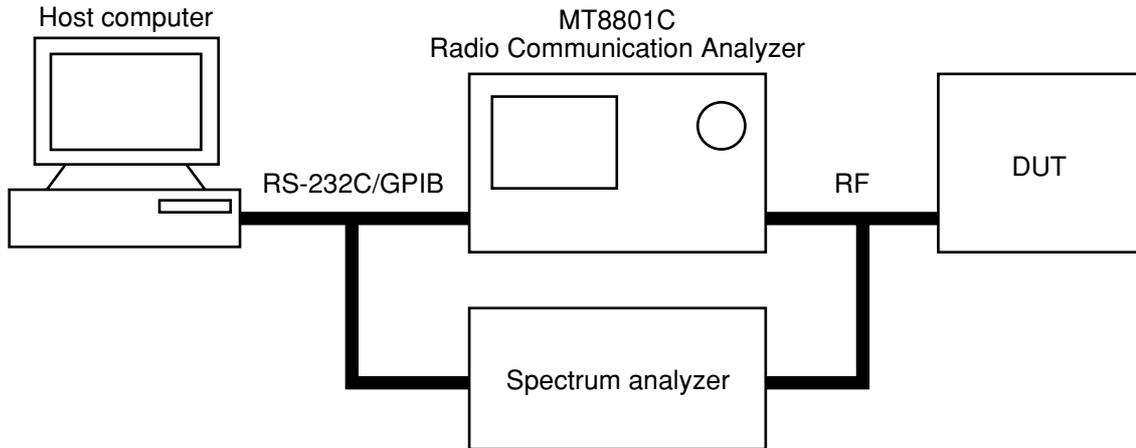
These functions enable to configure the automatic measurement system when the MT8801C is combined with a personal computer and other measuring instruments

1.3 Example of System Configuration Using RS-232C/GPIB

(1) Control by the host computer (1)



(2) Control by the host computer (2)



1.4 RS-232C Specifications

The RS-232C specifications of the MT8801C are shown in the table below.

Item	Specification
Function	Control from an external controller (except power switch)
Communication system	Asynchronous (start-stop method), half-duplex
Communication control	X-ON/OFF control
Baud rate	1200, 2400, 4800, 9600 bps
Data bits	7 bits, 8 bits
Parity	Odd, Even, None
Start bit	1 bit
Stop bit	1 bit, 2 bits
Connector	D-sub 9 pins, female

1.5 GPIB Specifications

The GPIB of the MT8801C provides the IEEE488.1 interface function subsets listed in the table below.

GPIB Interface Functions

Code	Interface function
SH1	All source handshake functions are provided. Synchronizes the timing of data transmission.
AH1	All acceptor handshake functions are provided. Synchronizes the timing for receiving data.
T6	Synchronizes the timing for receiving data. The serial poll function is provided. The talk-only function is not provided. The talker can be canceled by MLA.
L4	Basic listener functions are provided. The listen-only function is not provided. The listener can be canceled by MTA.
SR1	All service request and status byte functions are provided.
RL1	All remote/local functions are provided. The local lockout function is provided.
PP0	Parallel poll functions are not provided.
DC1	All device clear functions are provided.
DT1	The device trigger function is provided.
C0	Controller functions are not provided.

Section 2 Device Messages

This section outlines and lists the device messages of the MT8801C.

2.1	General Description	2-2
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2.1 General Description

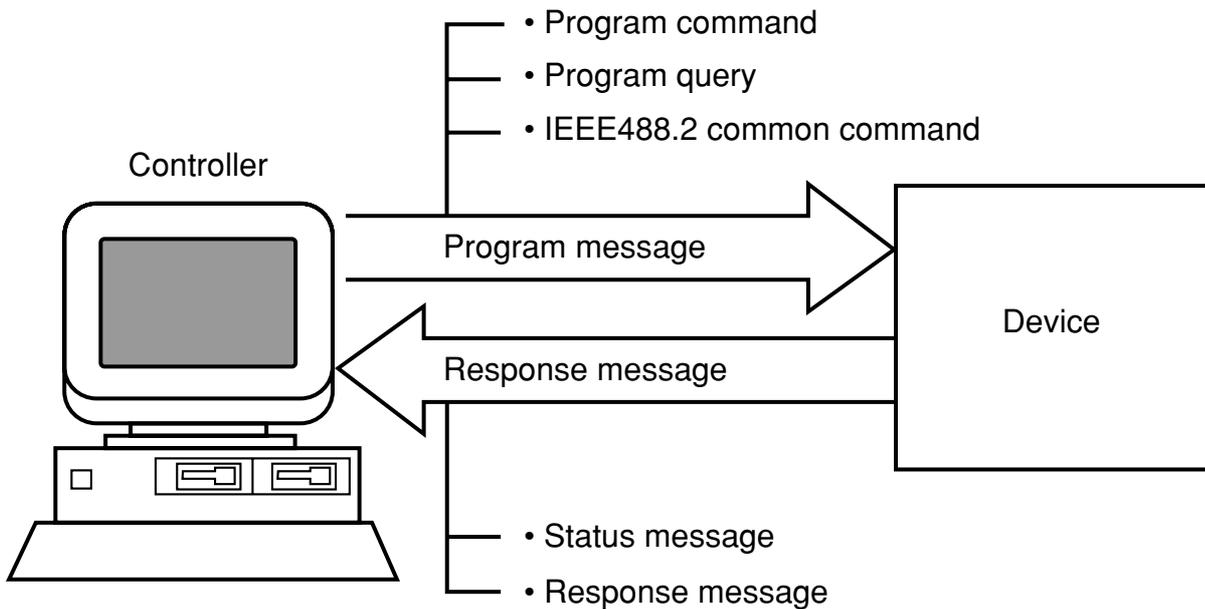
A device message is a data message transmitted between the controller and device via the system interface. Device messages are classified into program messages and response messages.

A program message is an ASCII data message transferred from the controller to the device. Program messages are classified into program commands and program queries.

Program commands are classified into device-specific commands used exclusively to control the MT8801C, and IEEE488.2 common commands. IEEE488.2 common commands are also used for other measuring instruments conforming to IEEE488.2 connected to the bus.

A program query is a command used to obtain a response message from the device. It is transferred from the controller to the device in advance, then the controller receives the response message from the device.

A response message is an ASCII data message transferred from the device to the controller.



Program messages and response messages may have a suffix (units) at the end of the numeric data.

2.2 Suffix Code

The table below shows the suffixes used for the MT8801C.

MT8801C Suffix Codes

Type	Unit	Suffix code
Frequency	GHz	GHZ , GZ
	MHz	MHZ , MZ
	kHz	KHZ , KZ
	Hz	HZ
	Default	HZ
Time	second	S
	m second	MS
	μ second	US
	Default	MS
Level (dB)	dB	DB
	dBm	DBM , DM
	dB μ	DBU
	Default	Determined in conformance with the set scale unit
Level (W)	W	W
	mW	MW
	μ W	UW
	nW	NW
	Default	UW
Level (V)	V	V
	mV	MV
	μ V	UV
	Default	V

2.3 IEEE488.2 Common Commands and Supported Commands

The table below lists 39 common commands specified in the IEEE488.2 standard. IEEE488.2 common commands which are supported by the MT8801C are indicated with the  symbol in the table.

Mnemonic	Command name	IEEE488.2 standard	MT8801C supported commands
*ADD	Accept Address Command	Optional	
*CAL	Calibration Query	Optional	
*CLS	Clear Status Command	Mandatory	
*DDT	Define Device Trigger Command	Optional	
*DDT?	Define Device Trigger Query	Optional	
*DLF	Disable Listener Function Command	Optional	
*DMC	Define Macro Command	Optional	
*EMC	Enable Macro Command	Optional	
*EMC?	Enable Macro Query	Optional	
*ESE	Standard Event Status Enable Command	Mandatory	
*ESE?	Standard Event Status Enable Query	Mandatory	
*ESR?	Standard Event Status Register Query	Mandatory	
*GMC?	Get Macor contents Query	Optional	
*IDN?	Identification Query	Mandatory	
*IST?	Individual Status Query	Optional	
*LMC?	Learn Macro Query	Optional	
*LRN?	Learn Device Setup Query	Optional	
*OPC	Operation Complete Command	Mandatory	
*OPC?	Operation Complete Query	Mandatory	
*OPT?	Option Identification Query	Optional	
*PCB	Pass Control Back Command	Mandatory if other than C0	
*PMC	Purge Macro Command	Optional	
*PRE	Parallel Poll Register Enable Command	Optional	
*PRE?	Parallel Poll Register Enable Query	Optional	
*PSC	Power On Status Clear Command	Optional	
*PSC?	Power On Status Clear Query	Optional	
*PUD	Protected User Data Command	Optional	
*PUD?	Protected User Data Query	Optional	
*RCL	Recall Command	Optional	
*RDT	Resource Description Transfer Command	Optional	
*RDT?	Resource Description Transfer Query	Optional	
*RST	Reset Command	Mandatory	
*SAV	Save Command	Optional	
*SRE	Service Request Enable Command	Mandatory	
*SRE?	Service Request Enable Query	Mandatory	
*STB?	Read Status Byte Query	Mandatory	
*TRG	Trigger Command	Mandatory if DT1	
*TST?	Self Test Query	Mandatory	
*WAI	Wait to Continue Command	Mandatory	

Note:

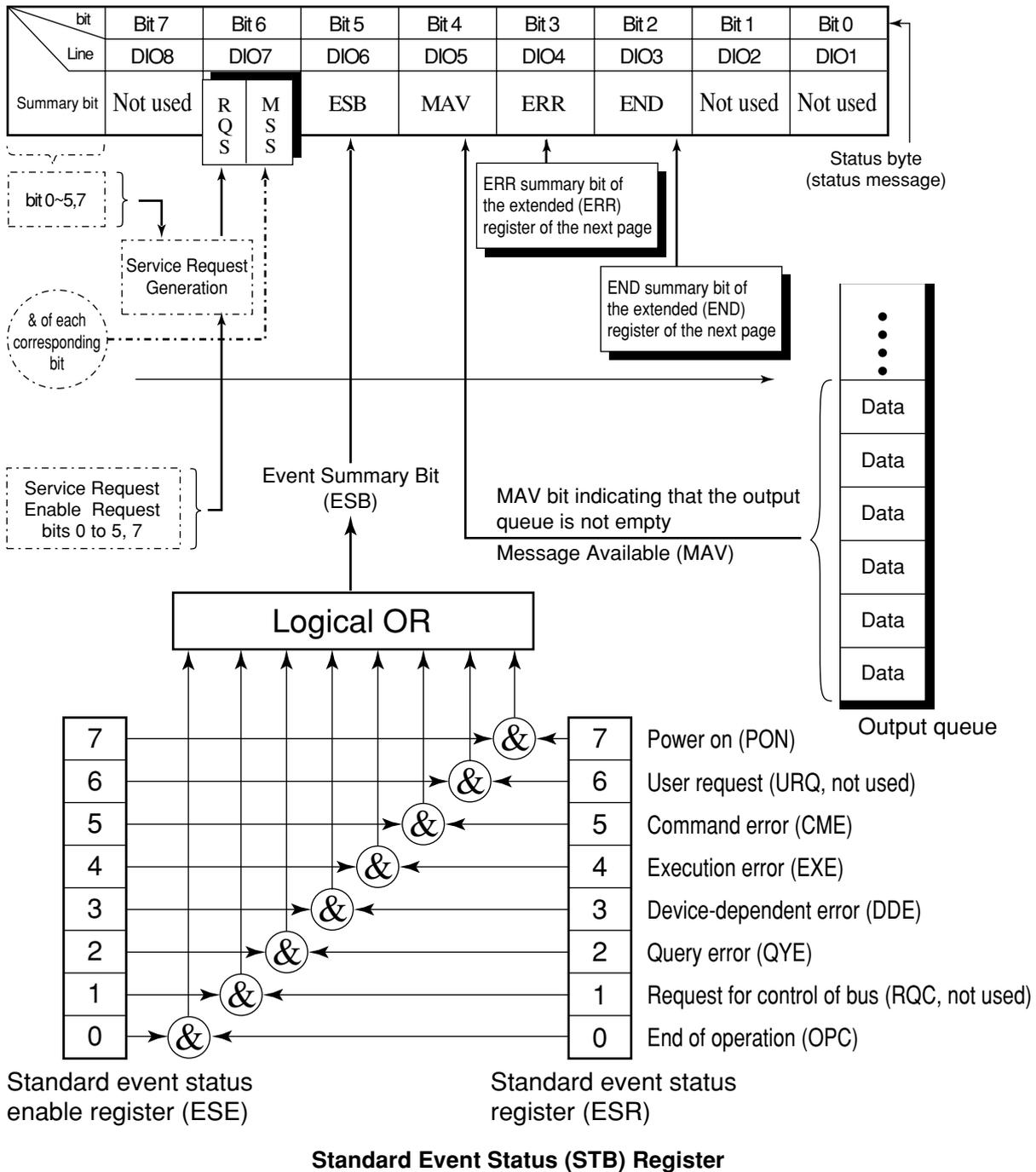
2.3 IEEE488.2 Common Commands and Supported Commands

Table below lists the IEEE488.2 common commands used in the MT8801C.

IEEE488.2 common command				
Command name	Program Msg	Query Msg	Response Msg	Remarks
Clear status	*CLS	—	—	
Standard event status enable	*ESE n	*ESE?	n	n:0 to 255
Standard event status register	—	*ESR?	n	n:0 to 255
Identification query	—	*IDN?	id	ID:Manufacturer name, model name, etc.
Operation complete	*OPC	*OPC?	1	
Reset	*RST	—	—	
Service request enable	*SRE	*SRE?	n	"n:0 to 63,128 to 191"
Read status byte	—	*STB?	n	
Trigger	*TRG	—	—	
Self test	—	*TST?	n	
Wait to continue	*WAI	—	—	

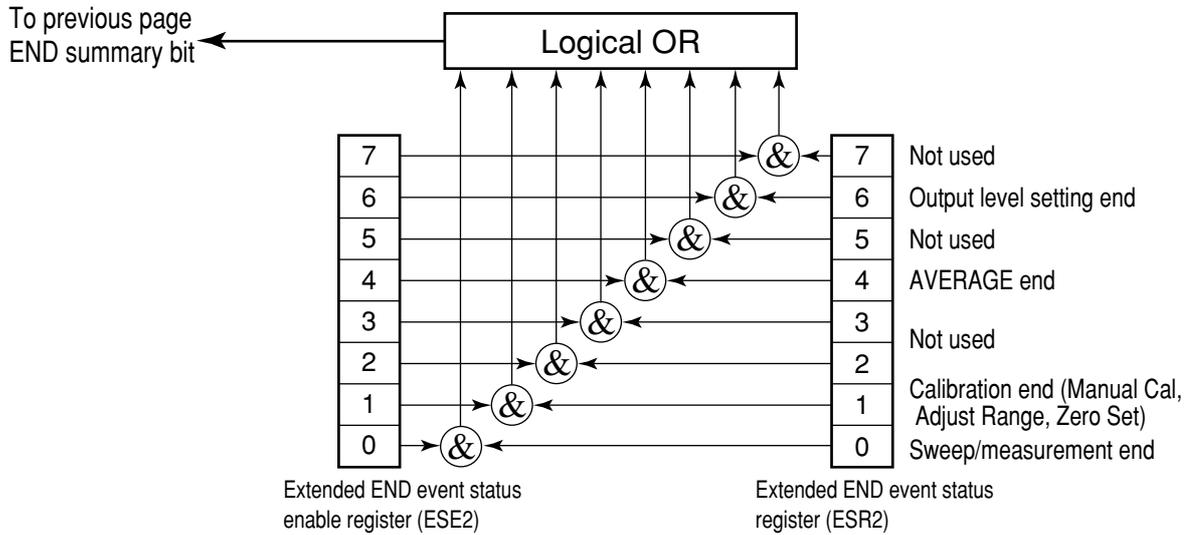
2.4 Status Messages

The diagram below shows the structure of service-request summary messages for the status byte register (STB) used with the MT8801C.

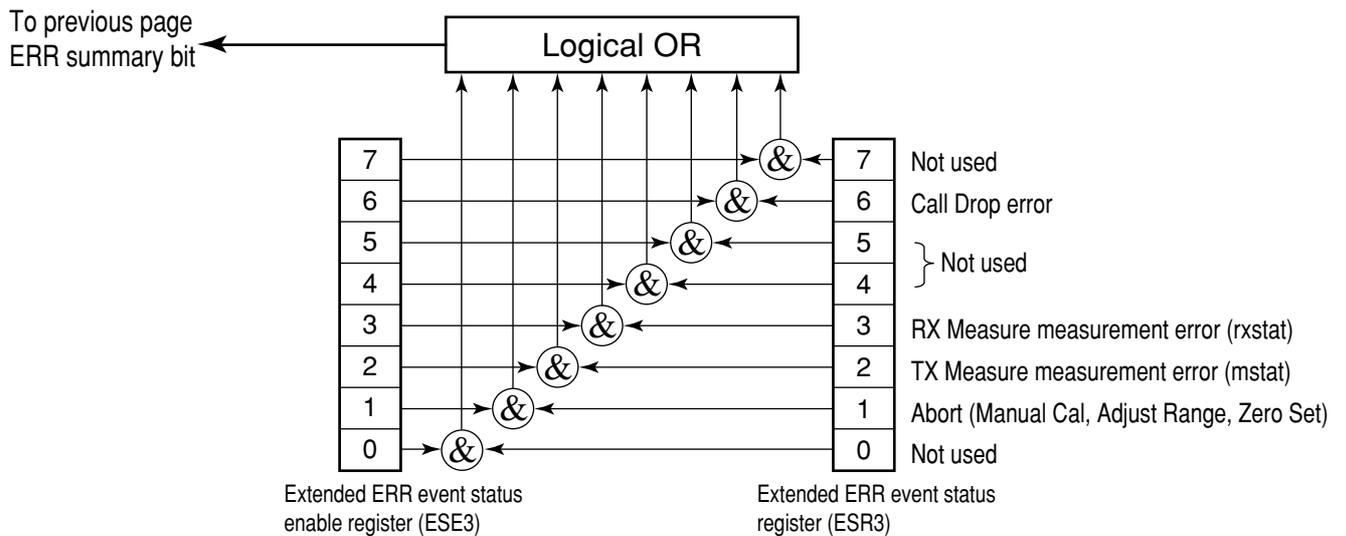


Note:

& indicates a logical product (AND).



Extended Event Status (END) Register



Extended Event Status (ERR) Register

2.5 Device Message List

MT8801C-specific program commands, query messages, and response messages are listed from paragraph 2.5.1.

• **Device message table**

(a) Program messages (Program Msg)/query message (Query Msg)

- (i) Uppercase characters : Reserved words
- (ii) Numeric : Reserved words (numeric code)
- (iii) Lowercase characters in argument
 - f (frequency) : Real number or integer with decimal point
Units :GHZ, MHZ, KHZ, HZ, GZ, MZ, KZ, no units = HZ
 - t (time) : Real number or integer with decimal point
Units :S, SC, MS, US, no unit = US
 - l (level) : Real number or integer with decimal point
Units :DB, DBM, DM, DBU, W, MW, UW, NW, no units = set SCALE units
 - n (no units integer) : Integer
 - r (no units real number) : Real number
 - h (no units hexadecimal number) : Hexadecimal number
 - Others : Listed in remarks columns of the table

(b) Response messages (Response Msg)

- (i) Uppercase characters : Reserved words
- (ii) Numeric : Reserved words (numeric code)
- (iii) Lowercase characters in argument
 - f (frequency) : 12-character fixed integer units = HZ
 - t (time) : Real number or integer with decimal point
 - l (level) : Real number or integer with decimal point
 - u (ratio) : Real number or integer with decimal point
 - s (symbol) : Real number or integer with decimal point
 - n (no units integer) : Integer, variable number of digits
(Significant digits are output.)
 - r (no units real number) : Real number with decimal point, variable number of digits (Significant digits are output.)
 - h (no units hexadecimal number) : Hexadecimal number
 - Others : Written in remarks columns of the table

Notes:

- Integer: NR1 format, real number: NR2 format
- Ø: Zero

Device messages are classified into ten types according to valid ranges:

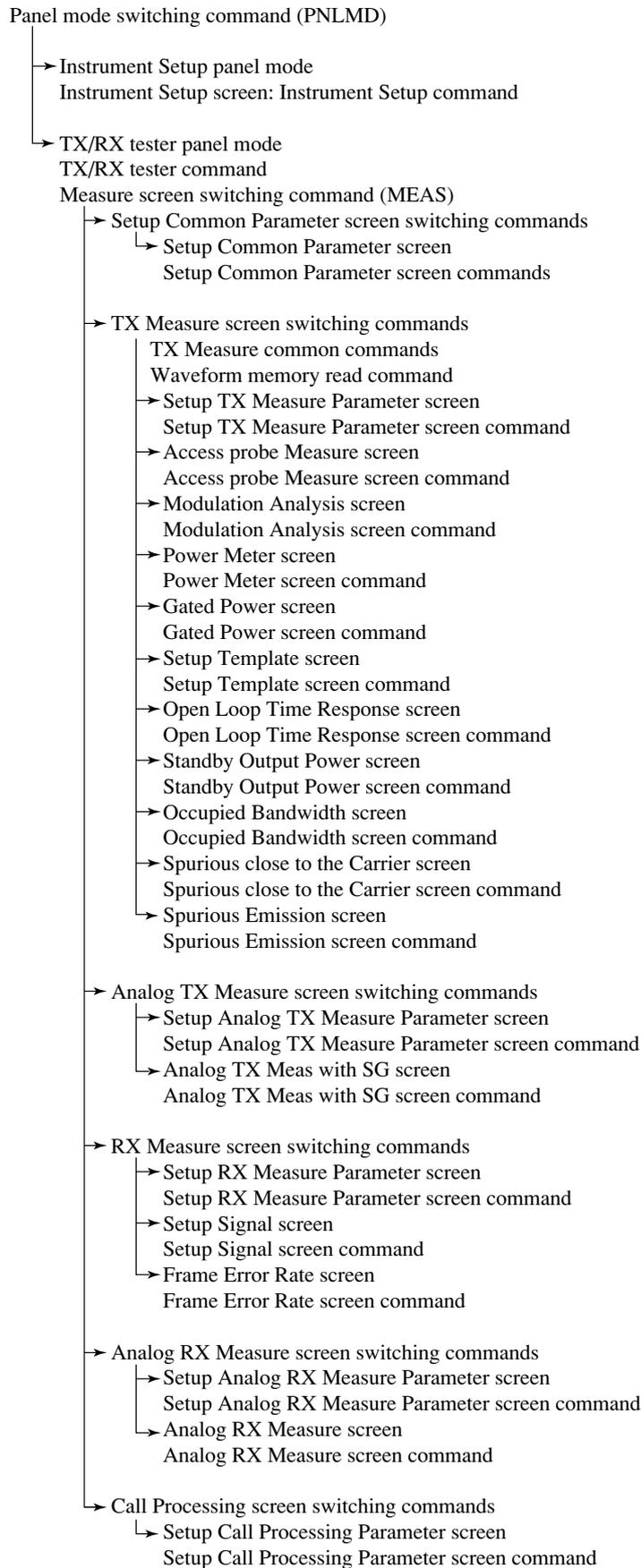
1. MT8801C common commands:
Valid in all MT8801C modes
2. Instrument Setup commands:
Valid in Instrument Setup panel mode
3. TX/RX tester commands:
Valid in TX/RX tester panel mode (on all TX/RX test screens)
4. Setup commands:
Valid in TX/RX tester panel mode (on all TX/RX test screens)
(Setup Common Parameter screen commands, Setup TX Measure Parameter screen commands, Setup Template screen commands, Setup Analog TX Measure Parameter screen commands, Setup RX Measure Parameter screen commands, Setup Signal screen commands, Setup Analog RX Measure Parameter screen commands, Setup Call Processing Parameter screen commands)
5. TX Measure commands:
Valid in a range defined on each TX Measure screen
6. Analog TX Measure commands:
Valid in a range defined on each Analog TX Measure screen
7. RX Measure commands:
Valid in a range defined on each RX Measure screen
8. Analog RX Measure commands:
Valid in a range defined on each Analog RX Measure screen
9. Call Processing commands:
Valid in a range defined on each Call Processing screen

These device messages are listed below.

- Relationship between screen hierarchies and commands
[MT8801C common commands]:
Valid in all MT8801C modes regardless of screen hierarchies
 - Save/Recall command
 - FD command (Verify)
 - Copy command
 - Single/Continuous switching command
 - Preset command
 - Panel mode switching command
 - Switch to upper screen command (BS: Back Screen)
 - Extended event status command (END, ERR)

Section 2 Device Messages

[Screen hierarchies and commands]



2.5.1 MT8801C common commands

MT8801C common commands are valid in all MT8801C modes.

(1) Save/Recall commands (parameter saving and recalling)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Recall	Recall file		RCM n	---	---	
Save	Save file		SVM n	---	---	

(2) FD commands (verify)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
	Verify	On Off	VERIFY ON VERIFY OFF	VERIFY? VERIFY?	ON OFF	

(3) Copy commands (copy)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
	Copy		PRINT PLS Ø	--- ---	--- ---	

(4) Single/Continuous switching commands

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
	Single sweep	Measurement/ Sweep start	SNGLS	---	---	
			S2	---	---	
		Measurement/ Sweep synchronization	SWP	---	---	
			TS	---	---	
	Continuous		CONTS	---	---	
			S1	---	---	
	Measurement/ Sweep status	Sweep end Sweep	---	SWP? SWP?	SWP Ø SWP 1	

(5) Preset commands (initialization, power-on setting)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Preset		PRE	---	---	---	
			INI	---	---	
			IP	---	---	
	Preset value	Previous state Recall memory No.	POWERON LAST POWERON n	POWERON? POWERON?	LAST n	

Section 2 Device Messages

(6) Panel-mode switching commands (TX/RX tester panel mode, Instrument Setup panel mode)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
	TX/RX tester		PNLMD TESTER	PNLMD?	TESTER	
	Analog		PNLMD ANALOG	PNLMD?	ANALOG	
	Instrument setup		PNLMD SYSTEM	PNLMD?	SYSTEM	

(7) Switch to upper screen command (BS)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
	Back screen		BS	---	---	

(8) Extended event status commands (END)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Event status	END event status	Enable register	ESE2 n	ESE2?	n	
		Status register	---	ESR2?	n	
	ERR event status	Enable register	ESE3 n	ESE3?	n	
		Status register	---	ESR3?	n	

2.5.2 Instrument Setup commands

The Instrument Setup command is valid in Instrument Panel mode.

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Hardware	Reference frequency	10MHz	REF 10MHZ	REF?	10MHZ	
		13MHz	REF 13MHZ	REF?	13MHZ	
	RF Input/Output	Main	RFINOUT MAIN	RFINOUT?	MAIN	*1
		AUX	RFINOUT AUX	RFINOUT?	AUX	*1
Main-in Aux-out		RFINOUT MAINAUX	RFINOUT?	MAINAUX	*1	
Main-out Aux-in		RFINOUT AUXMAIN	RFINOUT?	AUXMAIN	*1	
Display	Display	On	DSPL ON	---		
		Off	DSPL OFF	---		
	Title display	DATE/TIME	TTL DATE	TTL?	DATE	
		USER define	TTL USER	TTL?	USER	
		OFF	TTL OFF	TTL?	OFF	
	Title input	User title	TITLE a KSE a	TITLE? ---	a ---	a (The setting characters are up to 32.)
Select date display mode	Japan (yy/mmm/dd)	DATEMODE YMD	DATEMODE?	YMD		
	USA (mmm-dd-yy)	DATEMODE MDY	DATEMODE?	MDY		
	Europe (dd-mmm-yy)	DATEMODE DMY	DATEMODE?	DMY		
Set and read date	Japan (yy/mm/dd)	DATE yy,mm,dd	DATE?	yy,mm,dd		
Set and read time		TIME hh,mm,ss	TIME?	hh,mm,ss		
Buzzer	Buzzer switch	On	ALARM ON BEP 1	ALARM? ---	ON ---	
		Off	BEP ON ALARM OFF BEP 0 BEP OFF	ALARM? ---	OFF ---	
	Sounds buzzer		BZR	---	---	
GPIB	Terminator	LF	TRM 0	---	---	
		CR/LF	TRM 1	---	---	
RS232C	Baud rate	9600	BAUD 9600	BAUD?	9600	
		4800	BAUD 4800	BAUD?	4800	
		2400	BAUD 2400	BAUD?	2400	
		1200	BAUD 1200	BAUD?	1200	
	Parity	Even	PRTY EVEN	PRTY?	EVEN	
		Odd	PRTY ODD	PRTY?	ODD	
		Off	PRTY OFF	PRTY?	OFF	
	Date bit	7bits	DTAB 7	DTAB?	7	
8bits		DTAB 8	DTAB?	8		
Stop bit	1bit	STPB 1	STPB?	1		
	2bits	STPB 2	STPB?	2		

Note*1:

RF Input/Output commands are valid at all the screens.

Section 2 Device Messages

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
	Time out		TOUT t	TOUT?	t	t:0 to 255
	Delimiter	LF CR/LF	DELM 0 DELM 1	--- ---	--- ---	
Print	Type	ESC/P (24DOT)	PMOD 6	PMOD?	6	
		HP2225	PMOD 3	PMOD?	3	
		BMP(B&W)	PMOD11	PMOD?	11	
Color	Select pattern	Pattern1	COLORPTN COLOR1	COLORPTN?	COLOR1	
		Pattern2	COLORPTN COLOR2	COLORPTN?	COLOR2	
		Pattern3	COLORPTN COLOR3	COLORPTN?	COLOR3	
		Pattern4	COLORPTN COLOR4	COLORPTN?	COLOR4	
		User pattern	COLORPTN USERCOLOR	COLORPTN?	USERCOLOR	
	Copy from	Pattern1	COPYCOLOR COLOR1	---	---	
		Pattern2	COPYCOLOR COLOR2	---	---	
		Pattern3	COPYCOLOR COLOR3	---	---	
		Pattern4	COPYCOLOR COLOR4	---	---	
	User define	Red, green, blue	COLORDEF n,r,g,b,	COLORDEF? n	r,g,b	n:Frame number

2.5.3 TX/RX tester commands

- TX/RX tester commands are valid at all the screens of the TX/RX tester (screens under the Setup Common Parameter screen).

(1) System-mode switching command (IS-95)

Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
System	IS-95	SYS IS95	SYS?	IS95	

(2) Setup Common Parameter screen switching command

Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Setup common parameter		MEAS SETCOM	MEAS?	SETCOM	

(3) TX Measure screen switching commands

Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Setup TX Measure Parameter		MEAS SETTX	MEAS?	SETTX	
Access Probe Measure		MEAS ACCPRB	MEAS?	ACCPRB	
Standby Output Power		MEAS STANDPWR	MEAS?	STANDPWR	
Setup Gated Power Template		MEAS SETTEMP	MEAS?	SETTEMP	
Modulation Analysis		MEAS MODANAL	MEAS?	MODANAL	
Gated Power		MEAS GPWR	MEAS?	GPWR	
		MEAS RFPWR	MEAS?	GPWR	
Open Loop Power Cont.		MEAS TIMERSPOL	MEAS?	TIMERSPOL	
Power Meter		MEAS PWRMTR	MEAS?	PWRMTR	
Occupied Bandwidth	Spectrum	MEAS OBW,SPECT	MEAS?	OBW,SPECT	
	FFT	MEAS OBW,FFT	MEAS?	OBW,FFT	
		MEAS OBW,HIGH	---	---	
Spurious close to the Carrier	Spectrum	MEAS ADJ,SPECT	MEAS?	ADJ,SPECT	
		MEAS SPU,SPECT	---	---	
Setup Spurious Template		MEAS SPUTEMP	MEAS?	SPUTEMP	
Spurious Emission	Spot	MEAS SPURIOUS,SPOT	MEAS?	SPURIOUS,SPOT	
	Search	MEAS SPURIOUS,SEARCH	MEAS?	SPURIOUS,SEARCH	
Setup Frequency Table		MEAS SETTABLE	MEAS?	SETTABLE	

Section 2 Device Messages

(4) Analog TX Measure screen switching commands

The analog TX measure screen switching command is valid in analog measure mode.

Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Setup Analog TX Measure Parameter		MEAS SETATX	MEAS?	SETATX	
		MEAS SETTX	MEAS?	SETATX	
Analog TX Meas with SG		MEAS ATXSG	MEAS?	ATXSG	
		MEAS TXSG	MEAS?	ATXSG	

(5) RX Measure screen switching commands

Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Setup Rx Measure		MEAS SETRX	MEAS?	SETRX	
Setup Signal		MEAS SETSGNL	MEAS?	SETSGNL	
FER Measure		MEAS FER	MEAS?	FER	

(6) Analog RX Measure screen switching commands

The analog RX measure screen switching command is valid in analog measure mode.

Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Setup Analog RX Parameter		MEAS SETARX	MEAS?	SETARX	
		MEAS SETRX	MEAS?	SETARX	
Analog RX Measure		MEAS ARX	MEAS?	ARX	
		MEAS RX	MEAS?	ARX	

(7) Call Processing screen switching commands

Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Setup Call Proc. Parameter		MEAS SETCALLP	MEAS?	SETCALLP	

(8) Measure result status command

Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
TX Measure result status		---	MSTAT?	n	*1
RX Measure result status		---	RXMSTAT?	n	*2

***1:**

Response value n of MSTAT?

For CDMA measure mode

Value of n	Explanation
0	Normal termination
1	RF input limit
2	Level over
3	Level under
4	Un measurable
5	Short code not found
6	Time-out
9	Unmeasured

For analog measure mode

Value of n	Explanation
0	Normal termination
1	RF input limit
2	Level over
3	Level under
4	Unmeasurable
5	Deviation under
9	Unmeasured

***2:**

Response value n of RXMSTAT?

Value of n	Explanation
0	Normal termination
1	Time-out
2	Upper Limited error
3	Call Processing error
9	Unmeasured

(9) Trigger timeout command

Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Trigger timeout		TRGWAIT s	TRGWAIT?	s	

Section 2 Device Messages

2.5.4 Setup Common Parameter screen commands

- Setup Common Parameter screen commands are valid at all the screens of the TX/RX tester (screens under the Setup Common Parameter screen).

Intermediate	Function	Function	Program Msg	Query Msg	Response	Remarks
Mode Switching	DUT control	Call Proc	---	DUTCTRL?	CALLP	
Spec	Using Specification	IS-95A J-STD-008 ARIB-T53 KOREA-PCS TSB74	USINGSPEC IS95A USINGSPEC JSTD008 USINGSPEC ARIB USINGSPEC KOREAPCS USINGSPEC TSB74	USINGSPEC USINGSPEC USINGSPEC USINGSPEC? USINGSPEC?	IS95A JSTD008 ARIB KOREAPCS TSB74	
Frequency	Control Band	C800MHz	FREQBAND 800MHZ CBAND C800MHZ	FREQBAND? CBAND?	800MHZ C800MHZ	
		C1.9GHz	FREQBAND 1900MHZ CBAND C1900MHZ	FREQBAND? CBAND?	1900MHZ C1900MHZ	
		C1.7GHz	FREQBAND 1700MHZ CBAND C1700MHZ	FREQBAND? CBAND?	1700MHZ C1700MHZ	
		A800MHz	CBAND A800MHZ	CBAND?	A800MHZ	
	Traffic Band	C800MHz	TBAND C800MHZ	TBAND?	C800MHZ	
		C1.9GHz	TBAND C1900MHZ	TBAND?	C1900MHZ	
		C1.7GHz	TBAND C1700MHZ	TBAND?	C1700MHZ	
CDMA Channel	A800MHz	TBAND A800MHZ	TBAND?	A800MHZ		
	N800MHz-L	TBAND N800MHZ-L	TBAND?	N800MHZ-L		
	N800MHz-M	TBAND N800MHZ-M	TBAND?	N800MHZ-M		
	N800MHz-U	TBAND N800MHZ-U	TBAND?	N800MHZ-U		
Level	Reference Level		CHAN n CDMACHAN n	CHAN? CDMACHAN?	n [CH] n [CH]	
	Analog Traffic Channel		ATRAFCHAN n	ATRAFCHAN?	n [CH]	
	Analog Control Channel		ACTRLCHAN n	ACTRLCHAN?	n [CH]	
	Auto Reference Level	Off On	ARFLVL 0 ARFLVL ON	ARFLVL? ARFLVL?	0 [dBm/0.1dBm] OFF ON	
	BS Output Power Level		OLVL 0	OLVL?	0 [dBm/0.1dBm]	
	AWGN Power Level	Off On	AWGNPWR 0 AWGNLVL OFF AWGNLVL ON	AWGNPWR? AWGNLVL? AWGNLVL?	0 [dB/0.1dB] OFF ON	0:-20 to 6.0 dB
	MS Power Level		NOMPWR 0 INITPWR 0	NOMPWR? INITPWR?	0 0	0:-8 to 7 dB 0:-16 to 15 dB
Signal	Service Option	SO1	SERVOP SO1 SERVOP VOICE	SERVOP? SERVOP?	SO1 SO1	
		SO2	SERVOP SO2	SERVOP?	SO2	
		SO3	SERVOP SO3	SERVOP?	SO3	
		SO9	SERVOP SO9	SERVOP?	SO9	
	Data Rate	FULL 1/2 1/4 1/8	DATARATE 0 DATARATE 1 DATARATE 2 DATARATE 3	DATARATE? DATARATE? DATARATE? DATARATE?	0 1 2 3	
Call Drop	Call Drop Threshold (ON) Call Drop Threshold (OFF) Call Drop Threshold	CALLDROP ON CALLDROP OFF THRESHOLD n	CALLDROP? CALLDROP? THRESHOLD?	ON OFF n		
Echo Delay		ECHODELAY n	ECHODELAY?	n		
MSID Information	MSID	MSID	---	CALLMSID?	d1 d2	d1, d2: (See Call Processing Command *1)
	ESN	ESN	---	CALLESN?	h	h:00000000 to FFFFFFFF

2.5.5 TX Measure commands

(1) Setup TX Measure Parameter screen commands

- Setup TX Measure Parameter screen commands are valid at all the screens of the TX/RX measurement.

