

For MT8820B Radio Communication Analyzer

# MX882005C

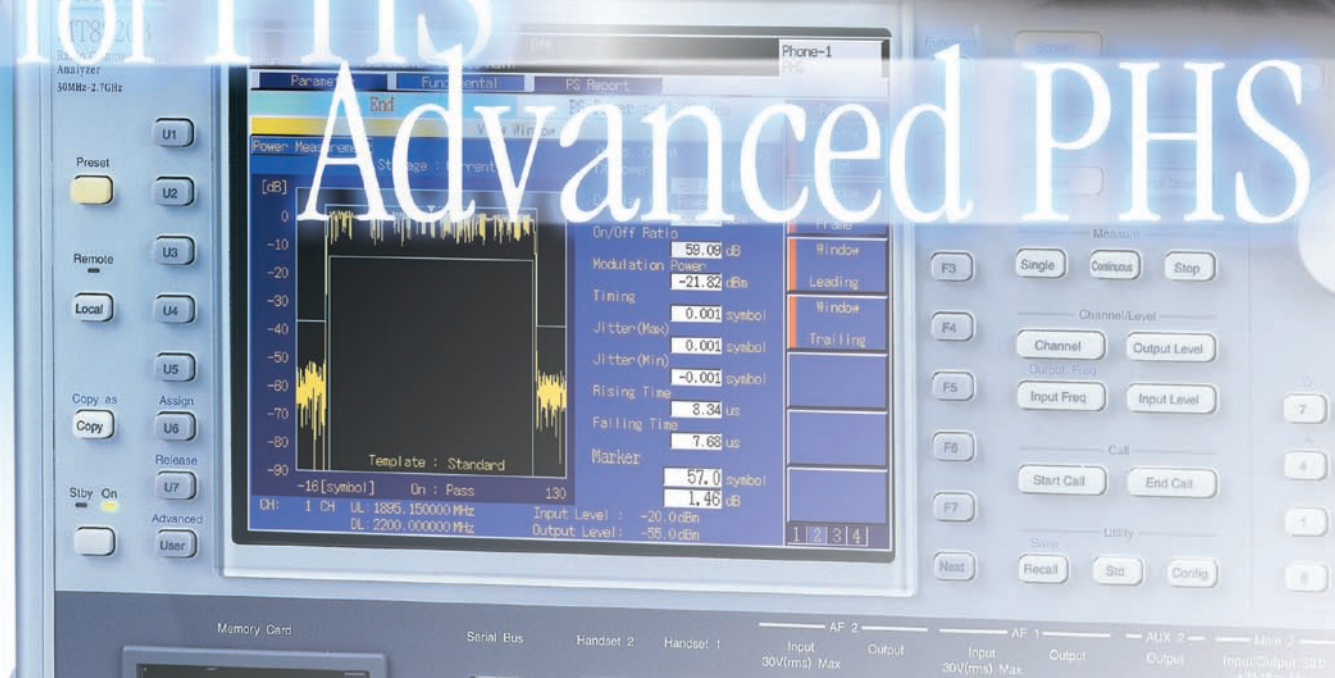
PHS Measurement Software

# MX882005C-011

ADVANCED PHS Measurement Software



for PHS  
Advanced PHS





for PHS

## Solution for PHS Terminals and Base Stations Production Lines

The MX882005C PHS Measurement Software supports transmitter and receiver measurements of PHS mobile terminals now spreading worldwide centered on Asia, including Japan. Installing the MX882005C PHS Measurement Software in one MT8820B main frame supports evaluation of major transmitter and receiver characteristics of PHS terminals and base stations. Advanced DSP and parallel measurement technologies greatly reduce manufacturing and test times for PHS terminals and base stations.

In addition, multiple measurement items can be selected freely for batch processing, while the number of repeat measurements can be set for each individual measurement.

At PHS measurement, selected items can be batch-measured by one touch for quick and simple Pass/Fail evaluation of major items, such as transmit frequency, modulation accuracy, transmit power, adjacent channel power and BER.

The standard GPIB interface allows the MT8820B to be built into automated production lines and test systems at service and repair depots.

### ■ PHS Measurements

Transmitter Measurements	Output Power
	Modulation Accuracy
	Occupied Bandwidth
	Adjacent Channel Power
Receiver Measurement	Transmission Rate
	Bit Error Ratio

# MX882005C PHS Measurement Software



## Transmitter Measurements

### Transmit Power

The RF power and carrier-off leakage power of PHS terminals and base stations are measured and the max., average and min. values are displayed by setting the number of repeat measurements to 2 or more, so variations in PHS terminal characteristics can be assessed. This repeat measurement function is also supported for other measurements.



Normal Measurement

### Wide Dynamic Range Mode

The absolute value and On/Off ratio of carrier-off leakage power are measured. When the carrier-off level is low, measurement can be performed in the wide dynamic range mode.



