MT8820B
Radio Communication Analyzer
30 MHz to 2.7 GHz
Unit for Basic Tx and Rx Measurements of W-CDMA/HSPA/HSPA Evolution, GSM/GPRS/EGPRS, CDMA2000 1X/1xEV-DO Rev. A, PHS/Advanced PHS, and TD-SCDMA/HSPA Systems

All in 1

Supports Multi-Communication Systems
The MT8820B Radio Communication Analyzer platform covers a frequency range of 30 MHz to 2.7 GHz. When the dedicated optional measurement software and hardware is installed, the major Tx and Rx characteristics of W-CDMA/HSPA/HSPA Evolution, GSM/GPRS/EGPRS, CDMA2000 1X, CDMA2000 1xEV-DO Rev. A, PHS/Advanced PHS, and TD-SCDMA/HSPA terminals can be measured using a single MT8820B unit.

Advanced Digital Signal Processing and Batch Measurement
Manufacturing and inspection test times have been dramatically cut by incorporating advanced DSP and parallel measurement technologies. Furthermore, several measurement items can be selected freely for batch measurement, and the number of measurements for each measurement item can be configured separately. The one-touch operation supports easy and quick measurement of Tx and Rx characteristics, including transmit frequency, modulation accuracy, transmit power, spectrum emission mask, adjacent channel leakage power ratio, occupied bandwidth, and BER.

Parallelphone Measurement
When the Parallelphone Measurement option is installed in the MT8820B main frame, two different mobile terminals can be connected and tested simultaneously with a single MT8820B using its second RF, AF, GPIB, and Ethernet port. This functionality significantly improves manufacturing efficiency by reducing production costs (return on investment and energy saving) and space.

Manufacturer Test Suite
Manufacturer Test Suite is the ideal solution for making RF adjustments and RF parametric tests on mobile terminal production lines. The basic configuration consists of signal generator and signal analyzer functions without call processing, supporting RF adjustments and RF parametric tests in the test mode (mobile controlled by external PC). Installing the call processing software option supports RF parametric tests while controlling the mobile terminal at call processing. Adding the adjustment software option shortens the time required for RF adjustment by using the chipset adjustment function. Combining Manufacturer Test Suite with the Parallelphone Measurement option offers the perfect solution for production lines.

CDMA2000® is a registered trademark of the Telecommunications Industry Association (TIA-USA).

Parallelphone™ is a registered trademark of Anritsu Corporation.

MT8820B
Radio Communication Analyzer
30 MHz to 2.7 GHz
Supports Multi-Communication Systems

All-in-one Support for Basic Tx and Rx Measurements of W-CDMA/HSPA/HSPA Evolution, GSM/GPRS/EGPRS, CDMA2000 1X/1xEV-DO Rev. A, PHS/Advanced PHS, and TD-SCDMA/HSPA Systems

W-CDMA Measurement

3GPP-compliant measurements of Tx and Rx characteristics of 3G W-CDMA terminals.

Transmitter Measurement

The transmit power, frequency error, occupied bandwidth, spectrum emission mask, adjacent channel leakage power ratio, modulation accuracy, and peak code domain error can be measured.

Receiver Measurement

The bit error rate can be measured using the 3GPP-specified loopback test mode. In addition, feeding the demodulated data and clock signals from the W-CDMA terminal directly to the MT8820B supports bit error rate measurement. Both PN9 and PN15 can be set as the downlink RF signal data pattern.

HSDPA Measurement

3GPP-compliant measurements of Tx and Rx characteristics of 3.5G HSDPA terminals.

Transmitter Measurement

The transmit power, spectrum emission mask and adjacent channel leakage power ratio of the HS-DPCCH transmission slot are measured. At measurement in the time domain, the power step at the HS-DPCCH slot boundary, modulation, and code domain power are measured.

Receiver Measurement

The HSDPA throughput can be measured by counting the number of ACK blocks from the HSDPA terminal.

* Requires MT8820B-001, MX882000C, and MX88205xC

* Requires MT8820B-001, MX882000C, MX882000C-011, and MX882050C

Refer to the MX882000C catalog for details.
**HSUPA Measurement**

3GPP-compliant measurements of Tx and Rx characteristics of 3.5G HSUPA terminals.