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
User Cal	User Cal Factor		UCAL \varnothing TXUCAL \varnothing	UCAL? TXUCAL?	\varnothing [dB/0.01dB] \varnothing [dB/0.01dB]	\varnothing :-55.00 to 55.00 dB \varnothing :-55.00 to 55.00 dB
Closed Loop Power Control	Power Control Bit Pattern	Closed Loop Alternate All '0' All '1' Auto	PCBPAT CLP PCBPAT ALT PCBPAT ALL0 PCBPAT ALL1 PCBPAT AUTO	PCBPAT? PCBPAT? PCBPAT? PCBPAT? PCBPAT?	CLP ALT ALL0 ALL1 AUTO	
	User Define Level		CLOSEDLOOPVLV \varnothing	CLOSEDLOOPVLV?	\varnothing [dBm/1dB]	\varnothing :-60 to 40dBm
Power Measure Method	Power Measure Method	Power Meter IF Level Meter	PMTH POW PMTH IF	PMTH? PMTH?	POW IF	
Access Probe	Access Parameter PWR_STEP		PWRSTEP \varnothing	PWRSTEP?	\varnothing	\varnothing :0 to 7dB
	Access Parameter NUM_STEP		NUMSTEP n	NUMSTEP?	n	n:0 to 15
	Access Parameter MAX_RSP_SEQ		MAXRSP n	MAXRSP?	n	n:1 to 15
	Measuring Period		MEASPRIOD	MEASPRIOD?	n	n:1 to 999Frame
	Measuring Number		MEASNUM n	MEASNUM?	n	n:1 to 240
Calibration	Calibration value		CALVAL \varnothing	CALVAL?	f, \varnothing	f=0:Not calibrated f=1:Internal calibrated f=2:External calibrated \varnothing :-10.00 to 10.00
Level Linearity Calibration	Calibration value		LVLLINEACALVAL \varnothing	LVLLINEACALVAL?	f, \varnothing	f=0:Not calibrated f=1:Internal calibrated f=2:External calibrated \varnothing :[dBm/0.001dB]

Section 2 Device Messages

(2) Access Probe Measure screen commands

- Program Msg of the Access Probe Measure screen commands are valid only at Access Probe Measure screen.

Query Msg of the Access Probe Measure screen commands are valid at all the screens of the TX/RX measurement screens.

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Measure	Start Access Probe Power		APBSA	---	---	
	Stop Access Probe Power		APBSO	---	---	
	BS Output Power Cal		OLVLCAL	---	---	
Calibration	Internal Osc. Calibration		OSCCAL	CALVAL?	0 [dB/0.01 dB]	
	Calibration Cancel		CALCANCEL	---		
Result	Time		---	APBTIME? p,d	t,t,t,t,...t [frame]	
	Level		---	APBLVL? p,d	0,0,0,0,...0 [dBm/0.01 dBm]	
	Number of bursts		---	APBNUM?	n [piece]	

Note:

- *1 Meaning of response Data → p: The start point of the access probe to be read-out (AP number)
- *2 Meaning of response Data → d: Number of data outputs

(3) Modulation Analysis screen commands

- Program Msg of the Modulation Analysis screen commands are valid only at Modulation Analysis screen.

Query Msg of the Modulation Analysis screen commands are valid at all the screens of the TX/RX measurement screens.

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Calibration	Power Meter Calibration		PWRCAL	CALVAL?	0 [dB/0.01 dB]	
	Internal Osc. Calibration		OSCCAL	CALVAL?	0 [dB/0.01 dB]	
	Calibration Cancel		CALCANCEL	---	---	
Adjust Range	Adjust Range		ADJRNG	---	---	
Closed Loop Power Control	Power Control Bit Pattern	Closed Loop	PCBPAT CLP	PCBPAT?	CLP	
		Alternate	PCBPAT ALT	PCBPAT?	ALT	
		All '0'	PCBPAT ALL0	PCBPAT?	ALL0	
		All '1'	PCBPAT ALL1	PCBPAT?	ALL1	
	Auto	PCBPAT AUTO	PCBPAT?	AUTO		
Closed Loop Power Control		Up	CLOSEDLOOP UP	---	---	
		Down	CLOSEDLOOP DOWN	---	---	
		User Define Level	CLOSEDLOOP USERLVL	---	---	
BS Output Power Cal	BS Output Power Cal		OLVLCAL	---	---	
Storage Mode	Storage Mode	Normal	STORAGE NRM	STORAGE?	NRM	
		Average	STORAGE AVG	STORAGE?	AVG	
	Average Count		AVR n VAVG n	AVR? VAVG?	n n	n:2 to 9999 n:2 to 9999
Refresh Interval		Every	INTVAL EVERY	INTVAL?	EVERY	
		Once	INTVAL ONCE	INTVAL?	ONCE	
Result	Carrier Frequency		---	CARRF?	f [Hz/0.01 Hz]	
	Carrier Frequency Error		---	CARRFERR?	f [Hz/0.01 Hz]	
			---	CARRFERR? HZ	f [Hz/0.01 Hz]	
			---	CARRFERR? PPM	u [ppm/0.1 ppm]	
	ρ (Waveform Quality Factor)		---	RHO?	r [-/0.00001]	
	τ (Timing Error)		---	TAU?	t [μ s/0.01 μ s]	
	RMS Vector Error		---	VECTERR?	u [%/0.01 %]	
	Peak Vector Error		---	PVECTERR?	u [%/0.01 %]	
	Phase Error		---	PHASEERR?	u [deg/0.01 deg]	
	Magnitude Error		---	MAGTDERR?	u [%/0.01 %]	
Origin Offset		---	ORGNOFS?	0 [dB/0.01 dB]		
TX Power		---	---	TXPWR? DBM	0 [dBm/0.01 dBm]	
		---	---	TXPWR? WATT	0 [W/(Note 1)]	

Note 1:

Denoted by 3 effective digits such as X.XX E \pm 66XX [W]

Section 2 Device Messages

(4) Power Meter screen commands

- Program Msg of the Power Meter screen commands are valid only at Power Meter screen.
Query Msg of the Power Meter screen commands are valid at all the screens of the TX/RX measurement screens.

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Measure Mode	Power Measure Method	Power Meter	PMTH POW	PMTH?	POW	
		IF Level Meter	PMTH IF	PMTH?	IF	
Other	Power Control Bit Pattern	Closed Loop	PWRCBPAT CLP	PWRCBPAT?	CLP	
		Alternative	PWRCBPAT ALT	PWRCBPAT?	ALT	
		All '0'	PWRCBPAT ALL0	PWRCBPAT?	ALL0	
		All '1'	PWRCBPAT ALL1	PWRCBPAT?	ALL1	
		Auto	PWRCBPAT AUTO	PWRCBPAT?	AUTO	
Closed Loop Power Control	Up	Down	CLOSEDLOOP UP	---	---	
		Down	CLOSEDLOOP DOWN	---	---	
		User Define Leve	CLOSEDLOOP USERLVL	---	---	Note 2
IF Level Meter Data Count Frame		IFLVLFRM n	IFLVLFRM?	n	n:1 to 10	
Disable IF Level Meter Meas. Result Dislpay Update	On		PWRMTRDISP ON	PWRMTRDISP?	On	Note 4
	Off		PWRMTRDISP OFF	PWRMTRDISP?	Off	
Calibration	Power Meter Calibration (IF Level)		PWRCAL	CALVAL?	0 [dB/0.01 dB]	
	Internal Osc. Calibration (IF Level)		OSCCAL	CALVAL?	0 [dB/0.01 dB]	
	Calibration Cancel (IF Level)		CALCANCEL	---	---	
Level	Calibration (IF Level)		LVLLINEACAL	LVLLINEACAL ?	0 [dBm/0.001 dB]	
Linearity Calibration	Calibration Cancel (IF Level)		LVLLINEACANCEL			
Adjust Range	Adjust Range		ADJRNG	---	---	
Storage Mode	Storage Mode (IF Level)	Normal	STORAGE NRM	STORAGE?	NRM	
		Average	STORAGE AVG	STORAGE?	AVG	
	Average Count (IF Level)		AVR n VAVG n	AVR? VAVG?	n n	n:2 to 9999 n:2 to 9999
Refresh Interval (IF Level)	Every Once		INTVAL EVERY INTVAL ONCE	INTVAL? INTVAL?	EVERY ONCE	
Range	Range Up (Power Meter)		RNG UP	---	---	
	Range Down (Power Meter)		RNG DN	---	---	
	Range 0dBm (Power Meter)		RNG 1	---	---	Note 3
	Range -20dBm (Power Meter)		RNG 1	---	---	
	Range 10dBm (Power Meter)		RNG 2	---	---	Note 3
	Range -10dBm (Power Meter)		RNG 2	---	---	
Range 20dBm (Power Meter)		RNG 3	---	---	Note 3	
Range 0dBm (Power Meter)		RNG 3	---	---		

2.5 Device Message List

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Range	Range 30dBm (Power Meter)		RNG 4	---	---	Note 3
	Range 10dBm (Power Meter)		RNG 4	---	---	
	Range 40dBm (Power Meter)		RNG 5	---	---	Note 3
	Range 20dBm (Power Meter)		RNG 5	---	---	
BS Output Power Cal	BS Output Power Cal		OLVLCAL	---	---	
Zero Set	Zero Set (Power Meter)		ZEROSET	---	---	
Result	Power	DBM	---	POWER? DBM	Q [dBm/0.01 dBm]	
		WATT	---	POWER? WATT	Q [W/(Note 1)]	
		DB	---	POWER? DB	Q [dB/0.01 dB]	
	TX Power (IF Level)		---	TXPWR?	Q [dBm/0.01dBm, W/(Note 1)]	Note1: Depends on the selected unit.
		DBM	---	TXPWR? DBM	Q [dBm/0.01 dBm]	
		WATT	---	TXPWR? WATT	Q [W/(Note 1)]	

Note:

“(Power Meter)” in the Function column on the above table indicates the command which becomes valid only when the Power Meter is selected for the Power Measure Method.

“(IF Level)” in the Function column on the above table indicates the command which becomes valid only when the IF Level is selected for the Power Measure Method.

Note 1: Denoted by 4 effective digits such as X.XXX E± XX [W]

Note 2: This function becomes valid only when the Power Control Bit Pattern is selected to Alternate.

Note 3: The upper line is the command for the RF Input/Output of “Main” or Main-in/AUX-out”.

The lower line is the command for the RF Input/Output of “AUX” or Main-out/AUX-in”.

Note 4: This command is used to reduce measurement time.

Section 2 Device Messages

(5) Gated Power screen commands

- Program Msg of the Gated Power screen commands are valid only at Gated Power screen.
Query Msg of the Gated Power screen commands are valid at all the screens of the TX/RX measurement screens.

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Calibration	Power Meter Calibration		PWRCAL	CALVAL?	Q [dB/0.01 dB]	
	Internal Osc. Calibration		OSCCAL	CALVAL?	Q [dB/0.01 dB]	
	Calibration Cancel		CALCANCEL	---	---	
Adjust Range	Adjust Range		ADJRNG	---	---	
Storage Mode	Storage Mode	Normal	STORAGE NRM	STORAGE?	NRM	
		Average	STORAGE AVG	STORAGE?	AVG	
	Average Count		AVR n VAVG n	AVR? VAVG?	n n	n:2 to 9999 n:2 to 9999
Level Rel./Abs.	Relative		LVLREL ON MTEMPREL ON	LVLREL? MTEMPREL?	ON ON	
	Absolute		LVLREL OFF MTEMPREL OFF	LVLREL? MTEMPREL?	OFF OFF	
Unit	dBm		UNIT DBM	UNIT?	DBM	
	pW/nW/μW/mW/W		UNIT WATT	UNIT?	WATT	
Window	Slot		WINDOW SLOT	WINDOW?	SLOT	
	Leading		WINDOW LEAD WINDOW RISE	WINDOW? ---	LEAD ---	
		Trailing		WINDOW TRAIL WINDOW FALL	WINDOW? ---	TRAIL ---
Marker	Mode	Normal Off	MKR NRM MKR OFF	MKR? MKR?	NRM OFF	
	Position		MKRP pn MKN pn	MKRP? MKN?	pn [μs/0.5 μs] pn [μs/0.5 μs]	pn: -80.0 to 1330.0 pn: -80.0 to 1330.0 (Setting resolution: 0.5)
BS Output Power Cal	BS Output Power Cal		OLVLCAL	---	---	
Result	TX Power		---	TXPWR?	Q [dBm/0.01dBm, W/(Note 1)]	Q: Depends on the selected unit.
		DBM	---	TXPWR? DBM	Q [dBm/0.01 dBm]	
		WATT	---	TXPWR? WATT	Q [W/(Note 1)]	
	Carrier Off Power		---	OFFPWR?	Q [dBm/0.01dBm, W/(Note 1)]	Q: Depends on the selected unit.
			---	OFFPWR? DBM	Q [dBm/0.01 dBm]	
			---	OFFPWR? WATT	Q [W/(Note 1)]	
	On/Off Ratio		---	RATIO?	Q [dBm/0.01 dBm]	
	Power vs Time (-6us)		---	PTLEAD?	Q [dB/0.01 dB]	
Power vs Time (1256us)		---	PTTRAIL?	Q [dB/0.01 dB]		
Marker		---	MKL?	Q [dB/0.01 dB]		
Judge	PASS FAIL	---	TEMPPASS? TEMPPASS?	PASS FAIL	Note 2	

Note 1: Denoted by 3 effective digits such as X.XX E± XX [W]

Note 2: When WINDOW is SLOT, it can put into practical.

(6) Setup Template screen commands

- Setup Template screen commands are valid at all the screens of the TX/RX measurement screens (screens under the Setup Common Parameter screen).

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Template	Save Template	File No.	SAVETEMP n	---	---	n:0 to 99
	Recall Template	File No.	SLCTTEMP n RCLTEMP n	SLCTTEMP? ---	n ---	n:0 to 99 n:0 to 99
Default	Standard		SLCTTEMP STD	SLCTTEMP?	STD	
Level	Line Level 1		TEMPLVL 1, ϱ	TEMPLVL? 1	ϱ [dB/0.1dB]	ϱ :-90.0 to 10.0
	Line Level 2		TEMPLVL 2, ϱ	TEMPLVL? 2	ϱ [dB/0.1dB]	ϱ :-90.0 to 10.0

(7) Open Loop Time Response screen commands

- Program Msg of the Open Loop Time Response screen commands are valid only at Open Loop Time Response screen.

Query Msg of the Open Loop Time Response screen commands are valid at all the screens of the TX/RX measurement screens.

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Start	Step Up Measure Start		STEPUPSA	---	---	
	Step Down Measure Start		STEPDNSA	---	---	
Calibration	Internal Osc. Calibration		OSCCAL	CALVAL?	ϱ [dB/0.01 dB]	
	Calibration Cancel		CALCANCEL	---	---	
Measure Status	BS Power Up Meas		---	OLPCSTAT?	UPM	
	BS Power Up Ready		---	OLPCSTAT?	UPR	
	BS Power Up Meas/Down Ready		---	OLPCSTAT?	UPMDNR	
	BS Power Down Meas		---	OLPCSTAT?	DNM	
	BS Power Down Ready		---	OLPCSTAT?	DNR	
	BS Power Up Ready/Down Meas		---	OLPCSTAT?	UPRDNM	
Marker	Mode	Normal	MKR NRM	MKR?	NRM	
		Off	MKR OFF	MKR?	OFF	
	Position		MKRP t MKN t	MKRP? MKN?	t [ms/0.5 ms] t [ms/0.5 ms]	t:0 to 100 ms t:0 to 100 ms
Level	Step Value		STEPVAL ϱ	STEPVAL?	ϱ [dB/0.1 dB]	ϱ :10.0 to 20.0 dB
	Step Up Total Level		STEPUP	---	---	
	Step Down Total Level		STEPDN	---	---	
BS Output Power Cal	BS Output Power Cal		OLVLCAL	---	---	
Result	Initial Level		---	INITLVL?	ϱ [dBm/0.1 dBm]	
	Current Level		---	CURRLVL?	ϱ [dBm/0.1 dBm]	
	Marker		---	MKL?	ϱ [dB/0.1 dB]	
	Judge (each point of Marker)	PASS	---	MKRPASS?	PASS	
		FAIL	---	MKRPASS?	FAIL	
Judge (Total)	PASS	---	TEMPPASS?	PASS		
	FAIL	---	TEMPPASS?	FAIL		

Section 2 Device Messages

(8) Standby Output Power screen commands

- Program Msg of the Standby Output Power screen commands are valid only at Standby Output Power screen.

Query Msg of the Standby Output Power screen commands are valid at all the screens of the TX/RX measurement screens.

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
	Start Standby Output Power		STDBYSA	---	---	
Result	Standby Output Power		---	STDBYPWR?	Q [dBm/0.01 dBm]	
Calibration	Internal Osc. Calibration		OSCCAL	CALVAL?	Q [dB/0.01 dB]	
	Calibration Cancel		CALCANCEL	---	---	

(9) Occupied Bandwidth commands

Intermediate	Function	Function details	Program Msg	Query Msg	Response	Remarks
Measure Method	Method	Spectrum FFT	MEAS OBW,SPECT MEAS OBW,FFT MEAS OBW,HIGH	MEAS? MEAS? ---	OBW,SPECT OBW,FFT ---	
RBW	RBW	30kHz 10kHz	RB 30KHZ RB 10KHZ	RB? RB?	30000 10000	
OccBW Ratio	OccBW Ratio		OBWRATIO f	OBWRATIO?	f	f:80 to 99.9
Storage Mode	Normal		STORAGE NRM	STORAGE?	NRM	
	Average		STORAGE AVG	STORAGE?	AVG	
	Average On		VAVG ON VAVG 1 KSG	--- --- ---	--- --- ---	
	Average Off		VAVG OFF VAVG 0 KSH	--- --- ---	--- --- ---	
	Average Count		AVR n VAVG n	AVR? VAVG?	n n	
	Refresh Interval	Every Once		INTVAL EVERY INTVAL ONCE	INTVAL? INTVAL?	EVERY ONCE
Adjust Range	Adjust Range		ADJRNG	---	---	
Calibration	Power Meter Calibration		PWRCAL	CALVAL?	Q [dB/0.01dB]	
	Internal Osc. Calibration		OSCCAL	CALVAL?	Q [dB/0.01dB]	
	Calibration Cancel		CALCANCEL	---	---	
Measure Result	Occupied Bandwidth		---	OCCBW? OBW?	f f	
	Upper Limit		---	OBWFREQ? UPPER OBWFREQ? +	f f	
	Lower Limit		---	OBWFREQ? LOWER OBWFREQ? -	f f	
	Center (Upper+Lower) /2		---	OBWFREQ? CENTER	f	
	Span Width		---	FSPAN?	f	

(10) Spurious close to the Carrier commands

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Measure Method	Method	Spectrum	MEAS ADJ,SPECT MEAS SPU,SPECT	MEAS? ---	ADJ,SPECT ---	
Level	Unit	dBm mW uW nW dB	UNIT DBM UNIT MW UNIT UW UNIT NW UNIT DB	UNIT? UNIT? UNIT? UNIT? UNIT?	DBM MW UW NW DB	
RBW	RBW	30kHz 1MHz 1.23MHz	RB 30KHZ RB 1MHZ RB 1.23MHZ	RB? RB? RB?	30000 1000000 1230000	
Span	Span Width	5MHz 25MHz	FSPAN 5MHZ FSPAN 25MHZ	FSPAN? FSPAN?	5000000 25000000	
Storage Mode	Normal		STORAGE NRM	STORAGE?	NRM	
	Average		STORAGE AVG	STORAGE?	AVG	
	Average On		VAVG ON VAVG 1 KSG	--- --- ---	--- --- ---	
	Average Off		VAVG OFF VAVG 0 KSH	--- --- ---	--- --- ---	
	Average Count		AVR n VAVG n	AVR? VAVG?	n n	
Adjust Range	Adjust Range		ADJRNG	---	---	
Calibration	Power Meter Calibration		PWRCAL	CALVAL?	0 [dB/0.01dB]	
	Internal Osc. Calibration		OSCCAL	CALVAL?	0 [dB/0.01dB]	
	Calibration Cancel		CALCANCEL	---	---	
Marker	Position	Point Frequency	MKP p MKRS f MKN f	MKP? MKRS? MKN?	p f f	p:Screen coordinates
Select Template	Select Template	File No.	SLCTTEMP n RCLTEMP n	SLCTTEMP? ---	n ---	n:0 to 99
		Standard IS-95 Relative	SLCTTEMP 95R	SLCTTEMP?	95R	
		IS-95 Absolute	SLCTTEMP 95A	SLCTTEMP?	95A	
		ARIB Relative	SLCTTEMP ABR	SLCTTEMP?	ABR	
		ARIB Absolute	SLCTTEMP ABA	SLCTTEMP?	ABA	
		MKK Relative	SLCTTEMP MKR	SLCTTEMP?	MKR	
		MKK Absolute	SLCTTEMP MKA	SLCTTEMP?	MKA	
		IS-95B Relative1	SLCTTEMP 95BR1	SLCTTEMP?	95BR1	
		IS-95B Relative2	SLCTTEMP 95BR2	SLCTTEMP?	95BR2	
		IS-95B Absolute1	SLCTTEMP 95BA1	SLCTTEMP?	95BA1	
		IS-95B Absolute2	SLCTTEMP 95BA2	SLCTTEMP?	95BA2	
		J-STD-008 Relative	SLCTTEMP JS8R	SLCTTEMP?	JS8R	
		J-STD-008 Absolute	SLCTTEMP JS8A	SLCTTEMP?	JS8A	
	Not Named		---	SLCTTEMP?	NOT	

Section 2 Device Messages

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Measure Result	Adjacent Channel Power		---	ADJCH? ps	0	ps:LOW1,LOW2, UP1,UP2 un:DB,DBM,WATT
			---	CHPWR? ps	0	
	---	ADJCH? ps,un	0	0 : Depends on unit selected. bw:RBW30,RBW1000, RBW1230 un:DB,DBM,WATT		
---	CHPWR? ps,un	0				
Marker			---	MKL? bw	0	0 : Depends on unit selected. bw:RBW30,RBW1000, RBW1230 un:DB,DBM,WATT
			---	MKL? bw,un	0	
Template PASS/FAIL		PASS	---	TEMPPASS?	PASS	
		FAIL	---	TEMPPASS?	FAIL	
		PASS	---	TEMPPRSLT?	1	
		FAIL	---	TEMPPRSLT?	0	

(11) Setup Spurious Template commands

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Save Template		File No.	SAVESTEMP n	---	---	n:0 to 99
Level	Modify	Limit-1	STEMPLVL 1, 0	TEMPLVL? 1	0	0 :-100.0 to 0.0dB
		Limit-2	STEMPLVL 2, 0	TEMPLVL? 2	0	
	Relative/Absolute	Relative	SLVREL ON	SLVREL?	ON	
		Absolute	MSTEMPREL ON	MSTEMPREL?	ON	
			SLVREL OFF	SLVREL?	OFF	
		MSTEMPREL OFF	MSTEMPREL?	OFF		
Offset Frequency	Modify	Limit-1	TEMPFREQ A,f	TEMPFREQ? A	f	f:0.10MHZ to 2.50MHZ
		Limit-2	TEMPFREQ B,f	TEMPFREQ? B	f	

(12) Spurious Emission commands

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Mode	Spurious Mode	Spot Search	MEAS SPURIOUS,SPOT MEAS SPURIOUS,SEARCH	MEAS? MEAS?	SPURIOUS,SPOT SPURIOUS,SEARCH	
Level	Unit	dB	UNIT DB	UNIT?	DB	
		dBm	UNIT DBM	UNIT?	DBM	
		mW	UNIT MW	UNIT?	MW	
		uW	UNIT UW	UNIT?	UW	
		nW	UNIT NW	UNIT?	NW	
Frequency Table	Save Frequency Table	File No. Not Named	SLCTTBL n ---	SLCTTBL? SLCTTBL?	n NOT	n:0 to 99
Adjust Range	Adjust Range		ADJRNG	---	---	
Calibration	Power Meter Calibration		PWRCAL	CALVAL?	0 [dB/0.01dB]	
	Internal Osc. Calibration		OSCCAL	CALVAL?	0 [dB/0.01dB]	
	Calibration Cancel		CALCANCEL	---	---	
Measure Result	f1 to f15		---	SPULVL? fn,po SPULVL?fn,po,un	0	fn:F1 to F15 po:RBW3,RBW30, RBW1000 un: DBM, WATT, DB

(13) Setup Frequency Table commands

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Frequency Table	Select Frequency Table	File No.	SLCTTBL n	SLCTTBL?	n	n:0 to 99
		Not Named	---	SLCTTBL?	NOT	
	Save Frequency Table	File No.	SAVETBL n	---	---	n:0 to 99
Frequency Modify	Frequency Modify	F1 to F15	SPUFREQ fn,f	SPUFREQ? fn	f	fn:F1 to F15
		Cancel	SPUFREQ fn,0	---	---	
		Harmonics	SPUFREQ HRM	---	---	

(14) Waveform memory read commands

- Waveform memory read commands are valid in all the modes of the MT8801C.
See Section 8 for such details as data format.

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks	
Gated Power	Gated Power	Mem D	XMD p,b	XMD? p,d	b,b,b,....	*1,2,3	
Open Loop Power Control	Open Loop Power Control	Mem O	XMO p,b	XMO? p,d	b,b,b,....	*1,2,3	
Occupied Bandwidth	Spectrum	Mem B	XMB p,b	XMB? p,d	b,b,b,...		
	FFT	Mem E	XME p,b	XME? p,d	b,b,b,...		
Spurious close to the Carrier	Spectrum	Mem bw,B	XMB bw,p,b	XMB? bw,p,d	b,b,b,....	bw: RBW30,RBW1000, RBW1230	
Output format	Output format	ASCII	BIN Ø	---	---		
			BIN OFF	---	---		
			BINARY	BIN 1	---	---	
			BIN ON	---	---		

Note:

- *1 Meaning of response Data → p: Index of waveform data save area
- *2 Meaning of response Data → b: Waveform data
- *3 Meaning of response Data → d: Number of data outputs

Section 2 Device Messages

2.5.6 Analog TX measure commands

- Program messages for the analog TX measure command are valid in ranges defined on each analog TX measure screen.

(1) Setup Analog TX Measure Parameter screen commands

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
User Cal	User Cal Factor		ATXUCAL 0	ATXUCAL?	0 [dB / 0.01dB]	
RF measure mode	RF measure mode	All	RFMM ALL	RFMM?	ALL	
		RF Only	RFMM RF	RFMM?	RF	
AF Output	Impedance	600Ω	AOIMP 600	AOIMP?	600	
		50Ω	AOIMP 50	AOIMP?	50	
Demod. output terminal (rear panel)	Range	40kHz	RRNG 40K	RRNG?	40K	
		4kHz	RRNG 4K	RRNG?	4K	
	High Pass Filter	300Hz	RHPF 300	RHPF?	300	
		Off	RHPF OFF	RHPF?	OFF	
	Low Pass Filter	3kHz	RLPF 3K	RLPF?	3K	
		Off	RLPF OFF	RLPF?	OFF	
	De-emphasis	On	RDEMP ON	RDEMP?	ON	
		Off	RDEMP OFF	RDEMP?	OFF	
	Squelch	Auto	RSQL AUTO	RSQL?	AUTO	
		Off	RSQL OFF	RSQL?	OFF	

(2) Analog TX Meas with SG screen commands

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Storage Mode	Storage Mode	Normal	STRG NRM	STRG?	NRM	
		Average	STRG AVG	STRG?	AVG	
	Average On		VAVG ON	---	---	
			VAVG 1	---	---	
			KSG	---	---	
Average Off		VAVG OFF	---	---		
		VAVG 0	---	---		
		KSH	---	---		
Average Count		AVR n	AVR?	n		
		VAVG n	VAVG?	n		
RF Power	Adjust Range		ADJRNG	---	---	
	Manual Calibration		PWRCAL	---	---	
	Calibration Cancel		CALCANCEL	---	---	
	Power Meter Zero Set		ZEROSET	---	---	
	Set Relative		RFPWRSRL	---	---	
Deviation	Demod.	FM	DDMOD FM	DDMOD?	FM	
		øM	DDMOD PM	DDMOD?	PM	
	Detect Mode	(P-P)/2	DETMD PP	DETMD?	PP	
		+P	DETMD +P	DETMD?	+P	
		-P	DETMD -P	DETMD?	-P	
		RMS	DETMD RMS	DETMD?	RMS	
		(P-P)/2 Hold	DETMD PPH	DETMD?	PPH	
		+P Hold	DETMD +PH	DETMD?	+PH	
		-P Hold	DETMD -PH	DETMD?	-PH	
	High Pass Filter	300Hz	DHPF 300	DHPF?	300	
		50Hz	DHPF 50	DHPF?	50	
		Off	DHPF OFF	DHPF?	OFF	
	Low Pass Filter	3kHz	DLPF 3	DLPF?	3	
		15kHz	DLPF 15	DLPF?	15	
		Off	DLPF OFF	DLPF?	OFF	
Relative On/Off	On	RDEVRL ON	RDEVRL?	ON		
	Off	RDEVRL OFF	RDEVRL?	OFF		

Section 2 Device Messages

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks	
AF Level/ Distortion	Filter	ITU-T P.53	AFLT P53	AFLT?	P53		
		C-MESSAGE	AFLT CMESS	AFLT?	CMESS		
		6kHz BPF	AFLT BPF	AFLT?	BPF		
		Off	AFLT OFF	AFLT?	OFF		
	High Pass Filter	400Hz Off	AHPF 400 AHPF OFF	AHPF? AHPF?	400 OFF		
De-emphasis	750μs Off	ADEMP 750 ADEMP OFF	ADEMP? ADEMP?	750 OFF			
Distortion Unit	dB	ADSTU DB	ADSTU?	DB			
	%	ADSTU PER	ADSTU?	PER			
AF Level Set Relative		TALVLSRL	---	---			
RF Frequency	Channel		ATRAFCHAN n	ATRAFCHAN?	n[ch / 1ch]		
RF Level	TX	TX Measure Ref Level	RFLVL 0	RFLVL?	0[dBm / 1dB]		
		RX Measure Output Level	Specifies the input level with dBm unit.	OLVL 0 DBM	OLVL?	0[dBm/1dB]	Unit can be changed by inputting the set value with a character string of unit.
			Specifies the input level with dBu unit.	OLVL 0 DBU	OLVL?	0[dBμ/0.1dBμ]	
			Specifies the input level with current selected unit.	OLVL 0	OLVL?	0	
		Incremental Step Value		LINC 0	LINC?	0[dB / 0.1dB]	
		RF Level Step Up		OLS UP UOL	--- ---	--- ---	
		RF Level Step Down		OLS DN DOL	--- ---	--- ---	
		Unit EMF/TERM	EMF TERM	RFUT EMF RFUT TERM	RFUT? RFUT?	EMF TERM	
		RF Level Rel. On/Off	On Off	OLVLR ON OLVLR OFF	OLVLR? OLVLR?	ON OFF	
Relative Value		---	OLVLRV?	0[dB / 0.1dB]			
RF Level On/Off	On Off	RRLV ON RRLV OFF	RRLV? RRLV?	ON OFF			

2.5 Device Message List

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks	
AF Oscillator 1 (Mod.)	Frequency		AFREQ1 f	AFREQ1?	f[Hz / 0.1Hz]		
	Deviation		ADEV1 f	ADEV1?	f[Hz / 0.1Hz]		
	Oscillator Switch	On Off	AOUT1 ON AOUT1 OFF	AOUT1? AOUT1?	ON OFF		
AF Oscillator 2 (Mod./AF)	Frequency		AFREQ2 f	AFREQ2?	f[Hz / 0.1Hz]		
	Deviation		ADEV2 f	ADEV2?	f[Hz / 0.1Hz]		
	Level	Specifies the input level with dBm unit. Specifies the input level with dBu unit. Specifies the input level with current selected unit.	ALVL2 v(V,MV,UV) ALVL2 \varnothing DBM ALVL2 \varnothing (or ALVL2 v)	ALVL2? V ALVL2? DBM ALVL2?	v[V / 1 μ V] \varnothing [dBm / 0.1dB] \varnothing (or v)		
	Signal	Tone Noise(ITU-T G.227) Noise(White)	ASIG2 TONE ASIG2 G227 ASIG2 WHITE	ASIG2? ASIG2? ASIG2?	TONE G227 WHITE		
	Output For Mod/AF	Mod. AF	AOPF2 MOD AOPF2 AF	AOPF2? AOPF2?	MOD AF		
	Oscillator Switch	On Off	AOUT2 ON AOUT2 OFF	AOUT2? AOUT2?	ON OFF		
	External Oscillator (Mod.)	Deviation		ADEVX f	ADEVX?	f[Hz / 0.1Hz]	
Oscillator Switch		On Off	AOUTX ON AOUTX OFF	AOUTX? AOUTX?	ON OFF		
Measure Result	RF Frequency		---	RFFREQ?	f[Hz / 0.01Hz]		
	RF Frequency Error		---	RFFREQERR?	f[Hz / 0.01Hz]		
	RF Freq. Error ppm		---	RFFREQERRPPM?	m[ppm / 0.0001ppm]		
	RF Power			---	RFPWR? W RFPWR? DBM	w[W / 1pW] \varnothing [dBm / 0.01dB]	
		Relative Value		---	RFPWRLV?	\varnothing [dB / 0.01dB]	
	Deviation	Demod. FM	---	RDEV?	f[Hz / 0.1Hz]		
		Demod. \varnothing M	---	RDEV?	r[rad / 0.0001rad]		
		Relative Value	---	RDEVRLV?	\varnothing [dB / 0.01dB]		
	Deviation	Demod. FM	---	RDEVALL?	f[Hz / 0.1Hz]	*1	
		Demod. \varnothing M	---	RDEVALL?	r[rad / 0.0001rad]		
	AF Level Readouts all the measured results.	Demod. FM	---	TALVL?	f[Hz / 0.1Hz]		
		Demod. \varnothing M	---	TALVL?	r[rad / 0.1rad]		
		Relative Value	---	TALVRLV?	\varnothing [dB / 0.01dB]		
	AF Level Readouts all the measured results.	Demod. FM	---	TALVLALL?	f[KHz / 0.1KHz]	*2	
Demod. \varnothing M		---	TALVLALL?	r[rad / 0.0001rad]			
Distortion		---	DSTN? DB	\varnothing [dB / 0.01dB]			
		---	DSTN? PER	p[% / 0.01%]			
		---	DSTN?	Output with current selected unit.			
AF Frequency		---	AFFREQ?	f[Hz / 0.001Hz]			
Freq. Characteristics		---	FREQCHAR? n	\varnothing [dB / 0.01dB]	*3		

NOTE:

*1 RDEVALL? command (which readouts all the measured results of the Deviation) outputs the measured results of the (P-P)/2, +P, -P, RMS, (P-P)/2 Hold, +P Hold, and -P Hold, in this order with commas for these data separation.

