Product Introduction

Anritsu

MX882001C

GSM Measurement Software

MT8820B
Radio Communication Analyzer

MX882001C
GSM Measurement Software
Product Introduction

Including MT8820B-002/-011,
MX882001C-001/-002/-011/-041

Version 2.0
May 2009

ANRITSU CORPORATION

Contents

1. Key Features of MX882001C GSM Measurement Software and MX882001C-011 EGPRS Measurement Software
2. MX882001C GSM Measurement Software
3. MX882001C-001 GSM Voice Codec
4. MX882001C-002 GSM External Packet Data
5. MX882001C-011 EGPRS Measurement Software
6. MX882001C-041 GSM High-Speed Adjustment and EGPRS Predistortion Adjustment*

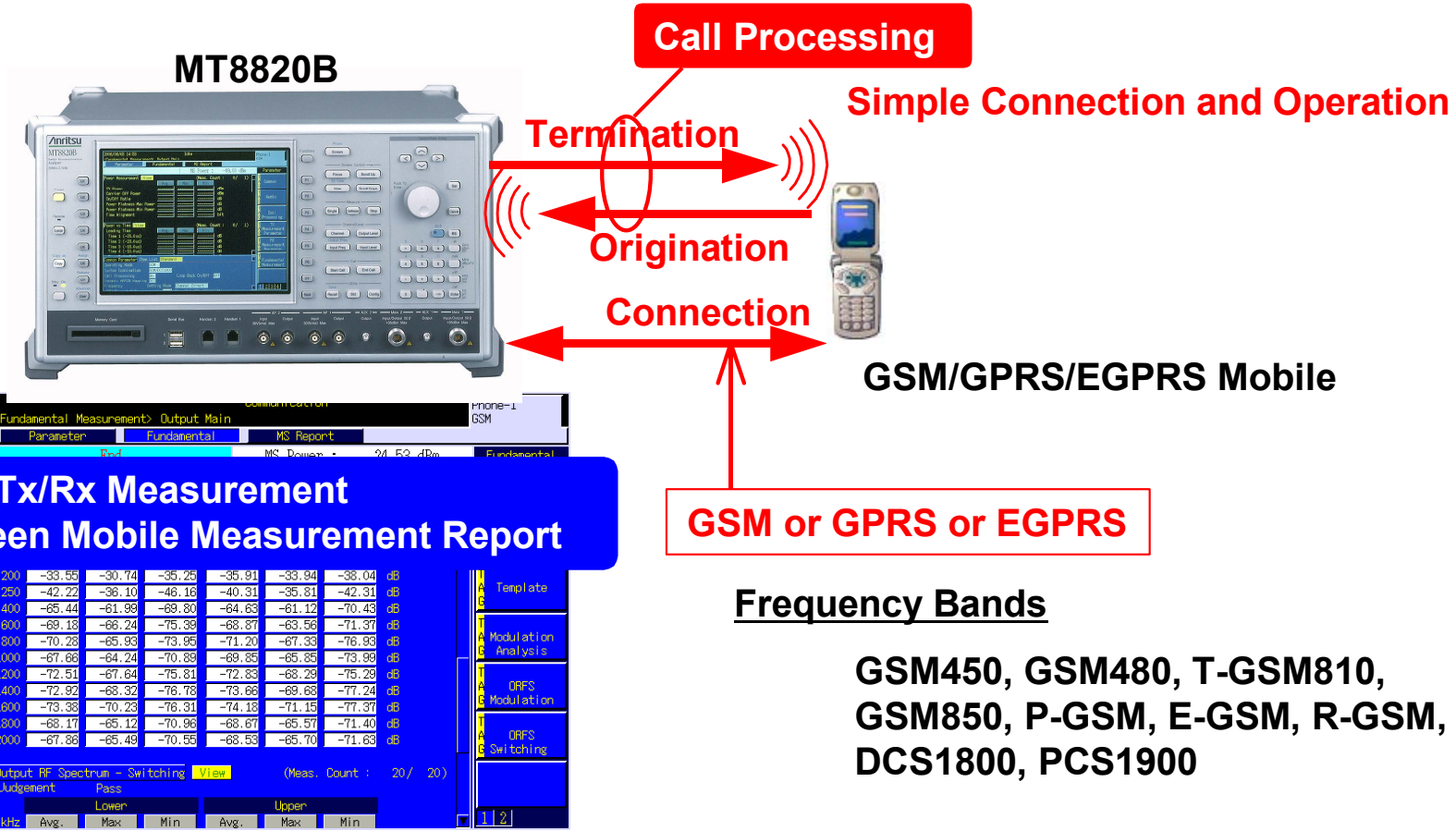
*MX882001C supports EGPRS Predistortion Adjustment is a standard feature.

Key Features of
MX882001C GSM Measurement Software and
MX882001C-011 EGPRS Measurement Software

Key Features of MX882001C GSM Measurement Software and MX882001C-011 EGPRS Measurement Software

All-in-One Call Processing and RF Tx/Rx Testing of GSM/GPRS/EGPRS Mobiles

The MT8820B can easily test the basic RF Tx/Rx characteristics of GSM/GPRS/EGPRS mobiles. And it supports testing of call processing, such as origination and termination.



Frequency Bands

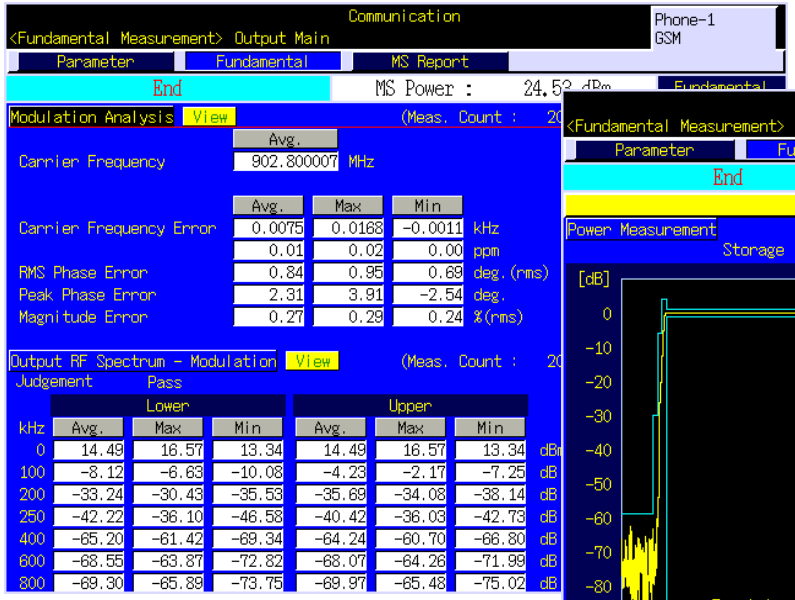
GSM450, GSM480, T-GSM810, GSM850, P-GSM, E-GSM, R-GSM, DCS1800, PCS1900

Key Features of MX882001C GSM Measurement Software and MX882001C-011 EGPRS Measurement Software

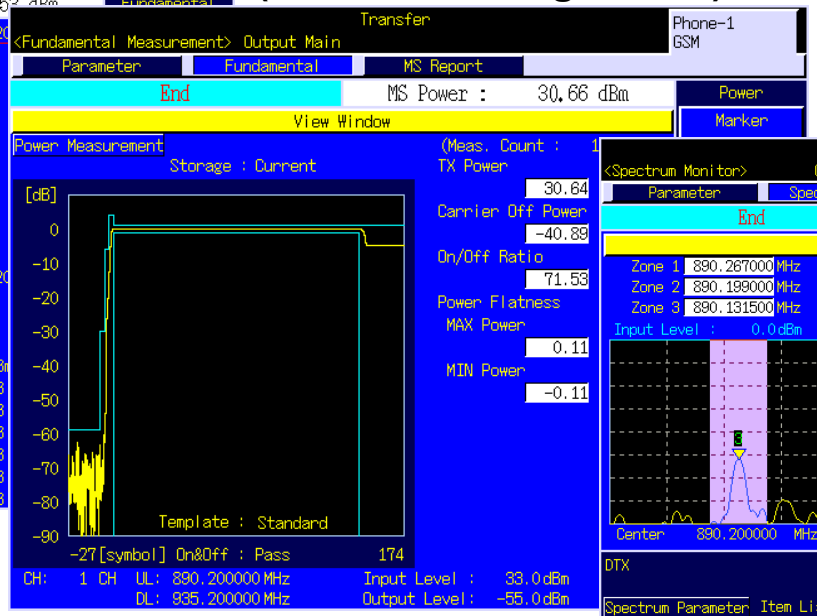
Wide Range of Measurement Functions

In addition to supporting basic Tx/Rx measurements of GSM/GPRS/EGPRS mobile terminals, the spectrum can be checked and calibration can be performed at the Spectrum Monitor screen. And the GPRS/EGPRS multislot can be measured.

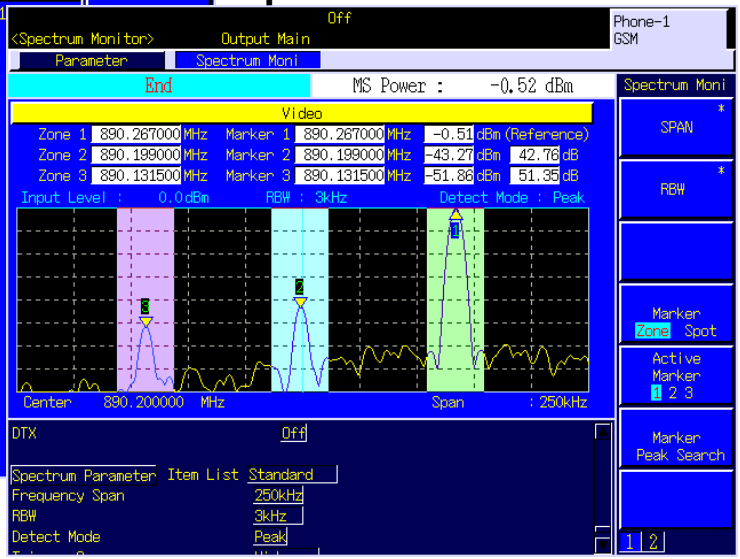
Fundamental Measurement Screen



Fundamental Measurement Screen (Multislot Configuration)



