MT8801B/C
RADIO COMMUNICATION ANALYZER

SOFTWARE UPDATE
OPERATION MANUAL

Seventh Edition

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

ANRITSU CORPORATION

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MT8801B/C Radio Communication Analyzer
Software Update
Operation Manual

30 September 1998 (First Edition)
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MT8801B/C
Radio Communication Analyzer

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1 ABOUT THIS MANUAL

This manual describes the additional functions introduced by installing the MT8801B/C software newly developed.

2 ADDITIONAL FUNCTIONS

2.1 SPA Function in CP

With a call being connected, the system can change into the SPA screen.
Systems implementing this function: IS-136A, GSM, PDC_CP, and PHS_CP.

2.2 Read/Write Manual Cal Value (TX Measurement Screen Excluding Power Meter Screen)

Now, an external controller can read and write a Manual Cal value. Also, a Manual Cal value will be backed up at Power Off.

External control command

Message format : CALVAL (l=–10.00 to 10.00)
CALVAL?

Response format : f,1 (f=0: not calibrated, f=1: internally calibrated, f=2: external write)

Systems implementing this function: IS-136A, GSM, PDC_CP, PHS_CP, PDC, and PHS.

2.3 TX Measure User Cal Factor (Setup TX Measure Parameter Screen)

Each band has its own User Cal Factor.
When each TX frequency is set in all the screens (including the TCH channel change) and the Cal Factor in the Setup TX Parameter screen is set, the system automatically sets up the Cal Factor for the band that is found to include the TX frequency as a result of checking it against bands.

Setting range : –30 dB to 30 dB (Band1/Band2)

Initial value : 0.00 dB

External control command (Band1)

Message format : TXUCALBA1 l: l (–30 dB to 30 dB)
TXUCALBA1?

Response format : 1

External control command (Band2)

Message format : TXUCALBA2 l: l (–30 dB to 30 dB)
TXUCALBA2?

Response format : 1

Systems implementing this function: IS-136A, GSM, and PDC_CP.

2.4 RX Measure User Cal Factor (Setup RX Measure Parameter Screen)

Each band has its own User Cal Factor.
When each RX frequency is set in all the screens (including the TCH channel change) and the Cal Factor in the Setup RX Parameter screen is set, the Cal Factor value of the band that is found to include the RX frequency as a result of checking it against bands is added to the Output Level.

Setting range : –30 dB to 30 dB (Band/Band2)

Initial value : 0.0 dB

External control command (Band1)

Message format : RXUCALBA1 l: l (–30 dB to 30 dB)
RXUCALBA1?

Response format : 1

External control command (Band2)

Message format : RXUCALBA2 l: l (–30 dB to 30 dB)
RXUCALBA2?

Response format : 1

Systems implementing this function: IS-136A, GSM, and PDC_CP.

2.5 Selectable Query Command

This command returns one response message into which it loads all the measured results selected in the measurement screen.
For details, refer to “3 Selectable Query Command Details.”
Systems implementing this function: IS-136A, GSM, PDC_CP, and PHS_CP.

2.6 Scenario Load (Sequence Monitor Screen)

Select this to load a new scenario file from a floppy disk.
Loading a new scenario file can cause Call Processing to be operated differently from the default setting at shipment.

External control command

Message format : SLOAD n: n (0 to 99)
SLOAD DEFAULT
SLOAD?

Response format : n, DEFAULT

Systems implementing this function: IS-136A, GSM, PDC_CP, and PHS_CP.

2.7 High-Speed RF Power Measurement

The High-Speed RF Power Measurement screen has been added. This screen speeds up processing by calculating only the amplitude element.
To enter this screen, use the GPIB command only.
You can measure the following in the screen:

TX Power

Carrier Off Power

On/Off Ratio

Flame Mean Power

Slot Mean Power

External control command

Message format : MEAS HIRFPWR
MEAS?

Response format : HIRFPWR

Systems implementing this function: IS-136A, GSM, and PDC_CP.

2.8 Simultaneous Change of Band and Channel (when entering a panel)

To change Band and Channel at the same time, enter a Channel.

For IS-136A,

Band in the setting range of D800 MHz : 1 to 799,990 to 1023,10001 to 10799,10990 to 11023
(10000 represents D800 MHz.)

Band in the setting range of D1.9 GHz : 1 to 1999,20001 to 21999 (20000 represents D1.9 GHz.)

Band in the setting range of A800 MHz : 1 to 799,990 to 1023,30001 to 30799,30990 to 31023
(30000 represents A800 MHz.)

Note: You cannot change a Channel to A800 MHz in the digital measurement screen. Also, you cannot change a Channel to D800 MHz and D1.9 GHz in the analog measurement screen.
When Measuring Object is Continuous, Band switching is disabled.

For PDC_CP,

(DUT Control: None)

Band in the setting range of 800M-1 : 0 to 9999, 10000 to 19999 (10000 represents 800M-1.)

Band in the setting range of 800M-2 : 0 to 9999, 20000 to 29999 (20000 represents 800M-2.)

Band in the setting range of 1.5 G : 0 to 9999

(DUT Control: Call Proc)

Band in the setting range of 800M-1 : 0 to 720, 10000 to 10720 (10000 represents 800M-1.)

Band in the setting range of 800M-2 : 1080 to 1680, 21080 to 21680 (20000 represents 800M-2.)

Band in the setting range of 1.5 G : 0 to 960

2.9 New RF Channel

Setting range : 0 to 82, 251 to 255

System implementing this function: PHS_CP.

2.10 IMSI Mode Switching (Setup Call Proc Parameter Screen)

This function can switch IMSI that will be sent to a mobile device when paging it.

Setting range : Fix (performs Paging using a value set by a user)
Auto (performs Paging using a value a mobile device has notified)

Initial value : Fix

External control command

Message format : PGIMSI FIX
PGIMSI AUTO
PGIMSI?

Response format : FIX, AUTO

System implementing this function: GSM

2.11 RACH (access) Burst Test

The RACH Burst Test is available under both call processing and non-call processing mode.

GPIB

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Signal	Measuring Object	RACH	MEASOBJ RACH	MEASOBJ?	RACH	

System implementing this function: GSM

2.12 NEW CODEC (EFR, HR)

EFR (Enhanced Full Rate) and HR0 (Half Rate subchannel 0), HR1 (Half Rate subchannel 1) are available.

GPIB

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Signal	CODEC type	FR EFR HR0 HR1	CODEC FR CODEC EFR CODEC HR0 CODEC HR1	CODEC? CODEC? CODEC? CODEC?	FR EFR HR0 HR1	

System implementing this function: GSM

2.13 Loop Back Type FAST

Loop Back Type FAST (Loop Back Type C in GSM specification) is available.

GPIB

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
BER Measure judge	FAST measure judge	On OFF	JBERMEAS FAST, ON JBERMEAS FAST, OFF	JBERMEAS? FAST	ON OFF	
BER Sample	FAST sample		BERSAMPLE FAST, n	BERSAMPLE? FAST	n	n: 0 to 9999999
BER event upper limit	FAST event limit		ULBEREVENT FAST, n	ULBEREVENT? FAST	n	n: 0 to 9999999
Bit error rate measure	Loop Back Type	FAST	LBTYPE FAST	LBTYPE?	FAST	
	BER Sample	FAST	BERSAMPLE FAST, n	BERSAMPLE? FAST	n	n: 0 to 9999999
Measure result	Error rate	FAST	---	BERRATE? FAST	r	
	Error event	FAST	---	BEREVENT? FAST	n	
	BER receive	FAST	---	BERRECEIVE? FAST	n	
Measurement result (Multi-response)				BERMEAS?	r0,r1,r2,r3,r4, r5, r6, r7, r8	returns all measurement result See *1
			---	BERMEAS ? n0, n1, n2, n3, n4, n5, n6, n7, n8	r0, r1, r2, r3, r4, r5, r6, r7, r8	returns selected measurement results See *1

*1 Multi-response

Query Format Example:

BERMEAS? n0, n1, n2, n3, n4, n5, n6, n7, n8

n0 to n9: Response flag

1 = Returns the measured results

0 = Does not return the measured results

Caution: The number of query parameter is fixed (=9)

Actual Query Example:

BERMEAS? 1, 0, 0, 1, 0, 0, 0, 0, 0

This query returns measurement results of Error rate (FER/CRC/FAST) and Error event (FER/CRC/FAST).

Response Format:

r0, r1, r2, r3, r4, r5, r6, r7, r8

r0: Error rate (FER/CRC/FAST) r1: Error rate (CIb)

r2: Error rate (CII) r3: Error event (FER/CRC/FAST)

r4: Error event (CIb) r5: Error event (CII)

r6: BER sample (FER/CRC/FAST) r7: BER sample (CIb)

r8: BER sample (CII)

(Note) r0, r3, r6 indicate one measurement result from FER or CRC or FAST by the Loop Back Type.

Actual Response Example:

(Error rate (FER/CRC/FAST) and Error event (FER/CRC/FAST))

0.000, 0

System implementing this function: GSM

2.14 5-band User Calibration

Features

(a) Supports individual 5 bands calibration

(b) Freely sets both beginning and ending frequency of each band

(c) Non volatile calibration value (No necessity to store into external PC's storage media)

(d) Needs only one GPIB command for compensating for RF power measurement drift

(e) 5-band User Calibration is available only by the GPIB commands

Functions

TX Band (for TX measurement)

(a) Band definition

The each band can be defined by the following GPIB program messages:

Program Message: DEFTXBAND n, F1, F2
n: 1 to 5 F1:Beginning Freq.[Hz] F2:Ending Freq.[MHz]
Query Message: DEFTXBAND? n
Response: F1, F2

(b) User Calibration

In order to remove the effects of cable loss and absolute error of the MT8801B/C's Power sensor, it is necessary to calibrate the MT8801B/C built-in manufacturing system by using precise power source when constructing the manufacturing line.
The GPIB commands for writing initial calibration value are as follows:

Program Message: TXUSRCAL Band, CalValue
Band: 1 to 5, CalValue: –50.0 to 50.0 [dB] (Initial Setting = 0.0 [dB])
Query Message: TXUSRCAL? Band
Response: CalValue

(c) Drift compensation

Every specified time (e.g. 1 hour), it is desirable to compensate for RF power measurement by internal power sensor of the MT8801B/C. When using this function, the MT8801B/C requires calibration signal source which is higher than 10 dBm mean power connected to Main Input connector.
By sending the following GPIB commands to the MT8801B/C, the MT8801B/C calculates the difference of Power measurement result between internal power sensor and DSP, and stores it as the drift compensation value of the current band.

Program Message: CMPTXPWR
Query Message: CMPTXPWR?
Response: Drift compensation value by "CMPTXPWR" Program Message. [dB]

(d) Cancellation of drift compensation value

The Drift compensation value stored by "CMPTXPWR" can be cleared by "CALCANCEL" command. (Clear current band only)

Program Message.: CALCANCEL

RX Band (for RX measurement)

(a) Band definition

The each band can be set by the following GPIB program messages.

Program Message: DEFRXBAND n, F1, F2
n: 1 to 5 F1:Beginning Freq. [Hz] F2:Ending Freq. [Hz]
Query Message: DEFRXBAND? n
Response: F1, F2

(b) User Calibration

In order to remove the effects of cable loss, it is necessary to calibrate the MT8801B/C built-in manufacturing system by using precise power meter when constructing the manufacturing line.
GPIB command for writing initial calibration value are as follows.

Program Message: RXUSRCAL Band, CalValue
Band: 1 to 5, CalValue: –50.0 to 50.0 [dB] (Initial Setting = 0.0 [dB])
Query Message: RXUSRCAL? Band
Response: CalValue

Calibration mode switch

The default calibration functionality is “2 bands User Calibration”, which is displayed on Setup TX Parameter Screen and Setup RX Parameter Screen.
To enable “5-band User Calibration”, the following GPIB commands are required after the MT8801B/C is switched on.