Output format is shown below, where one data is indicated with 7 characters.

Example 1: Outputs with kHz unit. (One digit under decimal point)

"10000.0, 1000.0, 100.0, 10.0, 1.0, 12.3, 123.4, 1234.5"

Example 2: Outputs with rad unit. (Four digits under decimal point)

"10.0000, 1.0000, 0.1000, 0.0100, 0.0001, 0.0003, 0.1234, 1.2345"

*2 TALVLALL? command (which readouts all the measured results of the AF Level) outputs the 8 types of the measured results, depending on the combination of the Filter and De-emphasis.

This command outputs the measured results of the ITU-T/750µs, C-MESSAGE/750µs, 6kHz BPF/750µs, Off/750µs, ITU-T/Off, C-MESSAGE/Off, 6kHz BPF/Off, and Off/Off, in this order with commas for these data separation.

Output format is shown below, where one data is indicated with 8 characters.

Example 1: Outputs with kHz unit. (Four digits under decimal point)

"100.0000, 10.0000, 1.0000, 0.0100, 0.1000, 0.0003, 0.1234, 1.2345"

Example 2: Outputs with rad unit. (Four digits under decimal point)

"100.0000, 10.0000, 1.0000, 0.1000, 0.0100, 0.0003, 0.1234, 1.2345"

*3 FREQCHAR? command (which readouts the measured results of the frequency characteristics) performs FFT of the demodulated AF signal, and outputs the frequency characteristics (from 50 Hz to 10 kHz, in 50 Hz steps, with the reference of the data at 1 kHz).

When inputting this command, specify multiple integer values of n (range: 1 to 200) which are integer-type parameters to determine the measurement frequencies.

The relation between n and the measurement frequency (f) is as follows:

$$f = 50n \quad (n: 1 \text{ to } 200)$$

2.5.7 RX Measure commands

(1) Setup RX Measure Parameter screen commands

- Setup RX Measure Parameter screen commands are valid at all the screens of the TX/RX measurement screens (screens under the Setup Common Parameter screen).

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
FER	Sample		FERSAMPLE n	FERSAMPLE?	n	n:5 to 10000 Frame
	Confidence Level		FERCONF r	FERCONF?	u	r:80.0 to 100.0 %
	FER		FER r	FER?	u	r:0.0 to 100.0 %
	FER Upper Limit		ULFER r	ULFER?	u	r:0.0 to 100.0 %
	Measure Stop Mode	On Off	FERSTOP ON FERSTOP OFF	FERSTOP? FERSTOP?	ON OFF	
User Cal	User Cal Factor		RXUCAL 0	RXUCAL?	0[dB/0.01dB]	0:-55.00 to 55.00 dB

(2) Setup Signal screen commands

- Setup Signal screen commands are valid at all the screens of the TX/RX measurement screens (screens under the Setup Common Parameter screen).

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
	Pilot Channel Level		PILOTLVL 0	PILOTLVL?	0	0:-5.0 to -10.0 dB
	Sync Channel Level		SYNCLVL 0	SYNCLVL?	0	0:-7.0 to -20.0 dB
	Paging Channel Level		PCHLVL 0	PCHLVL?	0	0:-7.0 to -20.0 dB
	Traffic Channel Level		TCHLVL 0	TCHLVL?	0	0:-7.0 to -29.0 dB
	OCNS Channel Level		---	OCNSLVL?	0	

Section 2 Device Messages

(3) Frame Error Rate screen commands

- Program Msg of the Frame Error Rate screen commands are valid only at Frame Error Rate screen.

Query Msg of the Frame Error Rate screen commands are valid at all the screens of the TX/RX measurement screens.

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Measure	Measure Start		FERSA	---	---	
	Measure Stop		FERSO	---	---	
Sample	Sample		FERSAMPLE n	FERSAMPLE?	n	n:5 to 10000 Frames in multiples of 5 only
FER	FER		FER r	FER?	u	r:0.0 to 100.0 %
BS Output Power Cal	BS Output Power Cal		OLVLCAL	---	---	
AWGN	AWGN Power Level		AWGNPWR \varnothing	AWGNPWR?	\varnothing	\varnothing :-20 to 6.0 dB
	Auto AWGN Power Level	Off On	AWGNLVL OFF AWGNLVL ON	AWGNLVL? AWGNLVL?	OFF ON	
Number of Measurement Frames	Number of Measurement Frames		---	FERTRANSMIT?	n	
Result	Errors		---	FERCNT?	n [piece]	
	FER		---	FERRATE?	u [%/0.01%]	
	Confidence Level		---	FERCFLVL?	u [%/0.1%]	
	Pass/Fail	PASS FAIL PASS FAIL	--- --- --- ---	FERPASS? FERPASS? FERRSLT? FERRSLT?	PASS FAIL 1 0	
Status	Status	RUN	---	FERSTATUS?	RUN	
		STOP	---	FERSTATUS?	STOP	
		RUN	---	FERSTAT?	1	
		STOP	---	FERSTAT?	0	

2.5.8 Analog RX measure commands

- Program messages for the analog RX measure commands are valid in ranges defined on each analog RX measure screen.

(1) Setup Analog RX Measure Parameter screen commands

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
AF Input	Range	30V	ARNG 30	ARNG?	30	
		4V	ARNG 4	ARNG?	4	
		400mV	ARNG 400M	ARNG?	400M	
		40mV	ARNG 40M	ARNG?	40M	
	Impedance	600Ω	AIMP 600	AIMP?	600	
		100kΩ	AIMP 100K	AIMP?	100K	
User Cal	User Cal Factor		ARXUCAL 0	ARXUCAL?	0 [dB/0.01dB]	

Section 2 Device Messages

(2) Analog RX Measure screen commands

- Program messages of the analog RX Measure command are valid on the analog RX Measure screen.

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Storage Mode	Storage Mode	Normal Average	STRG NRM	STRG?	NRM	
			STRG AVG	STRG?	AVG	
	Average On		VAVG ON	---	---	
			VAVG 1	---	---	
			KSG	---	---	
	Average Off		VAVG OFF	---	---	
			VAVG 0	---	---	
	Average Count		AVR n	AVR?	n	
VAVG n			VAVG?	n		
AF Level	Adjust Range		ADJRNG	---	---	
	Set Relative		AFLVLSRL	---	---	
	Level Range	Up	ALRNG UP	---	---	
		Down	ALRNG DN	---	---	
	High Pass Filter	400Hz	AHPF 400	AHPF?	400	
		300Hz	AHPF 300	AHPF?	300	
		50Hz	AHPF 50	AHPF?	50	
		Off	AHPF OFF	AHPF?	OFF	
	Low Pass Filter	3kHz	ALPF 3	ALPF?	3	
		15kHz	ALPF 15	ALPF?	15	
		Off	ALPF OFF	ALPF?	OFF	
Filter	ITU-T P.53	AFLT P53	AFLT?	P53		
	C-MESSAGE	AFLT CMES	AFLT?	CMES		
	6kHz BPF	AFLT BPF	AFLT?	BPF		
	OFF	AFLT OFF	AFLT?	OFF		
AF Level Unit	dBm	ALUT DBM	ALUT?	DBM		
	V	ALUT V	ALUT?	V		
Distortion Unit	dB	ADUT DB	ADUT?	DB		
	%	ADUT PER	ADUT?	PER		
RF Frequency	Channel		ATRAFCHAN n	ATRAFCHAN?	n[ch / 1ch]	

2.5 Device Message List

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
RF Level	RX Measure	Specifies the input level with dBm unit.	OLVL 0 DBM	OLVL?	0 [dBm/0.1dB]	Unit can be changed by inputting the set value with a character string of unit.
	Output Level	Specifies the input level with dBu unit.	OLVL 0 DBU	OLVL?	0 [dBμ/0.1dB]	
		Specifies the input level with current selected unit.	OLVL 0	OLVL?	0	
	Incremental Step Value		LINC 0	LINC?	0 [dB / 0.1dB]	
	RF Level Step Up		OLS UP UOL	--- ---	--- ---	
	RF Level Step Down		OLS DN DOL	--- ---	--- ---	
	Unit EMF/TERM	EMF TERM	RFUT EMF RFUT TERM	RFUT? RFUT?	EMF TERM	
	RF Level Rel. On/Off	On Off	OLVRL ON OLVRL OFF	OLVRL? OLVRL?	ON OFF	
Relative Value		---	OLVRLV?	0 [dB / 0.1dB]		
RF Level On/Off	On Off	RRLVL ON RRLVL OFF	RRLVL? RRLVL?	ON OFF		
AF Oscillator 1 (Mod.)	Frequency		AFREQ1 f	AFREQ1?	f [Hz / 0.1Hz]	
	Deviation		ADEV1 f	ADEV1?	f [Hz / 0.1Hz]	
	Oscillator Switch	On Off	AOUT1 ON AOUT1 OFF	AOUT1? AOUT1?	ON OFF	
AF Oscillator 2 (Mod./AF)	Frequency		AFREQ2 f	AFREQ2?	f [Hz / 0.1Hz]	
	Deviation	Specifies the input/output level with V unit.	ADEV2 f	ADEV2?	f [Hz / 0.1Hz]	
	Level	Specifies the input/output level with dBm unit. Specifies the input/output level with current selected unit.	ALVL2 v(V,MV,UV) ALVL2 0 DBM ALVL2 0 (or ALVL2 v)	ALVL2? V ALVL2? DBM ALVL2?	v [V / 1μV] 0 [dBm / 0.1dB] 0 (or v)	
	Signal	Tone Noise (ITU-T G.227) Noise (White)	ASIG2 TONE ASIG2 G227 ASIG2 WHITE	ASIG2? ASIG2? ASIG2?	TONE G227 WHITE	
	Output For Mod/AF	Mod. AF	AOPF2 MOD AOPF2 AF	AOPF2? AOPF2?	MOD AF	
	Oscillator Switch	On Off	AOUT2 ON AOUT2 OFF	AOUT2? AOUT2?	ON OFF	
	External Oscillator (Mod.)	Deviation		ADEVX f	ADEVX?	f [Hz / 0.1Hz]
Oscillator Switch		On Off	AOUTX ON AOUTX OFF	AOUTX? AOUTX?	ON OFF	

Section 2 Device Messages

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks	
Measure Result	AF Level	dBm	---	AFLVL? DBM	0 [dBm / 0.01dBm]	*The input level with 100kΩ is invalid.	
		V	---	AFLVL? V	v[V / #.####E+##V]		
		Relative Value	---	AFLVL?	Output with current selected unit.		
	AF Level Readouts all the measured results.			---	AFLVLRLV?	0 [dB / 0.01dB]	
				---	AFLVLALL? DBM	0 [dBm / 0.01dB]	*1
				---	AFLVLALL? V	v[V / 0.1μV]	
	AF SINAD			---	AFLVLALL?	Output with current selected unit.	
				---	SINAD?	0 [dB / 0.01dB]	
				---	DSTN? DB	0 [dB / 0.01dB]	
	AF Distortion	dB %		---	DSTN? PER	p[% / 0.01%]	
				---	DSTN?	Output with current selected unit.	
				---	AFFREQ?	f[Hz / 0.001Hz]	
AF Frequency			---	FREQCHAR? n	0 [dB / 0.01dB]	*2	
Freq. Characteristics			---				

Note:

*1 AFLVLALL? command (which readouts all the measured results of the AF Level) outputs the 8 types of the measured results, depending on the combination of the Filter and De-emphasis.

This command outputs the measured results of the ITU-T/750μs, C-MESSAGE/750μs, 6kHz BPF/750μs, Off/750μs, ITU-T/Off, C-MESSAGE/Off, 6kHz BPF/Off, and Off/Off, in this order with commas for these data separation.

Output format is shown below, where one data is indicated with 9 characters.

Example 1: Outputs with dBm unit. (Two digits under decimal point)

"100000.00, 10000.00, 1000.00, 0.01, 1234.56, 123.45, -12.34, -0.10"

Example 2: Outputs with Volt unit. (Exponent form)

"1.234E+01, 2.324E-03, 5.325E-05, 4.448E-06, 1.568E+01, 3.525E-04, 4.256E-03, 1.825E-02"

*2 FREQCHAR? command (which readouts the measured results of the frequency characteristics) performs FFT of the demodulated AF signal, and outputs the frequency characteristics (from 50 Hz to 10 kHz, in 50 Hz steps, with the reference of the data at 1 kHz).

When inputting this command, specify multiple integer values of n (range: 1 to 200) which are integer-type parameters to determine the measurement frequencies.

The relation between n and the measurement frequency (f) is as follows:

$$f = 50n \quad (n: 1 \text{ to } 200)$$

2.5.9 Call Processing commands

(1) Setup Call Processing Parameters screen commands

- Setup Call Processing screen commands are valid at all the screens of the TX/RX measurement screens (screens under the Setup Common Parameter screen).

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Code	Paging Channel Walsh Code		PWALSH n	PWALSH?	n	n:1 to 7
	Traffic Channel Walsh Code		TWALSH n	TWALSH?	n	n:8 to 31, 33 to 63
	OCNS Channel Walsh Code		OWALSH n	OWALSH?	n	n:1 to 31, 33 to 63
Synch Channel & Paging Channel Message	SID		CTRLSID n	CTRLSID?	n	n:0 to 32767
	Register SID		CTRLREGSID n	CTRLREGSID?	n	n:0 to 32767
	NID		CTRLNID n	CTRLNID?	n	n:0 to 65535
	Register NID		CTRLREGNID n	CTRLREGNID?	n	n:0 to 65534
	BASE_ID		CTRLBID n	CTRLBID?	n	n:0 to 65535
	Slot Cycle Index		SLOTINDEX n	SLOTINDEX?	n	n:0 to 7
	Default ESN		DEFESN h	DEFESN?	h	h:00000000 to FFFFFFFF
	Default MSID (IDT, MSID)		DEFMSID d1, d2	DEFMSID?	d1, d2	*1
	IDT	MSIN	IDT d1	IDT?	d1	
	Notation		NOTATION DEC NOTATION HEX	NOTATION? NOTATION?	DEC HEX	
	MSID		MSID d2	MSID?	d2	
Analog Channel Parameters	ACCH DCC		CTRLDCC n	CTRLDCC?	n	n:0 to 2
	SCC (SAT Color Code)		SATCC n	SATCC?	n	n:0 to 2
	DSAT Sequence		DSAT n	DSAT?	n	n:0 to 6
	AF Osc. Output to	FM mod. Off	AOPF MOD	AOPF?	MOD	
			AOPF OFF	AOPF?	OFF	
	AF Osc. Signal	Tone Noise (ITU-T G.227) Noise (White)	ASIG TONE	ASIG?	TONE	
			ASIG G227	ASIG?	G227	
			ASIG WHITE	ASIG?	WHITE	
Frequency		AFREQ f	AFREQ?	f [Hz/0.1Hz]		
Deviation		ADEV f	ADEV?	f [Hz/0.1Hz]		

*1 Meaning of response Data (DEC)

d1 : IDT	d2 : MSID
2 → MSIN	000000000 to 9999999999

Meaning of response Data (HEX)

d1 : IDT	d2 : MSID
2 → MSIN	000000000 to 3FFFFFFF

Section 2 Device Messages

(2) Call Processing Status screen commands

- Program Msg of the Call Processing Status commands are valid only at Setup Common Parameter screen.

Query Msg of the Call Processing Status commands are valid at all the screens of the TX/RX measurement screens.

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Status	Start		CALLSA	---	---	
	Stop		CALLSO	---	---	
	Register		CALLREG	---	---	
	NW Originate (Paging)		CALLPG	---	---	
	NW Release		CALLNWR	---	---	
	Refresh Call Status		CALLRFR	---	---	
Result	Call Processing Status		---	CALLSTAT?	ss	*1
	Call Processing Error		---	CALLERR?	ss, ec	*1, 2
	Call Processing Result		---	CALLRSLT?	ss flg, ec	*1, 2, 3

Note:

*1 Meaning of response Data → ss: 0-255 (0-14: Valid)

*2 Meaning of response Data → ec: (Error Code) 0, 1-255

*3 Meaning of response Data → flg: (Executed flag) 0,1

* Meaning of Response data

ss (Sequence) 0:Stop, 1:Idle, 2:Idle (Regist), 4:Registration, 5:Origination, 6:Termination, 7:Conversation, 8:Handoff, 9:NW Release, 10:MS Release, 12:Other, 13:Loop Back

flg (Received flag) 0:Not received, 1:Received (When Received flag is 0, then other data are set to 0.)

ec (Error code) 0:No error, 1 to 255:Error code

2.5.10 Maintenance commands

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Re- marks
Maintenance Mode On	Maintenance		TESTMODE TESTLOOPBACK	TESTMODE?	TESTLOOPBACK	*1
Mode Off	Maintenance			TESTMODE?	NONE	*1
Pilot Channel Output On	Pilot channel	Pilot Channel Only	TESTPILOTCH ON	TESTPILOTCH?	ON	*2
Output Off	Pilot channel		TESTPILOTCH OFF	TESTPILOTCH?	OFF	*2

Note 1:

*1 Moves from Idle state to Test Mode (Loop Back) state.

Valid only in CDMA mode with Idle state of Call Proc after Start execution on Setup Common Parameter screen.

*2 Sets SG output only from Pilot Channel.

Valid only at Test Mode (Loop Back) state.

Note 2:

The usable measurements in the Test Mode of Loop back are the Modulation Analysis and Power Meter.

Cannot move to the RF Power screen, Open Loop Time Response screen, and Frame Error Rate screen.

Section 2 Device Messages

Section 3 Setup

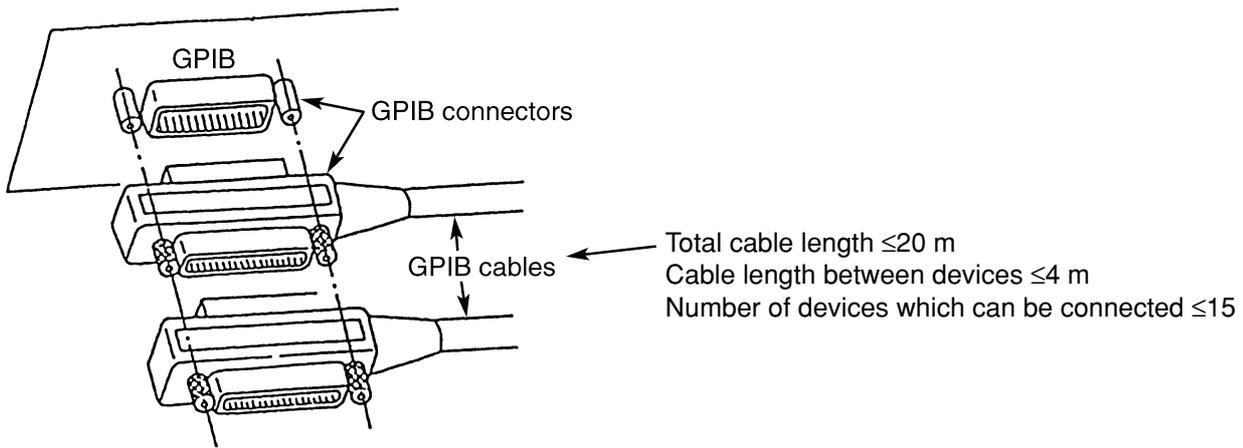
This section describes the RS-232C/GPIB connections to external devices and setting the remote-control interface of the MT8801C.

3.1	Connecting Devices with GPIB Cables	3-2
3.2	Setting GPIB Interface Conditions	3-3
3.3	Connection of RS-232C Interface Signal	3-4
3.4	Setting RS-232C Interface Conditions	3-5
3.5	Setting the Items Relating to Remote Control and Panel Key Control	3-6
3.5.1	Remote control and panel control keys	3-6
3.5.2	Remote control status	3-6

3.1 Connecting Devices with GPIB Cables

The rear panel has connectors for connecting GPIB cables.

Up to 15 devices, including the controller, can be connected to one system. Connect devices under the conditions described to the right of the diagram below.



Mounting and dismounting of the GP-IB cable must be done after turning off the power switch and pulling out the power cord from the socket. If the power remains on, only signal common line may disconnected before the other lines, then AC leak voltages are applied to the ICs, and there is a possibility that components such as ICs in the interface unit will be damaged.

CAUTION

The GPIB cables must be connected before the power is turned on.

3.2 Setting GPIB Interface Conditions

Set the GPIB interface on the Instrument Setup screen at the front panel.

Set the following items:

- (1) Interface: Connect to Controller (Initial value: GPIB)
- (2) GPIB: Address (Initial value: 01)

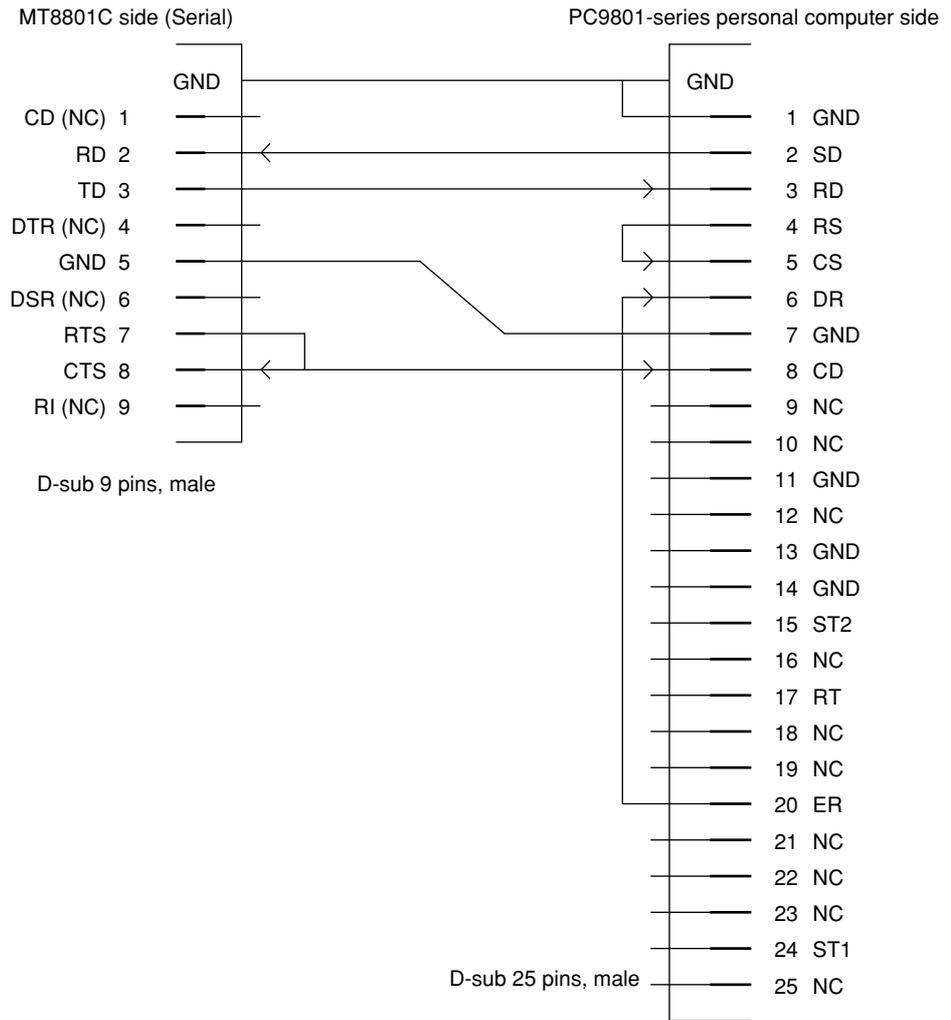
An example of the setting when the GPIB interface is set with the GPIB address 03 is given below.

Step	Key operation	Explanation
(Switching to the Instrument Setup screen)		
1.	[Main Func on off] F6	Sets the Main Func on to display the main menu.
2.	Next Menu [◀] [Instrument Setup] F2	Sets the Instrument Setup mode. Displays the Instrument Setup screen.
(Selecting the remote control interface)		
3.	Cursor [∧] [∨]	Uses these cursor keys to select “Interface Connect to Controller.”
4.	[Set]	Opens the setup window.
5.	Cursor [∧] [∨]	Selects GPIB on the setting window.
6.	[Set]	Closes the setting window and determines the set value.
(Setting the GPIB address)		
7.	Cursor [∧] [∨]	Use these cursor keys to select a GPIB address.
8.	[Set]	Opens the setup window.
9.	[0] [3] [Set]	Set the GPIB address to 03.

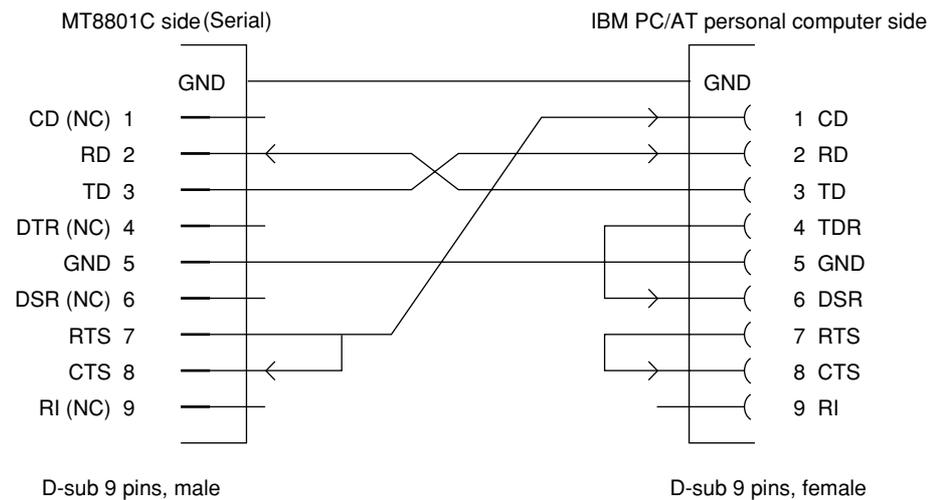
3.3 Connection of RS-232C Interface Signal

Connection of RS-232C interface signal between the MT8801C and a personal computer is shown below.

- Connection to PC98-series personal computer (NEC)



- Connection to IBM PC/AT personal computer



3.4 Setting RS-232C Interface Conditions

Set the RS-232C interface on the Instrument Setup screen at the front panel.

Set the following items:

- (1) Interface: Connect to Controller (Initial value: GPIB)
- (2) RS-232C: Baud Rate (Initial value: 2400)
Parity (Initial value: Even)
Data Bit (Initial value: 8 bits)
Stop Bit (Initial value: 1 bit)

Set the RS-232C interface conditions, as described below.

Step	Key operation	Explanation
(Switching to the Instrument Setup screen)		
1.	[Main Func On/Off] F6	Sets the Main Func on to display the main menu.
2.	Next Menu [◀] [Instrument Setup] F2	Sets the Instrument Setup mode. Displays the Instrument Setup screen.
(Selecting the remote control interface)		
3.	Cursor [↖] [↘]	These cursor keys are used to select “Interface Connect to Controller.”
4.	[Set]	Opens the setup window.
5.	Cursor [↖] [↘]	Selects RS-232C on the setting window.
6.	[Set]	Closes the setting window and establishes the set value.
(Setting the RS-232C interface)		
7.	Cursor [↖] [↘]	Uses these cursor keys to select the setting item Baud rate.
8.	[Set]	Opens the setup window.
9.	[↖] [↘] [Set]	Uses these cursor keys to select a Baud rate value (9600 [bps] etc.).
10.	[↖] [↘]	Sets other interface conditions in the same way.

3.5 Setting the Items Relating to Remote Control and Panel Key Control

3.5.1 Remote control and panel control keys

The keys and lamps described in this paragraph are assigned on the front panel as exclusive keys and lamps.

(1) REMOTE lamp and LOCAL key

The REMOTE lamp indicates that the MT8801C is controlled remotely via the GPIB interface. When the MT8801C is controlled remotely from an external controller via the GPIB interface on the rear panel, the REMOTE lamp lights. While the REMOTE lamp is on, key entry and rotary encoder entry from the front panel are disabled. The LOCAL key is used to cancel the remote control status of the GPIB interface. When the LOCAL key is pressed, the REMOTE lamp goes off and key entry and rotary encoder entry from the front panel are enabled.

(2) PANEL LOCK key

The PANEL LOCK key is used to enable and disable key entry and rotary encoder entry from the front panel. Use the PANEL LOCK key to prevent an operation error on the front panel for automatic measurement or status holding. When the panel is locked, the green lamp on the PANEL LOCK key lights.

3.5.2 Remote control status

If the MT8801C is controlled remotely, the REMOTE lamp on the left of the front panel lights. While the REMOTE lamp is on, key entry and rotary encoder entry from the front panel are disabled. To change from the remote control to front panel entry status, execute the following steps:

- (1) Halt the remote control.
- (2) If the REMOTE lamp is on, press the LOCAL key to cancel the REMOTE status.

Section 4 Device Message Format

This section describes the format of the device messages transmitted between a controller and the MT8801C via the GPIB system.

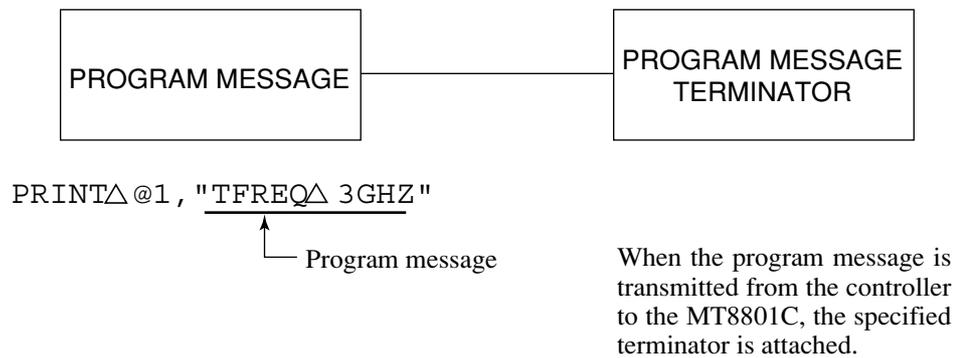
4.1	General Description	4-2
4.2	Program Message Format	4-2
4.3	Response Message Format	4-6

4.1 General Description

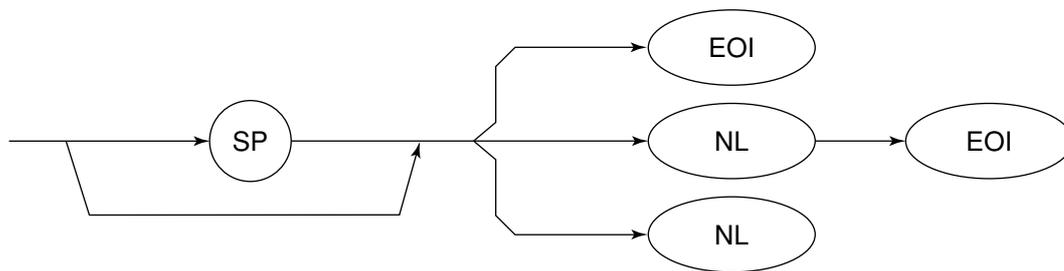
The device messages are data messages that are transmitted between the controller and devices. There are two types of data messages: program messages output from the controller to the MT8801C, and response messages input from the MT8801C by the controller. There are also two types of program commands and program queries in the program message. The program command is used to set this instrument's parameters and to instruct it to execute processing. The program query is used to query the values of parameters and measured results.

4.2 Program Message Format

To transfer program messages from the controller to the MT8801C using the PRINT statement, the program message formats are defined as follows:



(1) PROGRAM MESSAGE TERMINATOR

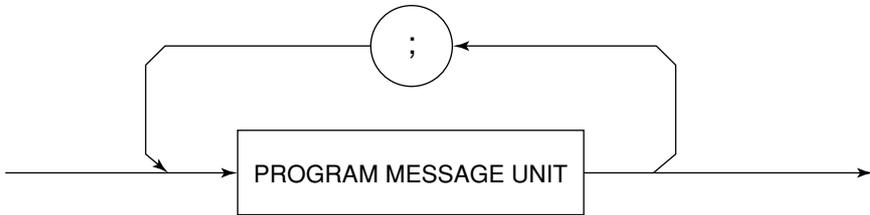


NL : New line or LF (Line Feed)

EOI: The EOI signal of the GPIB interface is used to indicate message termination.

Carriage Return (CR) is ignored, and is not processed as a terminator.

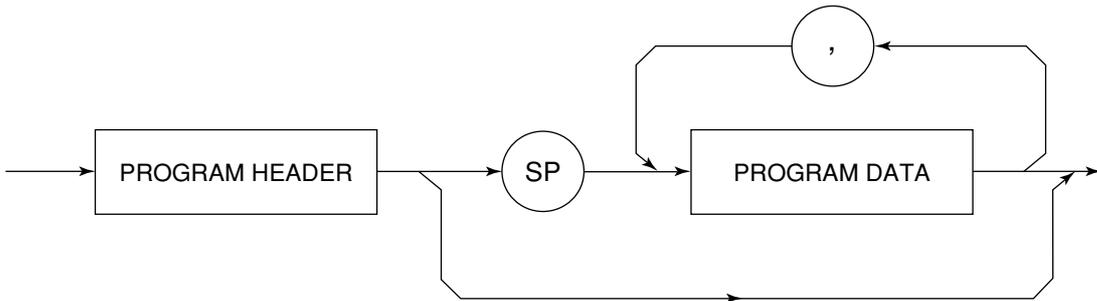
(2) PROGRAM MESSAGE



Multiple commands can be output sequentially by concatenating each of them with a semicolon.

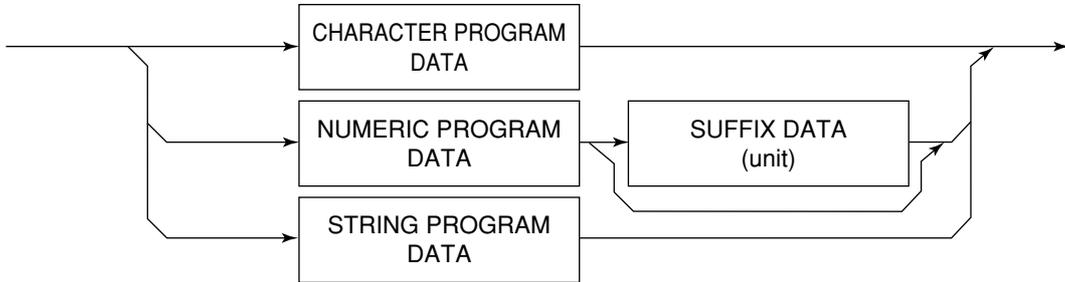
```
<Example> PRINT @1 2, "TFREQ 1GHZ;RFLVL UP"
```

(3) PROGRAM MESSAGE UNIT



- Each IEEE488.2 common command has a leading asterisk "*" that is always placed before the program header.
- The program query has a trailing question mark "?" that is always added at the end of the program header.

(4) PROGRAM DATA



(5) CHARACTER PROGRAM DATA

Character program data consists of uppercase alphabetic characters from A to Z, lowercase alphabetic characters from a to z, the underline "_", and the numbers 0 to 9. These characters can be used in specified combinations.

```
<Example> PRINT @1, "MKR NRM" ..... Sets Marker to Normal.
```

Section 4 Device Message Format

(6) NUMERIC PROGRAM DATA

Numeric program data has two types of formats: integer format (NR1) and fixed-point real number format (NR2).

<Integer Format (NR1)>

The diagram shows a flow from left to right. It starts with a sign selector consisting of two circles, one with a '+' and one with a '-'. An arrow from the sign selector points to a rectangular box labeled '<0 to 9>'. From this box, an arrow points to a circle labeled 'SP'. The final output is an arrow pointing to the right.

- Zeros can be inserted at the beginning. → 005, + 000045
- No spaces can be inserted between a + or - sign and a number. → 5, +△5 (×)
- Spaces can be inserted after a number. → + 5△△△
- The + sign is optional. → + 5,5
- Commas cannot be used to separate digits. → 1,234,567 (×)

<Fixed-Point (real number) Format (NR2)>

The diagram shows a flow from left to right. It starts with a sign selector (+/-). An arrow points to a rectangular box labeled '<0 to 9>'. From this box, an arrow points to a circle containing a decimal point '·'. From the decimal point, an arrow points to another rectangular box labeled '<0 to 9>'. From this second box, an arrow points to a circle labeled 'SP'. The final output is an arrow pointing to the right. Above the flow, there are labels: '(Integer part)' with a double-headed arrow above the first digit box, 'Decimal point' above the decimal point circle, and '(Fraction part)' with a double-headed arrow above the second digit box.