Wide Dynamic Range Mode

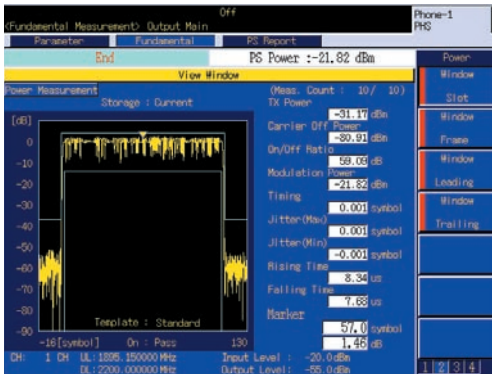
## Modulation Accuracy

The frequency, frequency errors (kHz and ppm), modulation accuracy, phase error, amplitude error and origin offset of PHS terminals and base stations are measured simultaneously. A waveform display function is also provided.

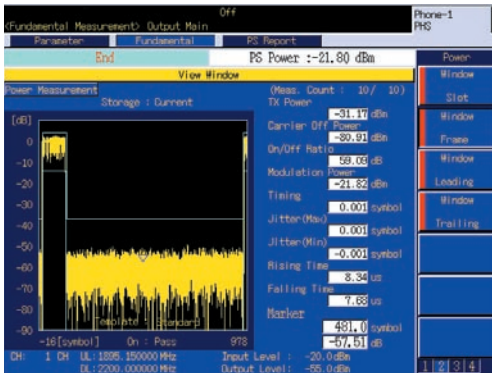


## Burst Waveform Display

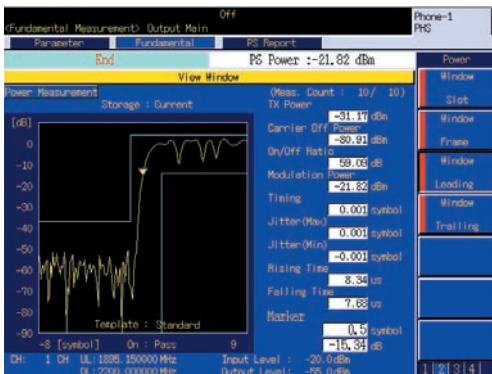
The burst waveform can be displayed graphically. Magnified display of the entire time slot and whole frame as well as the rising/falling edges enables users to easily check whether or not the burst waveform meets the PHS standard template.



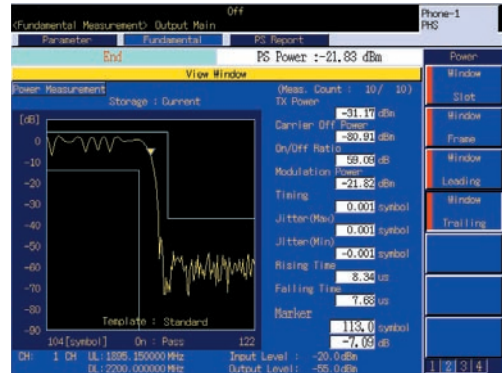
Entire Time Slot



Whole Frame



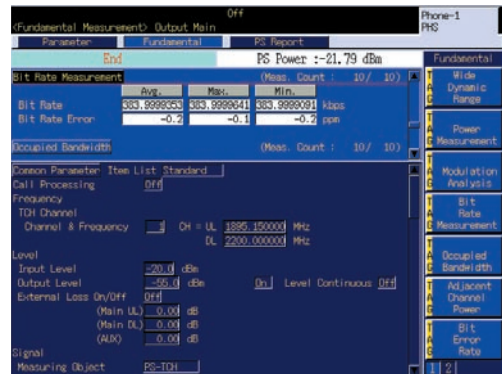
Rising Edge



Falling Edge

## Transmission Rate

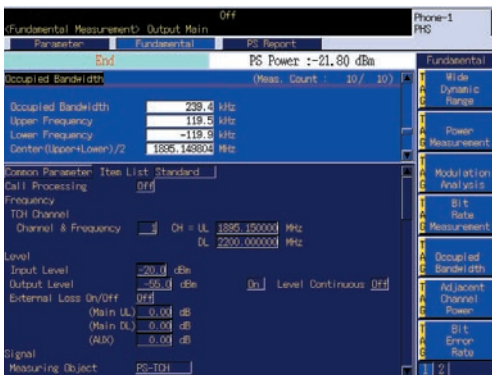
Transmission rate and transmission speed error of PHS terminals and base stations can be measured.