Program Message: CALMODE n
n: (0 = 2 bands mode, 1 = Enhanced 5 bands Mode)
Query Message: CALMODE?
Response: n: (0 = conventional (default), 1 = Enhanced 5 bands Calibration Mode)

GPIB

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
5 Bands User Calibration	TX calibration	TX calibration Band definition	DEFTXBAND n, f0, f1	DEFTXBAND? n	f0, f1	See *1 n: 1 to 5 (Band) f0:Beginning Freq.[Hz] f1:Ending Freq.[Hz] Initial Setting n:1 Band1 f0=300000 f1=599999999 Band2 f0=600000000 f1=1199999999 Band3 f0=1200000000 f1=1799999999 Band4 f0=1800000000 f1=2399999999 Band5 f0=2400000000 f1=3000000000
		TX user calibration	TXUSRCAL n, l	TXUSRCAL? n	l	n:1 to 5 (Band) l: Calibration value –50.0 to 50.0 [dB] Initial Setting n: 1 l: 0.0
		Drift Compensation	CMPTXPWR	CMPTXPWR?	l	
	RX calibration	RX calibration Band definition	DEFRXBAND n, f0, f1	DEFRXBAND? n	f0, f1	See *1 n: 1 to 5 (Band) f0: Beginning Freq. [Hz] f1: Ending Freq. [Hz] Initial Setting n:1 Band1 f0=300000 f1=599999999 Band2 f0=600000000 f1=1199999999 Band3 f0=1200000000 f1=1799999999 Band4 f0=1800000000 f1=2399999999 Band5 f0=2400000000 f1=3000000000

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
		RX user calibration	RXUSRCAL n, l	RXUSRCAL? n	l	n: 1 to 5 (Band) l: Calibration value –50.0 to 50.0 [dB] Initial Setting n: 1 l: 0.0
	Calibration mode switch		CALMODE n	CALMODE?	n	n: 0 = 2 band user calibration 1 = 5 band user calibration Initial Setting 0 (2 band user calibration)

*1

If the band is overlapped, higher band i.e. the band which has higher number n is applied.

Example:

DEFRXBAND 1, 1000000000, 150000000 (RX Band 1 = 1 GHz to 1.5 GHz)

DEFRXBAND 2, 1400000000, 190000000 (RX Band 2 = 1.4 GHz to 1.9 GHz)

This responses are as follows.

DEFRXBAND? 1

"100000000,139999999" (RX Band 1 = 1 GHz to 1.4 GHz - 1 Hz)

DEFRXBAND? 2

"140000000,190000000" (RX Band 2 = 1.4 GHz to 1.9 GHz)

System implementing this function: GSM

2.15 Optimized TX measurement

Features

(a) Faster TX batch measurement instead of current “All Measure”

(b) Returns Average, Max and Min measurement results

(c) Allows to perform measurement at any TX measurement screen and Setup Common Parameter Screen

(d) Allows to select measurement item at any TX measurement screen and Setup Common Parameter Screen

(e) Available by GPIB only

(f) Measures without changing screens, for speed up

(h) Fast averaging using all the valid bursts sampled in wave memory

GPIB

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Optimized TX measurement	Measurement item selection		MOPTXMEAS an, p0, p1, p2, ..., p58	MOPTXMEAS?	an, r0, r1, r2, ..., r58	See *1, *2
	Perform Measurement		SWPOPTXMEAS	OPTXMEAS?	r0, r1, r2, ..., r58	See *3, *4, *5

*1

an: averaging count (1 to 12) Initial Setting = 10

pn: 0 = measurement off 1 = measurement on Initial Setting = 1, 0, 0, ..., 0

The corresponding measurement items are as follows.

Corresponding measurement items

p0: Average Freq. Error
p1: Max Freq. Error
p2: Average RMS Phase Error
p3: Max RMS Phase Error
p4: Average Peak Phase Error
p5: Max Peak Phase Error
p6: Average Tx Power
p7: Max Tx Power
p8: Min Tx Power
p9: Average carrier on/off ratio
p10: Max carrier on/off ratio
p11: Min carrier on/off ratio
p12: Average Time Alignment
p13: Max Time Alignment
p14: Min Time Alignment
p15: Max Power in on portion
p16: Min Power in on portion
p17: Average Power vs Time at –28 µs
p18: Max Power vs Time at –28 µs
p19: Min Power vs Time at –28 µs
p20: Average Power vs Time at –18 µs
p21: Max Power vs Time at –18 µs
p22: Min Power vs Time at –18 µs
p23: Average Power vs Time at –10 µs
p24: Max Power vs Time at –10 µs
p25: Min Power vs Time at –10 µs
p26: Average Power vs Time at –5 µs
p27: Max Power vs Time at –5 µs
p28: Min Power vs Time at –5 µs
p29: Average Power vs Time at 0 µs
p30: Max Power vs Time at 0 µs
p31: Min Power vs Time at 0 µs
p32: Average Power vs Time at 542.8 µs
p33: Max Power vs Time at 542.8 µs
p34: Min Power vs Time at 542.8 µs
p35: Average Power vs Time at 547.8 µs
p36: Max Power vs Time at 547.8 µs
p37: Min Power vs Time at 547.8 µs
p38: Average Power vs Time at 552.8 µs
p39: Max Power vs Time at 552.8 µs

p40: Min Power vs Time at 552.8 µs
p41: Average Power vs Time at 560.8 µs
p42: Max Power vs Time at 560.8 µs
p43: Min Power vs Time at 560.8 µs
p44: Average Power vs Time at 570.8 µs
p45: Max Power vs Time at 570.8 µs
p46: Min Power vs Time at 570.8 µs
p47: Average Spectrum due to modulation at –400 kHz
p48: Max Spectrum due to modulation at –400 kHz
p49: Min Spectrum due to modulation at –400 kHz
p50: Average Spectrum due to modulation at 400 kHz
p51: Max Spectrum due to modulation at 400 kHz
p52: Min Spectrum due to modulation at 400 kHz
p53: Average Spectrum due to switching at –400 kHz
p54: Max Spectrum due to switching at –400 kHz
p55: Min Spectrum due to switching at –400 kHz
p56: Average Spectrum due to switching at 400 kHz
p57: Max Spectrum due to switching at 400 kHz
p58: Min Spectrum due to switching at 400 kHz

*2

The system returns no error when the number of parameter is less than 60.

*3

If corresponding pn (item) is 0, rn (result) is not returned.
e.g. if p1 and p3 is 0 (i.e. off), returned response is r0, r2, r4, r5....r58

*4

Units of Freq. Error and Spectrum due to switching are set in the Select All Measure Item Screen.

*5

The next GPIB msg. after “SWPOPTXMEAS” is not accepted until the end of measurement to avoid reading the previous measurement result. i.e. Sending “SWP” command after “SWPOPTXMEAS” is not necessary.

Example

MOPTXMEAS
10,0,0,1,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0

MOPTXMEAS?
————————>
10,0,0,1,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0

SWPOPTXMEAS

OPTXMEAS?
————————>3.65

System implementing this function: GSM

2.16 Optimized TX Measurement 2

Intermediate calss	Function	Function Detail	Program Msg	Query Msg	Response Msg	Remarks
Modulation Analysis and RF Power Measurement	Measurement Item Slection	Average number and Measure On/Off	MOPTX2MODPWR an,p0,p1,p2,...,p17	MOPTX2MODPWR?	an,r0,r1,r2,....,r17	*1,*2
	Perform Measurement		SWPMOPTX2MODPWR	---	---	*3
	Mesurement Result		---	OPTX2MODPWR?	r0-2,r0-1,r1-2,r1-1,....,r17-1	*4,*5
Output RF Spectrum	Mesurement Item Slection	Average number and Measure On/Off	MOPTX2ORFS an,p0,p1,p2,....,p51	MOPTX2ORFS?	an,r0,r1,r2,....,r51	*6,*7
	Perform Measurement		SWPMOPTX2ORFS	---	---	*8
	Mesurement Result		---	OPTX2ORFS?	r0-2,r0-1,r0-0,r1-2,....,r51-0	*9

*1

an: average count (1 to 9999) Initial Setting = 1

pn: bit-2 × 4 + bit-1 × 2 + bit-0 (0 to 7)

bit-2/bit-1/bit-0: 0 = measurement off, 1 = measurement on Initial Setting = 0

The corresponding Optimized TX Measurement 2 Modulation Analysis and Power Mesurement items are as follows:

Table 1 Corresponding measurement item pn (Modulation & Power)

P0	bit-2	Average frequency error	P9	bit-2	Average power vs time at –10 µs
	bit-1	Max frequency error		bit-1	Max power vs time at –10 µs
	bit-0	–		bit-0	Min power vs time at –10 µs
P1	bit-2	Average RMS phase error	P10	bit-2	Average power vs time at –5 µs
	bit-1	Max RMS phase error		bit-1	Max power vs time at –5 µs
	bit-0	–		bit-0	Min power vs time at –5 µs
P2	bit-2	Average peak phase error	P11	bit-2	Average power vs time at 0 µs
	bit-1	Max peak phase error		bit-1	Max power vs time at 0 µs
	bit-0	–		bit-0	Min power vs time at 0 µs
P3	bit-2	Average Tx power	P12	bit-2	Average power vs time at 542.8 µs
	bit-1	Max Tx power		bit-1	Max power vs time at 542.8 µs
	bit-0	Min Tx power		bit-0	Min power vs time at 542.8 µs
P4	bit-2	Average carrier on/off ratio	P13	bit-2	Average power vs time at 547.8 µs
	bit-1	Max carrier on/off ratio		bit-1	Max power vs time at 547.8 µs
	bit-0	Min carrier on/off ratio		bit-0	Min power vs time at 547.8 µs
P5	bit-2	Average time alignment	P14	bit-2	Average power vs time at 552.8 µs
	bit-1	Max time alignment		bit-1	Max power vs time at 552.8 µs
	bit-0	Min time alignment		bit-0	Min power vs time at 552.8 µs
P6	bit-2	–	P15	bit-2	Average power vs time at 560.8 µs
	bit-1	Max power in on portion		bit-1	Max power vs time at 560.8 µs
	bit-0	Min power in on portion		bit-0	Min power vs time at 560.8 µs
P7	bit-2	Average power vs time at –28 µs	P16	bit-2	Average power vs time at 570.8 µs
	bit-1	Max power vs time at –28 µs		bit-1	Max power vs time at 570.8 µs
	bit-0	Min power vs Time at –28 µs		bit-0	Min power vs time at 570.8 µs
P8	bit-2	Average power vs time at –18 µs	P17	bit-2	Average origin-offset
	bit-1	Max power vs time at –18 µs		bit-1	Max origin-offset
	bit-0	Min power vs time at –18 µs		bit-0	–

*2

RCA returns no error when the number of parameter is less than 17.

e.g. MOPTX2MODPWR 10,6,6,6,7,7,7,3,,7,7

*3

The next GPIB msg after “SWPOPTX2MODPWR” is not accepted by the end if measurement to avoid reading previous measurement result. i.e.No need to send “SWP” command after “SWPOPTX2MODPWR”.

*4

If corresponding pn (item) is 0, rn (result) is not returns.
e.g. if p1 and p3 is 0 (i.e. bit-2 = off, bit-1 = off, bit-0 = off), returned response is r0-2,r0-1,r1-1,r2-2,r2-1,r3-1,r4-2,r4-1,r4-0,...,r17-1.

*5

Unit of Freq Error is determined by the setting in Select All Measure Item Screen.