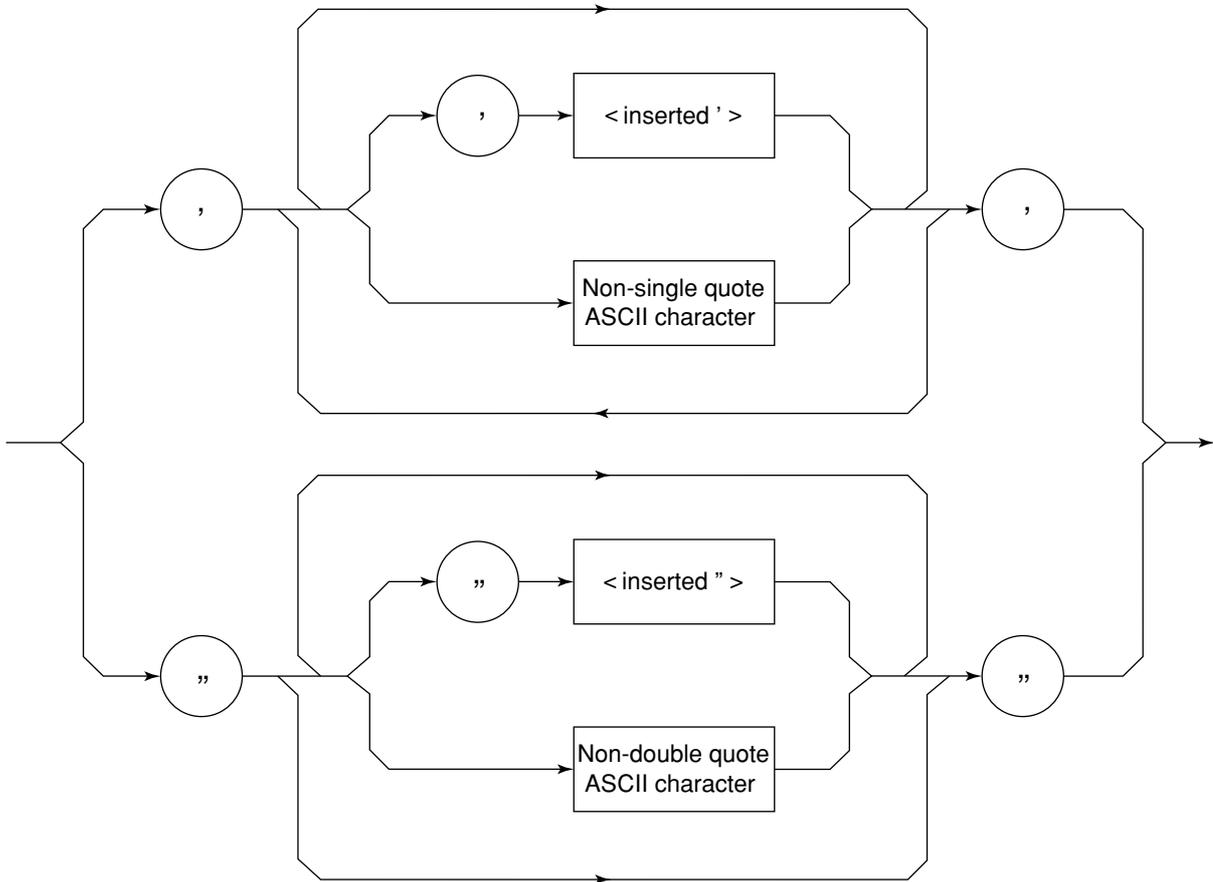
--- The digits in the integer part can be omitted.

--- The decimal point cannot be omitted.

--- The digits in the fraction part can be omitted.

- The numeric expression of the integer format is applied to the integer part.
- No spaces can be inserted between numbers and the decimal point. → +753△.123 (×)
- Spaces can be inserted between numbers and the decimal point. → +753.123△△△△
- A number may not always be placed before the decimal point. → .05
- A + or - sign can be placed before the decimal point. → +. 05, -.05
- A number can end with a decimal point. → 12.

(7) STRING PROGRAM DATA



- Both ends of string program data must have a pair of double quotation marks “ ”.
- ```
PRINT @1, "TITLE 'MT8801C' "
```

A single quotation mark used within the character string must be repeated as shown in ' or ”.

```
PRINT @1, "TITLE 'MT8801C' 'NOISE MEAS' ' ' "
Executing TITLE results in MT8801C 'NOISE MEAS'.
```

**Note:**

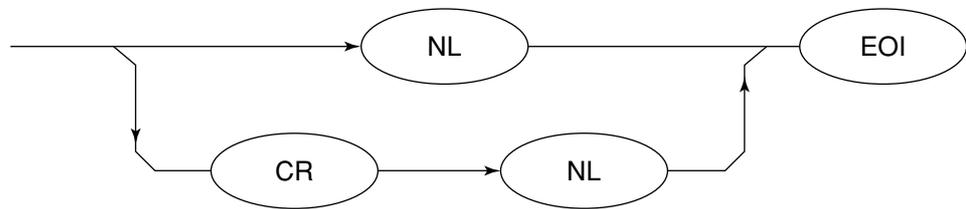
To use the double quotation mark ” in the PRINT statement, specify CHR\$ (&H22).

## 4.3 Response Message Format

To transfer responses messages from the MT8801C to the controller by using the INPUT statement, the response message formats are defined as follows:

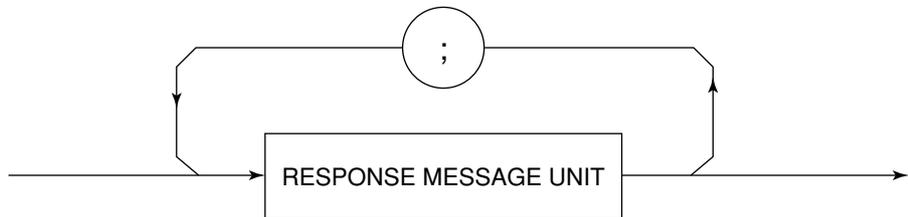


### (1) RESPONSE MESSAGE TERMINATOR



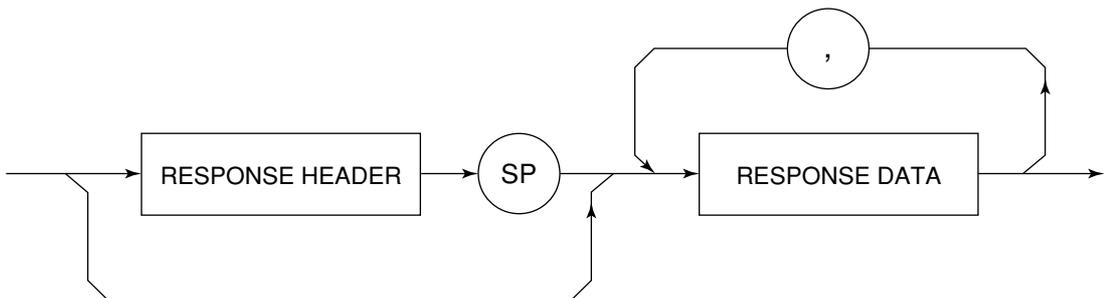
The response message terminator to be used depends on the TRM command.

### (2) RESPONSE MESSAGE

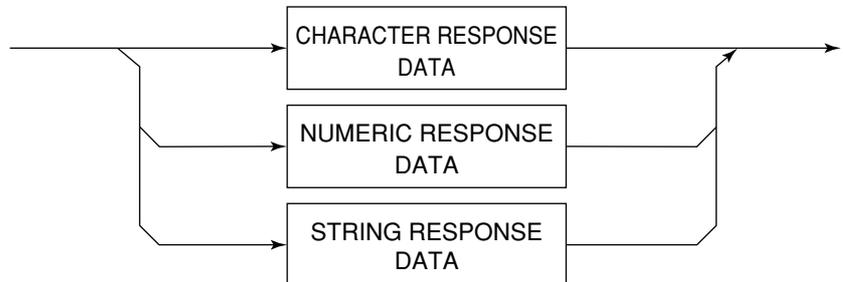


When a query is sent by the PRINT statement with one or more program queries, the response message also consists of one or more response message units.

### (3) Normal RESPONSE MESSAGE UNIT



**(4) RESPONSE DATA**

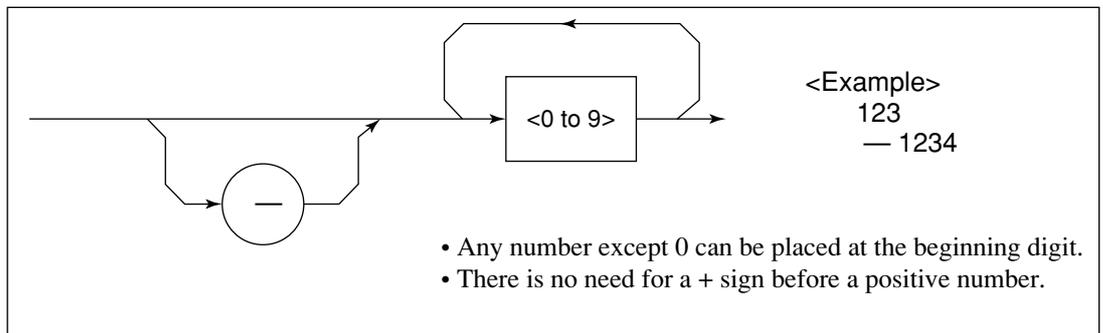


**(5) CHARACTER RESPONSE DATA**

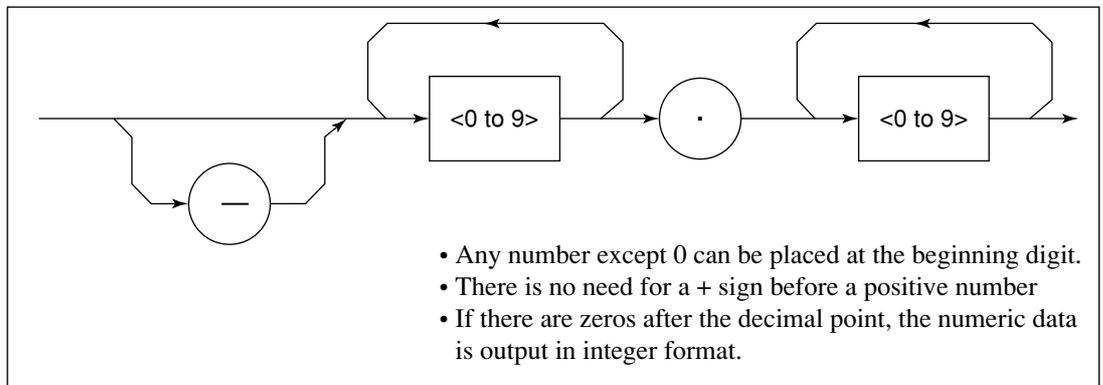
Character response data consists of uppercase alphabetic characters from A to Z, lowercase alphabetic characters from a to z, the underline “\_”, and the numbers 0 to 9. These characters can be used in specified combinations.

**(6) NUMERIC RESPONSE DATA**

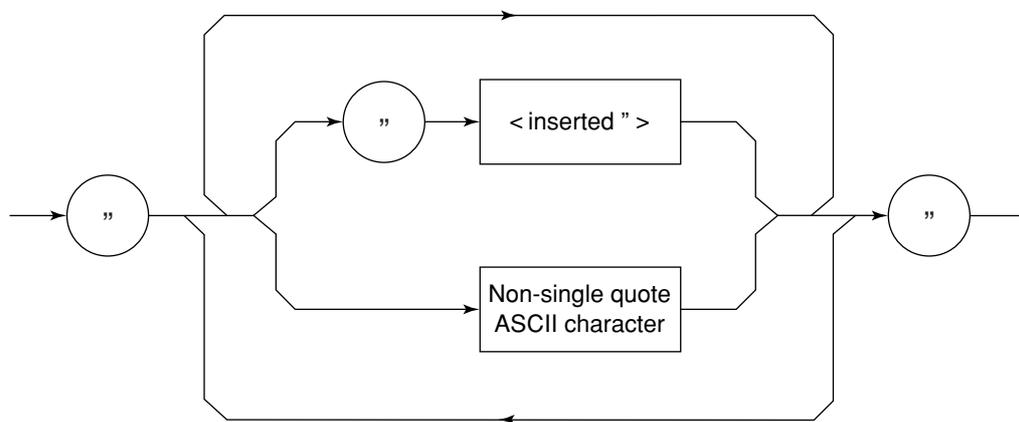
<Integer Format (NR1)>



<Integer Format (NR1)>



**(7) STRING RESPONSE DATA**



String response data is output as an ASCII character string, which is enclosed with double quotation marks.

**(8) Response message to input the waveform data using binary data**

For details on reading binary format, see paragraph 7.2.3 (4) in Section 7, "SAMPLE PROGRAMS."

# Section 5 Status Messages

---

This section describes MT8801C status messages, their data structure and models, and explains the techniques for synchronizing the controller and the MT8801C.

To obtain more detailed status information, the IEEE488.2 standard has more common commands and common queries than the IEEE488.1 standard.

|       |                                                                                  |      |
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## Section 5 Status Messages

---

The Status Byte (STB) sent to the controller is based on the IEEE488.1 standard. The bits comprising it are called a status summary message because they represent a summary of the current data contained in registers and queues.

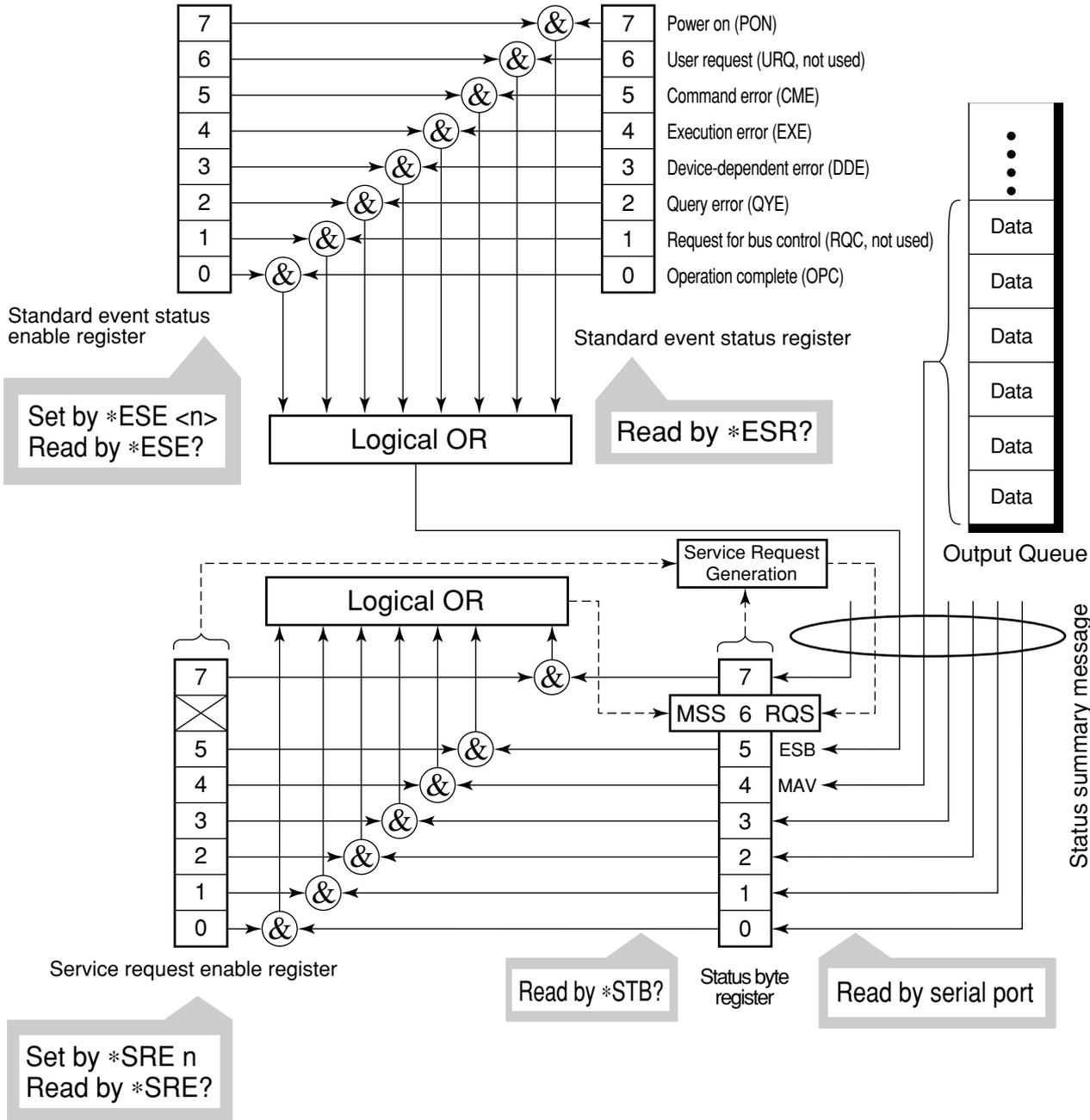
The following pages explain the status summary message and structure of status data that constitutes the status summary message bits, as well as techniques for synchronizing the MT8801C and controller, which use these status messages.

These functions are used by an external controller with the GPIB interface bus.

Almost functions can be used by an external controller with the RS-232C interface.

# 5.1 IEEE488.2 Standard Status Model

The diagram below shows the standard model for the status data structure stipulated in the IEEE488.2 standard.



Standard Status Model Diagram

**Section 5 Status Messages**

The IEEE488.1 status byte is used in the status model. This status byte is composed of seven summary message bits given from the status data structure. To create the summary message bits, there are two models for the data structure: the register model and the queue model.

| Register model                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Queue model                                                                                                                                                                                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The register model consists of the two registers used for recording events and conditions encountered by a device. These two registers are the Event Status Register and Event Status Enable Register. When the result of the AND operation of both register contents is not 0, the corresponding bit of the status bit becomes 1. In other cases, it becomes 0. And, when the result of their Logical OR is 1, the summary message bit also becomes 1. If the logical OR result is 0, the summary message bit also becomes 0. | The queue in the queue model is for sequentially recording the waiting status values and data. The queue structure is such that the relevant bit is set to 1 when there is data in it and 0 when it is empty. |

In IEEE488.2, there are three standard models for status data structure, two register models and one queue model, based on the register model and queue model explained above. They are:

- [1] Standard Event Status Register and Standard Event Status Enable Register
- [2] Status Byte Register and Service Request Enable Register
- [3] Output Queue

| Standard Event Status Register                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Status Byte Register                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Output Queue                                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The Standard Event Status Register has the structure of the previously described register model. In this register, bits are set for eight types of standard events encountered by a device.<br>[1] Power on, [2] User request, [3] Command error, [4] Execution error, [5] Device-dependent error, [6] Query error, [7] Request for bus control and [8] Operation complete. The logical OR output bit is represented by Status Byte Register bit 5 (DIO6) as a summary message for the Event Status Bit (ESB). | The Status Byte Register is a register in which the RQS bit and the seven summary message bits from the status data structure can be set. It is used together with the Service Request Enable Register. When the result of the OR operation of both register contents is not 0, SRQ goes ON. To indicate this, bit 6 of the Status Byte Register (DIO7) is reserved by the system as the RQS bit, which indicates a service request for the external controller. The mechanism of SRQ conforms to the IEEE488.1 standard. | The Output Queue has the structure of the queue model mentioned above. Status Byte Register bit 4 (DIO5) is set as a summary message for Message Available (MAV) to indicate that there is data in the output buffer. |

## 5.2 Status Byte (STB) Register

The STB register consists of device STB and RQS (or MSS) messages. The IEEE488.1 standard defines the method of reporting STB and RQS messages, but not the setting and clearing of protocols or the meaning of STB. The IEEE488.2 standard defines the device status summary message and the Master Summary Status (MSS) which is sent to bit 6 together with STB in response to an \*STB? common query.

### 5.2.1 ESB and MAV summary messages

The following describes the ESB and MAV summary messages.

#### (1) ESB summary messages

The ESB (Event Summary Bit) summary message is a message defined by IEEE488.2, and is represented by bit 5 of the STB register. This bit indicates whether at least one of the events defined in IEEE488.2 has occurred when the service request enable register is set to enable events after the final reading or clearing of the standard event register.

The ESB summary message bit becomes 1 when the setting permits events to occur if any of the events recorded in the standard event status register becomes 1. The ESB summary bit becomes true when the setting permits events to occur if any of the events registered in the standard event status register is true. Conversely, it is false if none of the recorded events occurs even if events are set to occur.

This bit becomes FALSE (0) when the ESR register is read by the \*ESR? query and the ESR register is cleared by the \*CLS command.

#### (2) MAV summary messages

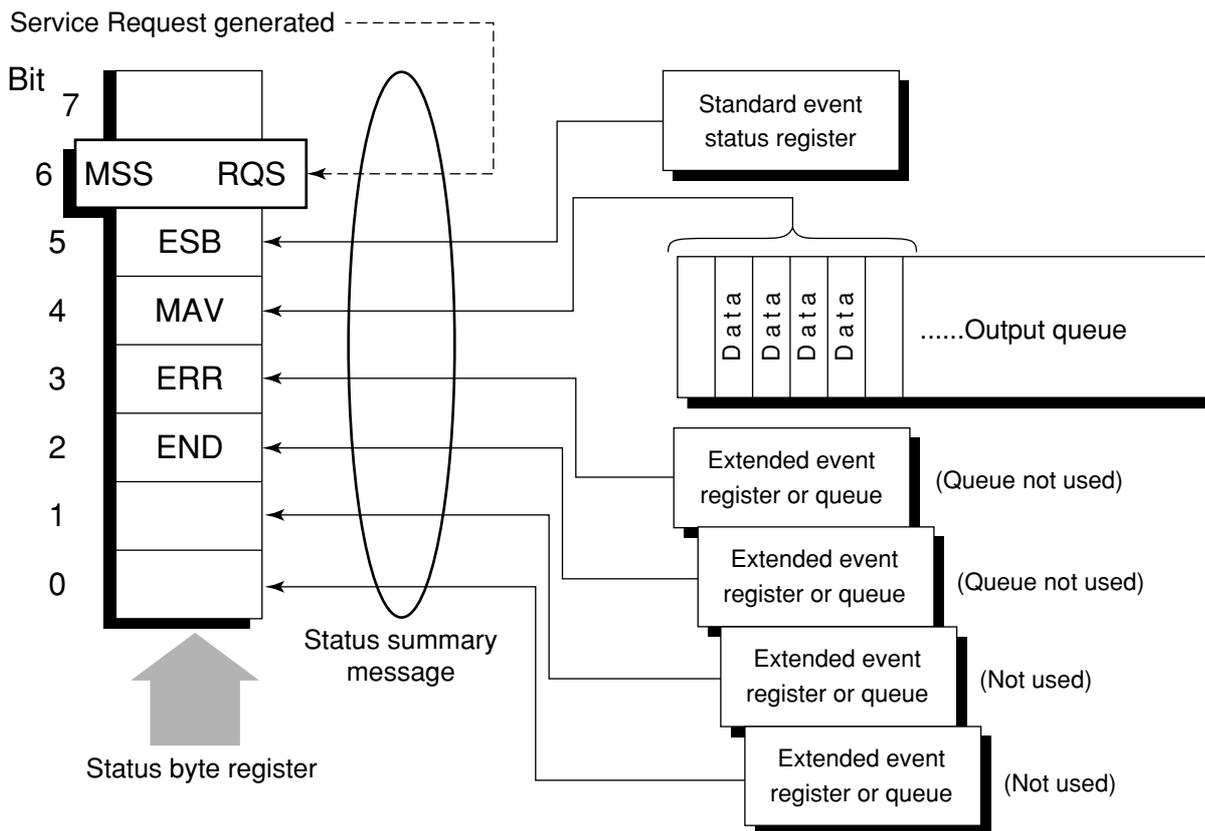
The MAV summary message is a message defined in IEEE488.2 and represented by bit 4 in the STB register. This bit indicates whether the output queue is empty. The MAV summary message bit is set to 1 (true) when a device is ready to receive a request for a response message from the controller and to 0 (false) when the output queue is empty. This message is used to synchronize the exchange of information with the controller. For example, this message can be used to make the controller wait until MAV is true after it sends a query command to the device. While the controller is waiting for a response from the device, it can process other jobs. Reading the output queue without first checking MAV delay all system bus operations until the device responds.

### 5.2.2 Device-dependent summary messages

The IEEE488.2 standard specifies that bits 7 (DIO8) and 3 (DIO4) to 0 (DIO1) of the status byte register can be used as status register summary bits, or to indicate that there is data in a queue.

Device-dependent summary messages have the respective status data structures of the register model or the queue model. Thus, the status data structure may be either the register to report events and status in parallel or the queue to report conditions and status in sequence. The summary bit represents a summary of the current status of the corresponding status data structure. For the register model, the summary message is true when there is an event set to permit the occurrence of more than one true event; while for the queue model, it is true if the queue is not empty.

As shown below, the MT8801C does not use bits 0, 1 and 7. As it uses bits 2 and 3 as the summary bit of the status register, it has 3 register model types (where 2 types are extended) and one queue model type (with no extension).



### 5.2.3 Reading and clearing the STB register

Serial poll or the \*STB? common query are used to read the contents of the STB register. STB messages conforming to IEEE488.1 can be read by either method, but the value sent to bit 6 (position) is different for each message.

The STB register can be cleared by using the \*CLS command.

#### (1) Reading by serial poll (only when using the GPIB interface)

When using serial poll conforming to IEEE488.1, the device must return a 7-bit status byte and an RQS message bit which conforms to IEEE488.1. According to IEEE488.1, the RQS message indicates whether the device sent SRQ as true or not. The value of the status byte is not changed by serial poll. The device must set the RQS message to false immediately after being polled. As a result, if the device is again polled before there is a new cause for a service request, the RQS message is false.

#### (2) Reading by the \*STB common query

The \*STB? common query requires the device to send the contents of the STB register and an integer format response message from the MSS (Master Summary Status) summary message. The response represents the total binary weighted value of the STB register and the MSS summary message. STB register bits 0 to 5 and 7 are weighted to 1, 2, 4, 8, 16, 32, and 128; and the MSS to 64, respectively. Thus, excepting the fact that bit 6 represents the MSS summary message instead of the RQS message, the response to \*STB? is identical to that for serial poll.

**(3) Definition of MSS (Master Summary Status)**

MSS indicates that there is at least one cause for a service request. The MSS message is represented by bit 6 in a device response to the \*STB? query, but it is not generated response to serial poll. In addition, it is not part of the status byte specified by IEEE488.1. MSS is generated by the logical OR operation of the STB register with SRQ enable (SRE) register. In concrete terms, MSS is defined as follows:

$$\begin{aligned} & (\text{STB Register bit0 AND SRE Register bit 0}) \\ & \quad \text{OR} \\ & (\text{STB Register bit1 AND SRE Register bit 1}) \\ & \quad \text{OR} \\ & \quad \quad \quad \vdots \\ & \quad \quad \quad \vdots \\ & (\text{STB Register bit5 AND SRE Register bit 5}) \\ & \quad \text{OR} \\ & (\text{STB Register bit7 AND SRE Register bit 7}) \end{aligned}$$

Since bit-6 status of the STB and SR enable registers is ignored in the definition of MSS, it can be considered that bit-6 status is always being 0 when calculating the value of MSS.

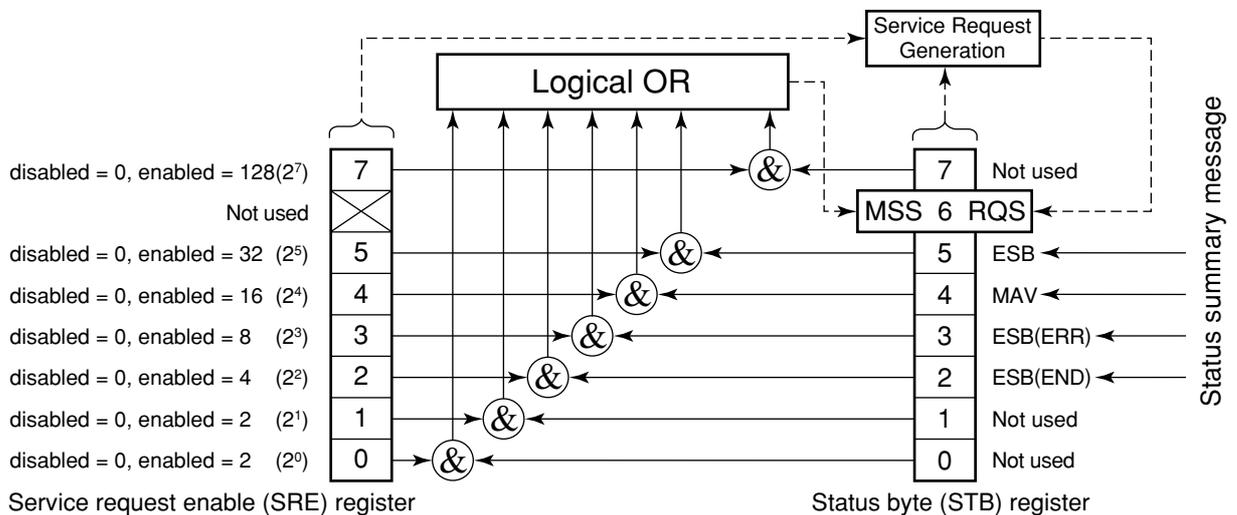
**(4) Clearing the STB register by the \*CLS common command**

With the exception of the output queue and its MAV summary message, the \*CLS common command clears all status data structures (status event registers and queues) as well as the corresponding summary messages. The \*CLS command does not affect settings in the enable registers.

## 5.3 Enabling the Service Request (SRQ)

All types of summary messages in the STB register can be enabled or disabled for service requests (SRE) by using the program-controlling service request (SRQ) enable operation. The service request enable (SRE) register controls the generation of SRQ in bits 0 to 7 as shown in the diagram below.

Bits in the service request enable register correspond to bits in the status byte register. If a bit in the status byte corresponding to an enabled bit in the service request enable register is set to 1, the device makes a service request to the controller with the RQS bit set to 1. For example, if bit 4 in the service request enable register is enabled, the device makes a request for service to the controller each time the MAV bit is set to 1 when there is data in the output queue.



### (1) Reading the SRE register

The contents of the SRE register are read using the `*SRE?` common query. The response message to this query is an integer from 0 to 255, which is the sum of the bit digit weighted values in the SRE register. SRE register bits 0 to 5 and 7 are respectively weighted to 1, 2, 4, 8, 16, 32, and 128. The unused bit 6 must always be set to 0.

### (2) Updating the SRE register

The `*SRE` common instruction is used to write data to the SRE register. An integer from 0 to 255 is added after the `*SRE . fm3common` instruction.

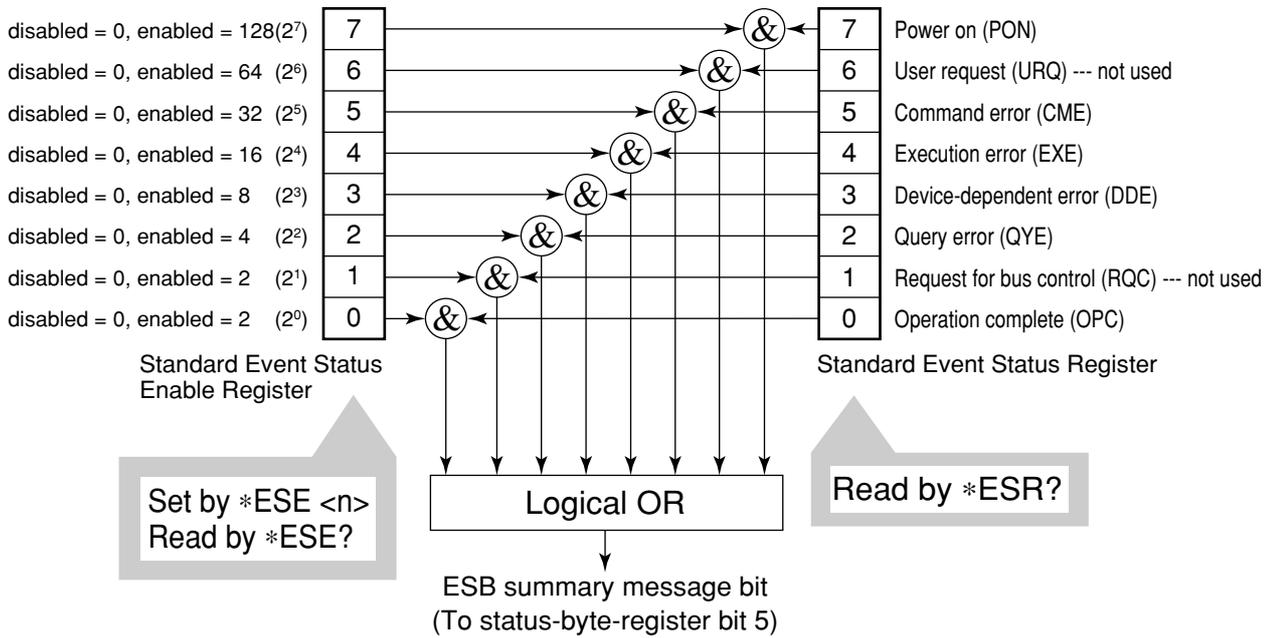
This integer indicates the total number of bits in the SRE register (weighted values: 1, 2, 4, 8, 16, 32, and 128), and sets the corresponding SRE register bit to 0 or 1.

A bit value of 1 indicates an enabled state; 0 indicates a disabled state. Always ignore the value of bit 6.

## 5.4 Standard Event Status Register

### 5.4.1 Bit definition of standard event status register

The standard event status register must be available on all devices conforming to the IEEE488.2 standard. The diagram below shows the operation of the standard event status register model. Because the operation of the model is the same as that for the other models already described, the following only explains the meaning of each bit in the standard event status register as defined in the IEEE488.2 standard.