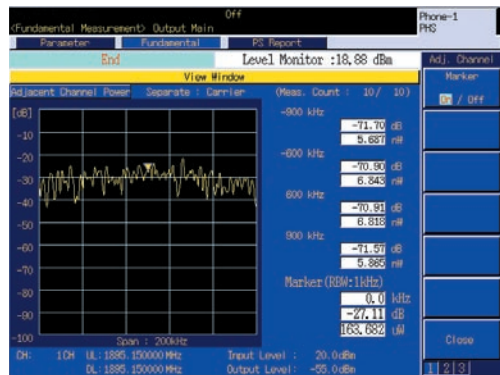
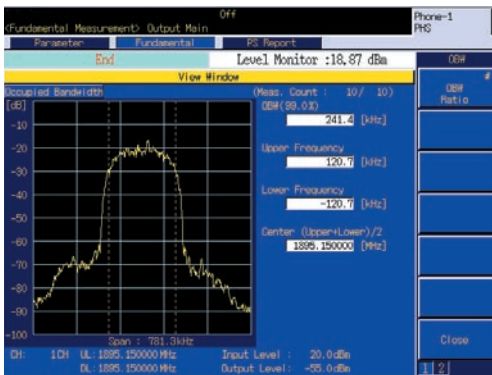
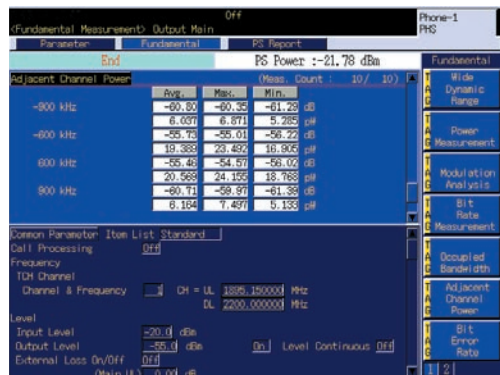
### Occupied Bandwidth

Occupied bandwidth of PHS terminals and base stations is measured. The bandwidth ratio for total power can be changed within the range of 80.0 to 99.9%. Measurements can be performed in the high-speed mode. Waveform can be displayed in the normal mode.



### Adjacent Channel Power

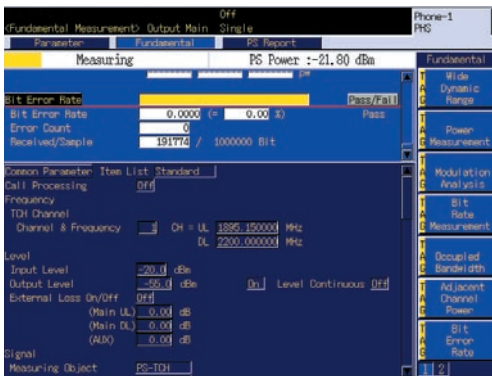
The adjacent channel power of PHS terminals and base stations is measured. The power spectrum is measured at four frequency points (-900, -600, +600 and +900 kHz) offset from the carrier frequency. Advanced DSP technology and parallel processing of the power spectrum with other measurements enable high-speed measurement. And the waveforms can be displayed too.



## Receiver Measurement

### Error Rate Test

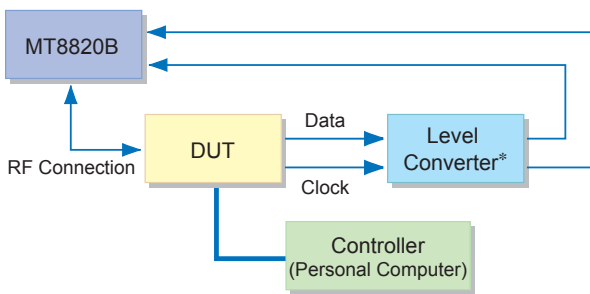
The bit error rate can be measured on receipt of demodulation data and clocks output from a PHS terminal/base station by controlling the PHS terminal with an external PC etc. This measurement can be performed in parallel with transmitter measurement.



Bit Error Rate Measurement

## Connection with DUT

### TRx Measurement



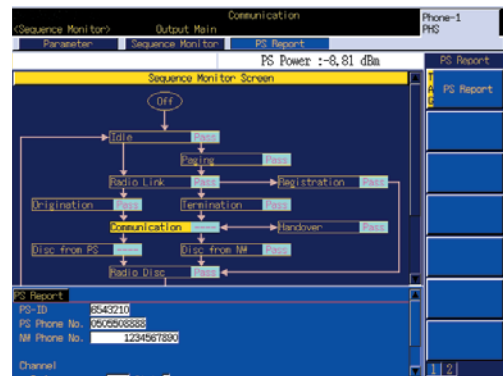
\*: Provide by user

## Call Processing Function

### Connection Test

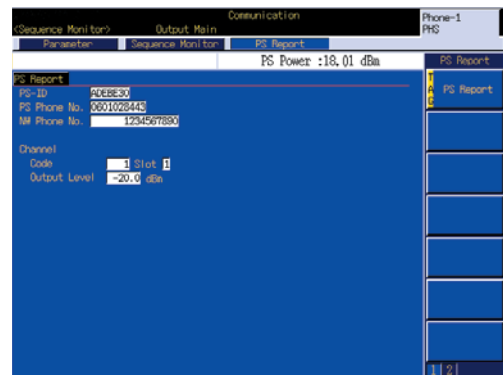
The call processing function supports various connection tests, including location registration, terminal call origination, network call communication, network disconnection, terminal disconnection, and handover.