Spectrum Monitor Screen

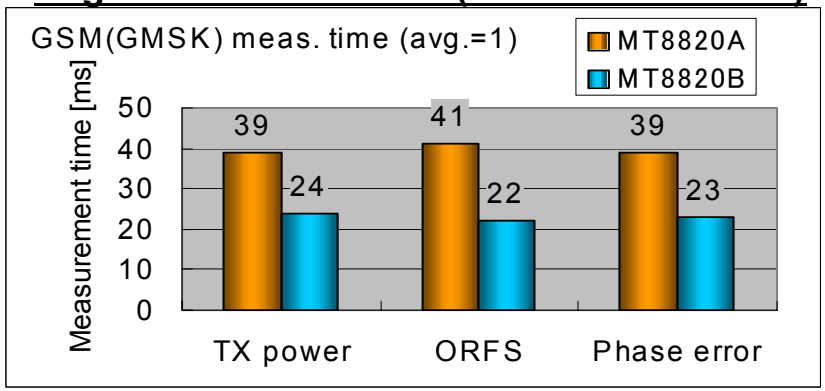


Key Features of MX882001C GSM Measurement Software and MX882001C-011 EGPRS Measurement Software

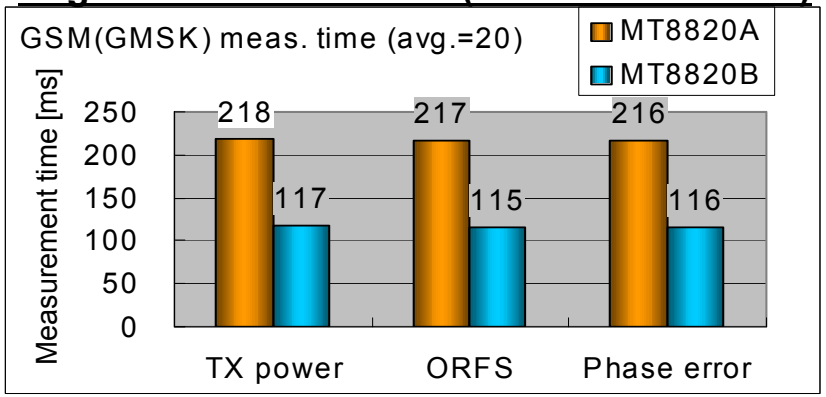
High-speed Tx Measurement

The Tx measurement times except signalling time are shown below. The MT8820B times are 40% to 75% shorter than the MT8820A.

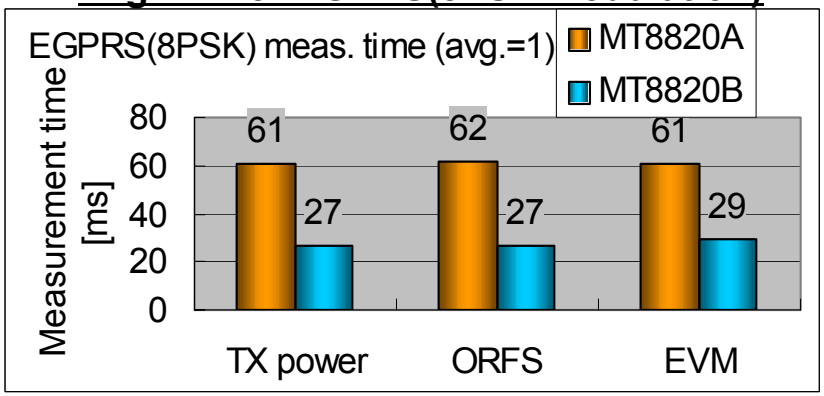
Avg. = 1 for GSM/GPRS(GMSK Modulation)



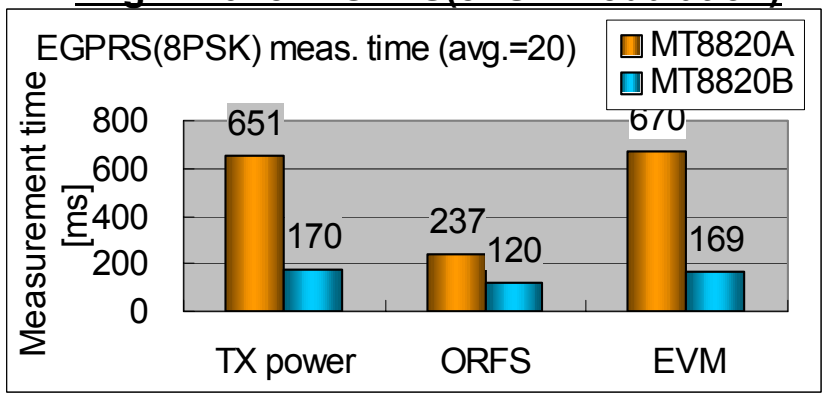
Avg. = 20 for GSM/GPRS(GMSK Modulation)



Avg. = 1 for EGPRS(8PSK Modulation)



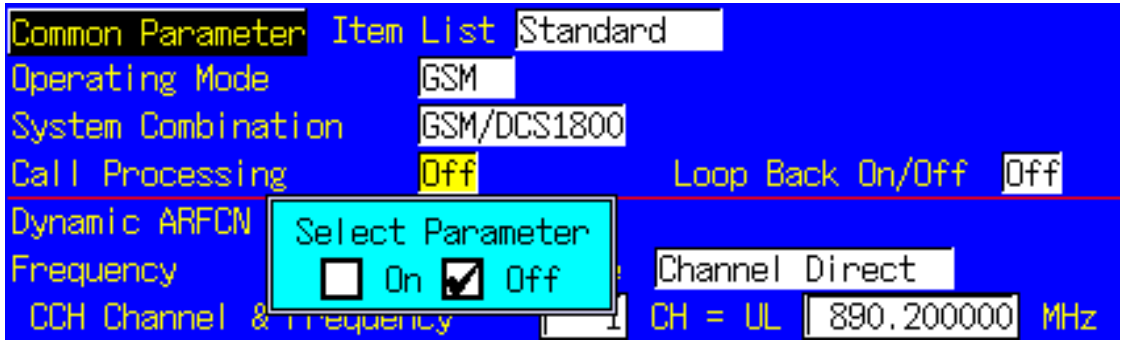
Avg. = 20 for EGPRS(8PSK Modulation)



Key Features of MX882001C GSM Measurement Software and MX882001C-011 EGPRS Measurement Software

RF Characteristics Tests without Call Processing

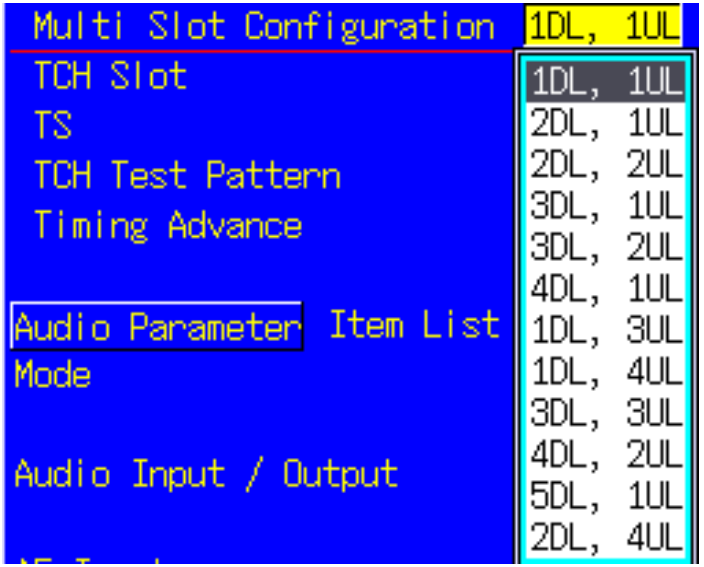
By setting Call Processing to OFF, RF characteristics are tested without call processing.



Call Processing Settings

Multislot Class (GPRS/EGPRS)

The "1DL,1UL", "2DL,1UL", "2DL,2UL", "3DL, 1UL", "3DL,2UL", "4DL,1UL", "1DL,3UL", “1DL,4UL” , “3DL,3UL”, “4DL,2UL”, “5DL,1UL”, and “2DL,4UL” multislot configurations are supported, along with multislot classes 1 to 12 and 30 to 33.



DL: Downlink, UL: Uplink

Multislot Configuration Settings

MX882001C GSM Measurement Software

MX882001C GSM Measurement Software

Key Specifications

Frequency range	: 300 to 2700 MHz
Maximum input level	: +40 dBm
Amplitude measurement accuracy	: ±0.5 dB (–20 to +40 dBm) ±0.7 dB (–30 to –20 dBm) after calibration
Modulation accuracy (residual phase error)	: ≤0.5 deg. rms, 2 deg. peak
Output RF spectrum (due to modulation)	: ≤–55 dB (≤250 kHz offset) ≤–65 dB (≥400 kHz offset)
RF Output level range	: –140 to –10 dBm (MAIN), –130 to 0 dBm (AUX)
RF Output level accuracy	: ±1.0 dB (–120 to –10 dBm, MAIN), ±1.0 dB (–110 to 0 dBm, AUX) after calibration

MX882001C GSM Measurement Software

The MX882001C GSM Measurement Software supports tests of Tx/Rx characteristics for both GSM and GPRS terminals.

Batch Measurements at Fundamental Measurement Screen

All Tx and Rx measurement items can be measured simultaneously (batch measurement), making measurement much faster.