## 5.4 Standard Event Status Register

Standard event status enable (ESE) register selects whether the register makes the summary message true when the corresponding bit of the event status register is set.

| Bit | Event name                   | Description                                                                                                                                                                   |
|-----|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7   | Power on (PON)               | The power is turned on.                                                                                                                                                       |
| 6   | User Request (URQ)           | Request for local control (rtl).<br>This bit is produced regardless of whether a device is in remote or local mode. It is not used for the MT8801C so, it is always set to 0. |
| 5   | Command Error (CME)          | An illegal program message, a misspelt command or a GET command within a program is received.                                                                                 |
| 4   | Execution error (EXE)        | A legal program message, which cannot be executed, is received.                                                                                                               |
| 3   | Device-dependent Error (DDE) | An error caused by other than CME, EXE or QYE (e.g., parameter error) occurred.                                                                                               |
| 2   | Query Error (QYE)            | An attempt is made to read data in the output queue though there is none there, or data is lost from the output queue due to some reason (e.g., overflow).                    |
| 1   | Request Control (RQC)        | A device is requesting an active controller. This bit is not used for the MT8801C so, it is always set to 0.                                                                  |
| 0   | Operation Complete (OPC)     | A device has completed specified operations and is ready to receive new commands. This bit is only set in response to the *OPC command.                                       |

**Section 5 Status Messages**

**5.4.2 Query error details**

| No. | Item                                                                           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----|--------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | Incomplete program message                                                     | If a device receives an MTA from the controller before it receives the terminator of the program message it is receiving, it aborts the incomplete program message and waits for the next one. To abort the incomplete message, the device clears its input-output buffer, reports a query error to the status report section and sets bit 2 in the standard status register to indicate the query error.                                                                                                                  |
| 2   | Interruption of response message output                                        | If a device receives an MLA from the controller before it has sent the terminator of the response message it is sending, it automatically interrupts response message output and waits for the next program. To interrupt the response message output, the device clears its output buffer, reports a query error to the status report section, and sets bit 2 in the standard status register to indicate the query error.                                                                                                |
| 3   | Sending the next program message without reading the previous response message | When a device becomes unable to send a response message because the controller has sent another program message immediately following a program or query message, the device aborts the response message and waits for the next program message. It then reports a query error to the status report section as in No.2 above.                                                                                                                                                                                              |
| 4   | Output queue overflow                                                          | When several program and query messages are executed in succession, too many response messages for the output queue (256 bytes) may be generated. If further query messages are received when the output queue is full, the output queue cannot send corresponding responses due to the overflow situation. If there is overflow in the output queue, the device clears it and resets the section where response messages are created. Then it sets bit 2 in the standard event status register to indicate a query error. |

### 5.4.3 Reading, writing to and clearing the standard event status register

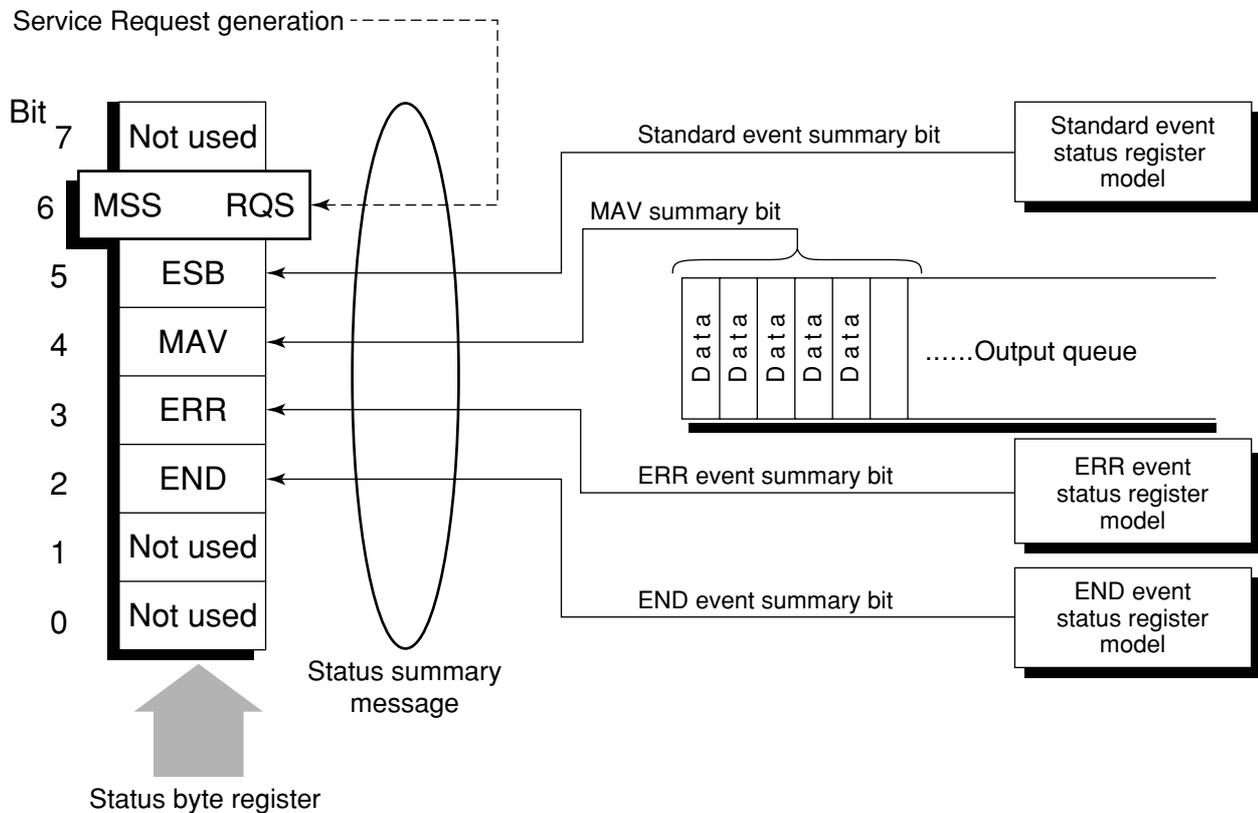
|          |                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reading  | <p>The register is read by the *ESR? common query.</p> <p>The register is cleared after being read. The response message is an integer format data value obtained by binary weighting the event bit and converting it to a decimal number.</p>                                                                                                                                                      |
| Writing  | <p>With the exception of clearing, writing operations cannot be performed externally.</p>                                                                                                                                                                                                                                                                                                           |
| Clearing | <p>The register is only cleared in the following cases:</p> <p>[1] A *CLS command received.</p> <p>[2] The power is turned on.</p> <p style="padding-left: 40px;">Devices first clear their standard event status registers but later record events that occurred during the sequence in the registers (e.g., setting of the PON event bit).</p> <p>[3] An event is read for the *ESR? command.</p> |

### 5.4.4 Reading, writing to and clearing the standard event status enable register

|          |                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reading  | <p>The register is read by the *ESE? common query.</p> <p>The response message is an integer format data value obtained by binary weighting the event bit and converting to a decimal number.</p>                                                                                                                                                                                                                |
| Writing  | <p>The register is written to by the *ESE common command. As bits 0 to 7 of the register are respectively weighted to 1, 2, 4, 8, 16, 32, 64, and 128, data to be written is sent by &lt;DECIMAL NUMERIC PROGRAM DATA&gt; which is the digit total of the bits selected from these bits.</p>                                                                                                                     |
| Clearing | <p>The register is cleared in the following cases:</p> <p>[1] An *ESE command with a data value of 0 is received.</p> <p>[2] The power is turned on.</p> <p>The standard event status enable register is not affected by the following:</p> <p>[1] Changes of the status of the IEEE488.1 device clear function</p> <p>[2] An *RST common command is received.</p> <p>[3] A *CLS common command is received.</p> |

## 5.5 Extended Event Status Register

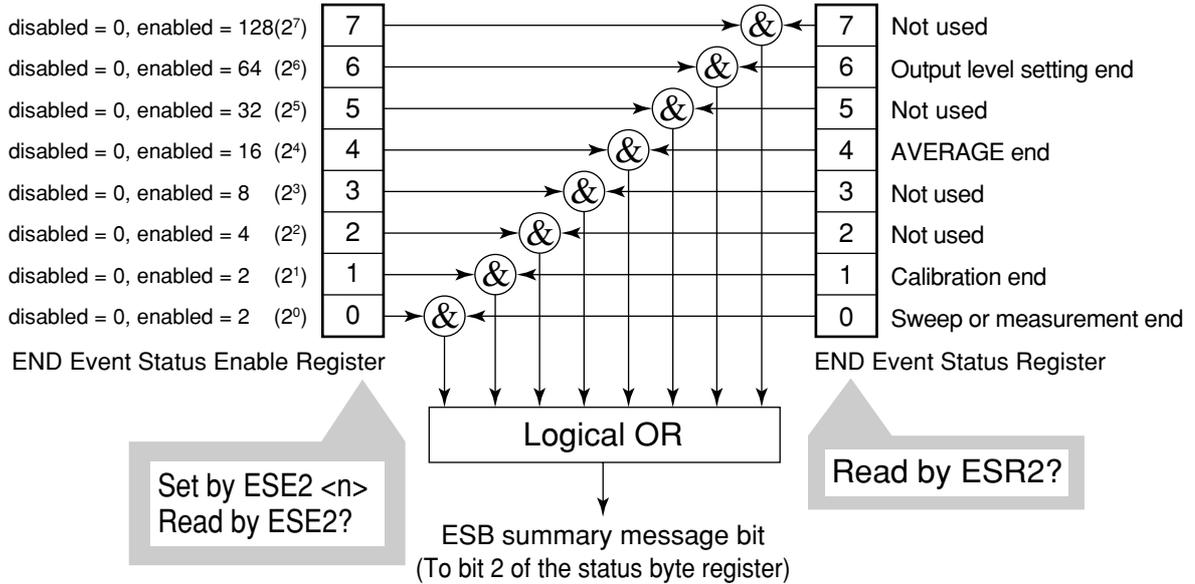
The register models of the status byte register, standard event status register and enable registers are mandatory for equipment conforming to the IEEE488.2 standard. In IEEE488.2, status-byte-register bits 7 (DIO8), 3 (DIO4) to 0 (DIO1) are assigned to status summary bits supplied by the extended-register and extended-queue models. For the MT8801C, as shown in the diagram below, bits 7, 1 and 0 are unused; bits 2 and 3 are assigned to the END and ERR summary bits as the status-summary bits supplied by the extended-register model. As the queue model is not extended, there is only one type of queue: the output queue.



The following pages describe bit definition, the reading, writing to and clearing of bits for the END extended event register model.

### 5.5.1 Bit definition of END event status register

The following describes the operation of the END event status register model, the naming of its event bits, and what they mean.

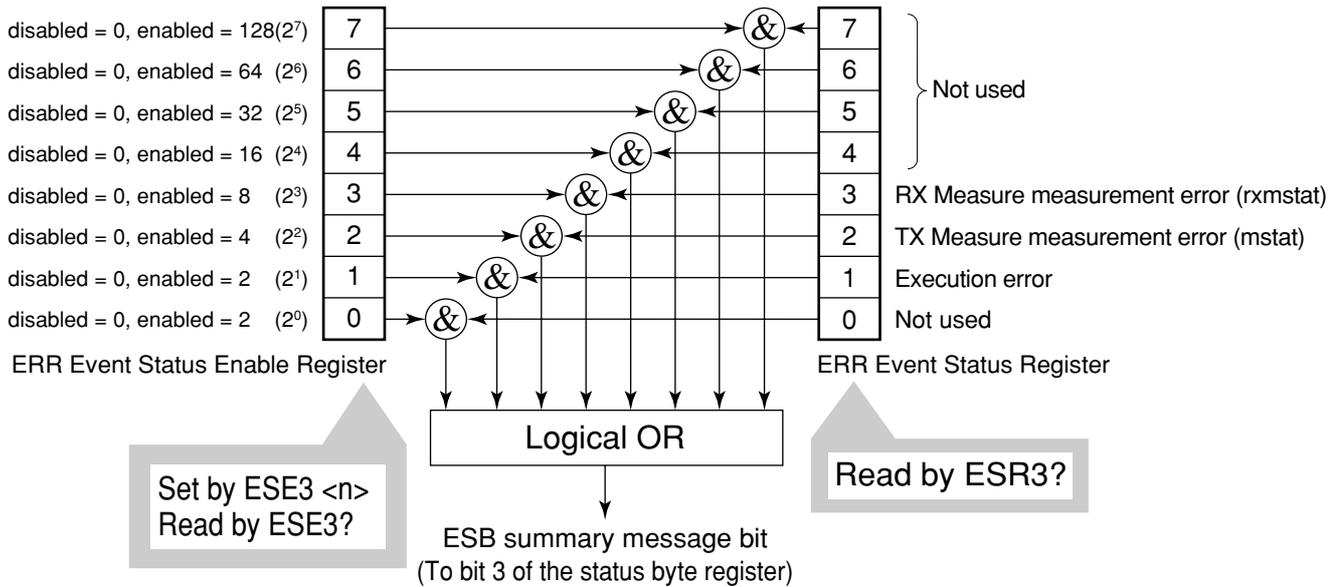


The END event status register selects whether the register makes the summary message true when the corresponding bit of the status register is set.

| Bit | Event name               | Description                                                                                 |
|-----|--------------------------|---------------------------------------------------------------------------------------------|
| 7   | (Not used)               | (Not used)                                                                                  |
| 6   | Output level setting end | This bit is set to 1 when output level setting ends.                                        |
| 5   | (Not used)               | (Not used)                                                                                  |
| 4   | AVERAGE end              | This bit is set to 1 when averaging ends.                                                   |
| 3   | (Not used)               | (Not used)                                                                                  |
| 2   | (Not used)               | (Not used)                                                                                  |
| 1   | CAL end                  | This bit is set to 1 when calibration (Zero Set, Adjust Range and Manual Calibration) ends. |
| 0   | Sweep or measurement end | This bit is set to 1 when sweep or measurement ends.                                        |

### 5.5.2 Bit definition of ERR event status register

The following describes the operation of the ERR event status register model, the naming of its event bits, and what they mean.



The ERR event status register selects whether the register makes the summary message true when the corresponding bit of the status register is set.

| Bit | Event name                             | Description                                                                                             |
|-----|----------------------------------------|---------------------------------------------------------------------------------------------------------|
| 7   | (Not used)                             | (Not used)                                                                                              |
| 6   | (Not used)                             | (Not used)                                                                                              |
| 5   | (Not used)                             | (Not used)                                                                                              |
| 4   | (Not used)                             | (Not used)                                                                                              |
| 3   | RX Measure measurement error (rxmstat) | This bit is set to 1 when CDMA reception measurement error is occurred.                                 |
| 2   | TX Measure measurement error (mstat)   | This bit is set to 1 when CDMA transmission measurement error or analog measurement error is occurred.  |
| 1   | Execution error                        | This bit is set to 1 when execution error is occurred at Zero Set, Adjust Range, or Manual Calibration. |
| 0   | (Not used)                             | (Not used)                                                                                              |

**Note:**

Sweep or measurement error means other than the three states of normal end, sync established, and not measured.

### 5.5.3 Reading, writing to and clearing the extended event status register

|          |                                                                                                                                                                                                                                                                                 |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reading  | The register is destructively read by a query (e.g., it cleared after being read).<br>The END/ERR event status register is read by ESR2?/ESR3? query. The read value, an integer format data (NR1), is obtained by binary weighting the event bit and converting it to decimal. |
| Writing  | With the exception of clearing, writing operations cannot be performed externally.                                                                                                                                                                                              |
| Clearing | The register is cleared in the following cases:<br>[1] A *CLS command is received.<br>[2] The power is turned on.<br>[3] An event is read by the ESR2?/ESR3? query command.                                                                                                     |

### 5.5.4 Reading, writing to and clearing the extended event status enable register

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reading  | The register is non-destructively read by a query (i.e., not cleared after being read).<br>The END/ERR event status register is read by the ESE2?/ESE3? query.<br>The read value, an integer format data (NR2), is obtained by binary total weighting the event bit and converting it to decimal.                                                                                                                                                                            |
| Writing  | The END/ERR event status register is written to by the ESE2/ESE3 program command. As bits 0 to 7 of the registers are respectively binary weighted to 1, 2, 4, 8, 16, 32, 64, and 128, write data is sent as the integer format data obtained by total weighting the digit value of bits selected from among them.                                                                                                                                                           |
| Clearing | The register is cleared in the following cases:<br>[1] The ESE2/ESE3 program command with a data value of 0 is received for the END/ERR event status register.<br>[2] The power is turned on the power-on-status-clear flag is true.<br>The extended event status enable register is not affected by the following:<br>[3] Changes of the status of the IEEE488.1 device clear function<br>[4] An *RST common command is received.<br>[5] A *CLS common command is received. |

## 5.6 Techniques for Synchronizing the MT8801C with a Controller

The MT8801C usually treats program messages as sequential commands that do not execute the processing of newly received commands until the previous command has been processed. Thus, special consideration need not be taken for pair-synchronization between the MT8801C and the controller.

If the controller controls one or more devices and synchronizes with them, after all the commands specified for the MT8801C have been processed, the next commands must be sent to other devices.

There are five ways of synchronizing the MT8801C with the controller:

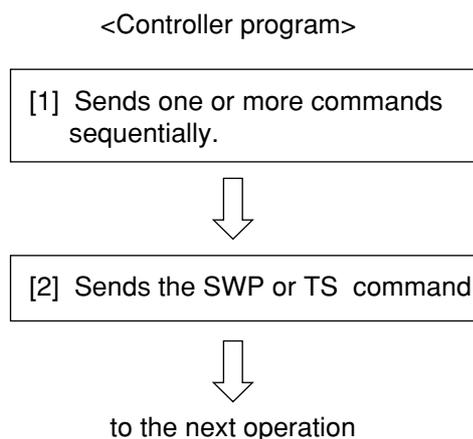
- [1] Wait for SWP or TS command termination.
- [2] Wait for a response after the \*OPC? query is sent.
- [3] Wait for SRQ after \*OPC is sent.
- [4] Wait for status generation of the status register.
- [5] Wait for SRQ by the status register.

### 5.6.1 Wait for SWP or TS command termination

When the MT8801C starts measurement using the SWP or TS command, it stops accepting the next measurement command until it terminates the measurement. Use this feature to set a synchronization.

**Note:**

In Average measurement mode, a response may be returned before averaging.



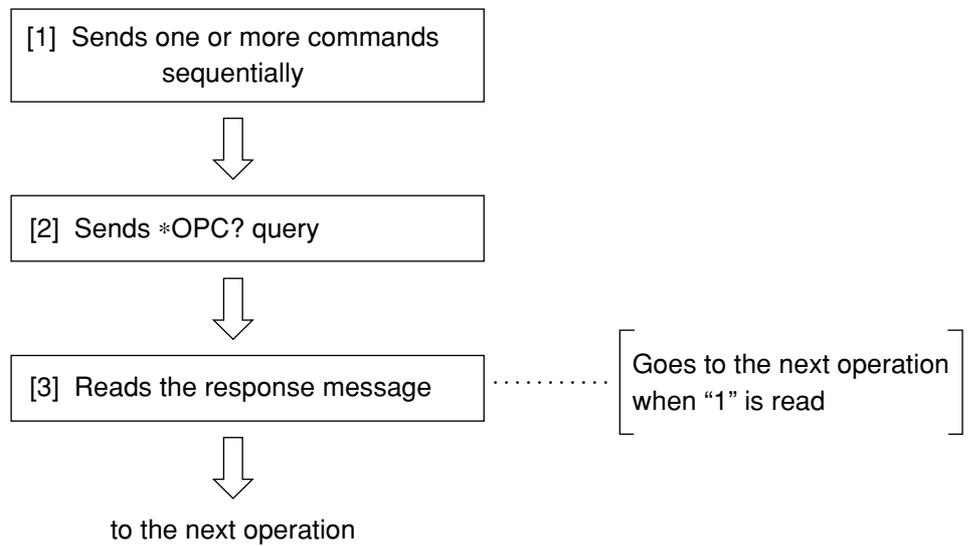
### 5.6.2 Wait for response after \*OPC? query is sent

When executing the \*OPC? query command, the MT8801C outputs “1” as the response message at the end of the previous command. The controller is synchronized with the MT8801C by waiting for the request message to be entered.

**Note:**

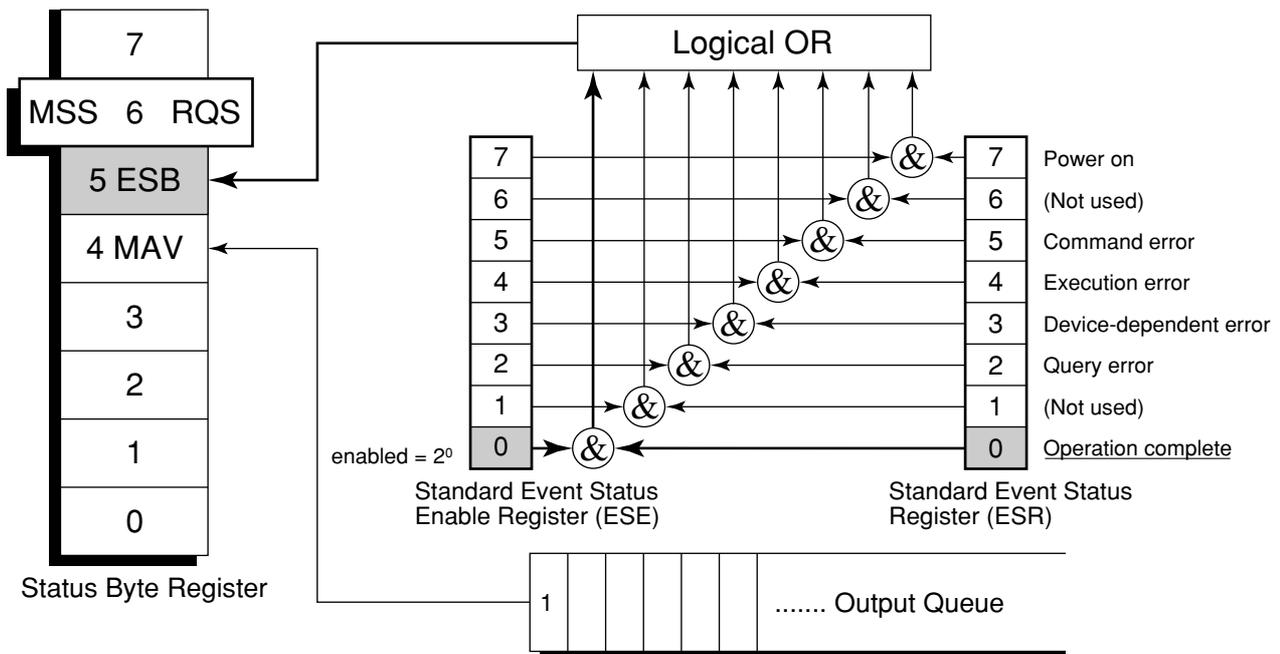
When the read response message is “Q” (command is being executed), wait for about 50 ms until the controller moves to the next operation.

<Controller program>



### 5.6.3 Wait for service request after \*OPC is sent

The MT8801C sets the operation-complete bit (bit 0) to 1 when executing the \*OPC command. The controller is synchronized with the MT8801C by waiting for SRQ when the operation-complete bit is set for SRQ.



• <Controller program>

- [1] Enables the 20 bit (1) of the Standard Event Status Enable Register PRINT△@1 ; " \*ESE△1 "
- ↓
- [2] Enables the 25 bit (32) of the Service Request Enable Register PRINT△@1 ; " \*SRE△32 "
- ↓
- [3] Makes the device execute the specified operation
- ↓
- [4] Sends the \*OPC command PRINT△@1 ; " \*OPC "
- ↓
- [5] Wait for an SRQ interrupt (ESB summary message) ....Value of status byte: 2<sup>6</sup> + 2<sup>5</sup> = 96

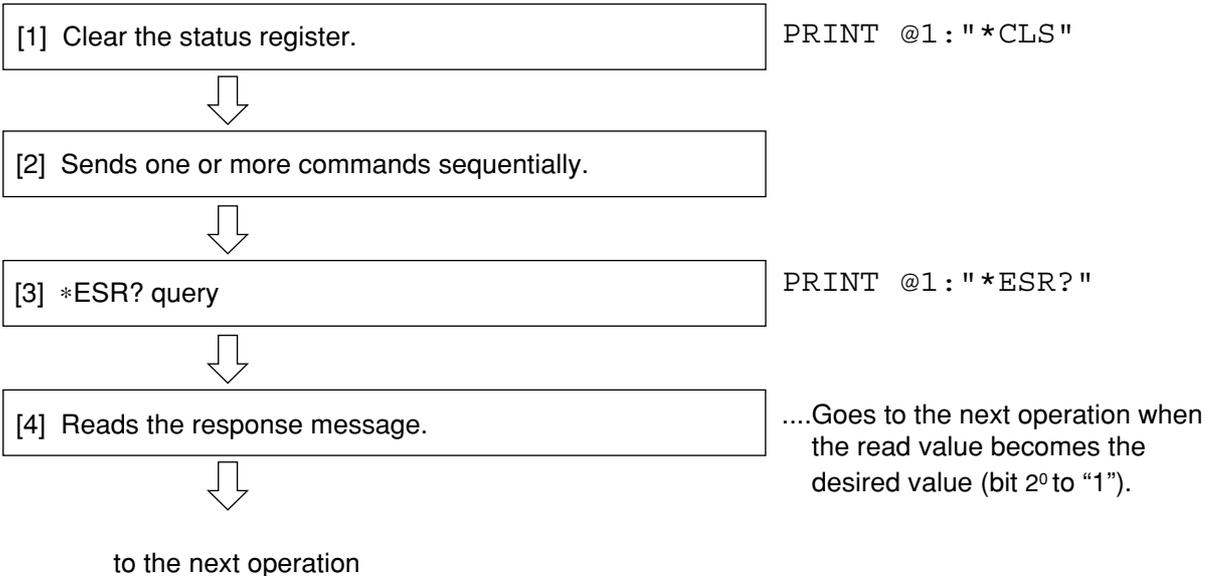
### 5.6.4 Wait for status generation of the status register

An event status register bit of the MT8801C is set to 1 when the corresponding event occurs. When the \*ESR?, ESR2?, or ESR3? query is executed, the MT8801C outputs the value of the corresponding status register as a response message. The controller reads this response message and waits until the response becomes the specified value for synchronization. Reset the event status register immediately before making a desired event occur.

**Note:**

Wait for 50 ms for the controller to go to the next operation after reading a response message.

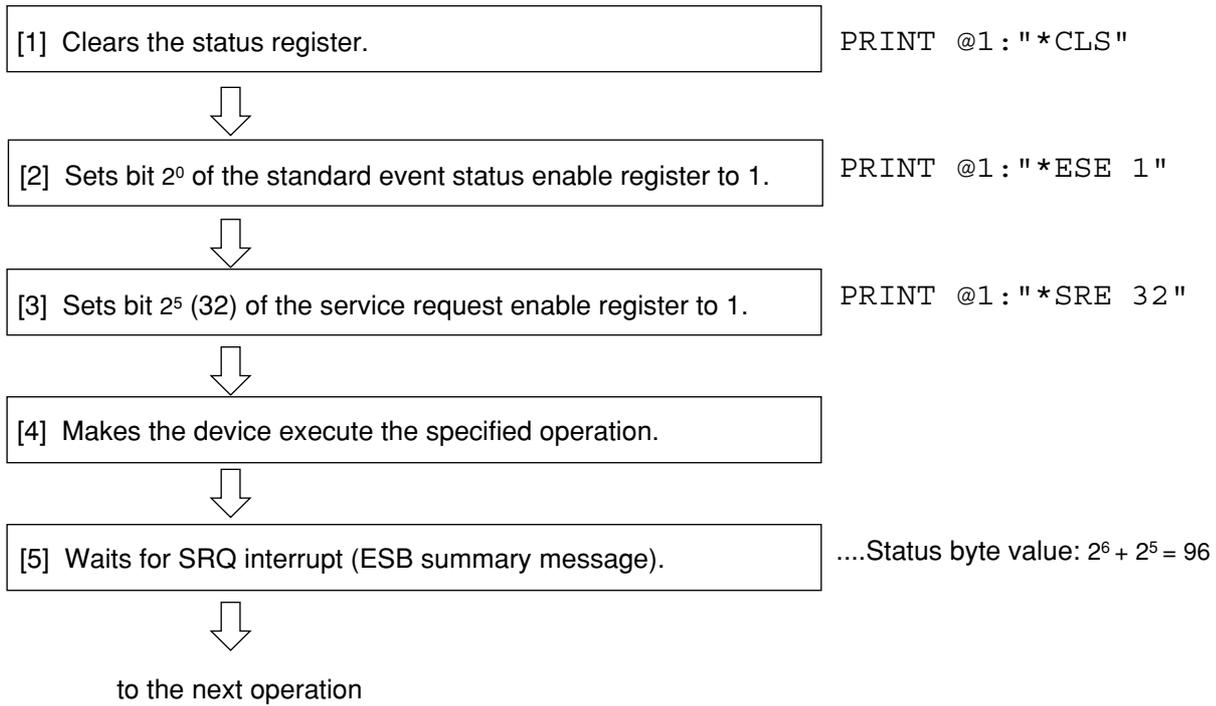
- <Controller program: Synchronization by operation termination bit>



### 5.6.5 Wait for service request issuance from the status register

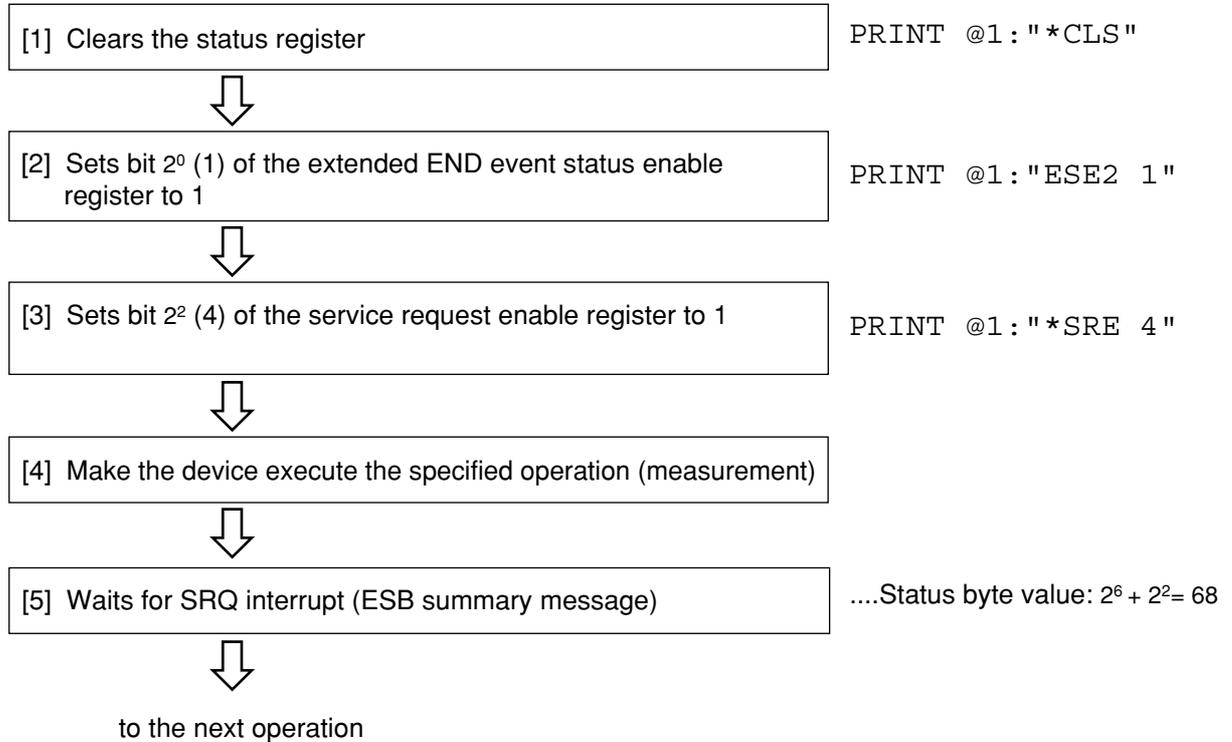
An event status register bit of the MT8801C is set to 1 when the corresponding event occurs. After setting these bits to set the RQS, the controller waits the SRQ for synchronization. Reset the event status register immediately before making a desired event occur.

- <Controller program 1: Synchronization by operation termination bit>



## 5.6 Techniques for Synchronizing the MT8801C with a Controller

- <Controller program 2: Synchronization by the sweep/measurement termination bit>



## Section 5 Status Messages

---

# Section 6 Initial Settings

---

This section outlines initialization for the system and describes how to initialize the system.

An example of initial settings are written for IBM-PC commands.

|     |                                                                          |     |
|-----|--------------------------------------------------------------------------|-----|
| 6.1 | General Description .....                                                | 6-2 |
| 6.2 | Bus Initialization by the IFC Statement .....                            | 6-3 |
| 6.3 | Initialization for Message Exchange by DCL and<br>SDC Bus Commands ..... | 6-4 |
| 6.4 | Device Initialization by the *RST Command .....                          | 6-5 |
| 6.5 | Device Initialization by the PRE/INI/IP Command ....                     | 6-6 |
| 6.6 | Device Status at Power-on .....                                          | 6-7 |

## 6.1 General Description

There are three levels of initialization for the GPIB system.

The first level is bus initialization using the IFC statement with the system bus in the idle state.

The second level is initialization for message exchange using the DCL command to enable devices to receive program messages.

The third level is device initialization using the PRE or \*RST command to initialize device functions. These levels of initialization prepare a device for operation.

A device must be set to a known state when the power is switched on.

| Level | Initialization type                 | Description                                                                                                                                                                                                                                                                 | Level combination and sequence                                                    |
|-------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| 1     | Bus initialization                  | The IFC message from the controller initializes all interface functions connected to the bus.                                                                                                                                                                               | Can be combined with other levels, level 1 must be executed before level 2.       |
| 2     | Initialization for message exchange | The message exchanges of all devices and specified devices on the GPIB are initialized respectively by the DCL (Device Clear) and SDC (Select Device Clear) GPIB bus commands, which also nullify the function that reports to the controller that operation has completed. | Can be combined with other levels, level 2 must be executed before level 3.       |
| 3     | Device initialization               | The *RST or PRE/INI/IP command returns the specified device to the device-dependent known state, regardless of the conditions of previous device use.                                                                                                                       | Can be combined with other levels; level 3 must be executed after levels 1 and 2. |

The following paragraph describes the commands for executing levels 1, 2, and 3, and the items initialized by execution. It also describes the known state which is set when the power is switched on.

When controlling with an external controller through the GPIB interface bus, all the initialization functions of the first/second/third levels can be used.

When controlling with an external controller through the RS-232C interface port, the initialization function of the third level (device initialization) can be used. The initialization functions of the first/second levels cannot be used.

## 6.2 Bus Initialization by the IFC Statement

### ■ Example

Call  $\triangle$ ibsic(ud%)

### ■ Explanation

The IFC statement initializes the interface functions of all devices connected to the GPIB bus line.

The initialization of interface functions involves erasing the settings (e.g. talker, listener) made by the controller and resetting to the initial states. In the table below,  $\circ$  indicates the initialized functions;  $\triangle$  indicates partially initialized functions.

| No | Function                      | Symbol  | Initialization by IFC |
|----|-------------------------------|---------|-----------------------|
| 1  | Source handshake              | SH      | $\circ$               |
| 2  | Acceptor handshake            | AH      | $\circ$               |
| 3  | Talker or extended talker     | T or TE | $\circ$               |
| 4  | Listener or extended listener | L or LT | $\circ$               |
| 5  | Service request               | SR      | $\triangle$           |
| 6  | Remote/local                  | RL      |                       |
| 7  | Parallel poll                 | PP      |                       |
| 8  | Device clear                  | DC      |                       |
| 9  | Device trigger                | DT      |                       |
| 10 | Controller                    | C       | $\circ$               |

Bus initialization by the IFC statement does not affect the device-operating state (e.g. frequency settings, lamp on/off).

## 6.3 Initialization for Message Exchange by DCL and SDC Bus Commands

### ■ Example

```
Call Δ ibclr (ud%)
```

Initializes only the device which is specified by ud% for message exchange (sending SDC)

### ■ Explanation

This statement executes initialization for message exchange by all devices or only the specified device on the GPIB of the specified select code.

### ■ Items to be initialized for message exchange

The MT8801C by which the DCL or SDC bus command is accepted executes the following:

- [1] Input buffer and Output Queue: Cleared; the MAV bit is also cleared at the same time.
- [2] Purser, Execution Controller, and Response For matter: Reset
- [3] Device commands including \*RST: Clears all commands that prevent these commands from executing.
- [4] Processing the \*OPC command: Puts a device in OCIS (Operation Complete Command Idle State). As a result, the operation complete bit cannot be set in the Standard Event Status Register.
- [5] Processing the \*OPC query: Puts a device in OQIS (Operation Complete Query Idle State). As a result, the operation complete bit 1 cannot be set in the Output Queue.
- [6] Device function: Puts sections relating to message exchange in an idle state. The device keeps waiting for a message from a controller.

#### **Note:**

The items listed below are not affected even if DCL and SDC bus command processing is executed:

- [1] The current data set or stored in the device
- [2] Front panel settings
- [3] Other status byte state except MAV bit
- [4] Device operation in progress

## 6.4 Device Initialization by the \*RST Command

### ■ Syntax

---

```
*RST
```

---

### ■ Example

```
PCall△ibwrt (ud%, "*RST"):
```

Initializes the device (MT8801C) whose address is 1 with level 3.

### ■ Explanation

The \*RST(Reset) command is an IEEE488.2 common command which resets a device with level 3.

The \*RST(Reset) command is used to reset a device (MT8801C) to a specific initial state. Refer to the separate Operation Manual Vol. 1 Appendix B for details of initialization items and initial values.

**Note:**

The \*RST command does not affect the items listed below.

- [1] IEEE488.1 interface state
- [2] Device address
- [3] Output Queue
- [4] Service Request Enable register
- [5] Standard Event Status Enable register
- [6] Power-on-status-clear flag setting
- [7] Calibration data affecting device specifications
- [8] Parameters preset for controlling external devices, etc.

## 6.5 Device Initialization by the PRE/INI/IP Command

### ■ Syntax

---

PRE  
INI  
IP

---

### ■ Example (program message)

Call  $\Delta$ ibwrt (ud%, "PRE"):

Initializes the device (MT8801C) whose address is 1 with level 3.

### ■ Explanation

The PRE, INI and IP commands are MT8801C device-dependent messages which initialize a device with level 3.

Refer to the separate Operation Manual Vol. 1 Appendix B for details of items initialized by the PRE, INI, and IP commands and initial values.

## 6.6 Device Status at Power-on

When the power is switched on:

[1] Preset value: When a power-off time (POWERON LAST) is selected, the device is set to the status before the last power off.