*6

an: average count (1 to 9999) Initial Setting = 1
pn: bit-2 × 4 + bit-1 × 2 + bit-0 (0 to 7)
bit-2/bit-1/bit-0: 0 = measurement off, 1 = measurement on Initial Setting = 0

The corresponding Optimized TX Measurement 2 Output RF Spectrum are as follows:

Table 2 Corresponding measurement item (ORFS) -1

P0	bit-2	Average due to mod at –0 kHz	P13	bit-2	Average due to mod at +0 kHz
	bit-1	Max due to mod at –0 kHz		bit-1	Max due to mod at +0 kHz
	bit-0	Min due to mod at –0 kHz		bit-0	Min due to mod at +0 kHz
P1	bit-2	Average due to mod at –100 kHz	P14	bit-2	Average due to mod at +100 kHz
	bit-1	Max due to mod at –100 kHz		bit-1	Max due to mod at +100 kHz
	bit-0	Min due to mod at –100 kHz		bit-0	Min due to mod at +100 kHz
P2	bit-2	Average due to mod at –200 kHz	P15	bit-2	Average due to mod at +200 kHz
	bit-1	Max due to mod at –200 kHz		bit-1	Max due to mod at +200 kHz
	bit-0	Min due to mod at –200 kHz		bit-0	Min due to mod at +200 kHz
P3	bit-2	Average due to mod at –250 kHz	P16	bit-2	Average due to mod at +250 kHz
	bit-1	Max due to mod at –250 kHz		bit-1	Max due to mod at +250 kHz
	bit-0	Min due to mod at –250 kHz		bit-0	Min due to mod at +250 kHz
P4	bit-2	Average due to mod at –400 kHz	p17	bit-2	Average due to mod at +400 kHz
	bit-1	Max due to mod at –400 kHz		bit-1	Max due to mod at +400 kHz
	bit-0	Min due to mod at –400 kHz		bit-0	Min due to mod at +400 kHz
P5	bit-2	Average due to mod at –600 kHz	P18	bit-2	Average due to mod at +600 kHz
	bit-1	Max due to mod at –600 kHz		bit-1	Max due to mod at +600 kHz
	bit-0	Min due to mod at –600 kHz		bit-0	Min due to mod at +600 kHz
P6	bit-2	Average due to mod at –800 kHz	P19	bit-2	Average due to mod at +800 kHz
	bit-1	Max due to mod at –800 kHz		bit-1	Max due to mod at +800 kHz
	bit-0	Min due to mod at –800 kHz		bit-0	Min due to mod at +800 kHz
P7	bit-2	Average due to mod at –1000 kHz	P20	bit-2	Average due to mod at +1000 kHz
	bit-1	Max due to mod at –1000 kHz		bit-1	Max due to mod at +1000 kHz
	bit-0	Min due to mod at –1000 kHz		bit-0	Min due to mod at +1000 kHz
P8	bit-2	Average due to mod at –1200 kHz	P21	bit-2	Average due to mod at +1200 kHz
	bit-1	Max due to mod at –1200 kHz		bit-1	Max due to mod at +1200 kHz
	bit-0	Min due to mod at –1200 kHz		bit-0	Min due to mod at +1200 kHz
P9	bit-2	Average due to mod at –1400 kHz	P22	bit-2	Average due to mod at +1400 kHz
	bit-1	Max due to mod at –1400 kHz		bit-1	Max due to mod at +1400 kHz
	bit-0	Min due to mod at –1400 kHz		bit-0	Min due to mod at +1400 kHz
P10	bit-2	Average due to mod at –1600 kHz	P23	bit-2	Average due to mod at +1600 kHz
	bit-1	Max due to mod at –1600 kHz		bit-1	Max due to mod at +1600 kHz
	bit-0	Min due to mod at –1600 kHz		bit-0	Min due to mod at +1600 kHz
P11	bit-2	Average due to mod at –1800 kHz	P24	bit-2	Average due to mod at +1800 kHz
	bit-1	Max due to mod at –1800 kHz		bit-1	Max due to mod at +1800 kHz
	bit-0	Min due to mod at –1800 kHz		bit-0	Min due to mod at +1800 kHz
P12	bit-2	Average due to mod at –2000 kHz	P25	bit-2	Average due to mod at +2000 kHz
	bit-1	Max due to mod at –2000 kHz		bit-1	Max due to mod at +2000 kHz
	bit-0	Min due to mod at –2000 kHz		bit-0	Min due to mod at +2000 kHz

Table 2 Corresponding measurement item (ORFS) -2

P26	bit-2	Average due to sw at –0 kHz	P39	bit-2	Average due to sw at +0 kHz
	bit-1	Max due to sw at –0 kHz		bit-1	Max due to sw at +0 kHz
	bit-0	Min due to sw at –0 kHz		bit-0	Min due to sw at +0 kHz
P27	bit-2	Average due to sw at –100 kHz	P40	bit-2	Average due to sw at +100 kHz
	bit-1	Max due to sw at –100 kHz		bit-1	Max due to sw at +100 kHz
	bit-0	Min due to sw at –100 kHz		bit-0	Min due to sw at +100 kHz
P28	bit-2	Average due to sw at –200 kHz	P41	bit-2	Average due to sw at +200 kHz
	bit-1	Max due to sw at –200 kHz		bit-1	Max due to sw at +200 kHz
	bit-0	Min due to sw at –200 kHz		bit-0	Min due to sw at +200 kHz
P29	bit-2	Average due to sw at –250 kHz	P42	bit-2	Average due to sw at +250 kHz
	bit-1	Max due to sw at –250 kHz		bit-1	Max due to sw at +250 kHz
	bit-0	Min due to sw at –250 kHz		bit-0	Min due to sw at +250 kHz
P30	bit-2	Average due to sw at –400 kHz	P43	bit-2	Average due to sw at +400 kHz
	bit-1	Max due to sw at –400 kHz		bit-1	Max due to sw at +400 kHz
	bit-0	Min due to sw at –400 kHz		bit-0	Min due to sw at +400 kHz
P31	bit-2	Average due to sw at –600 kHz	P44	bit-2	Average due to sw at +600 kHz
	bit-1	Max due to sw at –600 kHz		bit-1	Max due to sw at +600 kHz
	bit-0	Min due to sw at –600 kHz		bit-0	Min due to sw at +600 kHz
P32	bit-2	Average due to sw at –800 kHz	P45	bit-2	Average due to sw at +800 kHz
	bit-1	Max due to sw at –800 kHz		bit-1	Max due to sw at +800 kHz
	bit-0	Min due to sw at –800 kHz		bit-0	Min due to sw at +800 kHz
P33	bit-2	Average due to sw at –1000 kHz	P46	bit-2	Average due to sw at +1000 kHz
	bit-1	Max due to sw at –1000 kHz		bit-1	Max due to sw at +1000 kHz
	bit-0	Min due to sw at –1000 kHz		bit-0	Min due to sw at +1000 kHz
P34	bit-2	Average due to sw at –1200 kHz	P47	bit-2	Average due to sw at +1200 kHz
	bit-1	Max due to sw at –1200 kHz		bit-1	Max due to sw at +1200 kHz
	bit-0	Min due to sw at –1200 kHz		bit-0	Min due to sw at +1200 kHz
P35	bit-2	Average due to sw at –1400 kHz	P48	bit-2	Average due to sw at +1400 kHz
	bit-1	Max due to sw at –1400 kHz		bit-1	Max due to sw at +1400 kHz
	bit-0	Min due to sw at –1400 kHz		bit-0	Min due to sw at +1400 kHz
P36	bit-2	Average due to sw at –1600 kHz	P49	bit-2	Average due to sw at +1600 kHz
	bit-1	Max due to sw at –1600 kHz		bit-1	Max due to sw at +1600 kHz
	bit-0	Min due to sw at –1600 kHz		bit-0	Min due to sw at +1600 kHz
P37	bit-2	Average due to sw at –1800 kHz	P50	bit-2	Average due to sw at +1800 kHz
	bit-1	Max due to sw at –1800 kHz		bit-1	Max due to sw at +1800 kHz
	bit-0	Min due to sw at –1800 kHz		bit-0	Min due to sw at +1800 kHz
P38	bit-2	Average due to sw at –2000 kHz	P51	bit-2	Average due to sw at +2000 kHz
	bit-1	Max due to sw at –2000 kHz		bit-1	Max due to sw at +2000 kHz
	bit-0	Min due to sw at –2000 kHz		bit-0	Min due to sw at +2000 kHz

*7

RCA returns no error when the number of parameter is less than 51.
e.g. MOPTX2ORFS 10,7,7,7,7,7,7,7,,7,7,7

*8

The next GPIB msg after “SWPOPTX2ORFS” is not accepted by the end if measurement to avoid reading previous measurement result. i.e.No need to send “SWP” command after “SWPOPTX2ORFS”.

*9

If corresponding pn (item) is 0, rn (result) is not returns.
e.g. if p1 and p3 is 0 (i.e. bit-2 = off, bit-1 = off, bit-0=off), returned response is r0-2,r0-1,r0-0,r1-1,r2-2,r2-1, r2-0,r3-1,r4-2,r4-1,r4-0,...,r51-0

*10

Unit of Spectrum due to switching is determined by the setting in Select All Measure Item Screen.

Example

1. Optimized TX Measurement2 Modulation Analysis and RF Power
   A case of measuring average and max of RMS phase error and average, max and min of TX power.

   a. Setting the Measurement Items
      OPTX2MODPWR 100,0,6,0,7,0,0,0,0,0,0,0,0,0,0,0,0,0,0
   where average count is specified with 100.

   b. Query the measurement item
      OPTX2MODPWR?
      ————————>
      100,0,6,0,7,0,0,0,0,0,0,0,0,0,0,0,0,0,0

   c. Execute measurement
      SWPOPTX2MODPWR

   d. Query the measurement results
      MOPTX2MODPWR?
      ————————>
      3.65,3.70,20.0,20.9,19.4

2. Optimized TX Measurement 2 Output RF Spectrum
   A case of measuring average, max and min of power due to modulation and due to switching transient at ±400 kHz.
   a. Setting the measurement Items
      MOPTX2ORFS
      100,0,0,0,0,7,0,0,0,0,0,0,0,0,0,0,0,0,7,0,0,0,0,0,0,0,0,0,0,0,0,7,0,0,0,0,0,0,0,0,0,0,0,0,7,0,0,0,0,0,0,0,0
   where average count is specified with 100.

   b. Query the measurement Items
      OPTX2ORFS?
      ————————>
      100,0,0,0,0,7,0,0,0,0,0,0,0,0,0,0,0,0,7,0,0,0,0,0,0,0,0,0,0,0,0,7,0,0,0,0,0,0,0,0,0,0,0,0,7,0,0,0,0,0,0,0,0

   c. Execute measurement
      SWPOPTX2ORFS

   d. Query the measurement results
      MOPTX2ORFS?
      ————————>
      –65.89, –63.66, –67.98, –65.89, –62.88, –70.45, –64.82, –62.39, –66.96, –64.44, –62.79, –65.93

System implementing this function: GSM

2.17 PDC Measurement Function for Packet Communication Physical Channel (Only for GPIB)

Performs modulation analysis measurement for packet communication physical channel. This function can be used through GPIB remote control only when DUT Control is set to NONE. Available in all TX measure screens and the Setup Common Parameter screen.

The following measurements are available:
Carrier Frequency, Carrier Frequency Error, RMS Vector Error, First 10 Symbols Vector Error, Peak Vector Error, Magnitude Error, Phase Error, Origin Offset, Droop Factor

GPIB commands

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Packet Channel Measurement	Perform Measurement		MEASPKTM ODSWP			
	Measurement Result			MEASPKT MOD?	r0,r1,r2,...,r9	*1

*1 Multi response

Response Format:

r0, r1, r2, r3, r4, r5, r6, r7, r8, r9

r0: Carrier Frequency
r1: Carrier Frequency Error [Hz]
r2: Carrier Frequency Error [ppm]
r3: RMS Vector Error
r4: First 10 symbols RMS Vector Error
r5: Peak Vector Error
r6: Magnitude Error
r7: Phase Error
r8: Origin Offset
r9: Droop Factor

Response Example:

1429024824.30, –0.1757, –0.12, 7.00, 7.19, 26.51, 1.76, 3.88, –31.44, –0.003

Applicable System: PDC, PDC_CP

2.18 High-speed All Measure measurement Function

Performs All Measure measurement at high speed. This function can be used only through GPIB remote control. Available in all TX measure screens and the Setup Common Parameter screen. Change the measurement start command (SWP, etc.) for All Measure measurement to that for high-speed All Measure measurement (FASTALLMEASSWP).