Measurement Item	Note
Transmitter Characteristics	
Frequency and Phase Error	RMS and peak for phase error (GSM/GPRS)
Transmitter Output Power and Burst Timing	(GSM/GPRS)
Output RF Spectrum	Modulation and switching (GSM/GPRS)
Receiver Characteristics	
Reference Sensitivity	Loopback Type A, Loopback Type B and Loopback Type C (FAST BER) as Loopback Type (GSM)
Minimum Input Level for Reference Performance	BLER (GPRS)

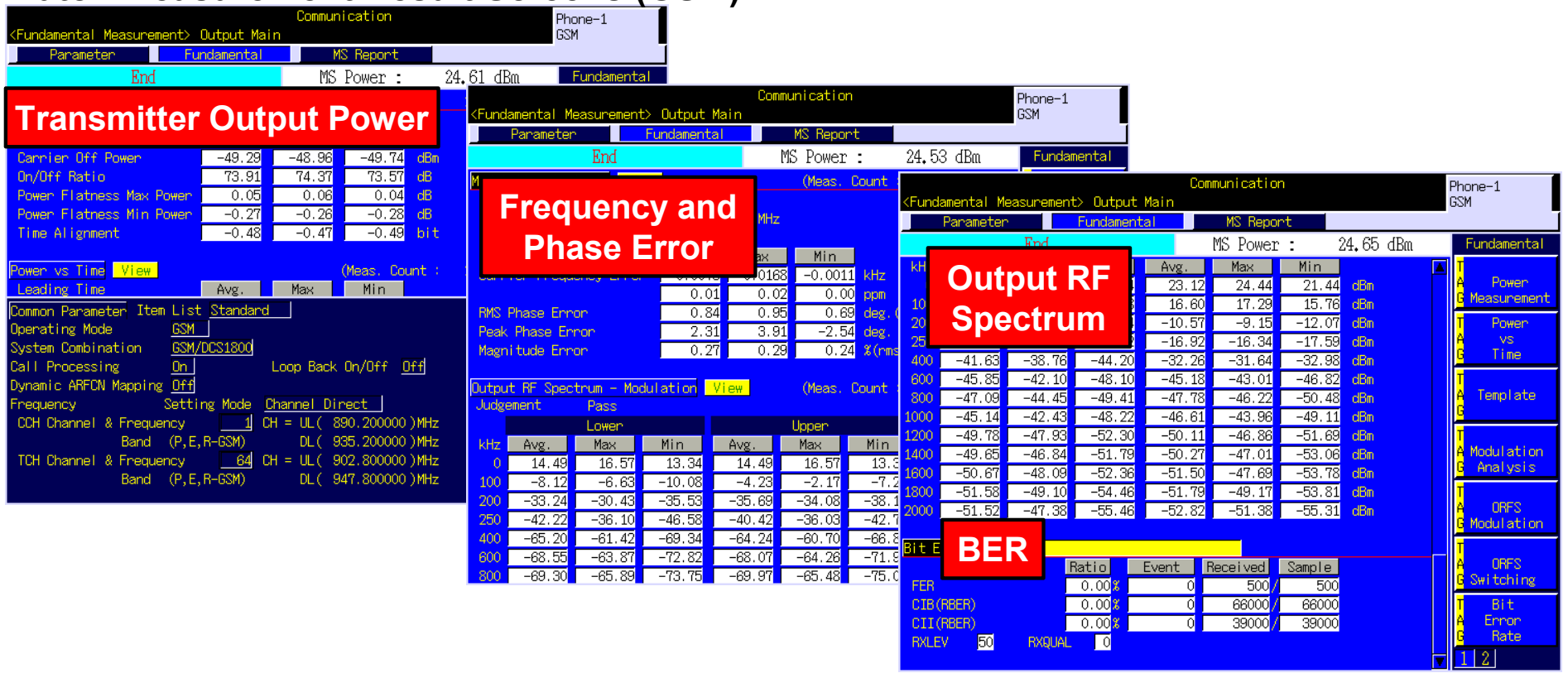
MX882001C GSM Measurement Software

Batch Measurements at Fundamental Measurement Screen

The batch measurement results screens for both Tx and Rx characteristics are shown below. The results can be read simultaneously via GPIB.

The FAST BER (Loopback Type C) supports faster BER measurement.

Batch Measurement Result Screens (GSM)

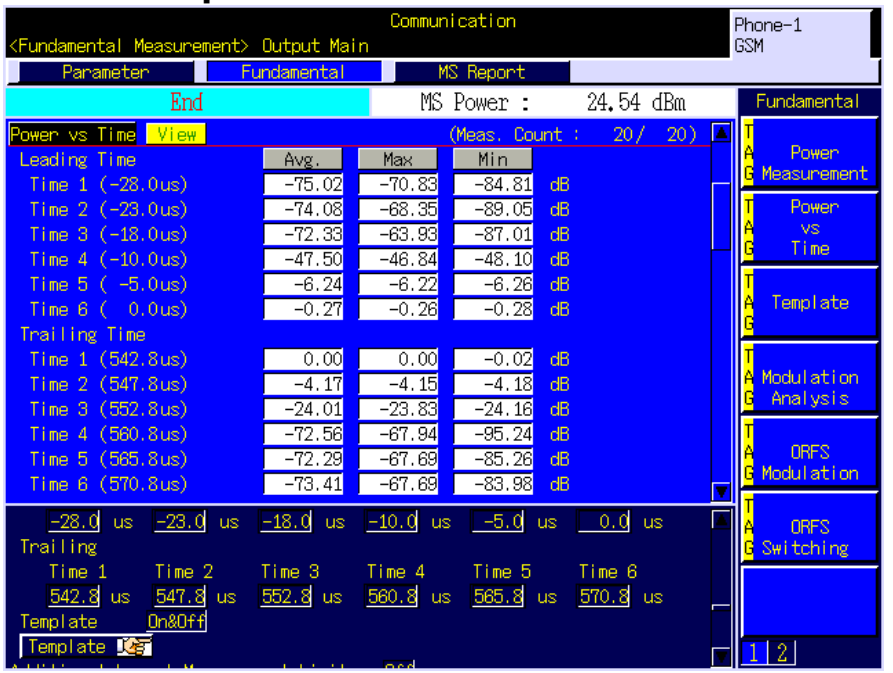


MX882001C GSM Measurement Software

Burst Waveform Evaluation

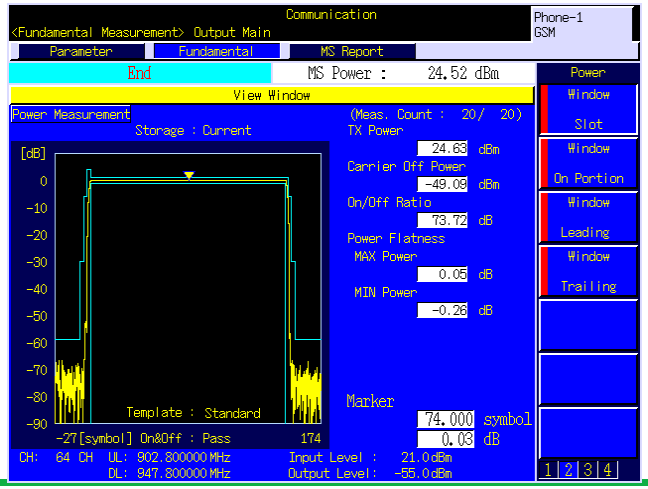
The burst characteristics at ramp-up and ramp-down can be evaluated graphically as well as numerically. Moreover, any measurement point in time can be specified.

Numerical Result of Ramp-up and Ramp-down Characteristics

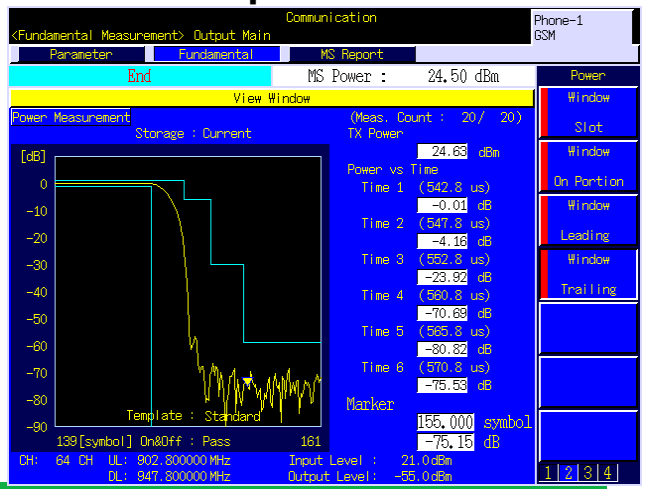


Burst Ramp-up Waveform

Burst Slot Waveform



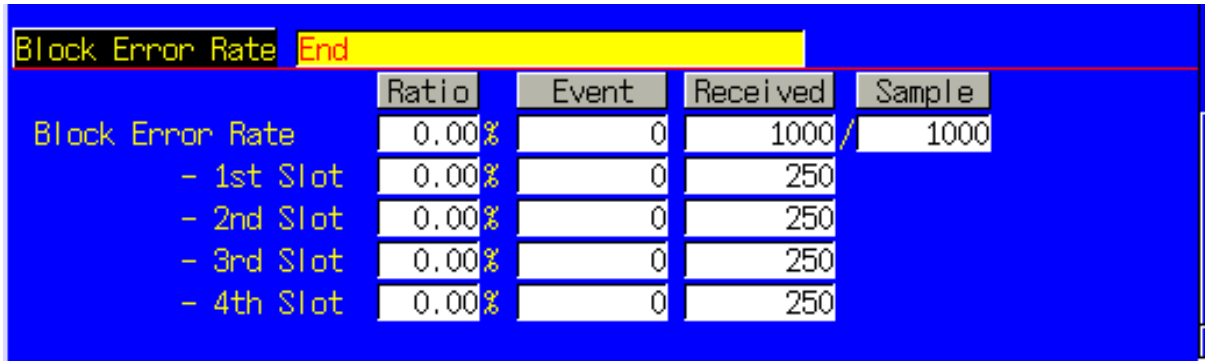
Burst Ramp-down Waveform



GPRS BLER Measurement

Multislot BLER measurement is supported for GPRS, reducing BLER measurement time.