Preset value: When Recall memory No. (POWERON n) is selected, the device is set to file (number [n]) status.

[2] The Input Buffer and Output Queue are cleared.

[3] The Purser, Execution Controller, and Response For matter are initialized.

[4] The device is put into OCIS (Operation Complete Command Idle State).

[5] The device is put into OQIS (Operation Complete Query Idle State).

[6] The Standard Event Status and Standard Event Status Enable Registers are cleared. Events can be recorded after the registers have been cleared.

For the special case of [1], when the power supply is first turned on after the device is shipped, the initial values are set to those in the initial setting table (refer to separate Operation Manual Vol. 1 Appendix B).

## Section 6 Initial Settings

---

# Section 7 Sample Programs

---

This section gives some examples of the Visual BASIC programs that control the MT8801C from the IBM-PC personal computer used as a controller.

|       |                                                                  |      |
|-------|------------------------------------------------------------------|------|
| 7.1   | Notes on Creating the Program .....                              | 7-2  |
| 7.2   | Sample Program (Example of Program<br>Using Visual Basic) .....  | 7-3  |
| 7.2.1 | Common items for sample program.....                             | 7-3  |
| 7.2.2 | Initializing the MT8801C .....                                   | 7-7  |
| 7.2.3 | Transmission (TX) measurement.....                               | 7-9  |
| 7.2.4 | Reception (RX) measurement .....                                 | 7-41 |
| 7.2.5 | Digital TX all measure item measurement,<br>AF measurement ..... | 7-53 |

## 7.1 Notes on Creating the Program

Note the items listed in the table below when creating the remote control program

| No. | Note                                                                                                     | Explanation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | Be sure to initialize each device.                                                                       | <p>The state of each device in actual use such as operating the operator panel of the device itself or executing another program may not be appropriate. Be sure to initialize each device to unify conditions at the start of use.</p> <p>Do the following:</p> <p>[1] Initialize the interface function (Call ibsic(ud%))</p> <p>[2] Initialize the message exchange function of the device (Call ibclr (ud%))</p> <p>[3] Initialize the device-specific function (PRE.INI or *RST)</p>                                                          |
| 2   | Set the remote state of the device to remote with lockout state (RWLS).                                  | <p>Execute Call ibcnd (ud%) to set the device to the local lockout state to prevent the device from returning to the local state.</p> <p>In the simple remote state, the device enters the local state when the [Local] key is pressed. At this time, when the panel key is pressed, automatic measurement of the device is not done correctly and measurement data may be unreliable.</p> <p>Execute Call ibcnd (ud%, chr\$ (&lt;listener&gt;), [+chr\$ (secondary-address)]+chr\$ (&amp;H01)) to set all devices to the local control state.</p> |
| 3   | Except for Call ibrd (ud%), do not send a command related to a device immediately after a query is sent. | <p>Write Call ibrd (ud%) after the query command.</p> <p>If MLA is received when a command other than Call ibrd (ud%) is sent to the controller before a query result is read, the output buffer is cleared. Therefore, the response message is erased.</p>                                                                                                                                                                                                                                                                                        |
| 4   | Program that avoids exceptional processing of protocol                                                   | <p>No.3 above is also a type of exceptional processing of the protocol. Avoid exceptional processing if necessary. For a predicted exception, create the exceptional processing part in the program to prevent execution from being halted due to an error.</p>                                                                                                                                                                                                                                                                                    |
| 5   | Check the interface function (subset) of each device.                                                    | <p>Be sure to check the subset of each device. Even if the program is executed on a device that does not provide the required subset, processing does not proceed. Also, check that the device type conforms to IEEE488.2.</p>                                                                                                                                                                                                                                                                                                                     |

## 7.2 Sample Program (Example of Program Using Visual Basic)

### 7.2.1 Common items for sample program

#### (1) Notes on use

**Note 1:**

The sample programs are used in any personal computer for control with the following environmental conditions:

- Microsoft Visual Basic version 2.0 or later
- OS such as MS Windows (version 3.1 or later) or Windows 95 in which above Visual Basic can operate.
- The GPIB board manufactured by the National Instruments corporation is mounted.
- BASIC library (NI-488 or NI-488.2) for the above GPIB board: Used as a library for Visual Basic.

**Note 2:**

The number on the left of the program list is the line number used for the program explanation. Do not write the number in the program.

**Note 3:**

Because the sample programs are given mainly to explain the GPIB control procedures, the user interface related to screen display is simplified. For details on creating a practical user interface, refer to the handbook of Visual Basic. (See paragraph (3).)

**Note 4:**

The description of the sample programs in this section is arranged as follows because of restrictions on structured programming in Visual Basic and the number of pages:

- In each item, the project file “\*\*\*.mak” is used to manage required files.
- If routines described in previous paragraphs are required in each paragraph, only the part that calls these routines and reference paragraphs are described. When operating a routine, write the required routine in the code module file, and call this file (multiple files can also be specified) from the project file.

**Note 5:**

Be sure to write subroutine Form1\_click() of the program to the form file (with extension of. FRM).

## Section 7 Sample Programs

---

### (2) Common module

This paragraph describes the program module used commonly when writing the sample programs:

#### 1) Response message read module

To simplify the program, create the following routines based on the functions provided by the BASIC library for the GPIB board to read response messages.

Code module file: RESP01.BAS

```
1 Function ReceiveResp() As String '
 Response message processing routine
2 Dim read_data$, read_term$
3 Dim i%
4 '
5 read_data$ = Space$(257) '
 Clears receiving buffer.
6 read_term$ = Chr$(10) '
 Reads the terminator as LF.
7 '
8 Do
9 Call ibrd(Ans%, read_data$) '
 Receives a response message.
10 If ibsta% < 0 Then '
 Displays an error if it occurs in reception
 process.
11 ReceiveResp$ = ""
12 MsgBox "Data Read Address = " & Str$(RCA%),
 MB_IconStop, "Data Error !"
13 End
14 Else
15 i% = InStr(read_data$, read_term$)
16 ReceiveResp$ = Mid$(read_data$, 1, i% - 1) '
 Accepts the terminator for the response
 message.
17 Exit Do
18 End If
19 Loop
20 End Function
```

## 7.2 Sample Program (Example of Program Using Visual Basic)

### 2) SG output control module

MX880201A uses downlink and uplink RF signals together for measurement. Therefore, the transmission measurement program also requires SG output control.

Code module file: SGOUT. BAS

```
1 Sub SG_out (Control%) '
 Processing routine for output control.
2 Dim Stat As String * 40'
 Variable for securing information for cur-
 rent measurement screen.
3 '
4 Call ibwrt (Ans%, "MEAS?") '
 Reads current measurement screen infor-
 mation.
5 Stat = ReceiveResp()
6 If Control% <> 0 Then
7 Call ibwrt (Ans%, "MEAS BER") '
 Moves to BER measurement screen.
8 Call ibwrt (Ans%, "LVL ON") '
 Outputs RX measurement signal.
9 Call ibwrt (Ans%, "MOD ON") '
 Modulates RX measurement signal.
10 Else
11 If Stat <> "SETCOM" And Stat <> "BER" Then
12 Call ibwrt (Ans%, "MEAS SETCOM") '
 Moves to common parameter setting
 screen.
13 End If
14 Call ibwrt (Ans%, "LVL OFF") '
 Stops outputting RX measurement signal.
15 End If
16 Call ibwrt (Ans%, "MEAS " & Stat$) '
 Returns to the original screen.
17 End Sub
```

Execute lines 4 and 5 to read the current measurement screen. Check argument Control% that controls SG output by executing line 6. If Control% is a value other than 0, execute lines 7 to 9 to turn on the SG output. If Control% is 0, execute lines 11 to 14 to turn off the SG output. Because the SG output can be set on the BER Measurement or Common Parameter screen, if another screen is displayed, execute line 7 or lines 11 to 13 to change the screen.

Execute line 16 to return to the original measurement screen.

## Section 7 Sample Programs

---

### 3) Form file

As described in Note 3 above, the display window data of the form file (file name FORM\*\*\*.FRM) is simplified. Write the contents indicating the display window data described below into the description of frame files in paragraph 7.2.2 and later.

#### **Note:**

The asterisks after "FORM" below indicate the form file name. (For example, set FORM\*\*\* to FORM201 for file FORM201.FRM.)

For file name FORM201.FRM

```
1 VERSION 2.00 1VERSION 2.00
2 Begin Form Form*** 2 Begin Form Form201
3 Caption = "Form***" 3 Caption = "Form202"
4 Height = 8235 4 Height = 8235
5 Left = 1035 5 Left = 1035
6 LinkTopic = "Form***" 6 LinkTopic = "Form202"
7 ScaleHeight = 7830 7 ScaleHeight = 7830
8 ScaleWidth = 7965 8 ScaleWidth = 7965
9 Top = 1230 9 Top = 1230
10 Width = 8085 10 Width = 8085
11 End
 11 End
 12
 13 Sub Form_click ()
 14 Call initial_gpib
 15 Call Set_TX_parameter
 16 End Sub
```

## 7.2.2 Initializing the MT8801C

<Example 1.1> Initializing the MT8801C

1) Project file: SMPL101.MAK

```

1 FORM101.FRM Specifies the form file.
2 INIT001.BAS Indicates the code file of the initialization
 module.
3 VBIB.BAS Specifies the GPIB library file.
4 NIGLOBAL.BAS Specifies the GPIB library file.
5 ProjWinSize=87,394,243,136
6 ProjWinShow=2

```

Lines 1 and 2 indicate that the files described below are used. Lines 3 and 4 specify the GPIB control library to be used. If the directory containing these files is not located where project file SMPL001.MAK is located, also specify the directory.

2) Form file: FORM101.FRM

Write the following additional procedures:

```

1 Sub Form_click () Executed when the form file is clicked.
2 Call initial_gpib' Calls the GPIB initialization routine.
3 End Sub

```

These procedures become main routines to call the initialization routine of the GPIB interface. When the mouse button is clicked on the Form101 window, initial\_gpib is executed.

3) Code module file: INIT001.BAS

```

1 '-----
2 ' MT8801C GPIB Sample Program
3 ' Initialize
4 '-----
5 '
6 Global Const RCA% = 1' Defines the MT8801C address in variable
 RCS.
7 Global Ans%' Variable for GPIB board
8 '
9 Sub initial_gpib ()' GPIB initialization routine
10 Call ibdev(0, RCA%, 0, 0, 1, 0, Ans%)'
 Initializes the GPIB board in the controller.
11 Call ibsic(Ans%)' Initializes the interface function.
12 Call ibclr(Ans%)' Clears the MT8801C device.
13 Call ibwrt(Ans%, "TRM 0")'
 Sets the GPIB send terminator of the
 MT8801C to LF.
14 Call ibwrt(Ans%, "INI")'
 Initializes the MT8801C.
15 End Sub

```

## Section 7 Sample Programs

---

Appendix B of the volume "Panel Operations" describes the parameters to be initialized by the above programs.

Use the GPIB address value defined on the Instrument Setup screen of the MT8801C as the address value on line 6 (see paragraph 3.2).

Lines 9 to 15 are initialization routines of the GPIB interface.

Line 10 initializes the GPIB board on the controller and sets the variable Ans%. No time-out is set here, but an appropriate time-out value can be set if necessary.

Line 11 initializes the GPIB interface function (it does not initialize any other function).

Line 12 performs initialization related to GPIB message exchange of the MT8801C.

Line 14 initializes the MT8801C device (initialization related to measurement).

The GPIB commands for device initialization are classified into IP, PRE, INI, and \*RST. Use IP, PRE, and INI as the same function. The initialization range of the \*RST command is wider than that of other initialization commands.

For the initialization range, see Section 5.

Generally, execute INI and \*RST as follows:

- 1) Use INI and \*RST to set the device to be controlled (MT8801C) to the initial state.
- 2) Use the program command to set the required functions.

By using this method, the device can be prevented from being controlled with unnecessary functions set.

### 7.2.3 Transmission (TX) measurement

#### (1) Setting the TX measurement parameters

<Example 2.1> Setting the TX measurement parameters (carrier frequency, reference level, and burst type) in the MT8801C.

##### 1) Project file: SMPL201.MAK

- |   |                            |                                                                              |
|---|----------------------------|------------------------------------------------------------------------------|
| 1 | FORM201.FRM                | Specifies the form file.                                                     |
| 2 | INIT001.BAS                | Use the code file of the initialization module described in paragraph 7.2.2. |
| 3 | SETTX.BAS                  | Code file of modules for setting the TX measurement parameters               |
| 4 | VBIB.BAS                   |                                                                              |
| 5 | NIGLOBAL.BAS               |                                                                              |
| 6 | ProjWinSize=87,394,243,136 |                                                                              |
| 7 | ProjWinShow=2              |                                                                              |

Specify the code module file of the initialization routine described in the previous paragraph as the code file on line 2.

##### 2) Form file: FORM201.FRM

Write the following additional procedures:

- |   |                        |                                         |
|---|------------------------|-----------------------------------------|
| 1 | Sub Form_click ()      |                                         |
| 2 | Call initial_gpib'     | Calls the GPIB initialization routine.  |
| 3 | Call Set_TX_parameter' | Calls the TX parameter setting routine. |
| 4 | End Sub                |                                         |

##### 3) Code module file: SETTXBAS

- ```

1  '-----
2  ' MT8801C GPIB Sample Program
3  ' Set TX Parameters
4  '-----
5  '
6  '
7  '
8  Sub Set_TX_parameter ()
9  '
10 Call ibwrt (Ans%, "SYS IS136") '
    Selects IS-136 measuring system.
11 Call ibwrt (Ans%, "PNLMD SYSTEM") '
    Moves to system setting screen.
12 Call ibwrt (Ans%, "RFINOUT MAIN") '
    Uses Main Input/Output connector.
13 Call ibwrt (Ans%, "PNLMD TESTER") '
    Sets measurement mode to "TX/RX tester."

```

Section 7 Sample Programs

```
14  '
15  Call ibwrt (Ans%, "MEAS SETCOM") '
                                     Moves to common parameter setting
                                     screen.
16  Call ibwrt (Ans%, "DUTCTRL NONE") '
                                     Sets DUT Control to One.
17  Call ibwrt (Ans%, "FREQBAND D800MHZ") '
                                     Sets frequency band to digital 800 MHz band.
18  Call ibwrt (Ans%, "CHAN 1") '
                                     Sets measurement frequency channel to CH1.
19  Call ibwrt (Ans%, "RFLVL 10DBM") '
                                     Sets TX reference level to 10 dBm.
20  Call ibwrt (Ans%, "OLVL -60DBM") '
                                     Sets output level to -60 dBm.
21  Call ibwrt (Ans%, "MEASOBJ MSDTC") '
                                     Sets measurement object signal to "MS-DTC."
22  Call ibwrt (Ans%, "SLTNUM 1") '
                                     Sets measurement slot number to 1.
23  Call ibwrt (Ans%, "DVCC 01") '
                                     Sets DVCC to 01H.
24  '
25  Call ibwrt (Ans%, "MEAS SETDTX") '
                                     Moves to setting screen for digital TX parameter.
26  Call ibwrt (Ans%, "MEASTRG SYNC") '
                                     Sets burst catch trigger to Sync word.
27  End Sub
```

Lines 8 to 27 are the routines for setting parameters for digital TX measurement.

Select the IS-136 measurement system in line 10.

Select the RF signal input-output connectors to be used in lines 11 and 12.

Set the parameters for the digital TX measurement on the Setup Common Parameter and Setup Digital TX Measure Parameter screens.

Lines 15 to 23 show the settings on the Setup Common Parameter screen. Set the center measurement frequency, reference measurement level, downlink signal output level, and signals to be measured here.

Lines 25 and 26 show the settings on the Setup digital TX Measure Parameter screen. Set the parameters (burst catch trigger) of the RF signals to be measured.

NOTE:

Handling the measurement-system select command

Execution of measurement system selection by line 10 may take a long time. All measurement parameters are initialized. If the system does not need to be selected, use the REM statement to make line 10 into the following comment line.

```
10  Rem Call ibwrt (Ans%, "SYS IS136")
```

7.2 Sample Program (Example of Program Using Visual Basic)

(2) Executing modulation analysis and reading the result of analysis

<Example 2.2> Executing modulation analysis and reading the result of measuring the vector error.

1) Project file: SMPL202.MAK

1	FORM202.FRM	
2	INIT001.BAS	Use the code file of the initialization module described in paragraph 7.2.2.
3	RESP01.BAS	Use the code file of the response reading module described in paragraph 7.2.1 (2).
4	SETTX.BAS	Indicates the code file of the parameter setup module for TX measurement described in paragraph 7.2.3 (1).
5	SGOUT.BAS	Indicates the code file of the SG output control module described in paragraph 7.2.1 (2).
6	MODANA01.BAS	Indicates the code file of the modulation analysis module.
7	VBIB.BAS	
8	NIGLOBAL.BAS	
9	ProjWinSize=87,394,243,136	
10	ProjWinShow=2	

2) Form file: FORM202.FRM

Write the following additional procedures:

```
1 Sub Form_click ()
2 Call initial_gpib' Calls the GPIB initialization routine.
3 Call Set_TX_parameter'
                                     Calls the TX parameter setup routine.
4 Call SG_out(1)' Calls the test signal output routine.
5 Call mod_analysis1' Calls the modulation analysis routine.
6 Call SG_out(0)' Calls the test signal output routine.
7 End Sub
```

3) Code module file: MODANA01.BAS

```
1 '-----
2 ' MT8801C GPIB Sample Program
3 ' Modulation analysis(1)
4 '-----
5 '
6 '
7 '
8 Sub mod_analysis1 ()
```

Section 7 Sample Programs

```
9 Dim Verr$, PVer$
10 '
11 Call ibwrt (Ans%, "MEAS MODANAL") '
                                Transits to the Modulation Analysis
                                screen.
12 Call ibwrt (Ans%, "STORAGE NRM") '
                                Sets the normal mode.
13 Call ibwrt (Ans%, "SWP") '
                                Starts measurement.
14 '
15 Call ibwrt (Ans%, "VECTERR?") '
                                Inquires about the measured value of an
                                rms vector error.
16 Verr$ = ReceiveResp()
17 Call ibwrt (Ans%, "PVECTERR?") '
                                Inquires about the measured value of a
                                peak vector error.
18 PVer$ = ReceiveResp()
19 '
20 Form202.Print "RMS vector error = "; Val (Verr$);
    "% (rms) "
21 Form202.Print "Peak vector error = "; Val (PVer$);
    "% "
22 End Sub
```

Lines 11 to 13 execute modulation analysis. Set the parameter (measurement mode) of the Modulation Analysis screen on line 12.

Execute line 13 to start modulation analysis measurement. If a SWP command is set, the next command acceptance enters the wait state until the measurement ends.

Execute lines 15 to 18 to read a vector error (the RMS and maximum values), which is the result of the measurement.

7.2 Sample Program (Example of Program Using Visual Basic)

(3) Executing modulation analysis and reading the result of analysis (reading analytical data row in ASCII format)

<Example 2.3> Executing modulation analysis and reading the data row of the vector error at each symbol.

1) Project file: SMPL203.MAK

1	FORM203.FRM	
2	INIT001.BAS	Use the code file of the initialization module described in paragraph 7.2.2.
3	RESP01.BAS	Use the code file of the response reading module described in paragraph 7.2.1 (2).
4	SETTX.BAS	Indicates the code file of the parameter setup module for TX measurement described in paragraph 7.2.3 (1).
5	SGOUT.BAS	Indicates the code file of the SG output control module described in paragraph 7.2.1 (2).
6	MODANA02.BAS	Indicates the code file of the modulation analysis module.
7	VBIB.BAS	
8	NIGLOBAL.BAS	
9	ProjWinSize=87,394,243,136	
10	ProjWinShow=2	

2) Form file: FORM203.FRM

Write the following additional procedures:

1	Sub Form_click ()	
2	Call initial_gpib'	Calls the GPIB initialization routine.
3	Call Set_TX_parameter'	
		Calls the TX parameter setup routine.
4	Call SG_out(1)'	Calls the test signal output routine.
5	Call mod_analysis2'	Calls the modulation analysis routine.
6	Call SG_out(0)'	Calls the test signal output routine.
7	End Sub	

3) Code module file: MODANA02.BAS

```
1 '-----  
2 ' MT8801C GPIB Sample Program  
3 ' Modulation analysis(2: ASCII Read)  
4 '-----  
5 '  
6 '  
7 '  
8 Sub mod_analysis2 ()
```

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```
9   Const NUM% = 156 '   Specifies the number of data items to be
                          read.
10  Dim TRACE%(NUM%) '   Declares the data storage array.
11  Dim Verr$
12  Dim I%
13  '
14  Call ibwrt (Ans%, "MEAS WAVEFORM") '
                          Transits to the Vector Error Waveform
                          Display screen.
15  Call ibwrt (Ans%, "TRFORM VECT") '
                          Transits to the Vector Error Waveform
                          Display screen.
16  Call ibwrt (Ans%, "STORAGE NRM") '
                          Sets the normal mode.
17  Call ibwrt (Ans%, "BIN 0") '
                          Sets the read data format to ASCII.
18  Call ibwrt (Ans%, "SWP") '
                          Starts measurement.
19  '
20  For I% = 0 To NUM% - 1
21  Call ibwrt (Ans%, "XMV? " & Str$(I%) & ",1") '
                          Inquires about the measured value of the
                          vector error.
22  Verr$ = ReceiveResp()
23  TRACE%(I%) = Val(Verr$) '
                          Converts ASCII format to a numeric value.
24  Next I%
25  '
26  For I% = 0 To NUM% - 1
27  Form203.Print "Vector Error at "; I% + 6; "symbol
                = "; TRACE%(I%) / 100; "%"
28  Next I%
29  End Sub
```

Line 14 sets the modulation analysis measurement mode (waveform display mode).

Line 16 sets the measurement mode (normal mode).

Line 17 sets the format of the measurement result to ASCII.

Start the measurement in line 18. The SWP command stops accepting the next command until the measurement terminates.

Execute lines 20 to 24 to read the measurement data and store it in array Trace. The data read here is in ASCII format. Use function Val() to convert the data to a real number.

7.2 Sample Program (Example of Program Using Visual Basic)

(4) Executing modulation analysis and reading the result of analysis (reading analytical data in binary format)

<Example 2.4> Executing modulation analysis and reading the data row of a vector error at each symbol in binary format.

1) Project file: SMPL204.MAK

1	FORM204.FRM	
2	INIT001.BAS	Use the code file of the initialization module described in paragraph 7.2.2.
3	RESP01.BAS	Use the code file of the response reading module described in paragraph 7.2.1 (2).
4	SETTX.BAS	Indicates the code file of the parameter setup module for TX measurement described in paragraph 7.2.3 (1).
5	SGOUT.BAS	Indicates the code file of the SG output control module described in paragraph 7.2.1 (2).
6	MODANA03.BAS	Indicates the code file of the modulation analysis module.
7	VBIB.BAS	
8	NIGLOBAL.BAS	
9	ProjWinSize=87,394,243,136	
10	ProjWinShow=2	

2) Form file: FORM204.FRM

Write the following additional procedures:

1	Sub Form_click ()	
2	Call initial_gpib'	Calls the GPIB initialization routine.
3	Call Set_TX_parameter'	
		Calls the TX parameter setup routine.
4	Call SG_out(1)'	Calls the test signal output routine.
5	Call mod_analysis3'	Calls the modulation analysis routine.
6	Call SG_out(0)'	Calls the test signal output routine.
7	End Sub	

3) Code module file: MODANA03.BAS

```
1 '-----
2 ' MT8801C GPIB Sample Program
3 ' Modulation analysis(3: Binary Read)
4 '-----
5 '
6 '
7 '
8 Sub mod_analysis3 ()
```

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```
9   Const NUM% = 156 '   Specifies the number of data items to be
                          read.
10  Dim TRACE%(NUM%) '   Declares the data storage array.
11  Dim dbuf%(NUM%) '   Declares the receive data buffer.
12  Dim UPRBYTE%, LWRBYTE%
13  Dim I%
14  '
15  '
16  Call ibwrt (Ans%, "MEAS WAVEFORM") '
                          Transits to the Vector Error Waveform
                          Display screen.
17  Call ibwrt (Ans%, "TRFORM VECT") '
                          Transits to the Vector Error Waveform
                          Display screen.
18  Call ibwrt (Ans%, "STORAGE NRM") '
                          Sets the normal mode.
19  Call ibwrt (Ans%, "BIN 1") '
                          Sets the read data format to binary.
20  Call ibwrt (Ans%, "SWP") '
                          Starts measurement.
21  '
22  Call ibwrt (Ans%, "XMV? Ø," + Str$(NUM%)) '
                          Inquiries about the measured value of a
                          vector error.
23  Call ibrdi (Ans%, dbuf%(), NUM% * 2) '
                          Receives the binary data.
24  For I% = Ø To NUM% - 1
25  UPRBYTE% = dbuf%(I%) And &HFF '
                          Fetches the upper byte data.
26  LWRBYTE% = (dbuf%(I%) / &H100) And &HFF '
                          Fetches the lower byte data.
27  If UPRBYTE% >= 128 Then UPRBYTE% = UPRBYTE% - &H100 '
                          Corrects a minus value.
28  TRACE%(I%) = UPRBYTE% * &H100 + LWRBYTE% '
                          Converts data to a 2-byte decimal number.
29  Next I%
30  '
31  For I% = Ø To NUM% - 1
32  form204.Print "Vector Error at "; I% + 6; "symbol
= "; TRACE%(I%) / 100; "%"
33  Next I%
34  End Sub
```

7.2 Sample Program (Example of Program Using Visual Basic)

Line 19 "BIN 1" sets the data format to binary. Line 22 inquires about data after one measurement is executed by line 20. Line 23 receives the data of the NUM%*2 bytes at controller.

Each element of array dbuf%() in the receive data is 2- byte unit. Each element of dbuf%() with its upper and lower bytes exchanged is the correct value because of the data format in the controller and the storage sequence of arrays in the receive data.

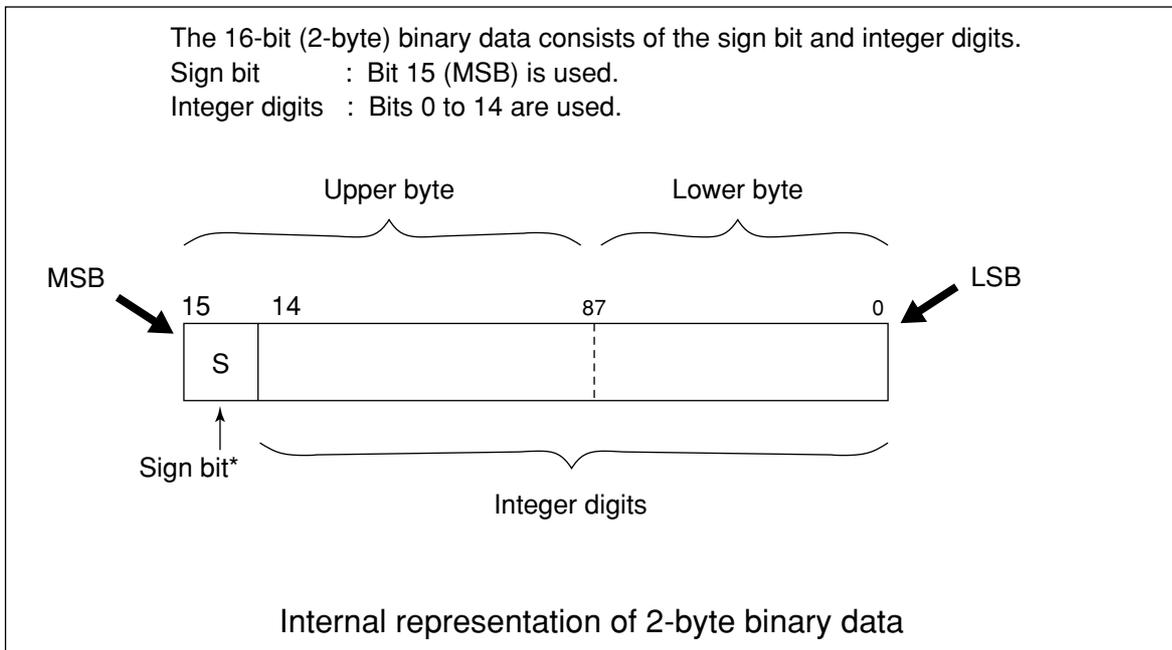
Lines 24 to 29 convert the 2-byte binary data to a decimal number and store it in variable TRACE(1). If the data is a minus value, line 27 converts it to a correct value.

Section 7 Sample Programs

[Transferring 2-byte binary data]

The 2-byte binary data can represent the 65,536 integers from -32,768 to 32,767 as shown in the figure below. The lower bytes of the data are sent after the upper byte.

<u>16-Bit Binary</u>	<u>With Sign</u>	<u>No Sign</u>
1000000000000000	-32768	32768
1000000000000001	-32767	32769
1000000000000010	-2766	32770
1111111111111101	-3	65533
1111111111111110	-2	65534
1111111111111111	-1	65535
0000000000000000	0	0
0000000000000001	1	1
0000000000000010	2	2
0000000000000011	3	3
0111111111111101	32765	32765
0111111111111110	32766	32766
0111111111111111	32767	32767



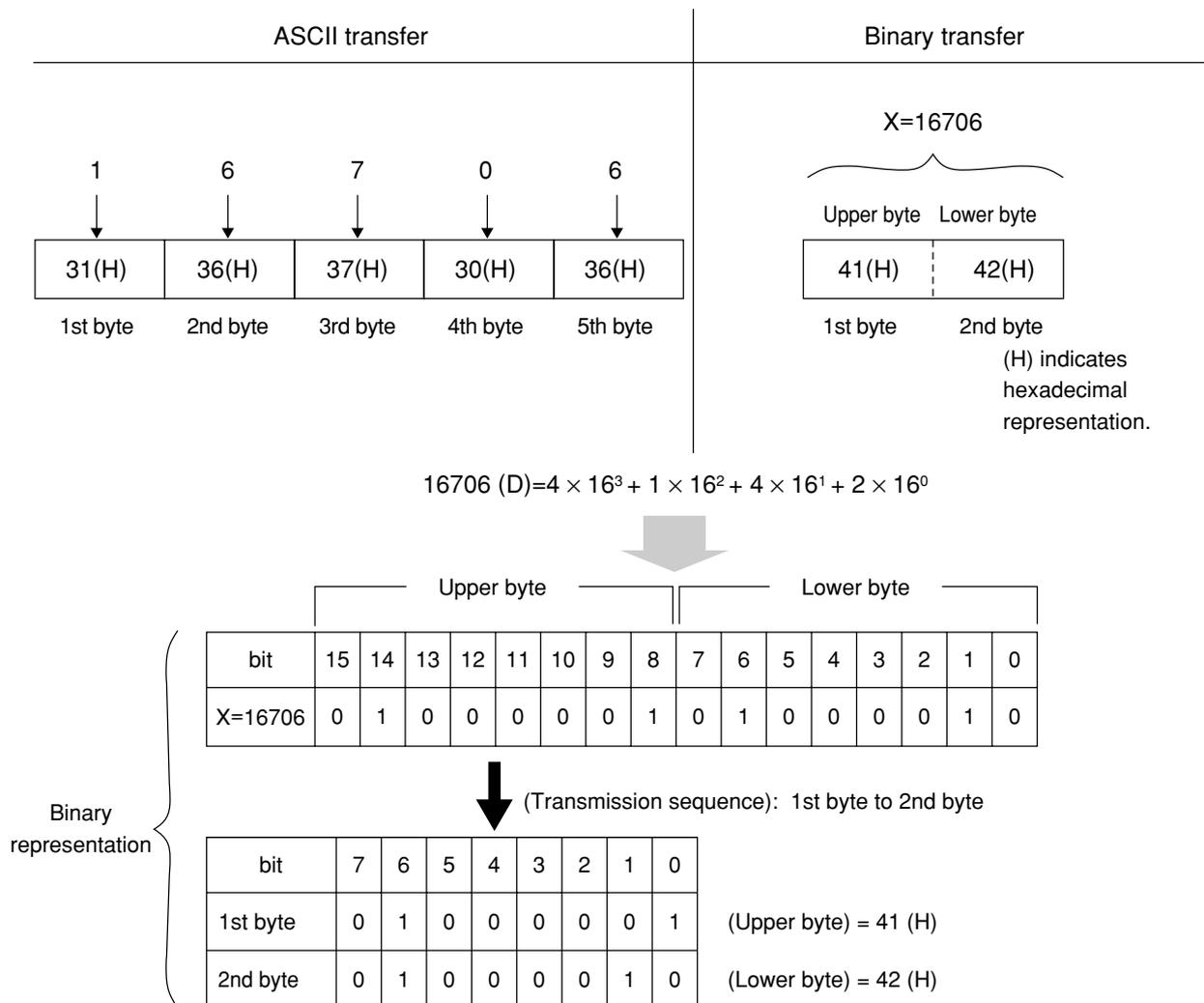
Note*:

When a minus value is stored in a numeric variable, sign bit 1 is set in the MSB to indicate that the stored value is a minus value. The minus value is stored in the numeric variable as a two's complement.

7.2 Sample Program (Example of Program Using Visual Basic)

For example, when integer value 16,706 is transferred in ASCII and binary formats are compared.

As shown in the figure below, five bytes are required to transfer the data in ASCII format. In this case, the ASCII code must be converted to binary code. On the other hand, only two bytes are required to transfer the data in binary format. In this case, the data format does not need to be converted. Therefore, binary transfer is usually used for high-speed data transfer.



(5) RF power measurement (average power measurement)

<Example 2.5> Measuring RF power and reading average power.

1) Project file: SMPL205.MAK

- 1 FORM205.FRM
- 2 INIT001.BAS Uses file of the initialization module in paragraph 7.2.2.
- 3 RESP01.BAS Uses code file of the response read module in paragraph 7.2.1 (2).
- 4 SETTX.BAS This is the code file of the parameter setting module for TX measurement in paragraph 7.2.3 (1).
- 5 SGOUT.BAS This is the code file of the SG output control module in paragraph 7.2.1 (2).
- 6 RFPWR01.BAS This is the code file of the RF power measurement module.
- 7 VBIB.BAS
- 8 NIGLOBAL.BAS
- 9 ProjWinSize=87,394,243,136
- 10 ProjWinShow=2

2) Form file: FORM205.FRM

The following procedures are added and described.

- 1 Sub Form_click ()
- 2 Call initial_gpib' Calls GPIB initialization routine.
- 3 Call Set_TX_parameter' Calls TX parameter setting routine.
- 4 Call SG_out (1) ' Calls test signal output routine.
- 5 Call RF_power1' Calls RF power measurement routine.
- 6 Call SG_out (0) ' Calls test signal output routine.
- 7 End Sub

3) Code module file: RFPWR01.BAS

- 1 '-----
- 2 ' MT8801C GPIB Sample Program
- 3 ' RF power measurement (1)
- 4 '-----
- 5 '
 - 6 '
 - 7 '
 - 8 Sub RF_power1 ()
 - 9 Dim sbuf As String * 40
 - 10 '
 - 11 Call ibwrt (Ans%, "MEAS RFPWR") '
 - Moves to RF power measurement screen.

7.2 Sample Program (Example of Program Using Visual Basic)

```
12 Call ibwrt (Ans%, "WINDOW SLOT") '  
           Sets waveform display to Slot.  
13 Call ibwrt (Ans%, "UNIT DBM") '  
           Sets measurement unit to dBm.  
14 Call ibwrt (Ans%, "ADJRNG") '  
           Optimizes power measurement range.  
15 '  
16 Call ibwrt (Ans%, "STORAGE NRM") '  
           Sets the mode to normal mode.  
17 Call ibwrt (Ans%, "SWP") '  
           Starts measurement.  
18 '  
19 Call ibwrt (Ans%, "TXPWR?") '  
           Inquires the RF power measurement value.  
20 sbuf = ReceiveResp()  
21 Form205.Print "TX RF Power = "; Val(sbuf); "dBm"  
22 End Sub
```

Set the RF power measurement mode in line 11.

Line 12 sets the MT8801C screen to slot display.

Set the measurement unit to dBm in line 13.

Line 14 optimizes the range to improve the precision of the RF power measurement. The ADJRNG command stops accepting the next command until range optimization terminates.

Start the measurement in line 17. The SWP command stops accepting the next command until the measurement terminates.

Read the measurement results in lines 19 and 20.

(6) RF power measurement (power measurement at marker point)

<Example 2.6> Measuring RF power and reading power at specified marker point.