Measurement items and measured results are used in the same way as for the previous All Measure measurement. For details on measurement item settings and measured results of All Measure, refer to 2.5.3 “TX/RX commands” in Section 2 “Device Message List” of the Operation Manual (Remote Control) for each measurement software.

Differences with All Measure

- High-speed All Measure measurement can be performed in all TX measure screens and the Setup Common Parameter screen.
- High-speed All Measure measurement does not update the measured data read by the waveform memory read command.

External control commands

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Fast All Measurement	Perform Measurement		FASTALLMEASSWP n			n: Average count (1 to 9999)*1

*1 Average count n can be omitted. It is set to 1 when omitted.

Measurement Example:

FASTALLMEASSWP 20 Executes high-speed All Measure with average count of 20.
MSTAT? Checks the measured result status. *2
——————————> 0

ALLMEAS? MODANAL Reads all measured results of Modulation Analysis.
——————————> 4,940024993.86,0,–6.14,0,0.70,0,3.69,0,0.38,0,0.34,0,–54.80,9,0

*2: For measured result status, refer to (5) Measurement status of 2.5.3 “TX/RX commands” in Section 2 “Device Message List” of the Operation Manual (Remote Control) for each measurement software.

Applicable System: PDC, PDC_CP

2.19 Covering PDC Packet Physical Channel

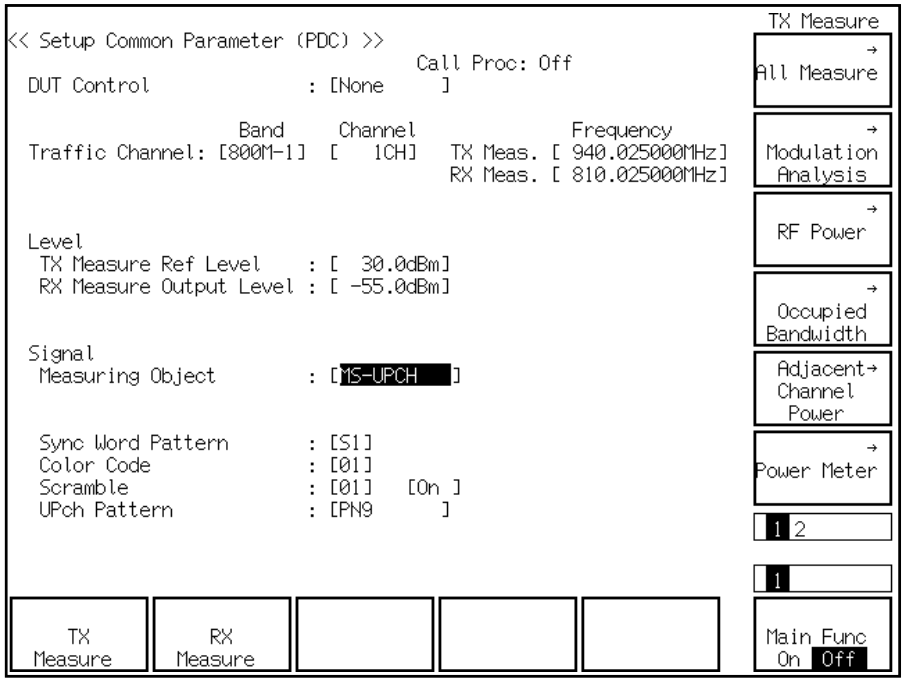
Transmission measurement and reception measurement have been enabled by covering PDC Packet Physical Channel. This function is available by selecting MS-UPCH for Measuring Object when NONE is selected for DUT Control.

PDC Packet Physical Channel is coverd for all the following measuring functions:

- Modulation Analysis *
- RF Power *
- Occupied Bandwidth *
- Adjacent Channel Power
- Bit Error Rate Measurement

*When MS-UPCH is selected for Measuring Object, the function of which to wait 10 seconds after starting measurement until signal to be input automatically runs.

For operations of each measurement, refer to “Section 4 Operation” of the software manual.



Setup Common Parameter screen when MS-UPCH is selected for Measuring Object

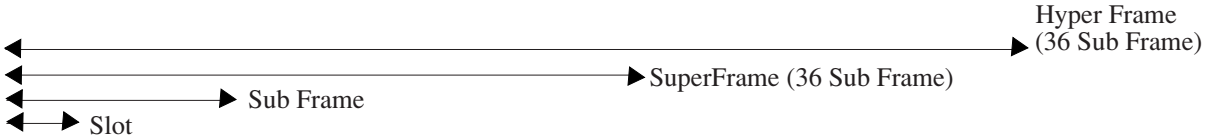
When MS-UPCH is selected for Measuring Object, the equipment can output the follwing signals according to the format of 3-slots Paket Physical Channel.

Structure of Downlink Packet Physical Cannel

R	P	CAC	SW	CC	CAC	E
4	2	112	20	8	112	22

R: Guard Time for Burst Transient Response
P: Preamble
CAC: Control Signal (UPCH) PN9/PN15 Pseudo RandomPattern
SW: Synchronization Word Slot0=S1/S7**
Slot1=S2/S8**
Slot2=S3/S9**
CC:Color Code 00 H (8 bits)
G:Guard Time 00 H (6 bits)
Scramble Function(CAC): On
Scramble Code: 000 H (9 bits)
[Setting Parameter]
CC: 00H~FFH (8 bits)
CAC: PN9, or PN15 Pseudo Random Pattern
Scramble Function: On/Off

**S7, S8, and S9 are to be used for the first slot of Super Frame when Super Frame is selected for Frame Structure, which is to be set on Setup RX Parameter screen.



S7	S8	S9	S1	S2	S3	...	S7	S8	S9	...	S7	S8	S9
ST#0	ST#1	ST#2	ST#0	ST#1	ST#2		ST#0	ST#1	ST#2		ST#0	ST#1	ST#2

Structure of Synchronization Word when Super Frame is selected for Frame Structure

S1	S2	S3	S1	S2	S3	...	S1	S2	S3	...	S1	S2	S3
ST#0	ST#1	ST#2	ST#0	ST#1	ST#2		ST#0	ST#1	ST#2		ST#0	ST#1	ST#2

Structure of Synchronization Word when Frame is selected for Frame Structure

S7~S9 :Super Frame Synchronization Word of Slots #0 to #2

S1~S3 :Synchronization Word of Slots #0 to #2

GPIB commandos

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Signal	Measuring Object	MS-UPCH	MEASOBJ	MEAS?	MSUPCH	
	UPCH Pattern	PN9	UPCH PN9	UPCH?	PN9	
		PN15	UPCH PN15	UPCH?	PN15	

System implementing this function PDC_CP (MX880116B)

2.20 New RF Channel

Setting range : 0 to 82, 206 to 255

System implementing this function: PHS_CP.

3 Details Selectable Query Command

3.1 Selectable Query Command (IS-136A)

Modulation Analysis Command (IS136A)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Measurement Result (Multi-response)			---	MODANALMEAS?	r0,r1,r2,r3,r4,r5,r6, r7,r8,r9,r10,r11,r12, r13,r14,r15,r16,r17, r18,fl19,r19,fl20, r20	Respond to all measurements See *1
			---	MODANALMEAS? n0,n1,n2,n3,n4,n5, n6,n7,n8,n9,n10, n11,n12,n13,n14, n15,n16,n17,n18, n19,n20	r0,r1,r2,r3,r4,r5,r6, r7,r8,r9,r10,r11,r12, r13,r14,r15,r16,r17, r18,fl19,r19,fl20, r20	Respond to selected measurements See *1

*1

Query Format:

MODANALMEAS? n0, n1, n2, n3, n4, n5, n6, n7, n8, n9, n10, n11, n12, n13, n14, n15, n16, n17, n18, n19, n20

n 0 to 20: Displays the returned values

1 = Returns the measured results

0 = Does not return the measured results

Query Number of Query parameters: 21

Query Example:

MODANALMEAS? 0, 0, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0

The query returns Carrier frequency error (ppm) and Rms vector error measurement values.

Response Format:

r0, r1, r2, r3, r4, r5, r6, r7, r8, r9, r10, r11, r12, r13, r14, r15, r16, r17, r18, fl19, r19, fl20, r20

r0: Carrier frequency
r1: Carrier frequency error (Hz)
r2: Carrier frequency error (ppm)
r3: RMS vector error
r4: First 10 symbols RMS vector error
r5: Peak vector error
r6: Peak vector error symbol
r7: Magnitude error
r8: +Peak magnitude error
r9: +Peak magnitude error symbol
r10: –Peak magnitude error
r11: –Peak magnitude error symbol
r12: Phase error
r13: +Peak phase error
r14: +Peak phase error symbol
r15: –Peak phase error
r16: –Peak phase error symbol
r17: Origin offset
r18: Droop factor
fl19: Bit rate measurement flag
(0: Normal end 4: Unable to measure 9: Does not measure (10Burst Average is not Off.))
r19: Bit rate
fl20: Bit rate error measurement flag
(0: Normal end 4: Unable to measure 9: Does not measure (10Burst Average is not Off.))
r20: Bit rate error

Response Example: (Carrier frequency error (ppm), Rms vector error)

–0.1, 2.82

RF Power Command (IS136A)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Measurement Result (Multi-response)			---	MODANALMEAS?	r0,r1,r2,r3,r4,r5,r6, r7,r8,r9,r10,r11,r12, r13,r14,r15,r16,r17	Respond to all measurements See *1
			---	MODANALMEAS? n0,n1,n2,n3,n4,n5, n6,n7,n8,n9,n10, n11,n12,n13,n14, n15,n16,n17	r0,r1,r2,r3,r4,r5,r6, r7,r8,r9,r10,r11,r12, r13,r14,r15,r16,r17	Respond to selected measurements See *1

*1

Query Format:

RFPWRMEAS? n0, n1, n2, n3, n4, n5, n6, n7, n8, n9, n10, n11, n12, n13, n14, n15, n16, n17

n0 to n17: Displays the returned values

1 = Returns the measured results

0 = Does not return the measured results

Number of Query parameters: 18

Query Example:

RFPWRMEAS? 0, 0, 1, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0

The query returns Carrier off power (dBm) and On/Off ratio measurement values.

Response Format:

r0, r1, r2, r3, r4, r5, r6, r7, r8, r9, r10, r11, r12, r13, r14, r15, r16, r17

r0: TX power (dBm)
r1: TX power (Watt)
r2: Carrier off power (dBm)
r3: Carrier off power (Watt)
r4: On/Off ratio
r5: Burst Timming
r6: Template pass/fail (on screen)
r7: Template pass/fail (off screen)
r8: Rising time
r9: Falling time
r10: Frame mean power (dBm)
r11: Frame mean power (Watt)
r12: Slot mean power (dBm)
r13: Slot mean power (Watt)
r14: Slot power1 (dBm)
r15: Slot power2 (dBm)
r16: Slot power3 (dBm)
r17: Reference power for template (dB)

Response Example: (Carrier off power (dBm), On/Off ratio)

–45.1, 72.88

Occupied Bandwidth Command (IS136A)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Measurement Result			---	OBWMEAS?	r0,r1,r2,r3,r4	Respond to all measurements See *1
(Multi-response)			---	OBWMEAS? n0,n1,n2,n3,n4	r0,r1,r2,r3,r4	Respond to selected measurements See *1

*1

Query Format:

OBWMEAS? n0, n1, n2, n3, n4

n0 to n4: Displays the returned values

1 = Returns the measured results

0 = Does not return the measured results

Number of Query parameters: 5

Query Example:

OBWMEAS? 0, 0, 1, 1, 0

The query returns Lower and Upper measurement values.