**Transmitter Measurement**

The transmit power, spectrum emission mask, and adjacent channel leakage power ratio at HS-DPCCH and E-DCH transmission are measured.

**Throughput Monitor**

The E-DCH throughput is calculated from the E-TFCI notification from the HSUPA terminals. In addition, the E-TFCI statistics (average, median, maximum and minimum) are displayed.

*Requires MT8820B-001, MX882000C, MX882000C-011, MX882000C-021, and MX882050C*

**HSPA Evolution Measurement**

3GPP-compliant measurements of Tx and Rx characteristics, throughput and CQI of enhanced 3.5G HSPA Evolution terminals. FRC H-Set 8 (64QAM) and HS-DSCH Category 14 (21 Mbps class) test signals can be transmitted for HSPA Evolution throughput measurements.

**Transmitter Measurement**

At measurement in the time domain, mobile terminal relative code domain power accuracy for HS-DPCCH and E-DCH with 16QAM are measured.

**Receiver Measurement**

The HSDPA throughput with 64QAM can be measured by counting the number of ACK blocks from the terminal.

*Requires MT8820B-001, MX882000C, MX882000C-011, MX882000C-021, MX882000C-031, and MX882050C*

*For terminal connectivity, contact your Anritsu sales representative.*

Refer to the MX882000C catalog for details.
GSM/GPRS Measurement

Measures Tx and Rx characteristics of GSM/GPRS terminals — world’s most common digital mobile standard.

Transmitter Measurement

At GSM/GPRS measurement, the transmit frequency, phase error (RMS and peak), transmit power, power versus time (template mask), and output RF spectrum can be measured.

Receiver Measurement

The uplink RF signal, which is looped back from GSM terminal, is demodulated by controlling the GSM terminal in the loopback condition to measure the frame error, bit error, and CRC error rates. And FAST BER measurement is supported.

The block error rate can be measured with the BLER and Test Mode B connection by controlling the GPRS terminal in the loopback condition. The above receiver measurements can be performed in parallel with transmitter measurements.

EGPRS Measurement

Measures Tx and Rx characteristics of enhanced GPRS system (EGPRS) terminals.

Transmitter Measurement

At EGPRS measurement, the transmit frequency, EVM (RMS and peak), origin offset, transmit power, power versus time (template mask), and output RF spectrum can be measured.

Receiver Measurement

The uplink RF signal, which is looped back from EGPRS terminal, is demodulated by controlling the EGPRS terminal in the loopback condition to measure the block error or bit error. The above receiver measurements can be performed in parallel with transmitter measurements.

* Requires MT8820B-002 and MX882001C

* Requires MT8820B-002, MX882001C, and MX882000C-011

Refer to the MX882001C catalog for details.
**CDMA2000 1X Measurement**

3GPP2-compliant measurements of Tx and Rx characteristics of 3G CDMA2000 1X terminals.

**Transmitter Measurement**

The transmit power, modulation analysis, occupied bandwidth, code domain power, spurious emission, and access probe power can be measured.

**Receiver Measurement**

The Frame Error Rate (FER) and Pass/Fail evaluation can be performed in SO2, SO9, SO55 and SO32 (TDSO) to display the FER, error frame count, Tx frame count, confidence level, and Pass/Fail results.

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**CDMA2000 1xEV-DO Rev. 0/Rev. A Measurement**

3GPP2-compliant measurements of Tx and Rx characteristics of 3.5G 1xEV-DO Rev. 0/Rev. A terminals.

**Measurement Software and Protocol Revision**

<table>
<thead>
<tr>
<th>Model</th>
<th>Protocol Revision</th>
</tr>
</thead>
<tbody>
<tr>
<td>MX882006C</td>
<td>IS-856-0 (1xEV-DO Rev. 0)</td>
</tr>
<tr>
<td>MX882006C-002</td>
<td>IS-856-0 (1xEV-DO Rev. 0)</td>
</tr>
<tr>
<td>MX882006C-011</td>
<td>IS-856-A (1xEV-DO Rev. A)</td>
</tr>
</tbody>
</table>

**Transmitter Measurement**

The transmit power, modulation analysis, occupied bandwidth, code domain power, spurious emission, and access probe power can be measured.