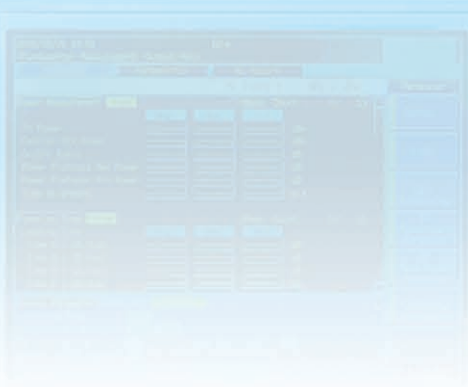
During a call, the user's voice can be echoed back from the mobile terminal to provide a simple voice communication test.



## Mobile Terminal Report Monitor

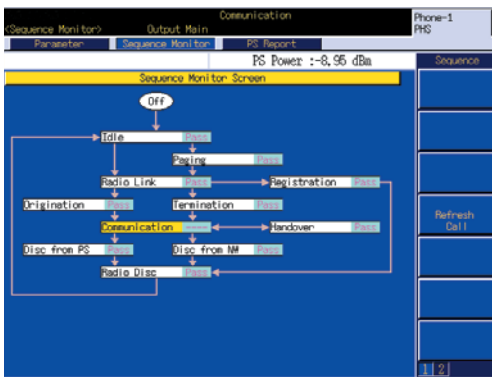
Mobile terminal information reported by a PHS terminal is displayed on the screen. This information includes the identification code (PS-ID) and phone number of the PHS terminal, as well as the dial network number.





### Sequence Monitor

The functions of a PHS terminal can be operated and verified using the call processing function. The MT8820B simulates the PHS base station and displays the sequence screen, so Pass/Fail results of the connection test for location registration, call origination, call termination, communication, handover (for THC switch type), network disconnection, terminal disconnection, etc., can be checked at a glance.



### Measurement Result Evaluation Function

The upper and lower limits of the normal value can be specified for each item and Pass/Fail can be displayed for measurement results. This function is useful for identifying faults at service centers and repair depots.

Parameter	Fundamental	PS Report	Level Monitor	PS Report
Fundamental Measurement: Output Main Off				
Total Judgment: Pass				
Power Measurement	Avg	Max	Min	Pass/Fail
TX Power	9.55	9.55	9.51	Pass
Carrier Off Power	-48.50	-48.42	-48.56	Pass
On/Off Ratio	14.151	14.305	13.942	Pass
Modulation Power	67.36	67.42	67.26	Pass
Timing	18.86	18.57	18.86	Pass
Jitter	16.965	17.163	16.833	Pass
Rising Time	0.000	0.001	-0.000	Pass
Falling Time	11.41	12.72	10.71	Pass
Template	Pass	Pass	Pass	Pass
Modulation Analysis	Avg	Max	Min	Pass/Fail
Carrier Frequency	1880.1436670	1880.1436670	1880.1436670	Pass

### Transmitter Test in Communication State

A transmission test can be performed in the communication state. As well as conducting evaluations during actual communications with the base station, transmission measurement can be performed regardless of restrictions on test controls, which vary with carrier and manufacturer. This function greatly improves production and maintenance efficiency.

Parameter	Fundamental	PS Report	Level Monitor	PS Report
Fundamental Measurement: Output Main Communication				
PS Power: 16.05 dBm				
Power Measurement	Avg	Max	Min	Pass/Fail
TX Power	6.67	6.67	6.67	Pass
Carrier Off Power	-55.63	-55.63	-55.63	Pass
On/Off Ratio	2.017	2.017	2.017	Pass
Modulation Power	16.04	16.04	16.04	Pass
Timing	-0.673	-0.673	-0.673	Pass
Jitter	-0.673	-0.673	-0.673	Pass
Common Parameter	Item List	Standard		
Call Processing	On			
Frequency				
CD Channel				
Channel & Frequency	11	CH = UL (1916.150000) MHz DL (1916.150000) MHz		
TCH Channel				
Channel & Frequency	11	CH = UL (1895.150000) MHz DL (1895.150000) MHz		
Level				
Level	15.70	dBm		

# MX882005C-011 ADVANCED PHS Measurement Software

Advanced High-speed and Batch Measurement Methods Supporting Advanced PHS Base Station Production Lines

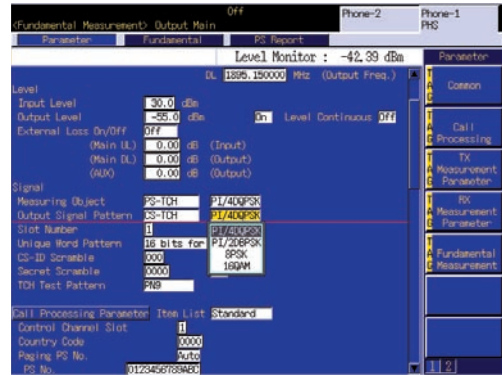
The MX882005C-011 ADVANCED PHS Measurement Software\*1 is a software option to enable Advanced PHS measurements in compliance with the PHS measurement specification (ARIB RCR-STD-28 edition 5.0). It evaluates the transmitter and receiver characteristics of Advanced PHS terminals and base stations.