Response Format:

r0, r1, r2, r3, r4

r0: Occupied Bandwidth

r1: Center Frequency

r2: Lower

r3: Upper

r4: Span width

Response Example: (Lower, Upper)

–15380.86, 15771.48

Adjacent channal Power Command (IS136A)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Measurement Result (Multi-response)			---	ACPMEAS?	r01,r02,r11,r12, r31,r32,r41,r42, r51,r52,r6,r7	Respond to all measurements See *1
			---	ACPMEAS? n0,n1,n2,n3,n4 n5,n6,n7	r01,r02,r11,r12, r31,r32,r41,r42, r51,r52,r6,r7	Respond to selected measurements See *1

*1

Query Format:

ACPMEAS? n0, n1, n2, n3, n4, n5, n6, n7

n0 to n7: Displays the returned values

1 = Returns the measured results

0 = Does not return the measured results

Number of Query parameters: 8

Query Example:

ACPMEAS? 0, 0, 1, 1, 0, 0, 0, 0

The query returns modulation 90 kHz, –90 kHz and switcing transient 30 kHz, and –30 kHz measurement values.

Response Format:

r01, r02, r11, r12, r31, r32, r41, r42, r51, r52r, r6, r7

r0: modulation 30 kHz — r02: modulation –30 kHz

r11: modulation 60 kHz — r12: modulation –60 kHz

r21: modulation 90 kHz — r12: modulation –90 kHz

r31: switching transient 30 kHz — r32: switching transient –30 kHz

r41: switching transient 60 kHz — r42: switching transient –60 kHz

r51: switching transient 90 kHz — r52 : switching transient –90 kHz

r6: Span width — r7: Signal power

(The unit is each screen.)

Response Example: (modulation 90 kHz, –90 kHz, switching transient 30 kHz, –30 kHz)

–48.11, –48.36, 0.17, –0.54

TX All Measure Command (IS136A)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Measurement Result (Multi-response)	Modulation analysis & RF Power		---	ALLMEAS? MODRF	PFn0,r0,PFn1,r1, PFn2,r2,PFn3,r3, PFn4,r4,PFn5,r5, PFn6,r6,PFn7,r7, PFn8,r8,PFn9,r9, PFn10,r10,PFn11, r11,PFn12,r12, PFn13,r13,PFn14, r14,PFn15,r15, PFn16,r16	Respond to all measurements See *1
			---	ALLMEAS? MODRF,n0,n1,n2, n3,n4,n5,n6,n7,n8, n9,n10,n11,n12,n13, n14,n15,n16	PFn0,r0,PFn1,r1, PFn2,r2,PFn3,r3, PFn4,r4,PFn5,r5, PFn6,r6,PFn7,r7, PFn8,r8,PFn9,r9, PFn10,r10,PFn11, r11,PFn12,r12, PFn13,r13,PFn14, r14,PFn15,r15, PFn16,r16	

*1

Query Format:

ALLMEAS? MODRF, n0, n1, n2, n3, n4, n5, n6, n7, n8, n9, n10, n11, n12, n13, n14, n15, n16

n0 to n16: Displays the returned values

1 = Returns the measured results

0 = Does not return the measured results

Number of Query parameters: 17

Query Example:

ALLMEAS? MODRF, 0, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0

The query returns Carrier Frequency Error and Rms vector error measurement values.

Response Format:

PF: 0 to Pass, 4 = Fail, 9 = Measurement off

PFn0, r0, PFn1, r1, PFn2, r2, PFn3, r3, PFn4, r4, PFn5, r5, PFn6, r6, PFn7, r7, PFn8, r8, PFn9, r9, PFn10, r10, PFn11, r11, PFn12, r12, PFn13, r13, PFn14, r14, PFn15, r15, PFn16, r16

r0: Carrier Frequency
r1: Carrier Frequency Error
r2: RMS vector error
r3: First 10 symbols RMS vector error
r4: Peak vector error
r5: Magnitude error
r6: Phase error
r7: Origin offset
r8: Droop factor
r9: Bit rate error
r10: TX Power
r11: Carrier off power
r12: On/Off ratio
r13: Burst timming
r14: Rising Time
r15: Falling Time
r16: Template Pass/Fail

Response Example: (Carrier Frequency Error, Rms vector error)

0, 0.1, 0, 2.82

BER Measure Command (IS136A)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Measurement result (Multi-response)			---	BERMEAS?	r0,r1,r2	Respond to all measurements See *1
			---	BERMEAS? n0,n1,n2	r0,r1,r2	Respond to selected measurements See *1

*1

Query Format:

BERMEAS? n0, n1, n2

n0 to n2: Displays the returned values

1 = Returns the measured results

0 = Does not return the measured results

Number of Query parameters: 3

Query Example:

BERMEAS? 0, 0, 1

The query returns BER sample measurement values.

Response Format:

r0, r1, r2

r0: Error rate r1: Error count

r2: BER sample

Response Example: (BER sample)

1000000

Sequence Monitor Command (IS136A)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Measurement Result (Multi-response)			---	SEQMONMEAS?	r0,r11,r12,r21,r22,r23,r31,r32,r33,r41,r42,r43,r44,r51,r52	Respond to all measurements See *1
			---	SEQMONMEAS? n0,n1,n2,n3,n4,n5	r0,r11,r12,r21,r22,r23,r31,r32,r33,r41,r42,r43,r44,r51,r52	Respond to selected measurements See *1

*1

Query Format:

SEQMONMEAS? n0, n1, n2, n3, n4, n5

n0 to n5: Displays the returned values

1 = Returns the measured resules

0 = Does not return the measured resules

Number of Query parameters: 6

Query Example:

SEQMONMEAS? 0, 0, 1, 0, 0, 0

The query returns MSID measurement values.

Response Format:

r0, r11, r12, r21, r22, r23, r31, r32, r33, r41, r42, r43, r44, r51, r52

r0: Call Status

r11: C/P error - Call Status

r12: C/P error - Error status

r21: MSID - Received flag

r22: MSID - IDT

r23: MSID - MSID

r31: Channel quality report - Received flag

r32: Channel quality report - RSSI

r33: Channel quality report - BER

r41: Current channel - Received flag

r42: Current channel - Band

r43: Current channel - Channel

r44: Current channel - Slot

r51: Input level - Received flag

r52: Input level - Level

Response Example: (MSID)

0, 2, 06F1BC86F

3.2 Selectable Query Command (GSM)

Modulation Analysis Command (GSM)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Measurement result (Multi response)			---	MODANALMEAS?	r0, r1, r2, r3, r4, r5, r6, r7, r8, r9, r10, r11, r12, r13	returns all measurement results see *1
			---	MODANALMEAS? n0, n1, n2, n3, n4, n5, n6, n7, n8, n9, n10, n11, n12, n13	r0, r1, r2, r3, r4, r5, r6, r7, r8, r9, r10, r11, r12, r13	returns selected measurement results see *1

*1 Multi response

Query Format Example:

MODANALMEAS? n0, n1, n2, n3, n4, n5, n6, n7, n8, n9, n10, n11, n12, n13

n0 to n13: Response flag

1 = Returns the measured results

0 = Does not return the measured results

Caution: The number of query parameter is fixed (=14)

Actual Query Example:

MODANALMEAS? 0, 0, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0

This query returns measurement results of Carrier freq error (ppm) and RMS Phase error

Response Format:

r0: Carrier freq
r1: Carrier freq error (Hz)
r2: Carrier freq error (ppm)
r3: RMS phase error
r4: Peak phase error
r5: RMS magnitude error
r6: +Peak phase error
r7: –Peak phase error
r8: +Peak phase error symbol
r9: –Peak phase error symbol
r10: +Peak magnitude error
r11: –Peak magnitude error
r12: +Peak magnitude error symbol
r13: –Peak magnitude error symbol

Actual Response Example: (Carrier freq error (ppm) and RMS Phase error)

0.1, 2.82

RF Power Command (GSM)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Meaurement result (Multi response)			---	RFPWRMEAS?	r0, r1, r2, r3, r4, r5, r6, r7, r8, r9, r10, r11, r12, r13, r14, r15, r16, r17, r18, r19, r20, r21, r22, r23, r25, r26, r27, r28, r29, r30, r31	returns all measurement results see *1
			---	RFPWRMEAS? n0, n1, n2, n3, r4, r5, r6, r7, n9, n10, n11, n12, n13, n14, n15, n16, n17, n18, n19, n20, n21, n22, n23, n24, n25, n26, n27, n28, n29, n30, n31	r0, r1, r2, r3, r4, r5, r6, r7, r8, r9, r10, r11, r12, r13, r14, r15, r16, r17, r18, r19, r20, r21, r22, r23, r25, r26, r27, r28, r29, r30, r31	returns selected measurement results see *1

*1 Multi response

Query Format Example:

RFPWRMEAS? n0, n1, n2, n3, n4, n5, n6, n7, n8, n9, n10, n11, n12, n13, n14, n15, n16, n17, n18, n19, n20, n21, n22, n23, n24, n25, n26, n27, n28, n29, n30, n31

n0 to n31: Response flag

1 = Returns the measured results

0 = Does not return the measured results

Caution: The number of query parameter is fixed (=32)

Actual Query Example:

RFPWRMEAS? 1, 0, 1, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0

This query returns measurement results of TX power (dBm), Carrier off power (dBm) and On/Off ratio

Response Format:

r0: TX power (dBm)
r1: TX power (Watt)
r2: Carrier off power (dBm)
r3: Carrier off power (Watt)
r4: On/Off ratio
r5: MAX power
r6: MIN power
r7: Power at –28 ms
r8: Power at –18 ms
r9: Power at –10 ms
r10: Power at –5 ms
r11: Power at 0 ms
r12: Power at 542.8 ms
r13: Power at 547.8 ms
r14: Power at 552.8 ms
r15: Power at 560.8 ms
r16: Power at 570.8 µs
r17: Template pass/fail (on screen)
r18: Template pass/fail (off screen)
r19: Frame mean power (dBm)
r20: Frame mean power (Watt)
r21: Slot mean power (dBm)
r22: Slot mean power (Watt)
r23: Slot power 0
r24: Slot power 1
r25: Slot power 2
r26: Slot power 3
r27: Slot power 4
r28: Slot power 5
r29: Slot power 6
r30: Slot power 7
r31: Reference power for template

Actual Response Example: (TX power (dBm), Carrier off power (dBm) and On/Off ratio)

28.24, –43.97, 72.21

Output RF Spectrum Command (GSM)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Measurement result (Multi response)			---	RFSPECMEAS?	rmu0, rml0, rmu1, rml1, : : rsu0, rsl0, rsu1, rsl1, : :	returns all measurement results see *1
			---	RFSPECMEAS? mn0, mn1, mn2, mn3, mr4, mn5, mn6, mn7, mn8, mn9, mn10, mn11, mn12, sn0, sn1, sn2, sn3, sn4, sn5, sn6, sn7, sn8, sn9, sn10, sn11, sn12	rmu0, rml0, rmu1, rml1, : : rsu0, rsl0, rsu1, rsl1, : :	returns selected measurement results see *1

*1 Multi response

Query Format Example:

RFSPECMEAS? mn0, mn1, mn2, mn3, mn4, mn5, mn6, mn7, mn8, mn9, mn10, mn11, mn12, sn0, sn1, sn2, sn3, sn4, sn5, sn6, sn7, sn8, sn9, sn10, sn11, sn12

mn0 to mn12, sn0 to sn12: Response flag

1 = Returns the measured results

0 = Does not return the measured results

Caution: The number of query parameter is fixed (=26)

Actual Query Example:

RFSPECMEAS? 0, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0

This query returns measurement results of 100 kHz and 200 kHz

Response Format:

rmu0, rml0, rmu1, rml1, ..., rsu0, rsl0, rsu1, rsl1, ...