Multislot BLER Measurement



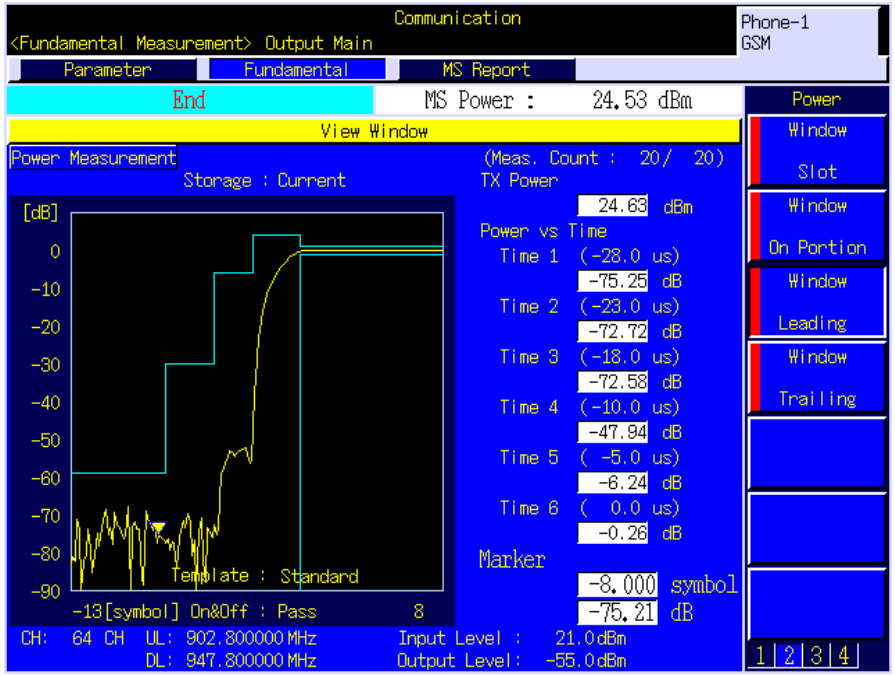
MX882001C GSM Measurement Software

Graphical Spectrum Interface(1)

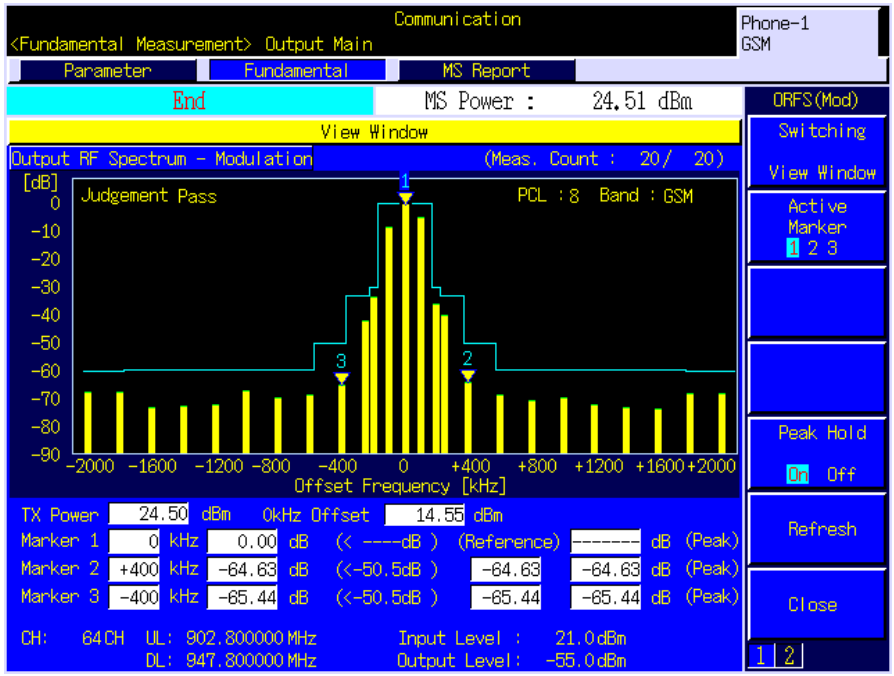
The graphical interface supports faster maintenance because the Tx characteristics of GSM/GPRS mobiles can be understood at a glance by viewing the spectrum.

At-a-glance understanding because spectrum and template mask displayed simultaneously

Efficient design, repair and maintenance



Power vs. Time

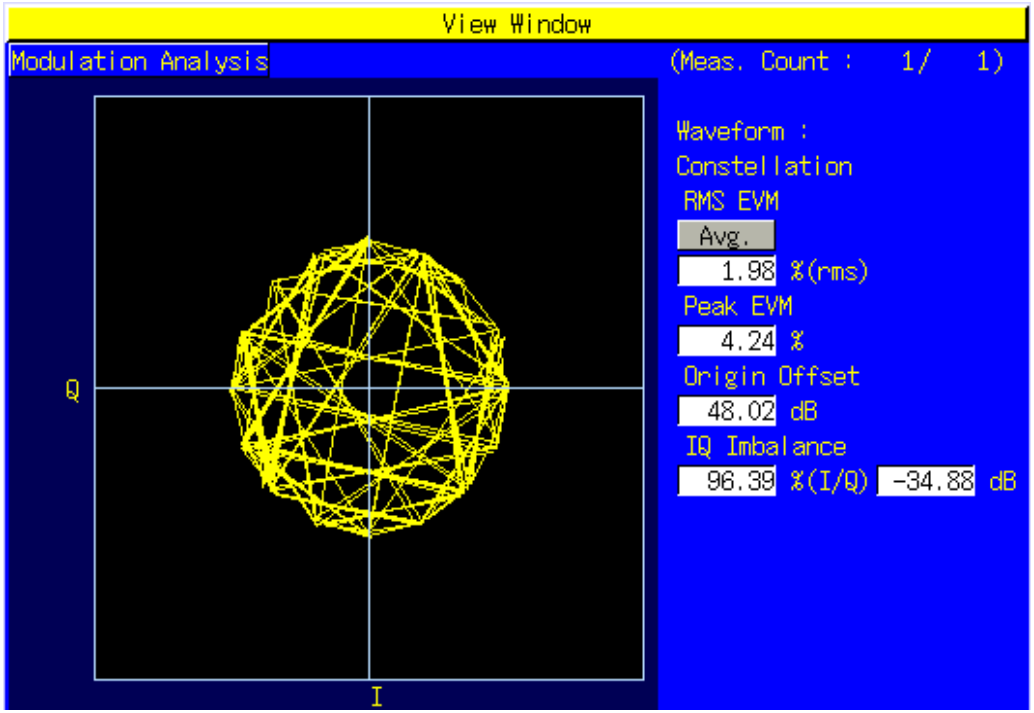


Spectrum for Output RF Spectrum

The phase error and magnitude error waveforms can be viewed and read via GPIB.

Graphical Spectrum Interface(2)

Modulation Analysis View window can show IQ Imbalance.

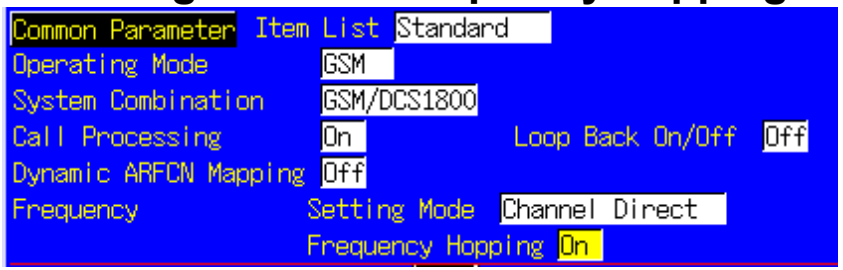


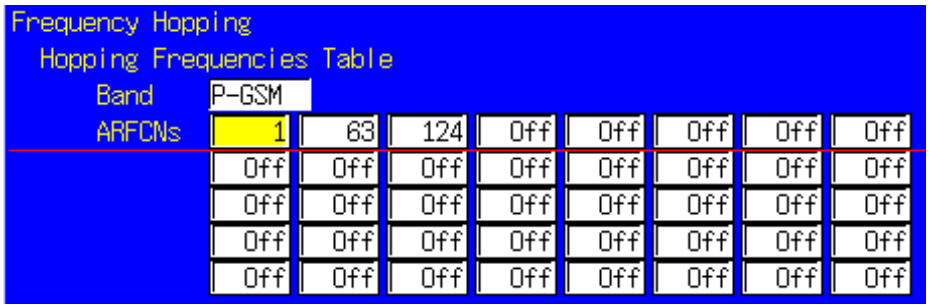
8PSK IQ Imbalance

GSM frequency hopping function

The frequency hopping is a function that changes the channel (ARFCN) used for communication between the base station (BS) and mobile station (MS) by each 4.62ms frame.

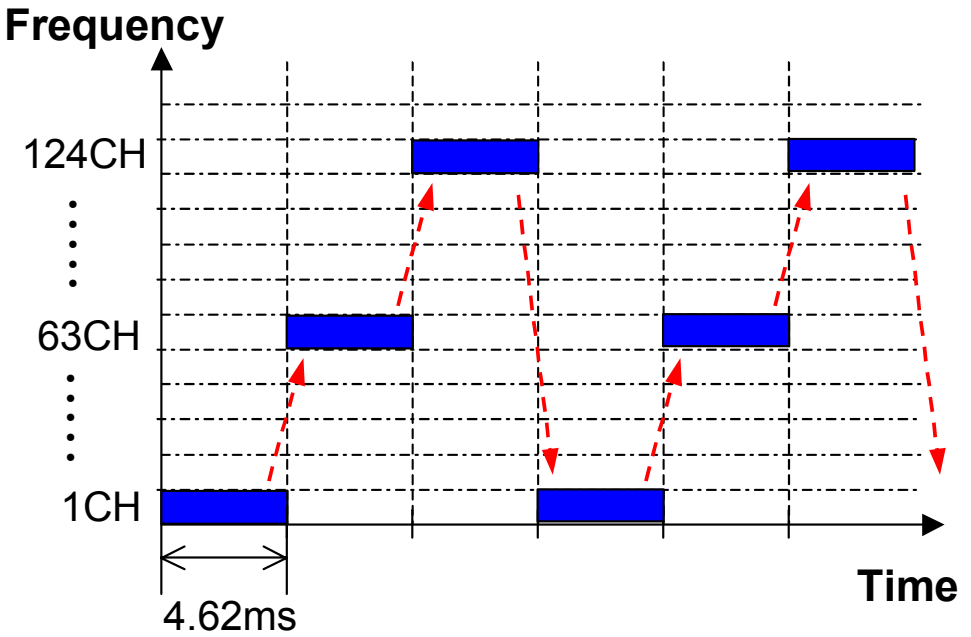
Setting the GSM frequency hopping





The value of Measure Channel & Frequency used for frequency hopping.
The frequency hopping changes the Measure Frequency based on this table.*

Image of GSM frequency hopping



Frequency hopping is operated by the Measure Channel & Frequency set value of 'hopping frequency table-ARFCNs'.

*Please refer MX882001C Operation manual for setting condition of the channel list.