Transmitter and receiver measurement is accomplished by installing the MX882005C-011 ADVANCED PHS Measurement Software in the MT8820B Mainframe and selecting the required modulation method from  $\pi/4$ DQPSK, 8PSK, and 16QAM.

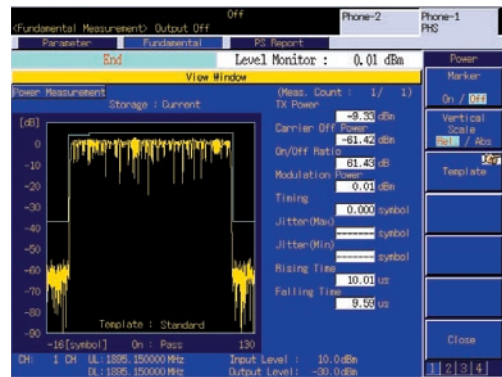
\*1: Requires MT8820B-002 and MX882005C

## ■ ADVANCED PHS Measurements

Transmitter Measurements	Output Power
	Modulation Accuracy
	Occupied Bandwidth
	Adjacent Channel Power
	Transmission Rate
Receiver Measurement	Bit Error Ratio



Modulation Type Select Pop-up Window



Burst Waveform (Entire Time Slot: 8PSK)

# for Advanced PHS



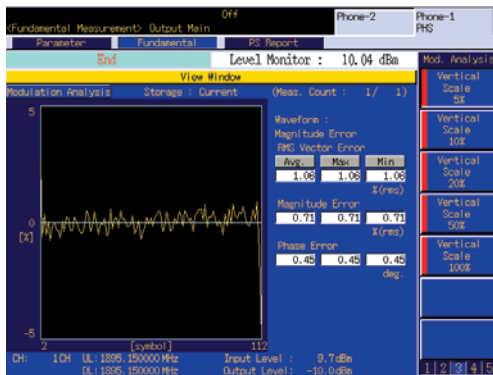
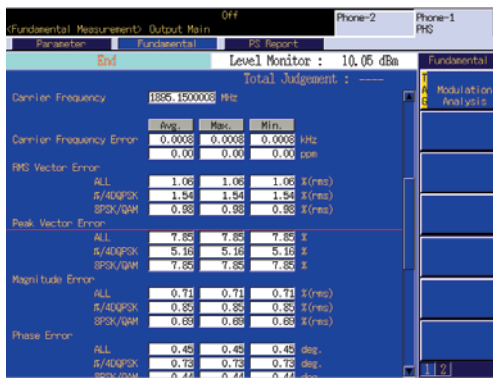


## Transmitter Measurements

### Modulation Accuracy

The frequency, frequency errors (kHz and ppm), modulation accuracy, phase error, amplitude error, and origin offset of Advanced PHS terminals and base stations are measured simultaneously.

A waveform display function is also provided.

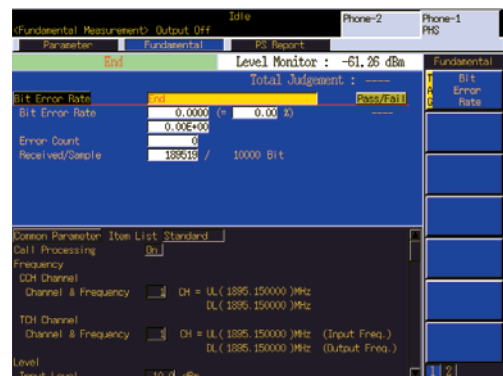


The output power, wide dynamic range mode, burst waveform display, transmission rate, occupied bandwidth and adjacent channel power operations are similar to the MX882005C.

## Receiver Measurement

### Error Rate Test

The bit error rate can be measured on receipt of demodulation data and clocks output from an Advanced PHS terminal/base station by controlling the PHS terminal with an external PC etc. This measurement can be performed in parallel with transmission measurement.



Bit Error Rate Measurement (8PSK)

## Call Processing Function

### Connection Test

The call processing function enables various connection tests including location registration, terminal call origination, network call origination, call communication, network disconnection, terminal disconnection, and handover.

The added  $\pi/2$ DBPSK voice communication function is based on the existing PHS standard (ARIB RCR-STD-28,  $\pi/4$ DQPSK modulation). During a call, the user's voice can be echoed back from the mobile terminal to provide a simple voice communication test.

The mobile terminal report monitor, sequence monitor, transmission test in communication state, and measurement result evaluation operations are similar to the MX882005C.