rmu: Modulation upper

rml: Modulation lower

rsu: Switching upper

rsl: Switching lower

Actual Response Example: (100 kHz and 200 kHz)

–5.47, –7.42, –35.38, –33.64, 16.96, 16.50, –7.90, –5.92

TX All Measure Command (GSM)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Measurement result (Multi response)	Modulation analysis & RF power		---	ALLMEAS? MODRF, n0, n1, n2, n3, n4, n5, n6, n7, n8, n9, n10,n11, n12, n13, n14, n15, n16, n17, n19, n20, n21	PFn0, r0, PFn1, r1 : :	returns selected measurement results see *1
	Call Processing report		---	ALLMEAS? CALLP	n,r0,n,r1,n,r2,n,r3	n: 0:PASS 4:FAIL 9:Measurement Off r0:RX level r1:RX quality r2:MS power level r3:Timing advance
			---	ALLMEAS? CALLP n0, n1, n2, n3	PFn0, r0, PFn1, r1, PFn2, r2, PFn3, r3	returns selected measurement results see *2
	Output RF Spectrum		---	ALLMEAS? RFSPEC	PFn0, MLn0, MUn0, SLn0, SUn0, PFn1, MLn1, MUn1, SLn1, SUn1, :	returns all measurement results see *3
			---	ALLMEAS? RFSPEC n0, n1, n2, n3, n4, n5, n6, n7, n8, n9, n10, n11, n12	PFn0, MLn0, MUn0, SLn0, SUn0, PFn1, MLn1, MUn1, SLn1, SUn1, :	returns selected measurement results see *3
Measurement result (Single response)	See each measurement screen for result					

*1 Modulation analysis & RF power Query in TX All Measure Screen

Query Format Example:

ALLMEAS? MODRF, n0, n1, n2, n3, n4, n5, n6, n7, n8, n9, n10, n11, n12, n13, n14, n15, n16, n17, n18, n19, n20, n21

n0 to n21: Response flag

1 = Returns the measured results

0 = Does not return the measured results

Caution: The number of query parameter is fixed (=22)

Actual Query Example:

ALLMEAS? MODRF, 0, 1, 1, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0

This query returns measurement results of Carrier freq error, RMS Phase error and TX power

Response Format:

PFn0, r0, PFn1, r1, ...

PF: 0 = Pass, 4 = Fail, 9 = Measurement off

r0: Carrier freq	r1: Carrier freq error
r2: RMS phase error	r3: Peak phase error
r4: Magnitude error	r5: TX power
r6: Carrier off power	r7: On/Off ratio
r8: MAX power	r9: MIN power
r10: Time alignment	r11: Template
r12: Power at –28 ms	r13: Power at –18 ms
r14: Power at –10 ms	r15: Power at –5 ms
r16: Power at 0 ms	r17: Power at 542.8 ms
r18: Power at 547.8 ms	r19: Power at 552.8 ms
r20: Power at 560.8 ms	r21: Power at 570.8 ms

Actual Response Example: (Carrier freq error, RMS Phase error and TX power)

0, 0.1, 2.82, 0, 28.24

*2 Call Processing report Query in TX All Measure Screen

Query Format Example:

ALLMEAS? CALLP, n0, n1, n2, n3

n0 to n3: Response flag

1 = Returns the measured results

0 = Does not return the measured results

Caution: The number of query parameter is fixed (=5)

Actual Query Example:

ALLMEAS? CALLP, 1, 0, 1, 0

This query returns measurement results of RX level and MS Power level

Response Format:

PFn0, r0, PFn1, r1, ...

PF: 0 = Pass, 4 = Fail, 9 = Measurement off

r0: RX level

r1: RX quality

r2: MS power level

r3: Timing advance

Actual Response Example: (RX level and MS Power level)

0, 23, 0, 8

*3 Output RF Spectrum Query in TX All Measure Screen

Query Format Example:

ALLMEAS? RFSPEC, n0, n1, n2, n3, n4, n5, n6, n7, n8, n9, n10, n11, n12

n0 to n12: Response flag

1 = Returns the measured results

0 = Does not return the measured results

Caution: The number of query parameter is fixed (=14)

Actual Query Example:

ALLMEAS? RFSPEC, 0, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0

This query returns measurement results of 100 kHz and 200 kHz

Response Format:

PFn0, MLn0, MUn0, SLn0, SUn0, PFn1, MLn1, MUn1, SLn1, SUn1, ...

PF: 0 = Pass, 4 = Fail, 9 = Measurement off

ML: Modulation Lower

MU: Modulation Upper

SL: Switching Lower

SU: Switching Upper

Actual Response Example: (Offset = 100 kHz and 200 kHz)

0, –7.42, –5.47, 16.50, 16.96, 0, –33.64, –35.38, –5.92, –7.90

BER Measure Command (GSM)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Meaurement result (Multi response)			---	BERMEAS?	r0, r1, r2, r3, r4, r5, r6, r7, r8	returns all measurement results see *1
			---	BERMEAS? n0, n1, n2, n3, n4, n5, n6, n7, n8	r0, r1, r2, r3, r4, r5, r6, r7, r8	returns selected measurement results see *1

*1 Multi response

Query Format Example:

BERMEAS? n0, n1, n2, n3, n4, n5, n6, n7, n8

n0 to n8 :Response flag

1 = Returns the measured results

0 = Does not return the measured results

Caution: The number of query parameter is fixed (=9)

Actual Query Example:

BERMEAS? 1, 0, 0, 1, 0, 0, 0, 0, 0

This query returns measurement results of Error rate (FER) and Error event (FER)

Response Format:

r0, r1, r2, r3, r4, r5, r6, r7, r8

r0: Error rate (FER)
r1: Error rate (CIb)
r2: Error rate (CII)
r3: Error event (FER)
r4: Error event (CIb)
r5: Error event (CII)
r6: BER sample (FER)
r7: BER sample (CIb)
r8: BER sample (CII)

Actual Response Example: (Error rate (FER) and Error event (FER))

0.000, 0

Sequence Monitor Command (GSM)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Meaurement result (Multi response)			---	SEQMONMEAS?	r0, r11, r12, f12, r2, f13, r3, f14, r4, f15, r51, r52, f16, r6, f17, r71, r72, f18, r81, r82, f19, r9	returns all measurement results see *1
			---	SEQMONMEAS? n0, n1, n2, n3, n4, n5, n6, n7, n8, n9	r0, r11, r12, f12, r2, f13, r3, f14, r4, f15, r51, r52, f16, r6, f17, r71, r72, f18, r81, r82, f19, r9	returns selected measurement results see *1

*1 Multi response

Query Format Example:

SEQMONMEAS? n0, n1, n2, n3, n4, n5, n6, n7, n8, n9

n0 to n9: Response flag

1 = Returns the measured results

0 = Does not return the measured results

Caution: The number of query parameter is fixed (=10)

Actual Query Example:

SEQMONMEAS? 1, 0, 0, 0, 0, 1, 0, 0, 0, 1

This query returns measurement results of Call status, RX level & quality and Input level

Response Format:

r0, r11, r12, f12, r2, f13, r3, f14, r4, f15, r51, r52, f16, r6, f17, r71, r72, f18, r81, r82, f19, r9

f1: 0 = Not receiver, 1 = Received

r0: Call status

r11: Call status

r12: Error status

r2: IMSI

r3: IMEI

r4: NW phone No.

r51: RX level

r52: RX quality

r6: Time alignment

r71: MS power level

r72: Timing advance

r81: Channel

r82: Slot

r9: Input level

Actual Response Example: (Call status, RX level & quality and Input level)

7, 1, 23, 0, 1, –10.5

3.3 Selectable Query Command (PDC_CP)

Modulation Analysis Command (PDC_CP)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Measurement Result (Multi-response)			---	MODANALMEAS?	r0,r1,r2,r3,r4,r5,r6, r7,r8,r9,fl10,r10,fl11, r11,r12,r13,r14,r15, r16,r17,r18,r19,r20	Respond to all measurements See *1
			---	MODANALMEAS? n0,n1,n2,n3,n4,n5, n6,n7,n8,n9,n10,n11, n12,n13,n14,n15,n16, n17,n18,n19,n20	r0,r1,r2,r3,r4,r5,r6, r7,r8,r9,fl10,r10,fl11 ,r11,r12,r13,r14,r15 ,r16,r17,r18,r19,r20	Respond to selected measurements See *1

*1

Query Format:

MODANALMEAS? n0, n1, n2, n3, n4, n5, n6, n7, n8, n9, n10, n11, n12, n13, n14, n15, n16, n17, n18, n19, n20

n0 to 20: Displays the returned values

1 = Returns the measured results

0 = Does not return the measured results

Number of Query parameters: 21

Query Example:

MODANALMEAS? 0, 0, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0

The query returns Carrier freq. error (ppm) and RMS Vector Error measurement values.

Response Format:

r0, r1, r2, r3, r4, r5, r6, r7, r8, r9, fl10, r10, fl11, r11, r12, r13, r14, r15, r16, r17, r18, r19, r20

ri: Result data

fln: 0: Normal end, 4: Abnormal end, 9: Measurement OFF

r0: Carrier Freq
r1: Carrier Freq Error (Hz)
r2: Carrier Freq Error (ppm)
r3: RMS Vector Error
r4: First 10 Symbols RMS Vector Error
r5: Peak Vector Error
r6: Magunitude error
r7: Phase Error
r8: Origin Offset
r9: Droop Factor
r10: Bit Error
r11: Bit Rate Error
r12: Peak Vector Error Symbol
r13: +Peak Magnitude Error
r14: +Peak Mag Error Symbol
r15: –Peak Magnitude Error
r16: –Peak Mag Error Symbol
r17: +Peak Phase Error
r18: +Peak Phase Error Symbol
r19: –Peak Phase Error
r20: –Peak Phase Error Symbol

Response Example: (Carrier freq error (ppm), RMS Vector Error)

0.1, 2.82

RF Power Command (PDC_CP)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Measurement Result (Multi-response)			---	RFPWRMEAS?	r0,r1,r2,r3,r4,r5,r6, r7,r8,r9,r10,r11,r12, r13,r14,r15,r16,r17, r18,r19,r20	Respond to all measurements See *1
			---	RFPWRMEAS? n0,n1,n2,n3,n4,n5, n6,n7,n8,n9,n10, n11,n12,n13,n14, n15,n16,n17,n18, n19,n20	r0,r1,r2,r3,r4,r5,r6, r7,r8,r9,r10,r11,r12, r13,r14,r15,r16,r17, r18,r19,r20	Respond to selected measurements See *1

*1

Query Format:

RFPWRMEAS? n0, n1, n2, n3, n4, n5, n6, n7, n8, n9, n10, n11, n12, n13, n14, n15, n16, n17, n18, n19, n20

n to n20: Displays the returned values

1 = Returns the measured results

0 = Does not return the measured results

Number of Query parameters: 21

Query Example:

RFPWRMEAS? 0, 0, 1, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0

The query returns Carrier Off Power (dBm) and Burst Timing measurement values.

Response Format:

r0, r1, r2, r3, r4, r5, r6, r7, r8, r9, r10, r11, r12, r13, r14, r15, r16, r17, r18, r19, r20

ri: Result data

r0: TX Power (dBm)
r1: TX Power (Watt)
r2: Carrier Off Power (dBm)
r3: Carrier Off Power (Watt)
r4: On/Off Ratio
r5: Burst Timing
r6: Template Pass/Fail (On)
r7: Template Pass/Fail (Off)
r8: Rising Time
r9: Falling Time
r10: Frame Mean Power (dBm)
r11: Frame Mean Power (Watt)
r12: Slot Mean Power (dBm)
r13: Slot Mean Power (Watt)
r14: Slot Power 1 (dBm)
r15: Slot Power 2 (dBm)
r16: Slot Power 3 (dBm)
r17: Slot Power 4 (dBm)
r18: Slot Power 5 (dBm)
r19: Slot Power 6 (dBm)
r20: Reference Power for Template (dB)

Response Example: (Carrier Off Power (dBm), Burst Timing)

–39.48, 0.010

Occupied Bandwidth Command (PDC_CP)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Measurement Result (Multi-response)			---	OBWMEAS?	r0,r1,r2,r3,r4	Respond to all measurements See *1
			---	OBWMEAS? n0,n1,n2,n3,n4	r0,r1,r2,r3,r4	Respond to selected measurements See *1

*1

Query Format:

OBWMEAS? n0, n1, n2, n3, n4

n0 to n4: Displays the returned values

1 = Returns the measured results

0 = Does not return the measured results

Number of Query parameters: 5

Query Example:

OBWMEAS? 0, 1, 0, 1, 0

The query returns Center Frequency and Upper measurement values.