**Receiver Measurement**

PER (Packet Error Rate) measurement and Pass/Fail evaluation can be performed in FTAP to display the PER, error packet count, transmission packet count, confidence level, and Pass/Fail results.

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* Requires MT8820B-003 and MX882002C

* Requires MT8820B-003, MT8820B-005, MX882002C, and MX882006C

* Installing the MT8820B-003, MT8820B-005, MX882002C, MX882006C, and MX882006C-011 can measure of Tx and Rx characteristics of 1xEV-DO Rev. A terminal.

Refer to the MX882002C/MX882006C catalog for details.
**TD-SCDMA Measurement**

3GPP-compliant measurements of the main Tx and Rx characteristics of 3G TD-SCDMA (1.28 Mcps TDD) and 3.5G HSDPA/HSUPA mobile terminals is supported.

**Transmitter and Receiver Measurement**

3GPP-compliant measurement of TD-SCDMA with call-processing functions, including Tx/Rx items such as transmit power, power template, frequency error, occupied bandwidth, spectrum emission mask, adjacent channel leakage power, modulation accuracy, peak code domain error, open loop power control, closed loop power control, out-of-sync handling, BER, and BLER, is supported. In addition, one-touch setting of main Tx/Rx test items and closed loop power control offer easy configuration of automated 3GPP-compliant test systems.

**PHS/Advanced PHS Measurement**

Measures Tx and Rx characteristics of PHS terminals/Advanced PHS terminals and base stations in compliance with ARIB RCR-STD-28 edition 5.0 supporting π/4DQPSK, 8PSK, and 16QAM modulation methods.

**Transmitter Measurement**

The transmit frequency, modulation accuracy, transmit power, transmission rate, occupied bandwidth, adjacent channel power of PHS terminals/Advanced PHS terminals and base stations are measured simultaneously.

**Receiver Measurement**

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

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**TD-SCDMA HSDPA Measurement**

3GPP-compliant Throughput, and CQI measurements of TD-SCDMA HSDPA terminals are supported. The signals for Throughput measurement include RMC signals for all TD-SCDMA HS-DSCH categories as well as maximum category-15 data rates (2.8 Mbps).

**TD-SCDMA HSUPA Measurement**

3GPP-compliant Tx measurement and Performance test of TD-SCDMA HSUPA with call-processing are measured. The signals for Tx measurement include HSUPA RMC category 1 to 6 (2.23 Mbps UE class) terminals can be transmitted. And, HSUPA performance measurement is calculated the information about bit rate by detecting E-DCH TB (Transport Block size) Index include E-UCCH sent from the mobile terminal to MT8820B/MT8815B.

* Requires MT8820B-001, MT8820B-007, and MX882007C for TD-SCDMA measurements.
* Requires MT8820B-001, MT8820B-007, MX882007C, and MX882007C-011 for TD-SCDMA HSDPA measurements.
* Requires MT8820B-001, MT8820B-007, MX882007C, MX882007C-011, and MX882007C-021 for TD-SCDMA HSUPA measurements.

* For terminal connectivity, contact your Anritsu sales representative.

Refer to the MX882007C catalog for details.
Supports All Function Tests

Real-time Voice Encoding and Decoding
Voice tests with a handset are supported by the real-time voice encoding and decoding function of the W-CDMA (GSM, CDMA2000 1X, TD-SCDMA) Measurement Software. In addition, the call Tx and Rx audio can be measured using the audio measurement function.

End-to-End Communications Test
This supports the end-to-end communications test between a handset connected to the RJ11 connector on the MT8820B and a mobile terminal.

Audio Transmitter and Receiver Measurement
The tone signal from the MT8820B AF Output connector is supplied to the microphone of the mobile terminal and the audio transmitter characteristics of the mobile terminal can be measured using the MT8820B to demodulate the uplink RF signal and measure the level, frequency, and distortion of the demodulated tone signal.

Packet Communication Data Transfer Test
End-to-End Data Transfer Test
Using the External Packet Data Software option supports end-to-end data transfer between a mobile terminal (W-CDMA, HSDPA, GPRS, CDMA2000 1X, CDMA2000 1xEV-DO Rev. 0) and an application server connected to the MT8820B, or a PC client connected to the terminal, and various application tests.