# Specifications

## • MT8820B-002 TDMA Measurement Hardware, MX882005C PHS Measurement Software

Frequency/Modulation measurement	<p>Frequency: 300 to 2700 MHz</p> <p>Input level (Average power within burst, Main):</p> <ul style="list-style-type: none"> <li>-30 to +40 dBm (Measurement object: PS-TCH, PS-SYNC, CS-TCH, CS-SYNC)</li> <li>-30 to +35 dBm (Measurement object: Continuous wave)</li> </ul> <p>Carrier frequency accuracy: <math>\pm</math> (setting frequency x accuracy of the reference oscillator + 10 Hz)</p> <p>Modulation accuracy: <math>\pm</math> (2% of indicated value + 0.7%)</p> <p>Origin offset accuracy: <math>\pm 0.5</math> dB to signal level of -30 dBc</p> <p>Transmission rate: <math>\pm 1</math> ppm (Measurement range 384 Kbps <math>\pm 100</math> ppm)</p>
Amplitude measurement	<p>Frequency: 300 to 2700 MHz</p> <p>Input level (Average in-burst power, Main):</p> <ul style="list-style-type: none"> <li>-30 to +40 dBm (Measurement object: PS-TCH, PS-SYNC, CS-TCH, CS-SYNC)</li> <li>-30 to +35 dBm (Measurement object: Continuous wave)</li> </ul> <p>Measurement accuracy (After calibration): <math>\pm 0.5</math> dB (-20 to +40 dBm), <math>\pm 0.7</math> dB (-30 to -20 dBm)</p> <p>Linearity: <math>\pm 0.2</math> dB (0 to -40 dB, <math>\geq -30</math> dBm)</p> <p>Carrier-off power measurement range:</p> <ul style="list-style-type: none"> <li><math>\geq 55</math> dB, <math>\geq</math> (Magnitude measurement value [dBm] + 70) dB (Wide dynamic range power measurement)</li> </ul>
Occupied bandwidth	<p>Frequency: 300 to 2700 MHz</p> <p>Input level (Average in-burst power, Main):</p> <ul style="list-style-type: none"> <li>-10 to +40 dBm (Measurement object: PS-TCH, PS-SYNC, CS-TCH, CS-SYNC)</li> <li>-10 to +35 dBm (Measurement object: Continuous wave)</li> </ul>
Adjacent channel power	<p>Frequency: 300 to 2700 MHz</p> <p>Input level (Average in-burst power, Main):</p> <ul style="list-style-type: none"> <li>-10 to +40 dBm (Measurement object: PS-TCH, PS-SYNC, CS-TCH, CS-SYNC)</li> <li>-10 to +35 dBm (Measurement object: Continuous wave)</li> </ul> <p>Measurement range: <math>\leq -60</math> dB (600 kHz offset), <math>\leq -65</math> dB (900 kHz offset)</p>
RF signal generator	<p>Output frequency: 300 to 2700 MHz, 1 Hz step</p> <p>Modulation accuracy: <math>\leq 3\%</math> rms</p> <p>Modulation data: PN9, PN15</p>
Error rate measurement	<p>Function: Bit error rate measurement</p> <p>Measurement object: Serial data inputted from the Call Proc. I/O terminal of a rear panel</p>
Call processing	<p>Call control: Location registration, Call origination, Call termination, Call communication, Network disconnection, Terminal disconnection, Handover</p>

## • MT8820B-002 TDMA Measurement Hardware, MX882005C-011 ADVANCED PHS Measurement Software

Measurement object	<p>The specifications are the same as for the MX882005C. The measurement objects are as follows:</p> <p>Measurement object:</p> <ul style="list-style-type: none"> <li>PS-TCH (<math>\pi/4</math>DQPSK, <math>\pi/2</math>DBPSK, 8PSK, 16QAM)</li> <li>PS-SYNC (<math>\pi/4</math>DQPSK, <math>\pi/2</math>DBPSK)</li> <li>PS-SCCH (<math>\pi/2</math>DBPSK)</li> <li>CS-TCH (<math>\pi/4</math>DQPSK, <math>\pi/2</math>DBPSK, 8PSK, 16QAM)</li> <li>CS-SYNC (<math>\pi/4</math>DQPSK, <math>\pi/2</math>DBPSK)</li> </ul> <p>* For modulation measurement</p> <p>Guaranteed only when no bias in symbol point when measurement object modulation type is 16QAM.</p>
Call processing	<p>Call control with <math>\pi/4</math>DQPSK or <math>\pi/2</math>DBPSK:</p> <ul style="list-style-type: none"> <li>Location registration, Call origination, Call termination, Call communication, Network disconnection, Terminal disconnection, Handover</li> </ul>

# Ordering Information

Please specify the model/order number, name and quantity when ordering.  
The names listed in the chart below are Order Names. The actual name of the item may differ from the Order Name.