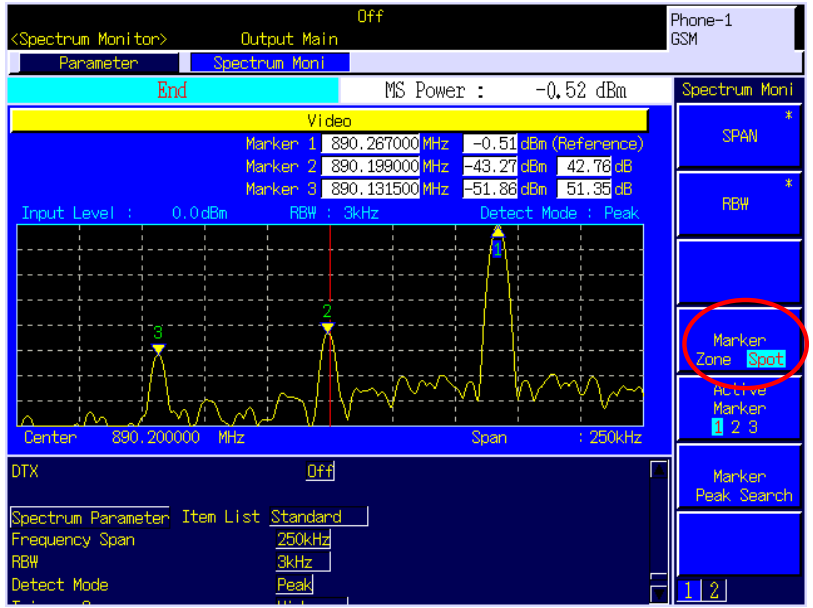
MX882001C GSM Measurement Software

Spectrum Monitor

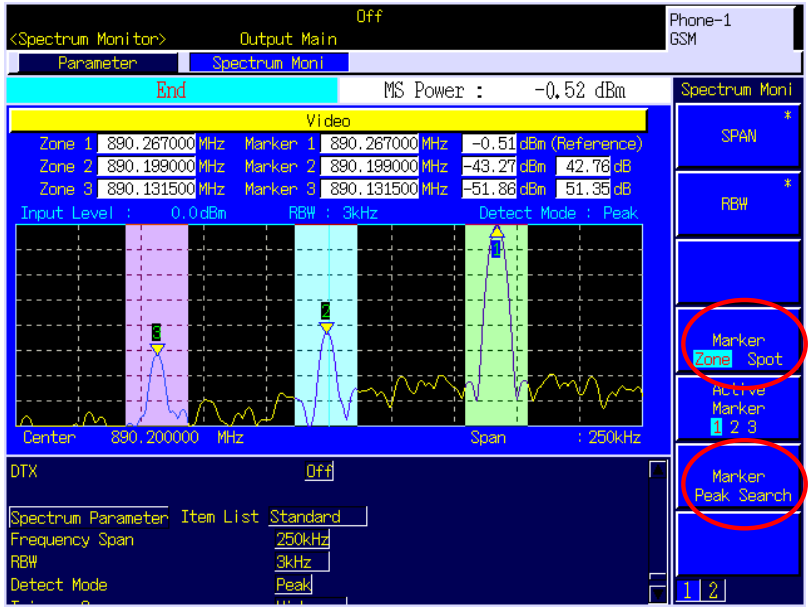
The spectrum in the 25 MHz band can be viewed using the spectrum monitor, and in-band spurious can be checked easily. Moreover, the IQ and carrier leakage from the orthogonal modulator can be adjusted easily. SPAN and RBW can be changed, and marker (zone and spot) and peak search functions are supported.

⇨ Effective adjustment and inspection

Spot Marker Function



Peak Searching Function with Zone Marker

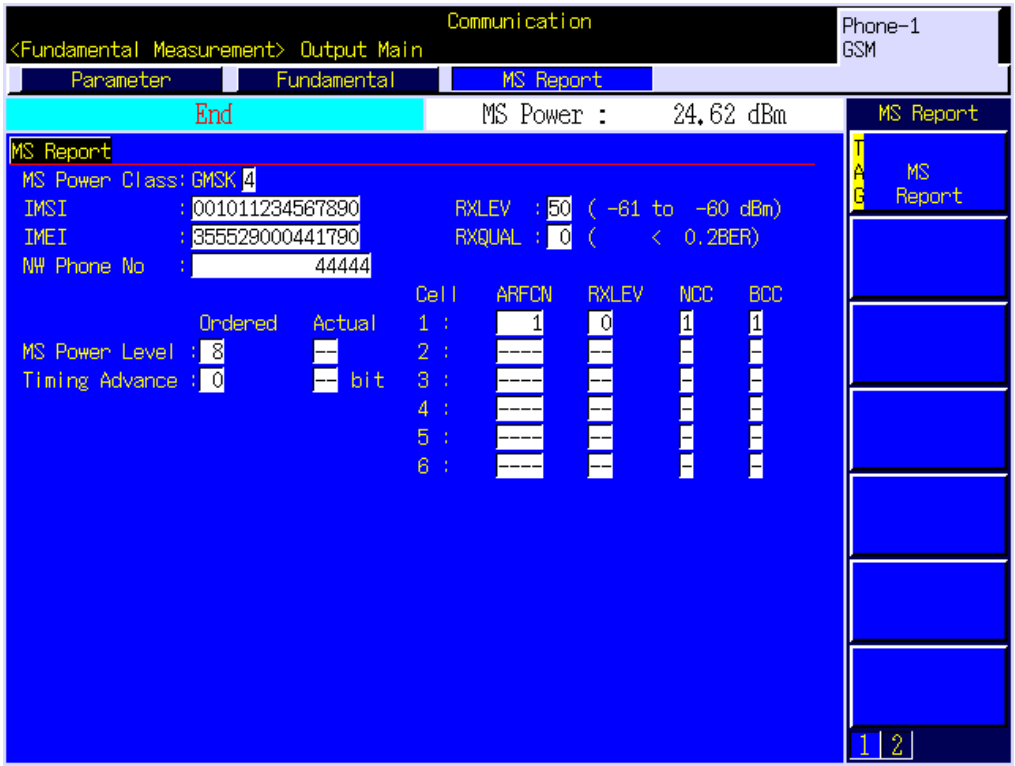


MX882001C GSM Measurement Software

MS Report

The power class of GSM terminals, and the power level (RXLEV) and quality (RXQUAL) at GSM receivers can be checked at the MS Report screen.

MS Report Screen



MX882001C-001 GSM Voice CODEC

MX882001C-001 GSM Voice Codec

Overview

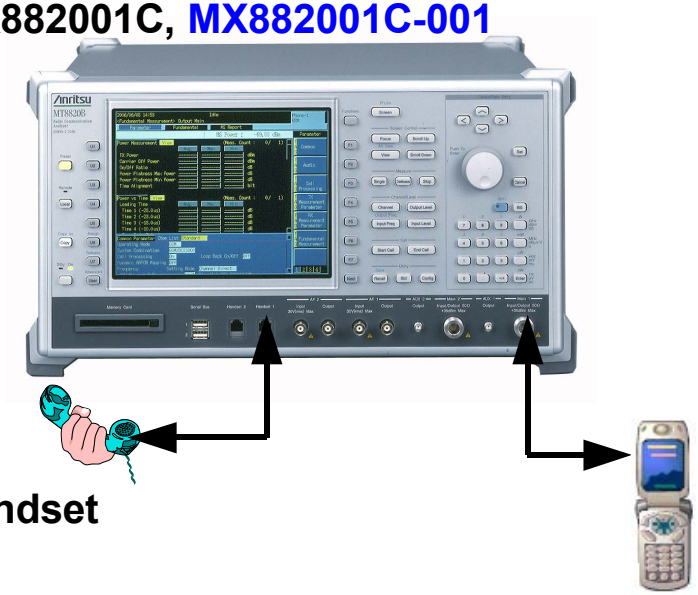
The MX882001C-001 GSM Voice Codec software option adds real-time voice encoding/decoding to the GSM measurement software. Live end-to-end communication tests between a handset and GSM terminal are supported by installing the MT8820B-011 Audio Board. Moreover, the MT8820B can measure audio Tx/Rx without an external audio analyzer and generator.

MX882001C-001 GSM Voice Codec

Live End-to-End Communication Test

When a handset is connected to the MT8820B RJ11 connector, live end-to-end communication between the handset and a GSM terminal can be tested.

MT8820B, MT8820B-002, MT8820B-011,
MX882001C, MX882001C-001



Handset

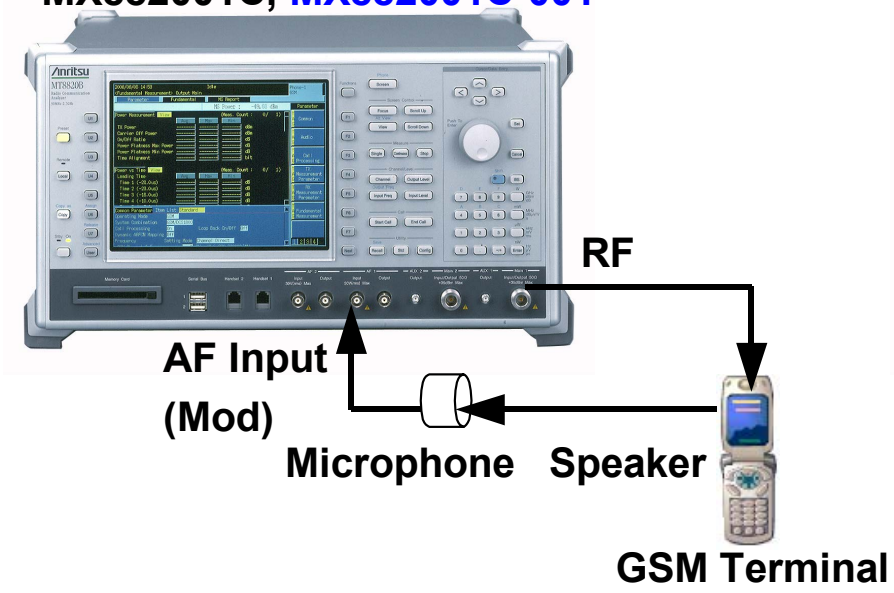
GSM Terminal

MX882001C-001 GSM Voice Codec

Audio Tx/Rx Measurement

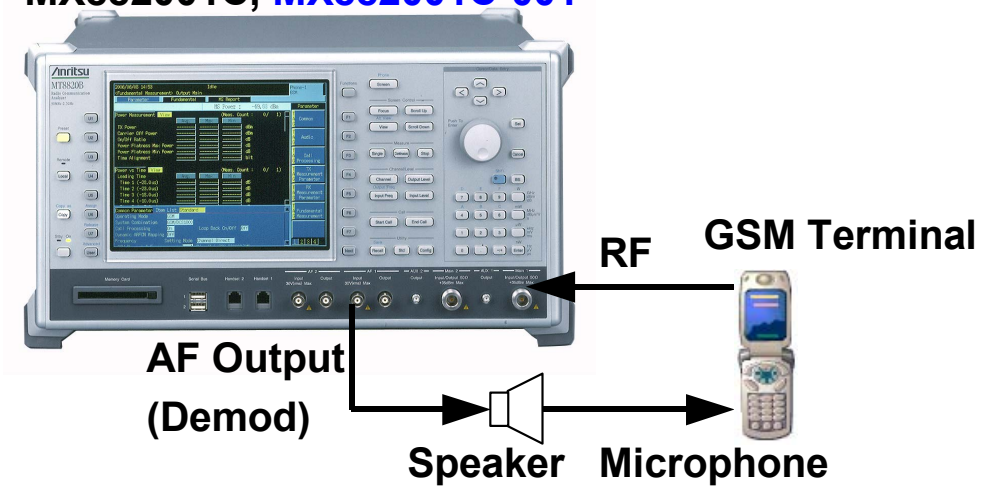
The GSM terminal audio characteristics can be measured with one MT8820B unit using the internal audio generator and audio meter.