Response Format:

r0, r1, r2, r3, r4, r5

ri: Result data

r0: Occupied Bandwidth
r1: Center Frequency
r2: Lower
r3: Upper
r3: Upper
r4: Span Width

Response Example: (Center Frequency, Upper)

1429024877.93, 13085.94

Adjacend Channel Power Command (PDC_CP)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Measurement Result (Multi-response)			---	ACPMEAS?	ru0,rl0,ru1,rl1,r2,r3	Respond to all measurements See *1
			---	ACPMEAS? n0,n1,n2,n3	ru0,rl0,ru1,rl1,r2,r3	Respond to selected measurements See *1

*1

Query Format Example:

ACPMEAS? n0, n1, n2, n3

n0 to n3: Displays the returned values

1 = Returns the measured results

0 = Does not return the measured results

Number of Query parameters: 4

Query Example:

ACPMEAS? 0, 0, 1, 1

The query returns Span Width and Signal Power measurement values.

Response Format:

ru0, rl0, ru1, rl1, r2, r3

rui, rli, rn: Result data

Note: Unit settings shown on the display are used.

ru0: Upper Level (50 kHz) rl0: Lower Level (50 kHz)

ru1: Upper Level (100 kHz) rl1: Lower Level (100 kHz)

r2: Span Width r3: Signal Power

Response Example: (Span Wigth, Signal Power)

244140, 11.95

TX All Measure Command (PDC_CP)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Measurement Result (Multi-response)	Modulation analysis & RF Power		---	ALLMEAS? MODRF	PFn0,r0,PFn1,r1,PFn2,r2 PFn3,r3,PFn4,r4,PFn5,r5, PFn6,r6,PFn7,r7,PFn8,r8, PFn9,r9,PFn10,r10, PFn11,r11,PFn12,r12, PFn13,r13,PFn14,r14,	Respond to all measurements See *1
			---	ALLMEAS? MODRF, n0,n1,n2,n3,n4,n5,n6,n7, n8,n9,n10,n11,n12,n13, n14	PFn0,r0,PFn1,r1,PFn2,r2 PFn3,r3,PFn4,r4,PFn5,r5, PFn6,r6,PFn7,r7,PFn8,r8, PFn9,r9,PFn10,r10, PFn11,r11,PFn12,r12, PFn13,r13,PFn14,r14,	Respond to selected measurements See *1

*1

Query Format Example:

ALLMEAS? MODRF, n0, n1, n2, n3, n4, n5, n6, n7, n8, n9, n10, n11, n12, n13, n14

n0 to n14: Displays the returned values

1 = Returns the measured results

0 = Does not return the measured results

Number of Query parameters: 15

Query Example:

ALLMEAS? MODRF, 0, 1, 1, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0

The query returns Carrier freq error, RMS Vector Error, and Phase Error measurement values.

Response Format:

PFn0, r0, PFn1, r1, PFn2, r2, PFn3, r3, PFn4, r4, PFn5, r5, PFn6, r6, PFn7, r7, PFn8, r8, PFn9, r9,
PFn10, r10, PFn11, r11, PFn12, r12, PFn13, r13, PFn14, r14

PF: 0=Pass, 4=Fail, 9=Measurement off

r0: Carrier Freq
r1: Carrier Freq Error
r2: RMS Vector Error
r3: Peak Vector Error
r4: Magunitude Error
r5: Phase Error
r6: Origin offset
r7: Bit Rate Error
r8: TX Power
r9: Carrier off Power
r10: On/Off Ratio
r11: Burst Timing
r12: Rising Time
r13: Falling Time
r14: Template

Response Example: (Carrier freq error, RMS Vector Error, Phase Error)

0, 0.1, 0, 2.82, 0, 28.24

BER Measure Command (PDC_CP)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Measurement Result			---	BERMEAS?	r0,r1,r2	Respond to all measurements See *1
(Multi-response)			---	BERMEAS?	r0,r1,r2 n0,n1,n2	Respond to selected measurements See *1

*1

Query Format Example:

BERMEAS? n0, n1, n2

n0 to n2: Displays the returned values

1 = Returns the measured results

0 = Does not return the measured results

Number of Query parameters: 3

Query Example:

BERMEAS? 0, 0, 1

The query returns Counting Time measurement value.

Response Format:

r0, r1, r2

ri: Result data

r0: Error Rate

r1: Error Count

r2: Counting Time

Response Example: (Counting Time)

1000000

Sequence Monitor Command (PDC_CP)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Measurement Result (Multi-response)			---	SEQMONMEAS?	r0,r11,r12,fl2,r2,fl3,r3, fl4,r4,fl5,r51,r52,r53,fl6, r6,fl7,r7,fl8,r81,r82,r83	Respond to all measurements See *1
			---	SEQMONMEAS? n0,n1,n2,n3,n4, n5,n6,n7,n8	r0,r11,r12,fl2,r2,fl3,r3, fl4,r4,fl5,r51,r52,r53,fl6, r6,fl7,r7,fl8,r81,r82,r83	Respond to selected measurements See *1

*1

Query Format:

SEQMONMEAS? n0, n1, n2, n3, n4, n5, n6, n7

n0 to 8: Displays the the returned values

1 = Returns the measured results

0 = Does not return the measured results

Query Number of Query parameters: 9

Query Example:

SEQMONMEAS? 0, 0, 0, 1, 1, 0, 0, 0, 0

The query returns MS Phone Number and NW Phone Number measurement values.

Response Format:

r0, r11, r12, fl2, r2, fl3, r3, fl4, r4, fl5, r51, r52, t53, fl6, r6, fl7, r7, fl8, r81, r82, r83

r0: Call Status

r1: Error Status

r11, r12 r11: Sequence No. of Error, r12: Error Code

r2: MSID

fl2, r2 fl2: Not Received yet/Reception Complete, r2: MSID

r3: MS Phone No.

fl3, r3 fl3: Not Received yet/Reception Complete, r3: MS Phone No.

r4: NW Phone No.

fl4, r4 fl4: Not Received yet/Reception Complete, r4: NW Phone No.

r5: RCH

fl5, r51, r52, r53 fl5: Not Received yet/Reception Complete, r51: MS Power Level, r52: RSSI, r53: ERR

r6: Time Alignment

fl6, r6 fl6: Not Received yet/Reception Complete, r6: Time Alignment

r7: Input Level

fl7, r7 fl7: Not Received yet/Reception Complete, r7: Input Level

r8: Current Channel

fl8, r81, r82, r83 fl8: Not Received yet/Reception Complete, r81: Band, r82: Channel, r83: Slot

Response Example: (MS Phone Number, MW Phone No.)

1, 8226680, 1, 123

3.4 Selectable Query Command (PHS_CP)

Modulation Analysis Command (PHS_CP)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Measurement Result (Multi-response)			---	MODANALMEAS?	r0,r1,r2,r3,r4,r5,r6, r7,r8,r9,fl10,r10,fl11, r11,r12,r13,r14,r15, r16,r17,r18,r19,r20	Respond to all measurements See *1
			---	MODANALMEAS? n0,n1,n2,n3,n4,n5, n6 ,n7,n8,n9,n10, n11,n12,n13,n14, n15,n16,n17,n18, n19,n20	r0,r1,r2,r3,r4,r5,r6,r7, r8,r9,fl10,r10,fl11,r11, r12,r13,r14,r15,r16, r17,r18,r19,r20	Respond to selected measurements See *1

*1

Query Format:

MODANALMEAS? n0, n1, n2, n3, n4, n5, n6, n7, n8, n9, n10, n11, n12, n13, n14, n15, n16, n17, n18, n19, n20

n0 to n20: Displays the returned values

1 = Returns the measured results

0 = Does not return the measured results

Number of Query parameters: 21

Query Example:

MODANALMEAS? 0, 1, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0

The query returns Carrier freq error (Hz) and RMS Vector Error measurement values.

Response Format:

r0, r1, r2, r3, r4, r5, r6, r7, r8, r9, fl10, r10, fl11, r11, r12, r13, r14, r15, r16, r17, r18, r19, r20

ri: Result data

fln: 0 = Normal end, 4 = Abnormal end, 9 = Measurement OFF

r0: Carrier Freq
r1: Carrier Freq Error (Hz)
r2: Carrier Freq Error (ppm)
r3: RMS Vector Error
r4: First 10 Symbol RMS Vector Error
r5: Peak Vector Error
6: Magunitude error
r7: Phase Error
r8: Origin Offset
r9: Droop Factor
r10: Bit Rate
r11: Bit Rate Error
r12: Peak Vector Error Symbol
r13: +Peak Magnitude Error
r14: +Peak Mag Error Symbol
r15: –Peak Magnitude Error
r16: –Peak Mag Error Symbol
r17: +Peak Phase Error
r18: +Peak Phase Error Symbol
r19: –Peak Phase Error
r20: –Peak Phase Error Symbol

Response Example: (Carrier freq error (Hz), RMS Vector Error)

630.74, 3.56

RF Power Command (PHS_CP)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Measurement Result (Multi-response)			---	RFPWRMEAS?	r0,r1,r2,r3,r4,r5,r6, r7,r8,r9,r10,r11,r12, r13,r14,r15,r16,r17, r18,r19,r20,r21,r22, r23,r24,r25,r26	respond to all measurements See *1
			---	RFPWRMEAS? n0,n1,n2,n3,n4,n5,n6, n7,n8,n9,n10,n11,n12, n13,n14,n15,n16,n17, n18,n19,n20,n21,n22, n23.n24,n25,n26	r0,r1,r2,r3,r4,r5,r6,r7, r8,r9,r10,r11,r12,r13, r14,r15,r16,r17,r18, r19,r20,r21,r22,r23, r24,r25,r26	respond to selected measurements See *1

*1

Query Format:

RFPWRMEAS? n0, n1, n2, n3, n4, n5, n6, n7, n8, n9, n10, n11, n12, n13, n14, n15, n16, n17, n18, n19, n20, n21, n22, n23, n24, n25, n26

n0 to n26: Displays thereturned values

1 = Returns the measured results

0 = Does not return the measured results

Number of Query parameters: 27

Query Example:

RFPWRMEAS? 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0

The query returns Carrier Off Power (dBm) measurement values.

Response Format:

r0, r1, r2, r3, r4, r5, r6, r7, r8, r9, r10, r11, r12, r13, r14, r15, r16, r17, r18, r19, r20, r21, r22, r23, r24, r25, r26

ri: Result data

r0: TX Power (dBm)
r1: TX Power (Watt)
r2: Carrier Off Power (dBm)
r3: Carrier Off Power (Watt)
r4: On/Off Ratio
r5: Modulation Power (dBm)
r6: Modulation Power (Watt)
r7: Timing
r8: Jitter (+)
r9: Jitter (–)
r10: Template Pass/Fail (On)
r11: Template Pass/Fail (Off)
r12: Rising Time
r13: Falling Time
r14: Frame Mean Power (dBm)
r15: Frame Mean Power (Watt)
r16: Slot Mean Power (dBm)
r17: Slot Mean Power (Watt)
r18: Slot Power 1 (dBm)
r19: Slot Power 2 (dBm)
r20: Slot Power 3 (dBm)
r21: Slot Power 4 (dBm)
r22: Slot Power 5 (dBm)
r23: Slot Power 6 (dBm)
r24: Slot Power 7 (dBm)
r25: Slot Power 8 (dBm)
r26: Reference Power for Template (dB)

Response Example: (Carrier Off Power (dBm))

–56.91

Occupied Bandwidth Command (PHS_CP)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Measurement Result (Multi-response)			---	OBWMEAS?	r0,r1,r2,r3,r4	respond to all measurements
			---	OBWMEAS? n0,n1,n2,n3,n4	r0,r1,r2,r3,r4	respond to selected measurements See *1

*1

Query Format:

OBWMEAS? n0, n1, n2, n3, n4

n0 to n4: Displays the returned values

1 = Returns the measured results

0 = Does not return the measured results

Number of Query parameters: 5

Query Example:

OBWMEAS? 0, 1, 0, 1, 0

The query returns Center Frequency and Upper measurement values.