Model/Order No.	Name
MT8820B	<b>Main frame</b> Radio Communication Analyzer
Z0956A CA68ADP W2778AE	<b>Standard accessories</b> Power Cord, 2.6 m: 1 pc ANR-CFX40T256 (CF card, 256 MB): 1 pc PC Card Adapter : 1 pc MT8815B/MT8820B Operation Manual (CD-ROM): 1 copy
MT8820B-001 MT8820B-002 MT8820B-003 MT8820B-004 MT8820B-005 MT8820B-007 MT8820B-011 MT8820B-012 MT8820B-031 MT8820B-032 MT8820B-043	<b>Options</b> W-CDMA Measurement Hardware TDMA Measurement Hardware CDMA2000 Measurement Hardware 1xEV-DO Measurement Hardware <sup>*1</sup> 1xEV-DO Measurement Hardware <sup>*1</sup> TD-SCDMA Measurement Hardware Audio Board Parallel Phone Measurement Hardware W-CDMA Measurement Hardware Lite TDMA Measurement Hardware Lite CDMA2000 Time Offset CAL For GPS SG (requires MT8820B-003 and MX882002C)
MT8820B-101 MT8820B-102 MT8820B-103 MT8820B-104 MT8820B-105 MT8820B-107 MT8820B-111 MT8820B-112 MT8820B-131 MT8820B-132 MT8820B-143	W-CDMA Measurement Hardware Retrofit TDMA Measurement Hardware Retrofit CDMA2000 Measurement Hardware Retrofit 1xEV-DO Measurement Hardware Retrofit <sup>*1</sup> 1xEV-DO Measurement Hardware Retrofit <sup>*1</sup> TD-SCDMA Measurement Hardware Retrofit Audio Board Retrofit Parallel Phone Measurement Hardware Retrofit W-CDMA Measurement Hardware Lite Retrofit TDMA Measurement Hardware Lite Retrofit CDMA2000 Time Offset CAL For GPS SG Retrofit (requires MT8820B-003 and MX882002C)
MX882000C MX882000C-001 MX882000C-011 MX882000C-012 MX882000C-013 MX882000C-021 MX882001C MX882001C-001 MX882001C-002 MX882001C-011 MX882001C-041 MX882002C MX882002C-001 MX882002C-002 MX882003C MX882003C-002 MX882005C MX882005C-011 MX882006C MX882006C-002 MX882006C-011 MX882007C MX882007C-001 MX882007C-003 MX882007C-011 MX882010C MX882030C MX882030C-001 MX882030C-008 MX882030C-009 MX882030C-011 MX882030C-021	<b>Softwares</b> W-CDMA Measurement Software (requires MT8820B-001 and MX88205xC) W-CDMA Voice Codec (requires MT8820B-011 and MX882000C) HSDPA Measurement Software (requires MT8820B-001, MX882000C, and MX882050C) HSDPA H-Set 6 Throughput Test (requires MT8820B-001, MX882000C, MX882000C-011, and MX882050C) HSDPA High Data Rate (requires MT8820B-001, MX882000C, MX882000C-011, and MX882050C) HSUPA Measurement Software (requires MT8820B-001, MX882000C, MX882000C-011, and MX882050C) GSM Measurement Software (requires MT8820B-002) GSM Voice Codec (requires MT8820B-011 and MX882001C) GSM External Packet Data (requires MX882001C) EGPRS Measurement Software (requires MX882001C) GSM High-speed Adjustment CDMA2000 Measurement Software (requires MT8820B-003) CDMA2000 Voice Codec (requires MT8820B-011 and MX882002C) CDMA2000 External Packet Data (requires MX882002C) 1xEV-DO Measurement Software (requires MT8820B-003, MT8820B-004, and MX882002C) 1xEV-DO External Packet Data (requires MX882003C) PHS Measurement Software (requires MT8820B-002) Advanced PHS Measurement Software (requires MX882005C) 1xEV-DO Measurement Software (requires MT8820B-003, MT8820B-005, and MX882002C) 1xEV-DO External Packet Data (requires MX882006C) 1xEV-DO Rev. A Measurement Software (requires MX882006C) TD-SCDMA Measurement Software (requires MT8820B-001 and MT8820B-007) TD-SCDMA Voice Codec (requires MT8820B-011 and MX882007C) TD-SCDMA Video Phone Test (requires MX882007C) TD-SCDMA HSDPA Measurement Software <sup>*3</sup> (requires MT8820B-001, MT8820B-007, and MX882007C) Parallel Phone Measurement Software <sup>*2</sup> [requires MT8820B-012, the two same measurement hardware (2 board/set) and one measurement software] W-CDMA Measurement Software Lite (requires MT8820B-031) W-CDMA Voice Codec (requires MT8820B-011 and MX882030C) W-CDMA Band XI <sup>*3</sup> (requires MX882030C-050) W-CDMA Band IX <sup>*3</sup> (requires MX882030C-050) HSDPA Measurement Software (requires MX882030C) HSUPA Measurement Software (requires MX882030C and MX882030C-011)