1) Project file: SMPL206.MAK

- | | | |
|---|-------------|--|
| 1 | FORM206.FRM | |
| 2 | INIT001.BAS | Uses the code file of the initialization module in paragraph 7.2.2. |
| 3 | RESP01.BAS | Uses the code file of the response read module in paragraph 7.2.1 (2). |
| 4 | SETTX.BAS | This is the code file of the parameter setting module for TX measurement in paragraph 7.2.3 (1). |
| 5 | SGOUT.BAS | This is the code file of the SG output control module in paragraph 7.2.1 (2). |
| 6 | RFPWR02.BAS | This is the code file of the RF power measurement module. |

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```
7 VBIB.BAS
8 NIGLOBAL.BAS
9 ProjWinSize=87,394,243,136
10 ProjWinShow=2
```

2) Form file: FORM206.FRM

The following procedures are added and described.

```
1 Sub Form_click ()
2 Call initial_gpib' Calls GPIB initialization routine.
3 Call Set_TX_parameter'
                                     Calls TX parameter setting routine.
4 Call SG_out(1)' Calls test signal output routine.
5 Call RF_power2' Calls RF power measurement routine.
6 Call SG_out(0)' Calls test signal output routine.
7 End Sub
```

3) Code module file: PFPWR02.BAS

```
1 '-----
2 ' MT8801C GPIB Sample Program
3 ' RF power measurement (2)
4 '-----
5 '
6 '
7 '
8 Sub RF_power2 ()
9 Const Pmak! = 10# '
                                     Specified position of marker point (10.0 th
                                     symbol).
10 Dim sbuf As String * 40
11 '
12 Call ibwrt (Ans%, "MEAS RFPWR") '
                                     Moves to RF power measurement screen.
13 Call ibwrt (Ans%, "WINDOW SLOT") '
                                     Sets waveform display to Slot.
14 Call ibwrt (Ans%, "MKR NRM") '
                                     Displays the normal marker.
15 Call ibwrt (Ans%, "UNIT DBM") '
                                     Sets measurement unit to dBm.
16 Call ibwrt (Ans%, "ADJRNG") '
                                     Optimizes power measurement range.
17 '
18 Call ibwrt (Ans%, "STORAGE NRM") '
                                     Sets the mode to normal mode.
19 Call ibwrt (Ans%, "SWP") '
                                     Starts measurement.
```

7.2 Sample Program (Example of Program Using Visual Basic)

```
20 '
21 Call ibwrt (Ans%, "MKRS " + Str$(Pmak!)) '
           Specifies marker point.
22 Call ibwrt (Ans%, "MKL?") '
           Inquires about measurement level of
           marker point.
23 sbuf = ReceiveResp()
24 Form206.Print "RF power at marker "; Pmak!; "sym-
           bol = "; Val(sbuf); "dB"
25 End Sub
```

The marker is displayed in line 14.

Start the measurement in line 19. The SWP command stops accepting the next command until the measurement terminates.

Specify the marker point in line 21. The marker point is the value specified in Pmak in line 9 (10.0th symbol).

Read the data on the marker point in lines 22 and 23.

(7) RF power measurement (reading of measured data string)

<Example 2.7> Measuring RF power, reading and displaying data string

1) Project file: SMPL207.MAK

- 1 FORM206.FRM
- 2 INIT001.BAS Uses code file of the initialization module in paragraph 7.2.2.
- 3 RESP01.BAS Uses code file of the response read module in paragraph 7.2.1 (2).
- 4 SETTX.BAS This is the code file of the parameter setting module for TX measurement in paragraph 7.2.3 (1).
- 5 SGOUT.BAS This is the code file of the SG output control module in paragraph 7.2.1 (2).
- 6 RFPWR03.BAS This is the code file of the RF power measurement module.
- 7 VBIB.BAS
- 8 NIGLOBAL.BAS
- 9 ProjWinSize=87,394,243,136
- 10 ProjWinShow=2

2) Form file: FORM207.FRM

The following procedures are added and described.

- 1 Sub Form_click ()
- 2 Call initial_gpib' Calls GPIB initialization routine.
- 3 Call Set_TX_parameter' Calls TX parameter setting routine.
- 4 Call SG_out(1)' Calls test signal output routine.
- 5 Call RF_power3' Calls RF power measurement routine.
- 6 Call SG_out(0)' Calls test signal output routine.
- 7 End Sub

3) Code module file: RFPWR03.BAS

- 1 '-----
- 2 ' MT8801C GPIB Sample Program
- 3 ' RF power measurement (3)
- 4 '-----
- 5 '
- 6 '
- 7 '
- 8 Sub RF_power3 ()
- 9 Const NUM% = 687' Specifies the number of data items to be read.
- 10 Dim Trace%(NUM%)' Declares array for storing data.

7.2 Sample Program (Example of Program Using Visual Basic)

```
11 Dim sbuf As String * 40
12 Dim I%
13 '
14 Call ibwrt (Ans%, "MEAS RFPWR") '
    Moves to RF power measurement screen.
15 Call ibwrt (Ans%, "WINDOW SLOT") '
    Sets waveform display to Slot.
16 Call ibwrt (Ans%, "UNIT DBM") '
    Sets measurement unit to dBm.
17 Call ibwrt (Ans%, "BIN 0") '
    Outputs measurement results in ASCII format.
18 Call ibwrt (Ans%, "ADJRNG") '
    Optimizes power measurement range.
19 '
20 Call ibwrt (Ans%, "STORAGE NRM") '
    Sets the mode to normal mode.
21 Call ibwrt (Ans%, "SWP") '
    Starts measurement.
22 '
23 For I% = 0 To NUM% - 1
24 Call ibwrt (Ans%, "XMD? " + Str$(I% * 10) + ",1") '
    Inquires about result of RF power measurement.
25 sbuf = ReceiveResp()
26 Trace%(I%) = Val(sbuf) '
    Converts read data to numerical value.
27 Next I%
28 '
29 For I% = 0 To NUM% - 1
30 Form207.Print "RF Power at "; I% - 100; "symbol =
    "; Trace%(I%) / 100; "dB"
31 Next I%
32 End Sub
```

Set the reading format of measurement results to ASCII format in line 17.

Start the measurement in line 21. The SWP command stops accepting the next command until the measurement terminates.

Read the measurement results in lines 23 to 27. The RF power measurement waveform can be read in units of 0.1 symbol as described in paragraph 8.2 (2), but it is read in units of one symbol here.

(8) RF power measurement (setting of template)

<Example 2.8> Setting the template for RF power measurement

1) Project file: SMPL208.MAK

- 1 FORM208.FRM
- 2 INIT001.BAS Uses the code file of the initialization module in paragraph 7.2.2.
- 3 SETTX.BAS This is the code file of the parameter setting module for TX measurement in paragraph 7.2.3 (1).
- 4 RFTMP01.BAS This is the code file for the RF power template setting module.
- 5 VBIB.BAS
- 6 NIGLOBAL.BAS
- 7 ProjWinSize=87,394,243,136
- 8 ProjWinShow=2

2) Form file: FORM208.FRM

The following procedures are added and described.

- 1 Sub Form_click ()
- 2 Call initial_gpib' Calls GPIB initialization routine.
- 3 Call Set_TX_parameter' Calls TX parameter setting routine.
- 4 Call Set_template' Calls RF power template setting routine.
- 5 End Sub

3) Code module file: RFTMP01.BAS

- 1 '-----
- 2 ' MT8801C GPIB Sample Program
- 3 ' RF power (4) Set Template
- 4 '-----
- 5 '
- 6 '
- 7 '
- 8 Sub Set_template ()
- 9 Call ibwrt (Ans%, "MEAS SETTEMP") ' Moves to template setting screen of RF power.
- 10 Call ibwrt (Ans%, "OFFLVL DBM") ' Sets the unit of standard level of Burst OFF to dBm.
- 11 Call ibwrt (Ans%, "TEMPLVL 1, -56") ' Sets the value of standard level 1 to -56 dBm.
- 12 Call ibwrt (Ans%, "TEMPLVL 2, 4") ' Sets the value of standard level 2 to +4 dB.
- 13 Call ibwrt(Ans%, "TEMPLVL 3, -14")' Sets the value of standard level 3 to -14 dB.
- 14 End Sub

By line 9, the RF power template setting screen is set.

By lines 10 to 13, the setting of template (level setting) is made.

7.2 Sample Program (Example of Program Using Visual Basic)

(9) Power meter (Average power measurement)

<Example 2.9> Measuring RF average power using a power meter.

1) Project file: SMPL209.MAK

1	FORM209.FRM	
2	INIT001.BAS	Uses the code file of the initialization module in paragraph 7.2.2.
3	RESP01.BAS	Uses the code file of the response read module in paragraph 7.2.1 (2).
4	SETTX.BAS	This is the code file of the parameter setting module for TX measurement in paragraph 7.2.3 (1).
5	SGOUT.BAS	This is the code file of the SG output control module in paragraph 7.2.1 (2).
6	PWMTR.BAS	This is the code file of the power meter measurement module.
7	VBIB.BAS	
8	NIGLOBAL.BAS	
9	ProjWinSize=87,394,243,136	
10	ProjWinShow=2.	

2) Form file: FORM209.FRM

The following procedures are added and described.

1	Sub Form209_click ()	
2	Call initial_gpib'	Calls GPIB initialization routine.
3	Call Set_TX_parameter'	
		Calls TX parameter setting routine.
4	Call SG_out(1)'	Calls test signal output routine.
4	Call power_meter'	Calls power meter routine.
6	Call SG_out(0)'	Calls test signal output routine.
5	End Sub	

3) Code module file: PWMTR.BAS

```
1 '-----
2 ' MT8801C GPIB Sample Program
3 ' Power meter
4 '-----
5 '
6 '
7 '
8 Sub power_meter ()
9 Dim sbuf As String * 40
10 '
11 Call ibwrt(Ans%, "MEAS PWRMTR")'
```

Moves to power meter measurement screen.

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```
12 Call ibwrt (Ans%, "ADJRNG") '  
                                     Optimizes power measurement range.  
13 '  
14 Call ibwrt (Ans%, "SWP") '  
                                     Starts measurement.  
15 '  
16 Call ibwrt (Ans%, "POWER? DBM") '  
                                     Inquires about result of power measure-  
                                     ment.  
17 sbuf = ReceiveResp()  
18 Form209.Print "Average RF Power = "; Val(sbuf);  
   "dBm"  
19 End Sub
```

Set the power meter measurement mode in line 11.

Set the optimum range in line 12. The ADJRNG command stops accepting the next command until the measurement terminates.

Start the measurement in line 14. The SWP command stops accepting the next command until the measurement terminates.

Read the measurement results in lines 16 and 17.

7.2 Sample Program (Example of Program Using Visual Basic)

(10) Power meter (zero point calibration)

<Example 2.10> Zero point calibration of power meter

1) Project file: SMPL210.MAK

1	FORM210.FRM	
2	INIT001.BAS	Uses the code file of the initialization module in paragraph 7.2.2.
3	RESP01.BAS	Uses the code file of the response reading module described in paragraph 7.2.1 (2).
4	SETTX.BAS	This is the code file of the parameter setting module for TX measurement in paragraph 7.2.3 (1).
5	SGOUT.BAS	Uses the code file of the SG output control module described in paragraph 7.2.1 (2).
6	ZEROSET.BAS	This is the code file for the zero point calibration module.
7	VBIB.BAS	
8	NIGLOBAL.BAS	
9	ProjWinSize=87,394,243,136	
10	ProjWinShow=2	

2) Form file: FORM210.FRM

The following procedures are added and described.

```
1 Sub Form_click ()
2 Call initial_gpib' Calls GPIB initialization routine.
3 Call Set_TX_parameter'
                                     Calls TX parameter setting routine.
4 Call zero_set' Calls zero point calibration routine.
5 End Sub
```

3) Code module file: ZEROSET.BAS

```
1 '-----
2 ' MT8801C GPIB Sample Program
3 ' Power meter (zero set)
4 '-----
5 '
6 '
7 '
8 Sub zero_set ()
9 Dim sbuf As String * 40
10 Dim Stat%, I%
11 '
12 Call SG_out (0) ' Sets the SG output to off.
```

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```
13 Call ibwrt (Ans%, "MEAS PWRMTR") '  
                                     Moves to power meter measurement  
                                     screen.  
14 Call ibwrt (Ans%, "*CLS") '  
                                     Clears GPIB status register.  
15 '  
16 Call ibwrt (Ans%, "ZEROSET") '  
                                     Starts adjustment of zero point.  
17 Do  
18 For I% = 0 To 10000: Next I%  
19 Call ibwrt (Ans%, "ESR2?") '  
20 sbuf = ReceiveResp()  
21 Stat% = Val(sbuf)  
22 Loop While (Stat% And 2) <> 2  
23 '  
24 Form210.Print "End of zero set for RF Power."  
25 End Sub
```

Turn off the RF input to this device before executing this program. Set the SG output to off in line 12 to set the RF input-output terminal to a no signal state.

Start the zero point calibration of the power meter in line 16.

Monitor completion of the zero point calibration (calibration termination bit of the END event status register) in lines 17 to 22.

(11) Measurement of occupied frequency bandwidth

<Example 2.11> Measuring occupied frequency bandwidth

1) Project file: SMPL211.MAK

1	FORM211.FRM	
2	INIT001.BAS	Uses the code file of the initialization module in paragraph 7.2.2.
3	RESP01.BAS	Uses the code file of the response read module in paragraph 7.2.1 (2).
4	SETTX.BAS	This is the code file of the parameter setting module for TX measurement in paragraph 7.2.3 (1).
5	SGOUT.BAS	This is the code file of the SG output control module in paragraph 7.2.1 (2).
6	OCCBW.BAS	This is the code file of the occupied frequency bandwidth measurement module.
7	VBIB.BAS	
8	NIGLOBAL.BAS	
9	ProjWinSize=87,394,243,136	
10	ProjWinShow=2	

2) Form file: FORM211.FRM

The following procedures are added and described.

1	Sub Form_click ()	
2	Call initial_gpib'	Calls GPIB initialization routine.
3	Call Set_TX_parameter'	Calls TX parameter setting routine.
4	Call SG_out(1)'	Calls test signal output routine.
5	Call occ_bw'	Calls occupied frequency bandwidth measurement routine.
6	Call SG_out(0)'	Calls test signal output routine.
7	End Sub	

3) Code module file: OCCBW.BAS

```
1 '-----
2 MT8802A GPLB Sample Program
3 ' OCC. BW
4 '-----
5 '
6 '
7 '
8 Sub occ_bw ()
9 Dim sbuf as string * 40
10 Dim Endsts%, I%
```

Section 7 Sample Programs

```
11  '  
12  Call ibwrt (Ans%, "MEAS OBW,HIGH") '  
                                     Moves to occupied frequency bandwidth  
                                     measurement (High Speed) screen.  
13  Call ibwrt (Ans%, "STORAGE AVG") '  
                                     Sets the mode to average mode.  
14  Call ibwrt (Ans%, "AVR 3") '  
                                     Sets average number to 3.  
15  Call ibwrt (Ans%, "ADJRNG") '  
                                     Optimizes measurement range.  
16  '  
17  Call ibwrt (Ans%, "*CLS") '  
                                     Clears GPIB status register.  
18  Call ibwrt (Ans%, "SNGLS") '  
                                     Starts measurement.  
19  '  
20  Do  
21  For I% = 0 To 10000: Next I%  
22  Call ibwrt (Ans%, "ESR2?") '  
                                     Confirms state of ending measurement.  
23  sbuf = ReceiveResp()  
24  Endsts% = Val(sbuf)  
25  Loop While (Endsts% And 16) <> 16  
26  '  
27  Call ibwrt (Ans%, "OCCBW?") '  
                                     Inquires about results of occupied fre-  
                                     quency bandwidth measurement.  
28  sbuf = ReceiveResp()  
29  Form211.Print "Occupied Bandwidth = "; Val(sbuf) /  
30  1000; "kHz"  
End Sub
```

Set the occupied frequency bandwidth measurement (high-speed measurement) mode in line 12.

Specify averaging of the measurement value in lines 13 and 14.

Start the measurement in line 18. In this example, the SNGLS command is used to start the measurement. Unlike the SWP command, the SNGLS command accepts the next command regardless of measurement termination.

For this processing, monitor measurement termination (the sweep measurement termination bit of the END event status register) in lines 20 to 25.

Specify the number of repetitions of the For-to-Next loop in line 21 so that the wait time for the GPIB control of the controller becomes about 50 ms.

Read the measurement results in lines 27 and 28 after checking that the measurement terminates.

(12) Measurement of adjacent channel leakage power

<Example 2.12> Measuring adjacent channel leakage power

1) Project file: SMPL212.MAK

1	FORM212.FRM	
2	INIT001.BAS	Uses the code file of the initialization module in paragraph 7.2.2.
3	RESP01.BAS	Uses the code file of the response read module in paragraph 7.2.1 (2).
4	SETTX.BAS	This is the code file of the parameter setting module for TX measurement in paragraph 7.2.3 (1).
5	SGOUT.BAS	This is the code file of the SG output control module in paragraph 7.2.1 (2).
6	ADJCH.BAS	This is the code file of the adjacent channel leakage power measurement module.
7	VBIB.BAS	
8	NIGLOBAL.BAS	
9	ProjWinSize=87,394,243,136	
10	ProjWinShow=2	

2) Form file: FORM212.FRM

The following procedures are added and described.

1	Sub Form_click ()	
2	Call initial_gpib'	Calls GPIB initialization routine.
3	Call Set_TX_parameter'	Calls TX parameter setting routine.
4	Call SG_out(1)'	Calls test signal output routine.
5	Call Adj_ch'	Calls adjacent channel leakage power measurement routine.
6	Call SG_out(0)'	Calls test signal output routine.
7	End Sub	

3) Code module file: ADJCH.BAS

```
1 '-----
2 ' MT8801C GPIB Sample Program
3 ' ADJ. CH
4 '-----
5 '
6 '
7 '
8 Sub Adj_ch ()
9 Dim Low90$, Low60$, Low30$, Up30$, Up60$, Up90$
10 '

```

Section 7 Sample Programs

```
11 Call ibwrt (Ans%, "MEAS ADJ,HIGH" ) '  
                                     Moves to adjacent channel leakage power  
                                     measurement (High Speed method) screen.  
12 Call ibwrt (Ans%, "STORAGE NRM" ) '  
                                     Sets the normal mode.  
13 Call ibwrt (Ans%, "ADJRNG" ) '  
                                     Optimizes measurement range.  
14 '  
15 Call ibwrt (Ans%, "SWP" ) '  
                                     Starts measurement.  
16 '  
17 Call ibwrt (Ans%, "MODPWR? LOW90,DBM" ) '  
                                     Inquires about measurement results of  
                                     lowerside next-to-next adjacent channel  
                                     leakage power.  
18 Low90$ = ReceiveResp ()  
19 Call ibwrt (Ans%, "MODPWR? LOW60,DBM" ) '  
                                     Inquiries about measurement results of  
                                     lowerside next adjacent channel leakage  
                                     power.  
20 Low60$ = ReceiveResp ()  
21 Call ibwrt (Ans%, "MODPWR? LOW30,DBM" ) '  
                                     Inquiries about measurement results of  
                                     lowerside adjacent channel leakage power.  
22 Low30$ = ReceiveResp ()  
23 Call ibwrt (Ans%, "MODPWR? UP30,DBM" ) '  
                                     Inquires about measurement results of  
                                     upperside adjacent channel leakage power.  
24 Up30$ = ReceiveResp ()  
25 Call ibwrt (Ans%, "MODPWR? UP60,DBM" ) '  
                                     Inquires about measurement results of  
                                     upperside next adjacent channel leakage  
                                     power.  
26 Up60$ = ReceiveResp ()  
27 Call ibwrt (Ans%, "MODPWR? UP90,DBM" ) '  
                                     Inquires about measurement results of  
                                     upperside next-to-next adjacent channel  
                                     leakage power.  
28 Up90$ = ReceiveResp ()  
29 '  
30 Form212.Print "Adjacent channel power"
```

7.2 Sample Program (Example of Program Using Visual Basic)

```
31 Form212.Print "Modulation (-900kHz) = ";  
    Val(Low90$); "dBm"  
32 Form212.Print " (-600kHz) = "; Val(Low60$); "dBm"  
33 Form212.Print " (-300kHz) = "; Val(Low30$); "dBm"  
34 Form212.Print " ( 300kHz) = "; Val(Up30$); "dBm"  
35 Form212.Print " ( 600kHz) = "; Val(Up60$); "dBm"  
36 Form212.Print " ( 900kHz) = "; Val(Up90$);  
    "dBm"  
  
37 End Sub
```

Set the adjacent channel leakage power measurement (high-speed measurement) mode in line 11.

Optimize the range in line 13.

Start the measurement in line 15. The SWP command stops accepting the next command until the measurement terminates.

Read the measurement result in lines 17 to 28.

7.2 Sample Program (Example of Program Using Visual Basic)

```
14 '
15 Call ibwrt (Ans%, "MEAS SETCOM") '
    Moves to common parameter setting
    screen.
16 Call ibwrt (Ans%, "DUTCTRL NONE") '
    Sets DUT Control to None.
17 Call ibwrt (Ans%, "FREQBAND A800MHZ") '
    Sets frequency band to analog 800 MHz
    band.
18 Call ibwrt (Ans%, "CHAN 1") '
    Sets measurement frequency channel to CH 1.
19 Call ibwrt (Ans%, "RFLVL 10DBM") '
    Sets TX reference level to 10 dBm.
20 Call ibwrt (Ans%, "MEASOBJ MSAVC") '
    Sets measurement object signal to "MS-
    AVC."
21 Call ibwrt (Ans%, "SATCC 1") '
    Sets SAT CC to 1.
22 '
23 Call ibwrt (Ans%, "MEAS SETATX") '
    Moves to Setup screen for analog TX pa-
    rameter.
24 Call ibwrt (Ans%, "PMTM POW") '
    Sets power measurement method to Power
    Meter.
25 Call ibwrt (Ans%, "RFMM ALL") '
    Sets RF measurement mode to All Item
    Measurement.
26 Call ibwrt (Ans%, "AOIMP 600") '
    Set output impedance to 600 Ω.
27 End Sub
```

Lines 8 to 27 are the routines for setting parameters for the analog TX measurement. Set the IS-136 measurement system in line 10.

Set the RF signal input connector in lines 11 and 12. Set the parameters for the analog TX measurement on the Setup Common Parameter and Setup Analog TX Measure Parameter screens.

Lines 15 to 21 show the settings on the Setup Common Parameter screen. Set the center measurement frequency, reference measurement level, and signals to be measured here.

Lines 23 to 26 show the settings on the Setup Analog TX Measure Parameter screen. Set the power measurement method, RF measurement mode, and AF output impedance.

Section 7 Sample Programs

4) Code module file: ATXMEAS.BAS

```
1  '-----
2  ' MT8801C GPIB Sample Program
3  ' Analog TX Measure
4  '-----
5  '
6  '
7  '
8  Sub ATX_Measure ()
9  Dim RFFreq$, RFPwr$, RFDev$, AFLvl$, AFDstn$,
      AFFreq$
10 '
11 Call ibwrt (Ans%, "MEAS ATXSG") '
      Moves to the screen of analog TX measure-
      ment with signal generator.
12 Call ibwrt (Ans%, "AFREQ1 6000HZ") '
      Sets frequency of AF oscillator for SAT
      modulation to 6 kHz.
13 Call ibwrt (Ans%, "AOUT1 ON") '
      Sets AF oscillator for SAT modulation to On.
14 Call ibwrt (Ans%, "ADEV1 2KHZ") '
      Sets SAT modulation to 2 kHz.
15 Call ibwrt (Ans%, "RRLVL ON") '
      Sets RF output to On.
16 Call ibwrt (Ans%, "OLVL -50DBM") '
      Set RF output level to -50 dBm.
17 '
18 Call ibwrt (Ans%, "AOPF2 AF") '
      Sets AF oscillator 2 to AF output (for mi-
      crophone input use).
19 Call ibwrt (Ans%, "ASIG2 TONE") '
      Assigns AF oscillator (for microphone in-
      put use) to Tone.
20 Call ibwrt (Ans%, "AFREQ2 1004HZ") '
      Sets frequency of AF oscillator (for micro-
      phone input use) to 1004 Hz.
21 Call ibwrt (Ans%, "AOUT2 ON") '
      Sets AF oscillator (for microphone input
      use) to On.
22 Call ibwrt (Ans%, "ALVL2 200MV") '
      Sets level of AF oscillator (for microphone
      input use) to 200 mV.
23 '
24 Call ibwrt (Ans%, "ADEMP 750") '
      Sets Deemphasis to 750 µs
```

7.2 Sample Program (Example of Program Using Visual Basic)

```
25 Call ibwrt (Ans%, "AFLT CMESS") '  
           Sets the evaluation fileter to C-MESSAGE.  
26 '  
27 Call ibwrt (Ans%, "STRG NRM") '  
           Sets the normal mode.  
28 Call ibwrt (Ans%, "ADJRNG") '  
           Optimizes measurement range.  
29 '  
30 Call ibwrt (Ans%, "SWP") '  
           Starts measurement.  
31 '  
32 Call ibwrt (Ans%, "RFFREQ?") '  
           Requests for the measured results of RF  
           frequency.  
33 RFFreq$ = ReceiveResp()  
34 Call ibwrt (Ans%, "RFPWR? DBM") '  
           Requests measured results of RF levels.  
35 RFPwr$ = ReceiveResp()  
36 Call ibwrt (Ans%, "RDEV?") '  
           Requests measured results of modulation.  
37 RFDev$ = ReceiveResp()  
38 Call ibwrt (Ans%, "TALVL?") '  
           Requests measured results of AF levels.  
39 AFLvl$ = ReceiveResp()  
40 Call ibwrt (Ans%, "DSTN? DB") '  
           Requests measured results of AF  
           distorton.  
41 AFDstn$ = ReceiveResp()  
42 Call ibwrt (Ans%, "AFFREQ?") '  
           Requests measured results of AF fre-  
           quency.  
43 AFFreq$ = ReceiveResp()  
44 '  
45 Form213.Print "RF Frequency = "; Val(RFFreq$);  
           "Hz"  
46 Form213.Print "RF Power = "; Val(RFPwr$); "dBm"  
47 Form213.Print "Deviation = "; Val(RFDev$); "Hz"  
48 Form213.Print "AF Level = "; Val(AFLvl$); "Hz"  
49 Form213.Print "AF Distortion = "; Val(AFDstn$); "dB"  
50 Form213.Print "AF Frequency"; Val(AFFreq$); "Hz"
```

Section 7 Sample Programs

```
51  '  
52  Call ibwrt (Ans%, "AOUT2 OFF") '  
                                     Sets AF oscillator (for microphone input  
                                     use) to Off.  
53  Call ibwrt (Ans%, "RRLVL OFF") '  
                                     Sets RF output to Off.  
54  End Sub
```

Set the analog TX measurement with signal generator screen in line 11.

Set the SAT modulation signals of 6 kHz in lines 12 to 16.

Set the AF oscillators for microphone input in lines 18 to 22.

Set the measurement conditions in lines 24 and 25.

Optimize the range in line 28.

Start the measurement in line 29. The SWP command stops accepting the next command until the measurement terminates.

Read the measurement results in lines 32 to 43.

Set the AF output and RF output to off in lines 52 and 53.

7.2.4 Reception (RX) measurement

(1) Setting of parameter for RX measurement

<Example 3.1> Setting parameters for RX measurement (measurement signal, BER input interface, etc.) for MT8801C.

1) Project file: SMPL301.MAK

```

1  FORM301.FRM
2  INIT001.BAS           Uses the code file of the initialization mod-
                           ule in paragraph 7.2.2.
3  SETRX.BAS            This is the code file of parameter setting
                           module for RX measurement.
4  VBIB.BAS
5  NIGLOBAL.BAS
6  ProjWinSize=87,394,243,136
7  ProjWinShow=2

```

2) Form file: FORM301.FRM

The following procedures are added and described.

```

1  Sub Form301_click ()
2  Call initial_gpib'   Calls GPIB initialization routine.
3  Call Set_RX_parameter'
                           Calls RX parameter setting routine.
4  End Sub

```

3) Code module file: SETRX.BAS

```

1  '-----
2  ' MT8801C GPIB Sample Program
3  ' Setup Digital RX Measure Parameters
4  '-----
5  '
6  '
7  '
8  Sub Set_RX_parameter ()
9  '
10 Call ibwrt (Ans%, "SYS IS136") '
                           Selects IS-136 measuring system.
11 Call ibwrt (Ans%, "PNLMD SYSTEM") '
                           Moves to system setting screen.
12 Call ibwrt (Ans%, "RFINOUT MAIN") '
                           Uses Main Input/Output connector.
13 Call ibwrt (Ans%, "PNLMD TESTER") '
                           Sets measurement mode to "TX/RX
                           tester."

```

Section 7 Sample Programs

```
14  '  
15  Call ibwrt (Ans%, "MEAS SETCOM") '  
                                     Moves to common parameter setting  
                                     screen.  
16  Call ibwrt (Ans%, "DUTCTRL NONE") '  
                                     Sets DUT Control to None.  
17  Call ibwrt (Ans%, "FREQBAND D800MHZ") '  
                                     Sets frequency band to digital 800 MHz  
                                     band.  
18  Call ibwrt (Ans%, "CHAN 1") '  
                                     Sets measurement frequency channel to  
                                     CH1.  
19  Call ibwrt (Ans%, "RFLVL 10DBM") '  
                                     Sets TX reference level to 10 dBm.  
20  Call ibwrt (Ans%, "MEASOBJ MSDTC") '  
                                     Sets measurement object signal to "MS-  
                                     DTC."  
21  Call ibwrt (Ans%, "SLTNUM 1") '  
                                     Sets measurement slot number to 1.  
22  Call ibwrt (Ans%, "DVCC 01") '  
                                     Sets DVCC data to 01H.  
23  '  
24  Call ibwrt (Ans%, "MEAS SETDRX") '  
                                     Moves to Setup Digital RX parameter  
                                     screen.  
25  Call ibwrt (Ans%, "BERMEASIN RFLOOP") '  
                                     Sets BER signal input to RF connector.  
26  Call ibwrt (Ans%, "SACCH 000") '  
                                     Sets SACCH data to 000H.  
27  '  
28  End Sub
```

By lines 11 and 12, RF signal input terminal is set.

Setting of parameter for RX measurement is made on the Setup Common parameter screen and the Setup Digital RX Measure Parameter screen.

Lines 15 to 22 are setting of Setup Common parameter screen. Here, test signal center frequency, TX reference level (for loop back), and measurement signal classification are set.

Line 24 and subsequent lines are settings at the Setup Digital RX Measure Parameter screen. The RF signal parameter is set as the measurement object (measurement signal parameter, BER input interface, etc.).

7.2 Sample Program (Example of Program Using Visual Basic)

(2) Setting of transmission signal for RX tests

<Example 3.2> Setting transmission signal parameter of RX measurement for MT8801C to output test signal.

1) Project file: SMPL302.MAK

1	FORM302.FRM	
2	INIT001.BAS	Uses the code file of the initialization module in paragraph 7.2.2.
3	RESP01.BAS	Uses the code file of the response reading module described in paragraph 7.2.1 (2).
4	SETRX.BAS	This is the code file of the parameter setting module for RX measurement in paragraph 7.2.4 (1).
5	SGOUT.BAS	This is the code file of the SG output control module.
6	VBIB.BAS	
7	NIGLOBAL.BAS	
8	ProjWinSize=87,394,243,136	
9	ProjWinShow=2	

2) Form file: FORM302,FRM

The following procedures are added and described.

1	Sub Form302_click ()	
2	Call initial_gpib'	Calls GPIB initialization routine.
3	Call Set_RX_parameter'	Calls RX parameter setting routine.
4	Call SG_out (1)'	Calls test signal output routine.
5	End Sub	

3) Code module file:

Uses SGOUT.BAS file in paragraph 7.2.1 (2).

(3) BER measurement (1) BER measurement at stipulated level

<Example 3.3> Performing the BER measurement using the test signal of the specified level.

1) Project file: SMPL303.MAK

- 1 FORM303.FRM
- 2 INIT001.BAS Uses the code file of the initialization module in paragraph 7.2.2.
- 3 RESP01.BAS Uses the code file of the response read module in paragraph 7.2.1 (2).
- 4 SETRX.BAS This is the code file of the parameter setting module for RX measurement in paragraph 7.2.4 (1).
- 5 SGOUT.BAS This is the code file of the SG output control module in paragraph 7.2.1 (2).
- 6 BER01.BAS This is the code file of the BER measurement module.
- 7 VBIB.BAS
- 8 NIGLOBAL.BAS
- 9 ProjWinSize=87,394,243,136
- 10 ProjWinShow=2

2) Form file: FORM303.FRM

The following procedures are added and described.

- 1 Sub Form303_click ()
- 2 Call initial_gpib' Calls GPIB initialization routine.
- 3 Call Set_RX_parameter' Calls RX parameter setting routine.
- 4 Call BER_measure1' Calls BER measurement routine.
- 5 Call SG_out (0) ' Calls test signal output routine.
- 6 End Sub

3) Code module file: BER01.BAS

- 1 '-----
- 2 ' MT8801C GPIB Sample Program
- 3 ' Bit Error Rate Measurement (1)
- 4 '-----
- 5 '
- 6 '
- 7 '
- 8 Sub BER_measure1 ()
- 9 Const SGLVL! = -50!' Sets RX measurement signal output level to -50 dBm.
- 10 Dim sbuf As String * 40
- 11 Dim Endsts%, I%

7.2 Sample Program (Example of Program Using Visual Basic)

```
12  '  
13  Call ibwrt (Ans%, "MEAS BER")  
14  Call ibwrt (Ans%, "CHAN 1")  
15  Call ibwrt (Ans%, "OLVL " + Str$(SGLVL!) + "DBM") '  
           Sets RX test signal level.  
16  Call ibwrt (Ans%, "LVL ON")  
17  Call ibwrt (Ans%, "MOD ON")  
18  '  
19  Call ibwrt (Ans%, "*CLS") '  
           Clears GPIB status register.  
20  Call ibwrt (Ans%, "BERSAMPLE 100000") '  
           Sets number of BER measurement data to  
           100000 bits.  
  
21  Call ibwrt (Ans%, "SNGLS") ' Starts BER measurement.  
22  '  
23  Do  
24  For I% = 0 To 10000: Next I%  
25  Call ibwrt (Ans%, "ESR2?")  
26  '  
27  sbuf = ReceiveResp()  
28  Endsts% = Val (sbuf)  
29  Loop While (Endsts% And 1) <> 1  
30  '  
31  Call ibwrt (Ans%, "BERRATE?") '  
           Reads BER measurement value.  
  