Response Format:

r0, r1, r2, r3, r4, r5

ri: Result data — r0: Occupied Bandwidth

r1: Center Frequency — r2: Lower

r3: Upper — r4: Span Width

Response Example: (Center Frequency, Upper)

1895153320.31, 110546.88

Adjacent Channel Power Command (PHS_CP)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Measurement Result (Multi-response)			---	ACPMEAS?	ru0,rl0,ru1, rl1,r2,r3	respond to all measurements See *1
			---	ACPMEAS? n0,n1,n2,n3	ru0,rl0,ru1, rl1,r2,r3	respond to selected measurements See *1

*1

Query Format:

ACPMEAS? n0, n1, n2, n3

n0 to n3: Displays the returned values

1 = Returns the measured results

0 = Does not return the measured results

Number of Query parameters: 4

Query Example:

ACPMEAS? 1, 0, 0, 0

The query returns Upper1 Level (600 kHz) and Lower1 Level (600 kHz) measurement values.

Response Format:

ru0, rl0, ru1, rl1, r2, r3

rui, rli, rn: Result data

Note: Unit settings shown on the display are used.

ru0: Upper1 Level (600 kHz) rl0: Lower1 Level (600 kHz)

ru1: Upper2 Level (900 kHz) rl1: Lower2 Level (900 kHz)

r2: Span Width r3: Signal Power

Response Example: (Upper1 Level (600 kHz), Lower1 Level (600 kHz))

–54.91, –55.09

TX All Measure Command (PHS_CP)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Measurement Result (Multi-response)	**Modulation analysis & RF Power**		---	**ALLMEAS? MODRF**	PFn0,r0,PFn1,r1, PFn2,r2,PFn3,r3, PFn4,r4,PFn5,r5, PFn6,r6,PFn7,r7, PFn8,r8,PFn9,r9, PFn10,r10,PFn11, r11,PFn12,r12, PFn13,r13,PFn14, r14, PFn15,r15	**Respond to all measurements See *1**
			---	**ALLMEAS? MODRF ,** n0,n1,n2,n3,n4,n5, n6,n7,n8,n9,n10, n11,n12,n13,n14,n15	PFn0,r0,PFn1,r1, PFn2,r2,PFn3,r3, PFn4,r4,PFn5,r5, PFn6,r6,PFn7,r7, PFn8,r8,PFn9,r9, PFn10,r10,PFn11, r11,PFn12,r12, PFn13,r13,PFn14, r14, PFn15,r15	**Respond to selected measurements See *1**

*1

Query Format Example:

ALLMEAS? MODRF , n0, n1, n2, n3, n4, n5, n6, n7, n8, n9, n10, n11, n12, n13, n14, n15

n0 to n16: Displays the returned values

1 = Returns the measured results

0 = Does not return the measured results

Number of Query parameters: 16

Query Example:

ALLMEAS? MODRF , 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0

The query returns RMS Vector Error measurement values.

Response Format:

PFn0, r0, PFn1, r1, PFn2, r2, PFn3, r3, PFn4, r4, PFn5, r5, PFn6, r6, PFn7, r7, PFn8, r8, PFn9, r9, PFn10, r10, PFn11, r11, PFn12, r12, PFn13, r13, PFn14, r14, PFn15, r15

PF: 0 = Pass, 4 = Fail, 9 = Measurement off

PF: 0 = Pass, 4 = Fail, 9 = Measurement off

r0: Carrier Freq

r1: Carrier Freq Error

r2: RMS Vector Error

r3: Peak Vector Error

r4: Magunitude Error

r5: Phase Error

r6: Origin offset

r7: Bit Rate Error

r8: TX Power

r9: Carrier off Power

r10: On/Off Ratio

r11: Modulation Power

r12: Burst Timing

r13: Rising Time

r14: Falling Time

r15: Template

Response Example: (RMS Vector Error)

0, 4.16

BER Measure Command (PHS_CP)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Measurement Result (Multi-response)			---	BERMEAS?	r0,r1,r2	Respond to all measurements See *1
			---	BERMEAS? n0,n1,n2	r0,r1,r2	Respond to selected measurements See *1

*1

Query Format Example:

BERMEAS? n0, n1, n2

n0 to n2: Displays the returned values

1 = Returns the measured results

0 = Does not return the measured results

Number of Query parameters: 3

Query Example:

BERMEAS? 0, 0, 1

The query returns Counting Time measurement value.

Response Format:

r0, r1, r2

ri: Result data

r0: Error Rate

r1: Error Count

r2: Counting Time

Response Example: (Counting Time)

1000000

Sequence Monitor Command (PHS_CP)

Intermediate class	Function	Function details	Program Msg	Query Msg	Response Msg	Remarks
Measurement Result (Multi-response)			---	SEQMONMEAS?	r0 ,r11,r12,fl2, r2, fl3,r3 fl4,r4, fl5,r5, fl6,r6, fl7, r71,r72	Respond to all measurements See *1
			---	SEQMONMEAS? n0,n1,n2,n3, n4,n5,n6,n7	r0 ,r11,r12,fl2, r2, fl3,r3 fl4,r4, fl5,r5,fl6,r6,fl7, r71,r72	Respond to selected measurements See *1

*1

Query Format:

SEQMONMEAS? n0, n1, n2, n3, n4, n5, n6, n7

n0 to n7: Displays the returned values

1 = Returns the measured results

0 = Does not return the measured results

Number of Query parameters: 8

Query Example:

SEQMONMEAS? 0, 0, 1, 1, 0, 0, 0, 0

The query returns PSID, PS Phone No. measurement values.

Response Format:

r0, r11, r12, fl2, r2, fl3, r3, fl4, r4, fl5, r5, fl6, r6, fl7, r71, r72

r0: Call Status

r1: Error Status

r11, r12 r11: Sequence No., r12: Error Code

r2: PSID

fl2, r2 fl2: Not Received yet/Reception Complete, r2: PSID

r3: PS Phone No.

fl3, r3 fl3: Not Received yet/Reception Complete, r3: PS Phone No.

r4: NW Phone No.

fl4, r4 fl4: Not Received yet/Reception Complete, r4: NW Phone No.

r5: Transmit timing

fl5, r5 fl5: Not Received yet/Reception Complete, r5: Transmit timing

r6: Input Level

fl6, r6 fl6: Not Received yet/Reception Complete, r6: Input Level

r7: Current Channel

fl7, r71, r72 fl7: Not Received yet/Reception Complete, r71: Channel, r72: Slot

Response Example: (PSID, PS Phone No.)

1, 996703D, 1, 0501042608

4. Installing the Software

4.1 Before starting installation

The software of MT8801B, MT8801C, and MT8802A; Radio Communication Analyzers (hereinafter, referred as MT880*); consists of two kinds of software as shown below:

	Main software		Measurement software	
	For MT8801B, MT8801C	For MT8802A	For MT8801B, MT8801C	For MT8802A
Model name	MT8801B/C	MT8802A	MX8801xxx	MT8802xxx
Number of floppy disk	2		1, 2, or 3 (depends on the software)	

A list of the software configuration and floppy disk

To install both of the software, refer to Section 4.2 “Installing the Main Software.” To install only the measurement software, refer to Section 4.3 “Installing the measurement software.”

4.2 Installing the Main Software

To install the main software, follow the procedure shown below. Note that the software to be installed will overwrite the original software, which has been installed. Also, be careful not to turn the power off. If the power is turned off while installing, there may be a risk of failure in rebooting.

4.2.1 Installation procedure of the main software (First step)

1. Turn off the power of MT880*.
2. Insert the FD0 (first floppy disk for the main software).
3. Turn the power on while pressing the BS key. Let go the BS key immediately after access is started. The message “loading...” appears at the bottom of the screen indicating that installation has been started.
4. When installation is complete, the message “>>Change disk! << <F1>key to continue” appears. Change the FD0 with the FD1 (the second floppy disk for the main software) and press the F1 key. Installation of the FD1 starts.
5. When the first step of installation is complete, the message “Loading...done.” appears and the buzzer goes off. Move on to the second step.

4.2.2 Installation of the main software (Second step)

1. Turn off the power of MT880*.
2. Re-insert the FD0 (first floppy disk for the main software).
3. Turn the power on while pressing the Step DOWN key. Let go the Step DOWN key after the logotype of Anritsu Corporation is displayed. The message “Copying...” appears at the bottom of the screen indicating that the installation has been started.
4. The message “Loading...done.” appears and the buzzer goes off when the installation is complete.

4.2.3 Confirmation of the software version and preparation for software installation

1. Turn off the power of MT880*.
2. Insert the first floppy disk of the measurement software.
3. Turn the power on while pressing the Preset key. Let go the Preset key after the logotype of Anritsu Corporation is displayed.
4. If the measurement software is composed of two software, the message ">>Change disk! << <F1> key to continue." appears. Insert the second floppy disk and press the F1 key.
5. MT880* is rebooted with the Setup Common Parameter displayed.
6. Press the F6 (Main Func On Off) key and select On for Main Func.
7. Press the Next Menu key to display the second page of Main Menu.
8. Press the F1 key (Change System) to move on to the Change System screen.
9. Confirm the version number. If the version number is renewed, installation is normally complete.
10. Move on to the step 6 in Section 4.3.1 "Installation procedure of the measurement software" to continue grading up of the measurement software.

4.3 Installing the Measurement Software

To install the main software, follow the procedure shown below. Note that if the power is turned off while installing, there may be a risk of failure in rebooting.

4.3.1 Installation procedure of the measurement software

1. Reboot MT880*.
2. After rebooting, the Setup Common Parameter screen appears.
3. Press the F6 key (Main Func On Off) and select On for Main Func.
4. Press the Next Menu key to display the second page of Main Menu.
5. Press the F1 key to move on to the Change System screen.
6. Insert the first floppy disk of the measurement software.
7. Press the F10 key (Install System From FD) on the Change System screen. The system name and date in the floppy disk appears in the frame at the right side of the screen.
8. Press the F7 key (Install System) to display the confirmation window.
9. Move the cursor to "Yes" and press the Set key to fix. The message appears at the center of the screen and starts installation.
10. The message disappears when installation completes. If the measurement software is composed of two software, insert the second floppy disk and go through the step 8 and 9.
11. To confirm whether installation has completed normally, move on to Section 4.3.2 "Change System."

4.3.2 Change System

1. Press the F12 key (Return), and select the system installed using the cursor key.
2. Press the F7 key (Change System) to display the confirmation window.
3. Select “Yes” using the cursor key, and press the Set key to fix. The message appears at the center of the screen starting Change System.
4. The Setup Common Parameter screen appears when Change System is complete.
5. To confirm the software version, move on to Section 4.3.2 “Confirming the software version.”

4.3.3 Confirming the software version

1. Press the Next Menu key to display the second page of Main Menu.
2. Press the F1 key (Change System) to move on to the Change System screen.
3. Confirm the version number. If the version number is renewed, installation is normally complete.
4. To install another software, go back to the step 2 of Section 4.3.1 “Installation procedure of the measurement software.”