MX882030C-040 MX882030C-050 MX882031C MX882031C-001 MX882031C-011 MX882031C-040 MX882031C-041 MX882031C-050 MX882050C MX882050C-002 MX882050C-003 MX882050C-008 MX882050C-009 MX882050C-011 MX882070C MX882051C MX882051C-002 MX882051C-003 MX882071C	W-CDMA High-speed Adjustment (requires MX882030C) W-CDMA Call Processing Software <sup>*3, *4</sup> (requires MX882030C) GSM Measurement Software Lite (requires MT8820B-032) GSM Voice Codec (requires MT8820B-011 and MX882031C) EGPRS Measurement Software (requires MX882031C) EGPRS Predistortion Adjustment (requires MX882031C) GSM High-speed Adjustment GSM Call Processing Software (requires MX882031C) W-CDMA Call Processing Software <sup>*3</sup> (requires MX882000C) W-CDMA External Packet Data <sup>*3, *4</sup> (requires MX882050C) W-CDMA Video Phone Test <sup>*3</sup> (requires MX882050C) W-CDMA Band XI <sup>*3</sup> (requires MX882050C) W-CDMA Band IX <sup>*3</sup> (requires MX882050C) HSDPA External Packet Data <sup>*3</sup> (requires MX882000C-011) W-CDMA Ciphering Software <sup>*3</sup> (requires MX882050C) W-CDMA Call Processing Software <sup>*3</sup> (requires MX882000C) W-CDMA External Packet Data <sup>*3</sup> (requires MX882051C) W-CDMA Video Phone Test <sup>*3</sup> (requires MX882051C) W-CDMA Ciphering Software <sup>*3</sup> (requires MX882051C)
MT8820B-ES210 MT8820B-ES310 MT8820B-ES510	<b>Warranty</b> Extended Two Year Warranty Service Extended Three Year Warranty Service Extended Five Year Warranty Service
P0019 P0035B A0013 J1249 J1267 J0576B J0576D J0127A J0127C J0007 J0008 MN8110B B0332 B0333G B0499 B0499B W2776AE W2765AE W2771AE W2790AE W2791AE W2793AE W2794AE W2769AE W2930AE W2931AE W2940AE W2894AE W2895AE W2767AE W2773AE	<b>Application parts</b> TEST USIM001 <sup>*5</sup> W-CDMA/GSM Test USIM Handset CDMA2000 Cable [D-Sub (15 pin, P-type) · D-Sub (15 pin, P-type), used in combination with J1267 (sold separately)] CDMA2000 Cross Cable [D-Sub (9 pin, P-type) · D-Sub (9 pin, P-type), reverse cable used in combination with J1249 (sold separately)] Coaxial Cord (N-P · 5D-2W · N-P), 1 m Coaxial Cord (N-P · 5D-2W · N-P), 2 m Coaxial Cord (BNC-P · RG58A/U · BNC-P), 1 m Coaxial Cord (BNC-P · RG58A/U · BNC-P), 0.5 m GPIB Cable, 1 m GPIB Cable, 2 m I/O Adapter (for call processing I/O) Joint Plate (4 pcs/set) Rack Mount Kit Carrying Case (hard type, with protective cover and casters) Carrying Case (hard type, with protective cover, without casters) MT8815B/MT8820B Operation Manual (booklet) MX882000C Operation Manual (booklet) MX882001C Operation Manual (booklet) MX882002C Operation Manual Panel Operation (booklet) MX882002C Operation Manual Remote Control (booklet) MX882003C Operation Manual Panel Operation (booklet) MX882003C Operation Manual Remote Control (booklet) MX882005C Operation Manual (booklet) MX882006C Operation Manual (booklet) MX882006C Operation Manual Remote Control (booklet) MX882007C Operation Manual (booklet) MX882030C Operation Manual (booklet) MX882031C Operation Manual (booklet) MX88205xC Operation Manual (booklet) MX88207xC Operation Manual (booklet)

- \*1: The MT8820B-004 hardware supports IS-856-0 (1xEV-DO Rev. 0) RF measurements but does not support IS-856-A (1xEV-DO Rev. A) measurements.  
The MT8820B-005 hardware supports both IS-856-0 (1xEV-DO Rev. 0) and IS-856-A (1xEV-DO Rev. A) RF measurements.
- \*2: The following measurement hardware supports the Parallelphone measurement option: MT8820B-001, MT8820B-002, MT8820B-003, MT8820B-004 (or MT8820B-005), MT8820B-007. All the measurement hardware can be installed simultaneously. However, the MT8820B-004 and MT8820B-005 cannot be installed simultaneously.
- \*3: For terminal connectivity, contact your Anritsu sales representative.
- \*4: These options preinstall the integrity protection function.
- \*5: This Test USIM can be worked on only W-CDMA mode. When the connection of GSM or TD-SCDMA is necessary, P0035B can be applied.

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