32  sbuf = ReceiveResp()  
33  Form303.Print "RX level "; SGLVL!; "dBm : Bit Er-  
           ror Rate = "; sbuf  
34  '  
35  End Sub
```

Output test signals in lines 14 to 17.

Set the measurement unit of the BER measurement data to 100000 bits in line 20.

In this example, the SNGLS command is used to start the measurement as in line 21. Unlike the SWP command, the SNGLS command accepts the next command regardless of measurement termination.

For this processing, monitor measurement termination (sweep or measurement termination bit of the END event status register) in lines 23 to 29.

Read the measurement results in lines 31 and 32 after checking that the measurement terminates.

(4) BER measurement (2) BER measurement to test the receiving level that produces the specified error rate

<Example 3.4> BER measurement to look for test signal level of specified error ratio

1) Project file: SMPL304.MAK

- 1 FORM304.FRM
- 2 INIT001.BAS Uses the code file of the initialization module in paragraph 7.2.2.
- 3 RESP01.BAS Uses the code file of the response read module in paragraph 7.2.1 (2).
- 4 SETRX.BAS This is the code file of the parameter setting module for TX measurement in paragraph 7.2.4 (1).
- 5 SGOUT.BAS This is the code file of the SG output control module in paragraph 7.2.1 (2).
- 6 BER02.BAS This is the code file of the BER measurement module.
- 7 VBIB.BAS
- 8 NIGLOBAL.BAS
- 9 ProjWinSize=87,394,243,136
- 10 ProjWinShow=2

2) Form file: FORM304.FRM

The following procedures are added and described.

- 1 Sub Form304_click ()
- 2 Call initial_gpib' Calls GPIB initialization routine.
- 3 Call Set_RX_parameter' Calls RX parameter setting routine.
- 4 Call BER_measure2' Calls BER measurement routine.
- 5 Call SG_out (0) ' Calls test signal output routine.
- 6 End Sub

3) Code module file: BER02.BAS

- 1 '-----
- 2 ' MT8801C GPIB Sample Program
- 3 ' Bit Error Rate Measurement (2)
- 4 '-----
- 5 '
- 6 '
- 7 '
- 8 Sub BER_measure2 ()
- 9 Const BERLIMIT = .01' Designates specified error ratio.
- 10 Const SGLVL1! = -50!'

7.2 Sample Program (Example of Program Using Visual Basic)

```
11 Const SGLVL2! = -70!'
12 Const LVLSTEP! = 1!'
    Sets level step to 1 dB.
13 Dim sbuf As String * 40
14 Dim Endsts%, I%
15 Dim SGLVL!
16 '
17 Call ibwrt (Ans%, "MEAS BER")
18 Call ibwrt (Ans%, "CHAN 1")
19 SGLVL! = SGLVL1!
20 Call ibwrt (Ans%, "OLVL " + Str$(SGLVL!) + "DBM") '
    Sets RX test level.
21 Call ibwrt (Ans%, "OIS " + Str$(LVLSTEP!)) '
    Sets level step.
22 Call ibwrt (Ans%, "LVL ON")
23 Call ibwrt (Ans%, "MOD ON")
24 '
25 Call ibwrt (Ans%, "BERSAMPLE 10000") '
    Sets number of BER measurement data to
    1000 bits.
26 Do
27 Call ibwrt (Ans%, "*CLS") '
    Clears ESR status.
28 Call ibwrt (Ans%, "SNGLS") '
    Starts BER measurement.
29 '
30 Do'
    Waits until the end of BER measurement.
31 For I% = 0 To 10000: Next I%
32 Call ibwrt (Ans%, "ESR2?")
33 '
34 sbuf = ReceiveResp()
35 Endsts% = Val (sbuf)
36 Loop While (Endsts% And 1) <> 1
37 '
38 Call ibwrt (Ans%, "BERRATE?") '
    Reads BER measurement value.
39 sbuf = ReceiveResp()
40 Form304.Print "RX level "; SGLVL!; "dBm : Bit Er-
    ror Rate = "; sbuf
41 '
42 If BERLIMIT <= Val (sbuf) Then Exit Do
43 Call ibwrt (Ans%, "OLS DN") '
    Reduces test signal level.
44 Call ibwrt (Ans%, "OLVL?") '
    Reads test signal level.
```

Section 7 Sample Programs

```
45  sbuf = ReceiveResp()  
46  SGLVL! = Val(sbuf)  
47  Loop While SGLVL! >= SGLVL2!  
48  '  
49  End Sub
```

Output test signal in lines 18 to 23.

Set the measurement unit of the BER measurement data to 10000 bits in line 25.

Measure BER while lowering the test signal level in lines 26 to 47. When BER exceeds the specified value in line 42, the measurement stops.

“OLS DN” in line 43 lowers the test signal level by the level steps set in line 21.

Read test signal level in lines 44 to 46.

(5) Analog receiver measurement

<Example 3.5> Measuring the analog receiver

1) Project file: SMPL305.MAK

1	FORM305.FRM	
2	INIT001.BAS	Uses the code file of the initialization module described in paragraph 7.2.2.
3	RESP01.BAS	Uses the code file of the response reading module described in paragraph 7.2.1 (2).
4	SETARX.BAS	Code file of the parameter setting module for analog RX measurement.
5	ARXMEAS.BAS	Code file of the analog RX measurement module.
6	VBIB.BAS	
7	NIGLOBAL.BAS	
8	ProjWinSize = 87, 394, 243, 136	
9	ProjWinShow = 2	

2) Form file: FORM305.FRM

The following procedures are added and described.

1	Sub Form_click()	
2	Call initial_Gpib'	Calls the GPIB initialization routine.
3	Call Set_ARX_parameter'	
		Calls the analog RX parameter setting routine.
4	Call ARX_Measure'	Calls the analog RX measurement routine.
5	End Sub	

3) Code module file: SETARX.BAS

```
1 '-----
2 ' MT8801C GPIB Sample Program
3 ' Set Analog RX Parameters
4 '-----
5 '
6 '
7 '
8 Sub Set_ARX_parameter ()
9 '
10 Call ibwrt(Ans%, "SYS IS136") '
    Selects IS-136 measuring system.
11 Call ibwrt(Ans%, "PNLMD SYSTEM") '
    Moves to system setting screen.
12 Call ibwrt(Ans%, "RFINOUT MAIN") '
    Uses Main Input/Output connector.
```

Section 7 Sample Programs

```
13  Call  ibwrt (Ans%, "PNLMD TESTER") '  
           Sets measurement mode to "TX/RX  
           tester."  
14  '  
15  Call  ibwrt (Ans%, "MEAS SETCOM") '  
           Moves to common parameter setting  
           screen.  
16  Call  ibwrt (Ans%, "DUTCTRL NONE") '  
           Sets DUT Control to None.  
17  Call  ibwrt (Ans%, "FREQBAND A800MHZ") '  
           Sets frequency band to analog 800 MHz  
           band.  
18  Call  ibwrt (Ans%, "CHAN 1") '  
           Sets measurement frequency channel to  
           CH 1.  
19  Call  ibwrt (Ans%, "RFLVL 10DBM") '  
           Sets TX reference level to 10 dBm.  
20  Call  ibwrt (Ans%, "MEASOBJ MSAVC") '  
           Sets measurement object signal to "MS-  
           AVC."  
21  Call  ibwrt (Ans%, "SATCC 1") '  
           Sets SATCC to 1.  
22  '  
23  Call  ibwrt (Ans%, "MEAS SETARX") '  
           Moves to Analog TX parameter setting  
           screen.  
24  Call  ibwrt (Ans%, "AIMP 100K") '  
           Sets AF input impedance to 100 kΩ.  
25  End  Sub
```

Lines 8 to 25 are the routines for setting parameters for the analog RX measurement. Set the IS-136 measurement system in line 10.

Set the RF signal input connectors in lines 11 and 12. Set the parameters for the analog TX measurement on the Setup Common Parameter and Setup Analog RX Measure Parameter screens.

Lines 15 to 21 show the settings on the Setup Common Parameter screen. Set the center measurement frequency, reference measurement level, and signals to be measured here.

Lines 23 and 24 show the settings on the Setup Analog RX Measure Parameter screen. Set the AF input impedance.

7.2 Sample Program (Example of Program Using Visual Basic)

4) Code module file: ARXMEAS.BAS

```
1  '-----
2  ' MT8801C GPIB Sample Program
3  ' Analog RX Measure
4  '-----
5  '
6  '
7  '
8  Sub ARX_Measure ()
9  Dim AFLvl$, AFDstn$, AFFreq$
10 '
11 Call ibwrt (Ans%, "MEAS ARX") '
    Moves to the analog RX measure screen.
12 Call ibwrt (Ans%, "AFREQ1 1004HZ") '
    Sets AF oscillator frequency for modulation to 1004 Hz.
13 Call ibwrt (Ans%, "AOUT1 ON") '
    Sets AF oscillator for modulation to On.
14 Call ibwrt (Ans%, "ADEV1 8KHZ") '
    Sets modulation rate to 8 kHz.
15 Call ibwrt (Ans%, "RRLVL ON") '
    Sets RF output to On.
16 Call ibwrt (Ans%, "OLVL -50DBM") '
    Sets RF output level to -50 dBm.
17 '
18 Call ibwrt (Ans%, "AOPF2 AF") '
    Sets AF oscillator 2 to AF output (for microphone input use)
19 Call ibwrt (Ans%, "ASIG2 TONE") '
    Sets AF oscillator for microphone input use to Tone.
20 Call ibwrt (Ans%, "AFREQ2 1100HZ") '
    Sets AF oscillator frequency for microphone input use to 1004 Hz.
21 Call ibwrt (Ans%, "AOUT2 ON") '
    Sets AF oscillator for microphone input use to On.
22 Call ibwrt (Ans%, "ALVL2 200MV") '
    Sets AF oscillator level for microphone input use to 200 mV.
23 '
24 Call ibwrt (Ans%, "AFLT CMESS") '
    Sets the evaluation filter to C-MESSAGE.
25 '

```

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```
26 Call ibwrt (Ans%, "STRG NRM") '  
           Sets the mode to normal mode.  
27 Call ibwrt (Ans%, "ADJRNG") '  
           Optimizes measurement range.  
28 '   
29 Call ibwrt (Ans%, "SWP") '  
           Starts measurement.  
30 '   
31 Call ibwrt (Ans%, "AFLVL? V") '  
           Inquires about results of AF level measure-  
           ment.  
32 AFLvl$ = ReceiveResp ()  
33 Call ibwrt (Ans%, "DSTN? DB") '  
           Inquires about result of AF distortion mea-  
           surement.  
34 AFDstn$ = ReceiveResp ()  
35 Call ibwrt (Ans%, "AFFREQ?") '  
           Inquires about result of AF frequency mea-  
           surement.  
36 AFFreq$ = ReceiveResp ()  
37 '   
38 Form305.Print "AF Level = "; Val (AFLvl$); "V"  
39 Form305.Print "AF Distortion = "; Val (AFDstn$); "dB"  
40 Form305.Print "AF Frequency"; Val (AFFreq$); "Hz"  
41   
42 Call ibwrt (Ans%, "AOUT2 OFF") '  
           Sets AF oscillator for microphone input  
           use to On.  
43 Call ibwrt (Ans%, "RRLVL OFF") '  
           Set the RF output to On.  
44 End Sub
```

Set the analog RX measurement screen in line 11.

Set the RF modulation signal in lines 12 to 16.

Set the AF oscillators for microphone input use in lines 18 to 22.

Set the measurement conditions in line 24.

Optimize the range in line 27.

Start the measurement in line 29. The SWP command stops accepting the next command until the measurement terminates.

Read the measurement results in lines 31 to 36.

Set the AF output and RF output to off in lines 42 and 43.

7.2.5 Digital TX all measure item measurement, AF measurement

This paragraph describes examples of the programs for digital TX all measure item measurement and AF signal measurement.

(1) Setting the measurement items

<Example 4.1> Set the measurement items of the digital TX all measure item measurement.

1) Project file: SMPL401.MAK

1	FORM401.FRM	
2	INIT001.BAS	Uses the code file of the initialization module in paragraph 7.2.2.
3	RESP01.BAS	Uses the code file of the response reading module described in paragraph 7.2.1 (2).
4	SETTX.BAS	This is the code file of the parameter setting module for TX measurement in paragraph 7.2.3 (1).
5	SETALL.BAS	This is the code file of the measurement item setting module.
6	VBIB.BAS	
7	NIGLOBAL.BAS	
8	ProjWinSize=87,394,243,136	
9	ProjWinShow=2	

2) Form File: FORM401.FRM

The following procedures are added and described.

```

1 Sub Form401_click ()
2 Call initial_gpib' Calls GPIB initialization routine.
3 Call Set_TX_parameter' Calls TX parameter setting routine.
4 Call Sel_TX_all' Calls measurement items setting routine.
5 End Sub

```

3) Code module file: SETALL.BAS

```

1 '-----
2 ' MT8801C GPIB Sample Program
3 ' Select TX All Measure Item
4 '-----
5 '
6 '
7 '
8 Sub Sel_TX_all ()
9 '
10 Call ibwrt(Ans%, "MEAS TXITEM")'
                                     Moves to Select All Measure Item screen.
11 Call ibwrt(Ans%, "AITEM STD")'
                                     Sets the mode to Standard mode.
12 Call ibwrt(Ans%, "MTEMPPASS ON")' Judges Template.
13 Call ibwrt(Ans%, "LTEMPPASS BOTH")'
                                     Selects Template On & Off.
14 End Sub

```

Shift to the Select All Measure Item screen in line 10. First, set the default parameter "Standard" of the MT8801C in line 11. Next, add or change required items in lines 12 and 13.

Section 7 Sample Programs

(2) Digital TX all measure item measurement

<Example 4.2> Set the measurement items and perform Digital TX all measure item measurement based on the set items.

1) Project file: SMPL402.MAK

1	FORM402.FRM	
2	INIT001.BAS	Uses the code file of the initialization module in paragraph 7.2.2.
3	RESP01.BAS	Uses the code file of the response read module in paragraph 7.2.1 (2).
4	SETTX.BAS	This is the code file of the parameter setting module for TX measurement in paragraph 7.2.3 (1).
5	SETALL.BAS	This is the code file of the measurement item setting module.
6	SGOUT.BAS	This is the code file of the SG output control module in paragraph 7.2.1 (2).
7	TXALL01.BAS	This is the code file of the digital TX all item measurement module.
8	VBIB.BAS	
9	NIGLOBAL.BAS	
10	ProjWinSize=87,394,243,136	
11	ProjWinShow=2	

2) Form file: FORM402.FRM

The following procedures are added and described.

1	Sub Form402_click ()	
2	Call initial_gpib'	Calls GPIB initialization routine.
3	Call Set_TX_parameter'	Calls TX parameter setting routine.
4	Call Sel_TX_all'	Calls setting routine for measurement item.
5	Call SG_out(1)'	Calls test signal output routine.
6	Call TX_all_measure'	Calls digital TX all item measurement routine.
7	Call SG_out(0)'	Calls test signal output routine.
8	End Sub	

3) Code module file: TXALL01.BAS

```
1 '-----  
2 ' MT8801C GPIB Sample Program  
3 ' TX All Measurement  
4 '-----  
5 '  
6 '  
7 '
```

7.2 Sample Program (Example of Program Using Visual Basic)

```
8 Sub TX_all_measure ()
9 Const NUM% = 7'           Specifies the number of groups of read
                             data.
10 Dim JDGE%(NUM%), MDAT$(NUM%) '
                             Declares the array for storing read data.
11 Dim P%
12 Dim JUDGE$, RCVDAT$
13 Dim JMODPWR$, JTMPLAT$
14 Dim sbuf As String * 40
15 '
16 Call ibwrt (Ans%, "MEAS TXALL") '
                             Moves to TX All-Measure screen.
17 Call ibwrt (Ans%, "STORAGE NRM") '
                             Sets the mode to normal mode.
18 Call ibwrt (Ans%, "ADJRNG") '
                             Optimizes measurement range.
19 '
20 Call ibwrt (Ans%, "SWP") '
                             Starts measurement.
21 '
22 Call ibwrt (Ans%, "JTOTAL?") '
                             Inquires the result of total judgment.
23 JUDGE$ = ReceiveResp ()
24 Call ibwrt (Ans%, "ALLMEAS? RFPWR") '
                             Inquires the result of judgment of RF
                             Power and the measurement value.
25 RCVDAT$ = ReceiveResp ()
26 For I% = 0 To NUM% - 1 '
                             Classifies the batched read results of mea-
                             surement by items.
27 P% = InStr (RCVDAT$, ",")
28 JDGE%(I%) = Val (Mid$(RCVDAT$, 1, P% - 1))
29 RCVDAT$ = Right$(RCVDAT$, Len(RCVDAT$) - P%)
30 P% = InStr (RCVDAT$, ",")
31 If P% = 0 Then P% = Len(RCVDAT$)
32 MDAT$(I%) = Mid$(RCVDAT$, 1, P% - 1)
33 RCVDAT$ = Right$(RCVDAT$, Len(RCVDAT$) - P%)
34 Next I%
35 '
36 Form402.Print "Total judgment is "; JUDGE$
37 If JDGE%(0) = 0 Then JMODPWR$ = "PASS" Else
   JMODPWR$ = "FAIL"
38 Form402.Print " TX Power: "; JMODPWR$; " (";
   Val (MDAT$(0)); "dBm)"
```

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```
39  If JDGE%(6) = 0 Then JTMPLAT$ = "PASS" Else
    JTMPLAT$ = "FAIL"
40  Form402.Print " Template: "; JTMPLAT$
41  End Sub
```

Shift to the digital TX all item measurement screen in line 16.

Optimize the measurement range in line 18.

Start the measurement in line 20. The SWP command stops accepting the next command until the measurement terminates.

Read the measurement results in lines 22 to 25.

Divide the batched reading results (character strings delimited by commas) into character strings of individual items in lines 26 to 34.

(3) AF signal measurement

<Example 4.3> Measure the AF signal.

1) Project file: SMPL403.MAK

1	FORM403.FRM	
2	INIT001.BAS	Uses the code file of the initialization module described in paragraph 7.2.2.
3	RESP01.BAS	Uses the code file of the response reading module described in paragraph 7.2.1 (2).
4	SETAF.BAS	Code file of the setting module of AF measurement parameters
5	AFMEAS.BAS	Code file of the AF measurement module
6	VBIB.BAS	
7	NIGLOBAL.BAS	
8	ProjWinSize = 87, 394, 243, 136	
9	ProjWinShow = 2	

2) Form file: FORM403.FRM

The following procedures are added and described.

1	Sub Form_click()	
2	Call Initial_gpib'	Calls the GPIB initialization routine.
3	Call Set_AF_parameter'	
		Calls the AF parameter setting routine.
4	Call AF_Measure'	Calls the AF measurement routine.
5	End Sub	

3) Code module file: SETAF.BAS

1	'-----	
2	' MT8801C GPIB Sample Program	
3	' Set AF Parameters	
4	'-----	
5	'	
6	'	
7	'	
8	Sub Set_AF_parameter ()	
9	'	
10	Call ibwrt (Ans%, "SYS IS136")'	
		Selects IS-136 measuring system.
11	Call ibwrt (Ans%, "PNLMD TESTER")'	
		Sets measurement mode to "TX/RX" tester.
12	'	
13	Call ibwrt (Ans%, "MEAS SETCOM")'	
		Moves to common parameter setting screen.

Section 7 Sample Programs

```
14 Call ibwrt (Ans%, "DUTCTRL NONE") '  
           Sets DUT Control to None.  
15 Call ibwrt (Ans%, "FREQBAND A800MHZ") '  
           Sets frequency band to analog 800 MHz  
           band.  
16 '  
17 Call ibwrt (Ans%, "MEAS SETAF") '  
           Moves to analog TX parameter setting  
           screen.  
18 Call ibwrt (Ans%, "AIMP 100K") '  
           Sets AF input impedance to 100 k $\Omega$ .  
19 Call ibwrt (Ans%, "AOIMP 600") '  
           Sets AF output impedance to 600  $\Omega$ .  
20 End Sub
```

Lines 8 to 20 are the routines for setting the AF measurement parameters.

Set the IS-136 measurement system in line 10. Set the AF measurement parameters on the Setup Common Parameter and Setup AF Measure Parameter screens.

Lines 13 to 15 show the settings on the Setup Common Parameter screen. The AF measurement can be made available by setting DUT Control to None and the frequency band to the analog 800 MHz band.

Lines 17 to 19 show the settings on the Setup AF Measure Parameter screen. Set the AF input-output impedances.

4) Code module file: AFMEAS.BAS

```
1 '-----  
2 ' MT8801C GPIB Sample Program  
3 ' AF Measure  
4 '-----  
5 '  
6 '  
7 '  
8 Sub AF_Measure()  
9 Const NUM% = 200 ' Specifies the number of data items for  
           reading frequency characteristics.  
10 Dim AFLvlAll$, AFLvl$(8), AFDstn$, AFFreq$  
11 Dim AFFreqCharN$, AFFreqChar(NUM%)  
12 Dim i%, f%, t%  
13 '  
14 Call ibwrt (Ans%, "MEAS AF") '  
           Moves to the AF measurement screen.  
15 Call ibwrt (Ans%, "ASIG1 TONE") '  
           Sets AF oscillator as tone.
```

7.2 Sample Program (Example of Program Using Visual Basic)

```
16 Call ibwrt (Ans%, "AFREQ1 1000HZ") '
           Sets the AF oscillator frequency to 1000 Hz.
17 Call ibwrt (Ans%, "AOUT1 ON") '
           Sets AF oscillator for modulation to On.
18 Call ibwrt (Ans%, "ALVL1 1V") '
           Sets AF oscillator level to 1 V.
19 Call ibwrt (Ans%, "AOUT2 OFF") '
           Sets AF oscillator 2 to Off.
20 '
21 Call ibwrt (Ans%, "AFLT CMESS") '
           Sets evaluation filter as C-MESSAGE.
22 '
23 Call ibwrt (Ans%, "STRG NRM") '
           Sets the normal mode.
24 Call ibwrt (Ans%, "ADJRNG") '
           Optimizes measurement range.
25 '
26 Call ibwrt (Ans%, "SWP") '
           Starts measurement.
27 '
28 Call ibwrt (Ans%, "AFLVLALL? V") '
           Inquiries about all measured results of AF
           levels.
29 AFLvlAll$ = ReceiveResp()
30 Call ibwrt (Ans%, "DSTN? DB") '
           Inquiries about measurement results of AF
           distortion rate.
31 AFDstn$ = ReceiveResp()
32 Call ibwrt (Ans%, "AFFREQ?") '
           Inquiries about results of AF frequency
           measurement.
33 AFFreq$ = ReceiveResp()
34 '
35 f% = 1
36 For i% = 0 To 6
37 t% = InStr(f%, AFLvlAll$, ",")
38 AFLvl$(i%) = Mid$(AFLvlAll$, f%, t% - f%)
39 f% = t% + 1
40 Next i%
41 AFLvl$(7) = Mid$(AFLvlAll$, f%)
42
43 Form403.Print "AF Level (ITU-T P.53) = ";
Val(AFLvl$(4)); "V"
```

Section 7 Sample Programs

```
44 Form403.Print "AF Level (C-MESSAGE) = ";
   Val(AFLvl$(5)); "V"
45 Form403.Print "AF Level (6kHz BPF) = ";
   Val(AFLvl$(6)); "V"
46 Form403.Print "AF Level (Filter Off) = ";
   Val(AFLvl$(7)); "V"
47 Form403.Print "AF Distortion = "; Val(AFDstn$); "dB"
48 Form403.Print "AF Frequency"; Val(AFFreq$); "Hz"
49
50 Call ibwrt (Ans%, "ALVL1 0.5V") '
                               Sets AF oscillator level to 0.5 V.
51 Call ibwrt (Ans%, "ASIG1 WHITE") '
                               Sets AF oscillator as white noise.
52 Call ibwrt (Ans%, "AFLT OFF") '
                               Sets evaluation filter to Off.
53 Call ibwrt (Ans%, "ADJRNG") '
                               Optimizes measurement range.
54 '
55 Call ibwrt (Ans%, "SWP") '
                               Starts measurement.
56 '
57 For i% = 0 To NUM% - 1
58 Call ibwrt (Ans%, "FREQCHAR? " & Str$(i% + 1)) '
                               Inquiries about results of frequency char-
                               acteristics measurement.
59 AFFreqCharN$ = ReceiveResp()
60 AFFreqChar(i%) = Val(AFFreqCharN$)
61 Next i%
62 '
63 For i% = 0 To NUM% - 1
64 Form403.Print "AF Freq. Characteristics ("; 50 *
   (i% + 1); "Hz) = "; AFFreqChar(i%); "dB"
65 Next i%
66 '
67 Call ibwrt (Ans%, "AOUT1 OFF") ' Sets AF oscil-
   lator to Off.
68 End Sub
```

Set the AF measurement screen in line 14.

Set the AF oscillator to 1 kHz tone in lines 15 to 19.

Set the measurement conditions in line 21.

Optimize the range in line 24.

Start the measurement in line 26. The SWP command stops accepting the next command until the measurement terminates.

7.2 Sample Program (Example of Program Using Visual Basic)

Read the measurement results in lines 28 to 33.

Divide the batched read results (character strings delimited by commas) into character strings of individual items in lines 35 to 41.

Lines 50 to 65 are an examples of batched frequency characteristic measurement using the white noise.

Lines 50 and 51 set the AF oscillator to the white noise.

Optimize the range in line 53.

Start the measurement in line 55.

Read the measurement results in lines 57 to 61.

Set the AF output to off in line 67..

Section 8 Waveform Data Storage Format

This section describes the storage format of waveform data fetched by an external computer. The use examples are described in the IBM-PC instructions.

- 8.1 Notes on Fetching the Waveform Data 8-2
- 8.2 Waveform Data Storage Format 8-3

8.1 Notes on Fetching the Waveform Data

(1) Fetching screen

- The waveform data to be fetched must be displayed on the MT8801C screen.
- Check that the measurement terminates before fetching the waveform data. If Continuous measurement mode is set or measurement does not terminate, the correct data cannot be fetched.

Examples of checking measurement termination:

- (a) In Continuous measurement mode
 1. Switch to Single measurement mode.
 2. Read the End Event Status Register (ESR2) and check that the measurement terminates.
- (b) In Average measurement mode
 - Read the End Event Status Register (ESR2) and check that both averaging and measurement terminate.
- (c) In Single measurement mode
 - Read the End Event Status Register (ESR2) and check that the measurement terminates.

(2) Response data

- When fetching two or more data items together, commas (,) are output as data separators.
- The query command format is designed so that it can fetch all data items together. However, the number of data items actually fetched depends on restrictions placed on the external controller.

8.2 Waveform Data Storage Format

(1) XMD (RF power measurement waveform)

(a) Format

p		
0		-80.0 (μs)
1		-79.5 (μs)
2	⋮	-79.0 (μs)
⋮	⋮	⋮
1000		420.0 (μs)
1001		420.5 (μs)
⋮	⋮	⋮
2818	⋮	1329.0 (μs)
2819		1329.5 (μs)
2820		1330.0 (μs)

- Number of data items is fixed to 2821 points, which correspond to the horizontal axis of the screen display of RF Power measurement.

(b) Scaling

- Displays a 16-bit signed integer value (-32768 to 32767) in 0.01 dB units (1 dB = 100).

(c) Read commands

XMD? p, d

p: Read starting point (0 to 2820)

d: Number of reads

Use examples

```
Call  $\Delta$ ibwrt (ud%, "XMD?  $\Delta$ 1000, 1")
```

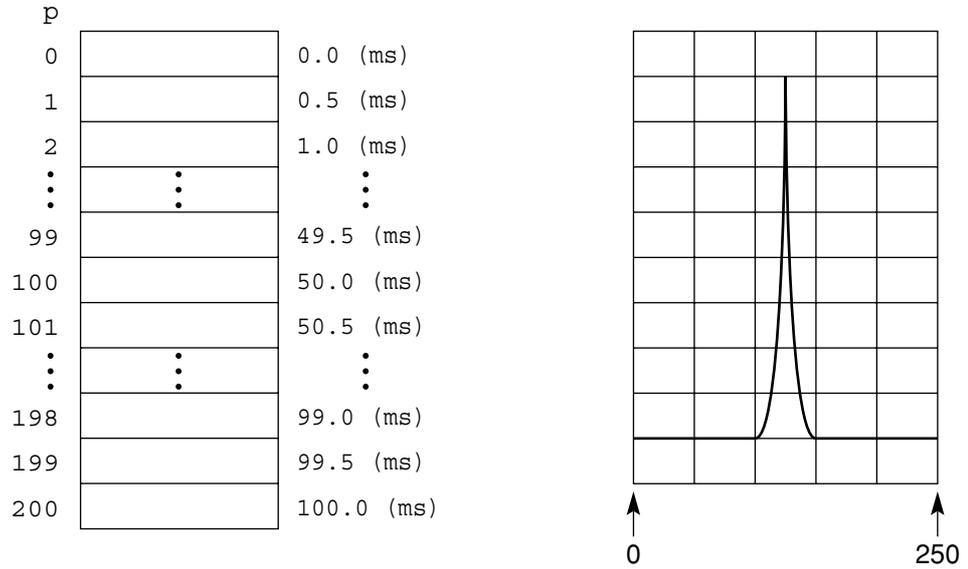
```
Call  $\Delta$ ibrd (ud%, rdbuf$)
```

```
p0! = Val (rdbuf$) / 1.00.0
```

Section 8 Waveform Data Storage Format

(2) XMO (Open Loop Power Control measurement waveform)

(a) Format



- Number of data items is fixed to 201 points, which correspond to the horizontal axis of the screen display of Open Loop Power Control measurement.

(b) Scaling

- Displays a 16-bit signed integer value in 0.01 dB units (1 dB = 100, -32768 to 32767).

(c) Read command

XMO? p,d
 p: Read starting point (0 to 200)
 d: Number of reads

Use examples

```
Call△ibwrt(ud%, "XMO?△125,1")
Call△ibrd(ud%, rdbuf$)
s0!=Val(rdbuf$)/100.0
```

Appendixes

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Appendixes

Table A-1 GPIB Interface Messages (Extended)

Bits					0	MSG	0	MSG	0	MSG	0	MSG	1	MSG	1	MSG	1	MSG									
b7	b6	b5	b3	b2	b1	COLUMN	0	1	2	3	4	5	6	7													
↓	↓	↓	↓	↓	↓	ROW	0	1	2	3	4	5	6	7													
0	0	0	0	0	0	0	NUL		DLE		SP	↑	0	↑	@	↑	P	↑	`	↑	p	↑					
0	0	0	0	1	1	1	SOH	GTL	DC1	LLO	!	↑	1	↑	A	↑	Q	↑	a	↑	q	↑					
0	0	1	0	0	2	2	STX		DC2		"	↑	2	↑	B	↑	R	↑	b	↑	r	↑					
0	0	1	1	0	3	3	ETX		DC3		#	↑	3	↑	C	↑	S	↑	c	↑	s	↑					
0	1	0	0	0	4	4	EOT	SDC	DC4	DCL	\$	↑	4	↑	D	↑	T	↑	d	↑	t	↑					
0	1	0	1	0	5	5	ENQ	PPC	NAK	PPU	%	↑	5	↑	E	↑	U	↑	e	↑	u	↑					
0	1	1	0	0	6	6	ACK		SYN		&	↑	6	↑	F	↑	V	↑	f	↑	v	↑					
0	1	1	1	0	7	7	BEL		ETB		'	↑	7	↑	G	↑	W	↑	g	↑	w	↑					
1	0	0	0	0	8	8	BS	GET	CAN	SPE	(	↑	8	↑	H	↑	X	↑	h	↑	x	↑				
1	0	0	1	0	9	9	HT	TCT	EM	SPD	)	↑	9	↑	I	↑	Y	↑	i	↑	y	↑				
1	0	1	0	0	A	A	LF		SUB		*	↑	:	↑	J	↑	Z	↑	j	↑	z	↑					
1	0	1	1	0	B	B	VT		ESC		+	↑	;	↑	K	↑	[	↑	k	↑	{	↑				
1	1	0	0	0	C	C	FF		FS		,	↑	<	↑	L	↑	\	↑	l	↑	|	↑					
1	1	0	1	0	D	D	CR		GS		-	↑	=	↑	M	↑	]	↑	m	↑	}	↑				
1	1	1	0	0	E	E	SO		RS		.	↑	>	↑	N	↑	^	↑	n	↑	~	↑					
1	1	1	1	0	F	F	SI		US		/	↑	?	↑	UNL	↑	O	↑	o	↑	DEL	↑					
							Address Command Group (ACG)		Universal Command Group (UCG)		Listen Address Group (LAG)			Talk Address Group (TAG)													
												Primary Command Group (PCG)										Secondary Command Group (SCG)					

Notes:

- [1] MSG=INTERFACE MESSAGE (Sent by ATN of True, Low level)
- [2] b1=DI01...b7=DI07 (b1 through b7 correspond to DI01 to DI07 sequence.)GTL

SDC	Go to Local
PPC	Select Device Clear
GET	Parallel Poll Configure
TCT	Group Execute Trigger
LLO	Take Control
DCL	Local Lockout
PPU	Device Clear
SPE	Parallel Poll Unconfigure
SPD	Serial Poll Enable
UNL	Serial Poll Disable
UNT	Unlisten
(ACG)	Untalk
(UCG)	Addressed Command Group
(LAG)	Universal Command Group
(TAG)	Listen Address Group
(PCG)	Talk Address Group
(SCG)	Primary Command Group
	Secondary Command Group

Table A-2 Interface Message Groups

D1	D0	D8	D7	D6	D5	D4	D3	D2	D1	Interface message group (G)
×	0	0	0	b4	b3	b2	b1			Addressed command G
×	0	0	1	b4	b3	b2	b1			Universal command G
×	0	1	b5	b4	b3	b2	b1			Listen address G
×	0	1	1	1	1	1	1			Unlisten (UNL)
×	1	0	b5	b4	b3	b2	b1			Talker Address G
×	1	0	1	1	1	1	1			Untalk (UNT)
×	1	1	b5	b4	b3	b2	b1			Secondary command G

Table A-3 Address Assignments

Address character		Address switch setting					Primary address	Factory address set device
Talk	Listen	5	4	3	2	1		
b7 b6	b7 b6	b5	b4	b3	b2	b1		
1 0	0 1	↓	↓	↓	↓	↓	Decimal	
@	SP	0	0	0	0	0	0	
A	!	0	1	0	0	1	1	
B	"	0	0	0	1	0	2	
C	#	0	0	0	1	1	3	
D	\$	0	0	1	0	0	4	
E	%	0	0	1	0	1	5	
F	&	0	0	1	1	0	6	
G	'	0	0	1	1	1	7	
H	(	0	1	0	0	0	8	
I	)	0	1	0	0	1	9	
J	*	0	1	0	1	0	10	
K	+	0	1	0	1	1	11	
L	,	0	1	1	0	0	12	
M	-	0	1	1	0	1	13	Printer Plotter
N	.	0	1	1	1	0	14	
O	/	0	1	1	1	1	15	
P	0	1	0	0	0	0	16	
Q	1	1	0	0	0	1	17	
R	2	1	0	0	1	0	18	
S	3	1	0	0	1	1	19	
T	4	1	0	1	0	0	20	
U	5	1	0	1	0	1	21	
V	6	1	0	1	1	0	22	
W	7	1	0	1	1	1	23	
X	8	1	1	0	0	0	24	
Y	9	1	1	0	0	1	25	
Z	:	1	1	0	1	0	26	
[	;	1	1	0	1	1	27	
\	<	1	1	1	0	0	28	
]	=	1	1	1	0	1	29	
^	>	1	1	1	1	0	30	
?	—	1	1	1	1	1	31	UNL,UNT

Appendix B

COMPARISON TABLE OF CONTROLLERS' GPIB INSTRUCTIONS

Function	Controller			
	PACKET V (Anritsu)	PC-9800 series (NEC)	IBM-PC	HP9000 series
Outputs data to a device	WRITE @ device number; data	PRINT @ listener address; data	CALL IBWRT()	OUTPUT device selector;data
Outputs binary data to a device	BIN WRITE @ device number; data	WBYTE command;data		
Assigns data entered from a device to a variable	READ @ device number:variable	INPUT @ talker address, listener address;variable LINE INPUT @ talker address, listener address;variable	CALL IBRD()	ENTER device selector;variable
Assigns binary data entered from a device to a variable	BIN READ @ device number; variable	RBYTE command;variable		
Initializes an interface function	IFC @ select code	ISSET IFC	CALL IBSIC()	ABORT select code
Turns REN line on	REN @ select code	ISSET REN	CALL IBSRE()	REMOTE device selector (select code)
Turns REN line off	LCL @ select code (sets all devices local) LCL @ device number (sets only specified devices to listeners, and sends out GTL command)	IRESET REN WBYTE &H3F,listener address,secondary address,&H01;	CALL IBSRE() CALL IBLOC()	LOCAL device selector (select code) LOCAL device selector (select code + primary address)
Outputs interface messages (messages) and data	COMMAND @ select code : character string for message [:data]		CALL IBCMD() CALL IBCMDA() (asynchronous)	SEND select code ;message string
Triggers a specified device	TRG @ device number	WBYTE &H3F,listener address,secondary address,&H08;	CALL IBTRG()	TRIGGER device selector

Appendix B

Function	Controller			
	PACKET V (Anritsu)	PC-9800 series (NEC)	IBM-PC	HP9000 series
Initializes devices	DCL @ select code (all devices bearing a specified select code) DCL @ device number (specified devices only)	WBYTE &H3F,&H14; WBYTE &H3F, listener address, secondary address,&H04;	CALL IBCLR()	CLEAR device selector (selector code) CLEAR device selector (selector code + primary address)
Disables a device from being switched over from remote to local	LLO @ select code	WBYTE &H3F, &H11;		LOCAL LOCKOUT
Transfers control to a specified device	RCT @ device number	WBYTE talker address, &H09;	CALL IBPCT()	PASS CONTROL
Sends out a service request	SRQ @ select code	ISSET SRQ	CALL IBRSV()	REQUEST select code
Performs serial polling	STATUS @ device number	POLL	CALL IBRSP()	SPOLL (device selector) (function)
Sets a terminator code	TERM IS	CMD DELIM	CALL IBEOS() CALL IBEOT()	
Sets a limit value for checking a timeout		CMD TIMEOUT	CALL IBTOM()	

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