MT8820B, MT8820B-002, MT8820B-011, MX882001C, MX882001C-001



<Audio Rx and Mobile Test>

MT8820B, MT8820B-002, MT8820B-011, MX882001C, MX882001C-001



<Audio Tx and Mobile Microphone Test>

MX882001C-001 GSM Voice Codec

Specifications

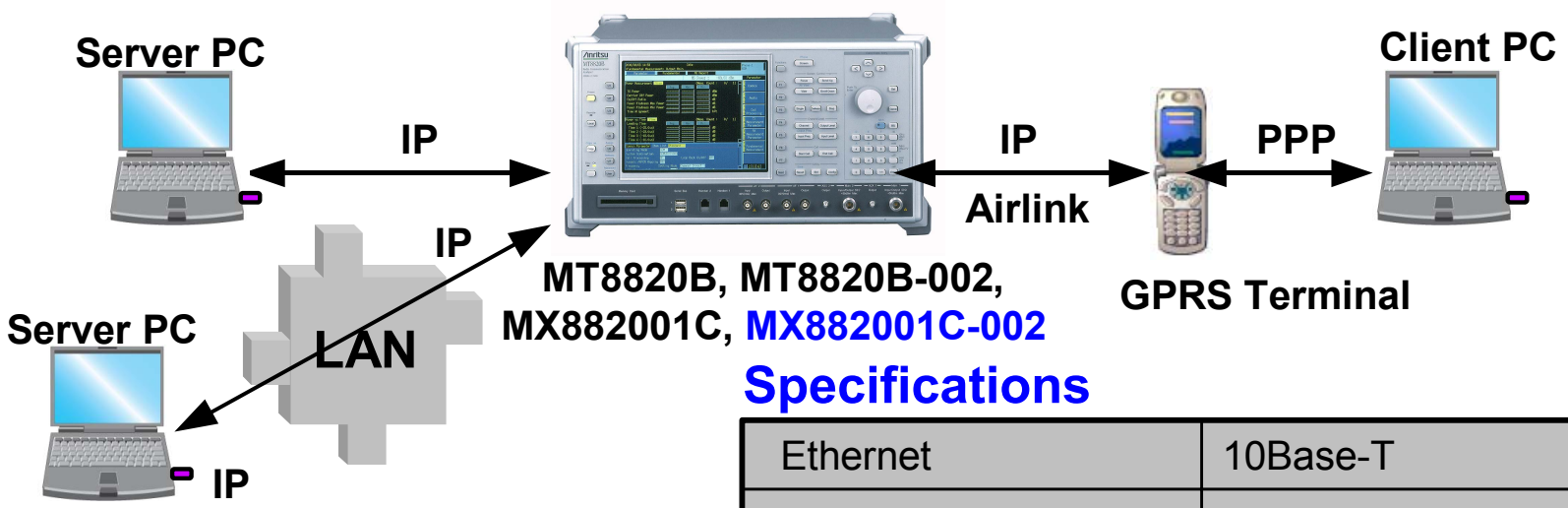
Voice Codec	GSM_EFR, GSM_AMR
Codec Level Adjustment	Encoder input gain: –3.00 to 3.00 dB, in 0.01 dB increments Handset microphone volume: 0, 1, 2, 3, 4, 5 Handset speaker volume: 0, 1, 2, 3, 4, 5
AF Output	Frequency range: 30 Hz to 10 kHz Setting range: 0 V peak to 5 V peak (AF Output connector) Setting resolution: 1 mV (≤5 V peak), 100 µV (≤500 mV peak), 10 µV (≤50 mV peak) Accuracy: ±0.2 dB (≥10 mV peak, ≥50 Hz), ±0.3 dB (≥10 mV peak, <50 Hz) Waveform distortion: band ≤30 kHz ≤–60 dB (≥500 mV peak, ≤5 kHz), ≤–54 dB (≥70 mV peak) Output impedance: ≤1 Ω Max. output current: 100 mA
AF Input	Frequency range: 50 Hz to 10 kHz Input voltage range: 1 mV peak to 5 V peak (AF Input connector) Max. allowable input voltage: 30 V rms Input impedance: 100 kΩ
Frequency Measurement	Accuracy: Reference oscillator accuracy + 0.5 Hz
Level Measurement	Accuracy: ±0.2 dB (≥10 mV peak), ±0.4 dB (≥1 mV peak, ≥1 kHz)
SINAD Measurement	At frequency = 1 kHz, band ≤30 kHz ≥60 dB (≥1000 mV peak), ≥54 dB (>50 mV peak), ≥46 dB (≥10 mV peak)
Distortion Rate Measurement	At frequency = 1 kHz, band ≤30 kHz ≤-60 dB (≥1000 mV peak), ≤-54 dB (>50 mV peak), ≤-46 dB (≥10 mV peak)

MX882001C-002 GSM External Packet Data

MX882001C-002 GSM External Packet Data

Overview

The MX882001C-002 can test end-to-end data transfer both in the local environment, such as the connection between and application server connected to the MT8820B and GPRS terminal, as well as in an almost-real environment, such as the connection between equipment connected to a LAN and GPRS terminal.



Specifications

Ethernet	10Base-T
Data Rate	Downlink: 85.6 kbps max. Uplink: 64.2 kbps max.
Server IP Address	0.0.0.0 to 255.255.255.255
Client IP Address	0.0.0.0 to 255.255.255.255
Coding Scheme	CS-1, CS-2, CS-3, CS-4
PDTCH Data Pattern	External IP Packet

MX882001C-011 EGPRS Measurement Software

MX882001C-011 EGPRS Measurement Software

Key Specifications

Frequency range	**: 300 to 2700 MHz**
Maximum input level	**: +40 dBm**
Amplitude measurement accuracy	**: ±0.5 dB (–20 to +40 dBm),**
	±0.7 dB (–30 to –20 dBm) after calibration
Modulation accuracy	
Residual phase error (GMSK)	**: ≤0.5 deg. rms, 2 deg. peak**
Residual EVM (8PSK)	**: ≤1.5% rms**
Output RF spectrum	**: ≤–55 dB (≤250 kHz offset)**
(due to modulation)	**≤–65 dB (≥400 kHz offset)**
	***Average of 10 measurements**
RF Output level range	**: –140 to –10 dBm (MAIN)**
	–130 to 0 dBm (AUX)
RF Output level accuracy	**: ±1.0 dB (–120 to –10 dBm, MAIN)**
	±1.0 dB (–110 to 0 dBm, AUX) after
calibration	

(Note) The MX882001C requires the MX882001C-011.

MX882001C-011 EGPRS Measurement Software

Batch Measurements at Fundamental Measurement Screen

All Tx and Rx measurement items can be measured simultaneously (batch measurement), making measurement much faster.

Measurement Item	Note
Transmitter Characteristics	
Frequency and Modulation Accuracy	RMS and peak of phase error for GMSK modulation RMS and peak of EVM, and origin offset for 8PSK modulation
Transmitter Output Power and Burst Timing	Estimated power measurement functionality supported
Output RF Spectrum	Modulation and switching
Receiver Characteristics	
SRB Loopback	BER
Minimum Input Level for Reference Performance	BLER

Estimated Power Measurement

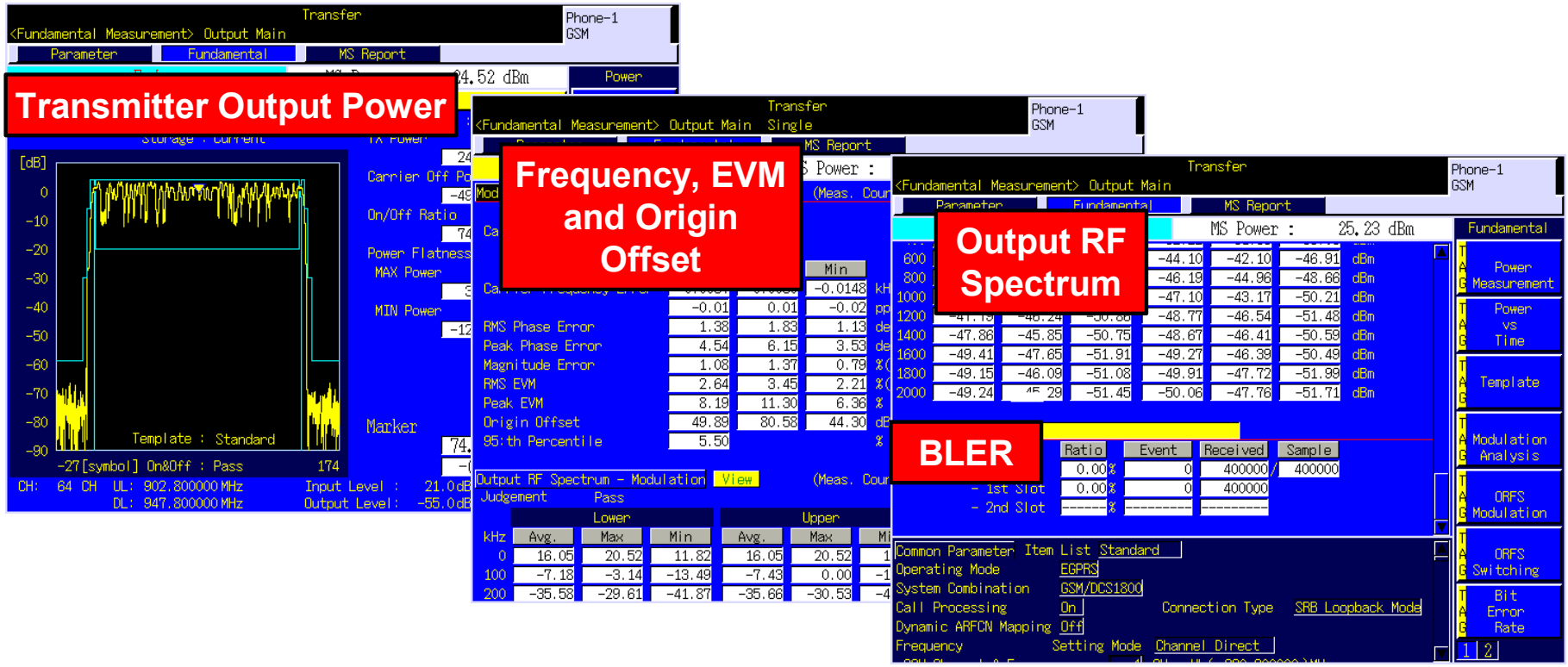
Since the 8PSK modulated signal has a level variation, multiple bursts are used to reduce the variance of measurement results,reducing the number of averagings (and measurement time).

MX882001C-011 EGPRS Measurement Software

Batch Measurements at Fundamental Measurement Screen

The batch measurement results screens for both Tx and Rx characteristics are shown below. The results can be read simultaneously via GPIB.

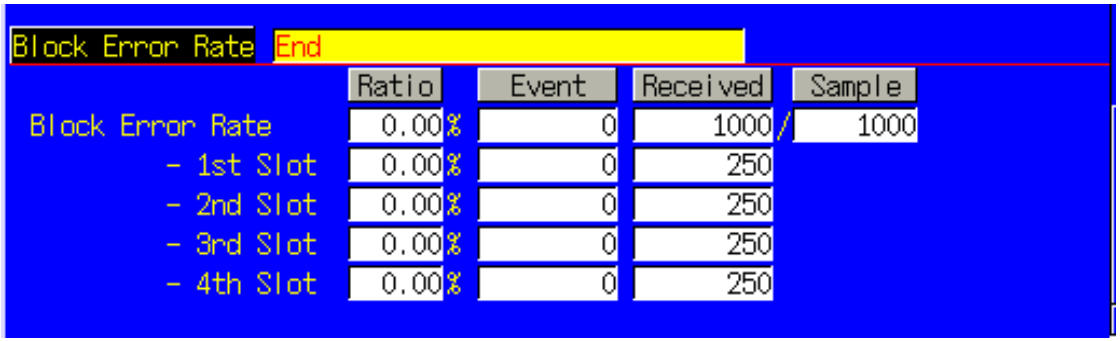
Batch Measurement Result Screens (EGPRS)



EGPRS BLER Measurement

Multislot BLER measurement is supported for EGPRS BLER, reducing measurement time.

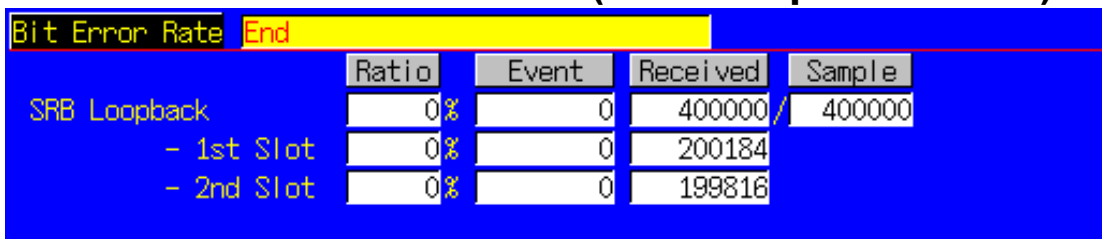
Multislot BLER Measurement



EGPRS BER Measurement

EGPRS BER can be measured by selecting the SRB loopback mode as the connection type.

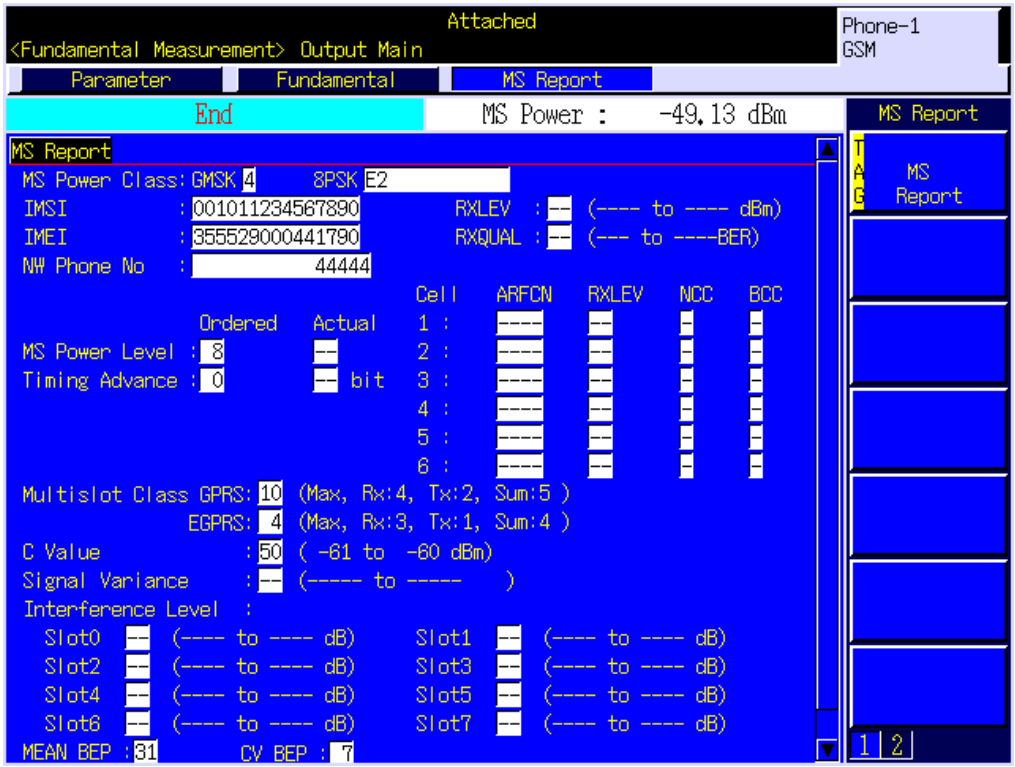
Multislot BER Measurement (SRB Loopback Mode)



MS Report

The power and multislot classes of EGPRS terminals, and the EGPRS receiver power level (C Value) and quality (Signal Variance) can be checked at the MS Report screen.

MS Report Screen

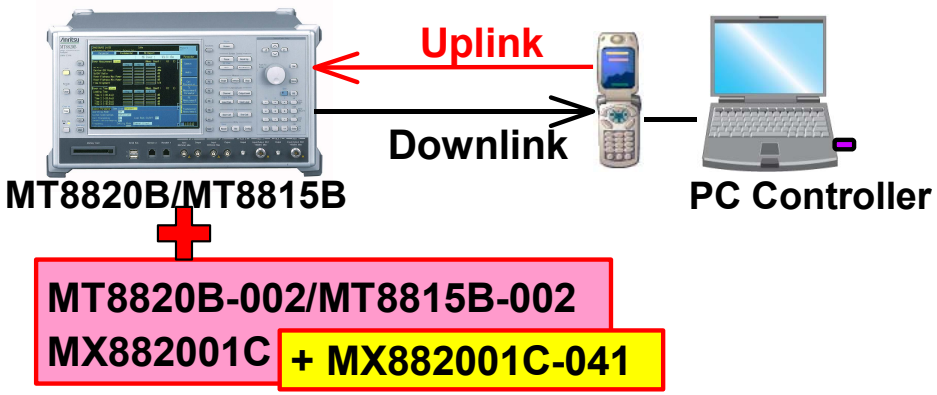


*MX882001C-041 GSM High-Speed Adjustment and EGPRS Predistortion Adjustment**

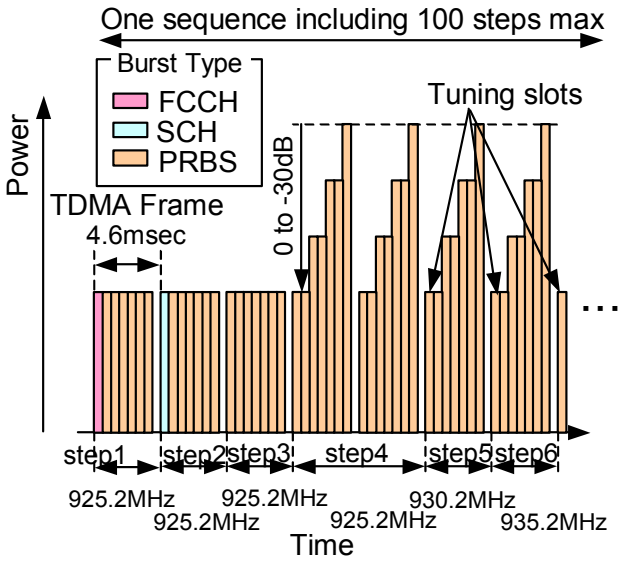
*MX882001C supports EGPRS Predistortion Adjustment as a standard feature.

MX882001C-041 GSM High-Speed Adjustment*

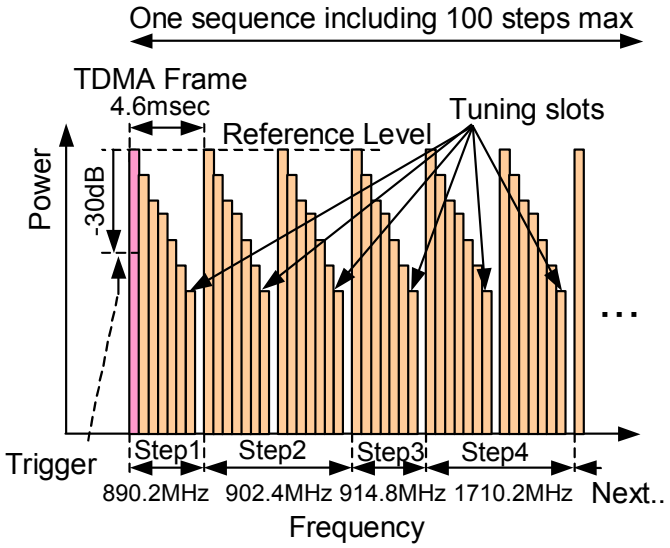
GSM High-Speed Adjustment is a function of GSM terminals, running in synchronization with the chipset adjustment function. And it runs IQ Capturing Measurement.



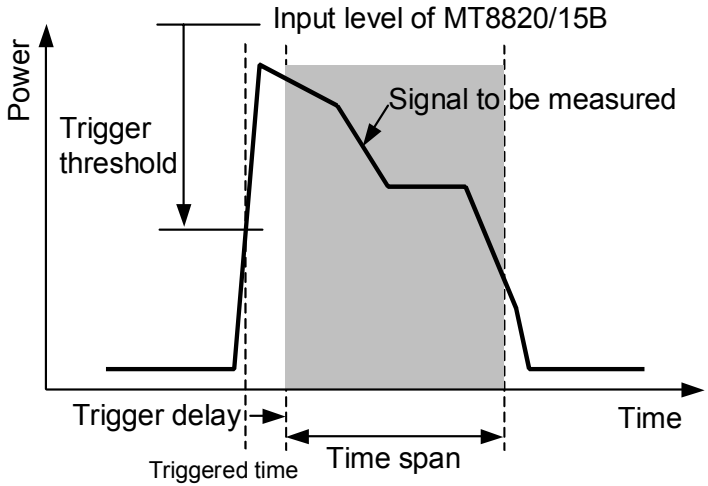
*The measurement runs Fundamental Measurement screen. The measurement can't run Fundamental Measurement, and IQ Capturing Measurement, or High-Speed Adjustment Measurement when the measurement is effective. The measurement runs with Remote Control only.



Sequence of Rx Sweep



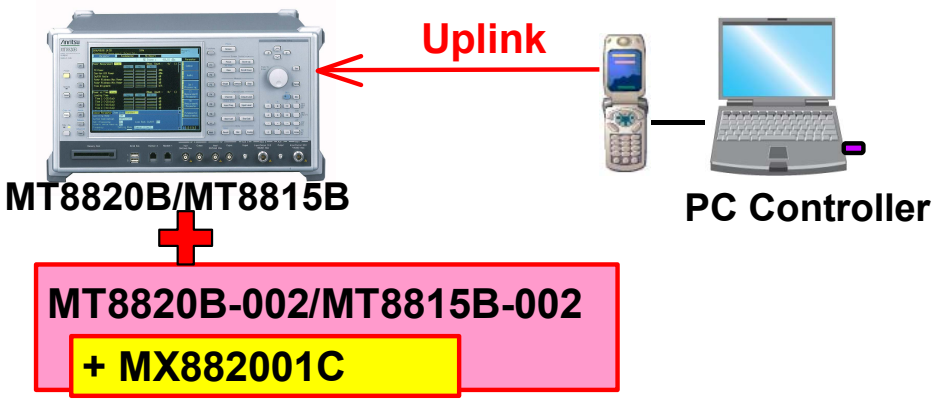
Sequence of Tx Sweep



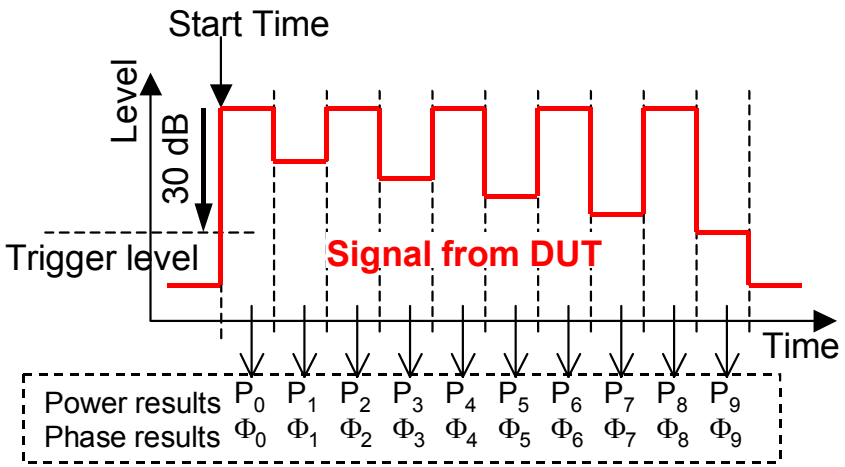
IQ Capturing Measurement

EGPRS Predistortion Adjustment*

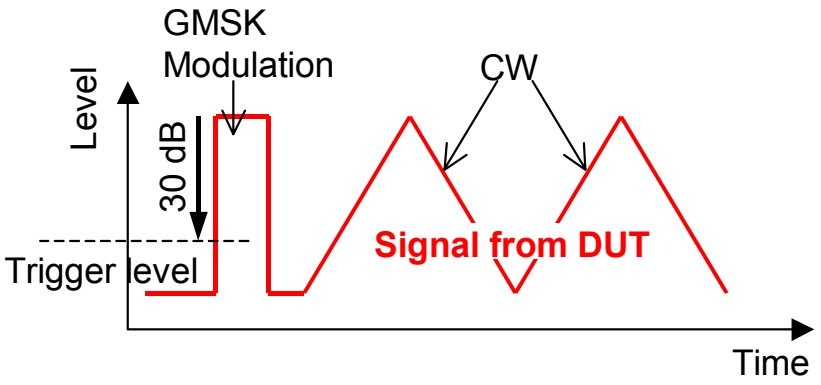
EGPRS Predistortion Adjustment is a function to adjust the predistortion part of EGPRS terminals. Predistortion adjustment is performed in conjunction with the mobile adjustment function.



*The measurement runs Fundamental Measurement screen.
The measurement runs with Call Processing Off only.
The measurement runs with Remote Control only.
MX882001C supports EGPRS Predistortion Adjustment is a standard feature.



Measure power and phase of each step



Measure amplitude and phase at each sample time in CW duration

Anritsu

Specifications are subject to change without notice.

Anritsu Corporation
5-1-1 Onna, Atsugi-shi, Kanagawa, 243-8555 Japan
Phone: +81-46-223-1111
Fax: +81-46-296-1264

• U.S.A.
Anritsu Company
1155 East Collins Blvd., Suite 100, Richardson,
TX 75081, U.S.A.
Toll Free: 1-800-267-4878
Phone: +1-972-644-1777
Fax: +1-972-671-1877

• Canada
Anritsu Electronics Ltd.
700 Silver Seven Road, Suite 120, Kanata,
Ontario K2V 1C3, Canada
Phone: +1-613-591-2003
Fax: +1-613-591-1006

• Brazil
Anritsu Eletrônica Ltda.
Praca Amadeu Amaral, 27 - 1 Andar
01327-010-Paraiso-São Paulo-Brazil
Phone: +55-11-3283-2511
Fax: +55-11-3288-6940

• Mexico
Anritsu Company, S.A. de C.V.
Av. Ejército Nacional No. 579 Piso 9, Col. Granada
11520 México, D.F., México
Phone: +52-55-1101-2370
Fax: +52-55-5254-3147

• U.K.
Anritsu EMEA Ltd.
200 Capability Green, Luton, Bedfordshire, LU1 3LU, U.K.
Phone: +44-1582-433200
Fax: +44-1582-731303

• France
Anritsu S.A.
16/18 avenue du Québec-SILIC 720
91961 COURTABOEUF CEDEX, France
Phone: +33-1-60-92-15-50
Fax: +33-1-64-46-10-65

• Germany
Anritsu GmbH
Nemetschek Haus, Konrad-Zuse-Platz 1
81829 München, Germany
Phone: +49-89-442308-0
Fax: +49-89-442308-55

• Italy
Anritsu S.p.A.
Via Elio Vittorini 129, 00144 Roma, Italy
Phone: +39-6-509-9711
Fax: +39-6-502-2425

• Sweden
Anritsu AB
Borgafjordsgatan 13, 164 40 KISTA, Sweden
Phone: +46-8-534-707-00
Fax: +46-8-534-707-30

• Finland
Anritsu AB
Teknobulevardi 3-5, FI-01530 VANTAA, Finland
Phone: +358-20-741-8100
Fax: +358-20-741-8111

• Denmark
Anritsu A/S
Kirkebjerg Allé 90, DK-2605 Brøndby, Denmark
Phone: +45-72112200
Fax: +45-72112210

• Spain
Anritsu EMEA Ltd.
Oficina de Representación en España
Edificio Veganova
Avda de la Vega, n° 1 (edf 8, pl 1, of 8)
28108 ALCOBENDAS - Madrid, Spain
Phone: +34-914905761
Fax: +34-914905762

• Russia
Anritsu EMEA Ltd.
Representation Office in Russia
Tverskaya str. 16/2, bld. 1, 7th floor.
Russia, 125009, Moscow
Phone: +7-495-363-1694
Fax: +7-495-935-8962

• United Arab Emirates
Anritsu EMEA Ltd.
Dubai Liaison Office
P O Box 500413 - Dubai Internet City
Al Thuraya Building, Tower 1, Suit 701, 7th Floor
Dubai, United Arab Emirates
Phone: +971-4-3670352
Fax: +971-4-3688460

• Singapore
Anritsu Pte. Ltd.
60 Alexandra Terrace, #02-08, The Comtech (Lobby A)
Singapore 118502
Phone: +65-6282-2400
Fax: +65-6282-2533

• India
Anritsu Pte. Ltd.
India Branch Office
3rd Floor, Shri Lakshminarayan Niwas, #2726, 80 ft Road,
HAL 3rd Stage, Bangalore - 560 075, India
Phone: +91-80-4058-1300
Fax: +91-80-4058-1301

• P.R. China (Hong Kong)
Anritsu Company Ltd.
Units 4 & 5, 28th Floor, Greenfield Tower, Concordia Plaza,
No. 1 Science Museum Road, Tsim Sha Tsui East,
Kowloon, Hong Kong
Phone: +852-2301-4980
Fax: +852-2301-3545

• P.R. China (Beijing)
Anritsu Company Ltd.
Beijing Representative Office
Room 2008, Beijing Fortune Building,
No. 5, Dong-San-Huan Bei Road,
Chao-Yang District, Beijing 100004, P.R. China
Phone: +86-10-6590-9230
Fax: +86-10-6590-9235

• Korea
Anritsu Corporation, Ltd.
8F Hyunjuk Building, 832-41, Yeoksam Dong,
Kangnam-ku, Seoul, 135-080, Korea
Phone: +82-2-553-6603
Fax: +82-2-553-6604

• Australia
Anritsu Pty. Ltd.
Unit 21/270 Ferntree Gully Road, Notting Hill,
Victoria 3168, Australia
Phone: +61-3-9558-8177
Fax: +61-3-9558-8255

• Taiwan
Anritsu Company Inc.
7F, No. 316, Sec. 1, Neihu Rd., Taipei 114, Taiwan
Phone: +886-2-8751-1816
Fax: +886-2-8751-1817

Please Contact:

081225

Printed on Recycled Paper

No. MX882001C-E-L-1-(2.00) 公知 Printed in Japan 2009-5 PRS