* Requires MT8820B-011, MX882000C-001, MX882001C-001, MX882002C-001 or MX882007C-001
* Audio Transmitter and Receiver Measurement supports W-CDMA, GSM, TD-SCDMA
Audio Transmitter and Receiver Measurement does not support CDMA2000 1X

* Any of MX882001C-002, MX882002C-002, MX882006C-002, MX882050C-002, MX882050C-011, or MX882051C-002 separately required

Refer to the MX882000C, MX882001C, MX882002C and MX882007C catalog for details.

Refer to the MX882000C, MX882001C and MX882002C catalog for details.
**Video Phone Test**

**End-to-End Video Phone Test**

The MT8820B supports two-ways tests between W-CDMA (TD-SCDMA) terminals with video functions via the MT8820B Ethernet port.

Two-way video phone tests require either two MT8820B units or one unit with the Parallelphone option.

- Sample MT8820B connection: when MT8820B is two sets
- Sample MT8820B connection: when MT8820B is one set (Parallelphone measurement correspondence)

* Requires MX88205xC-003 or MX882007C-003

Refer to the MX882000C and MX882007C catalog for details.

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**CDMA2000 1X/1xEV-DO (Rev. 0) Synchronous Function**

**CDMA2000 1X/1xEV-DO (Rev. 0) Hybrid Terminal Function Test**

By using the MX882002C and MX882006C with two MT8820B units or one MT8820B unit with the Parallelphone measurement option, the CDMA2000 1X and 1xEV-DO (Rev. 0) forward link signals can be output with synchronized system times, supporting function tests of terminals for both CDMA2000 1X and 1xEV-DO (Rev. 0) systems.

- Installing the MX882006C-011 option supports the mobile terminal connection test with ETAP only.

* Requires MX88205xC-003 or MX882007C-003

Please unload, when MX882000C or MX882007C is loaded.

* Requires MX88205xC-003 or MX882007C-003

Refer to the MX882002C/MX882006C catalog for details.
Simultaneous Measurement of Two Mobile Terminals

Installing the Parallelphone Measurement option supports simultaneous measurement of two terminals using the second RF, AF, GPIB, or Ethernet port of a single MT8820B unit.

![Diagram of RF connections and mobile terminals](image)

**Specifications**

**MX882010C Parallel Phone Measurement Software**

<table>
<thead>
<tr>
<th>Main2 Input/Output, Aux2 Output</th>
<th>AF2 Input/Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identical to Main1 Input/Output and Aux1 Output specified by the MT8820B and the measurement software installed in the MT8820B.</td>
<td>Identical to AF1 Input and Output specified by the measurement software. These are enabled only when the MT8820B-011 Audio Board is installed.</td>
</tr>
</tbody>
</table>

* The MT8820B-012 Parallel Phone Measurement Hardware requires the MX882010C Parallel Phone Measurement Software as well as installation of the required measurement software and two measurement hardware units.

**Case of GSM Parallelphone Measurements**

<table>
<thead>
<tr>
<th></th>
<th>Product</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>MT8820B</td>
<td>Radio Communication Analyzer</td>
<td>1</td>
</tr>
<tr>
<td>MT8820B-002</td>
<td>TDMA Measurement Hardware</td>
<td>2</td>
</tr>
<tr>
<td>MT8820B-012</td>
<td>Parallel Phone Measurement Hardware</td>
<td>1</td>
</tr>
<tr>
<td>MX882001C</td>
<td>GSM Measurement Software</td>
<td>1</td>
</tr>
<tr>
<td>MX882010C</td>
<td>Parallel Phone Measurement Software</td>
<td>1</td>
</tr>
</tbody>
</table>

Mobile Terminal Report Monitor

The mobile terminal status can be displayed as a periodic report sent by the mobile terminal to the MT8820B. The downlink RF signal level at the mobile receiver can be checked with the Rx level reported from the mobile terminal.

Mobile Terminal Report Monitor (GSM)

Higher Productivity

**High Production Efficiency and Smaller Equipment Footprint using Parallelphone Measurement**

**Supports Multi-System Call Processing Test**

**Call Processing Test**

**Connection Test**

Various connection tests, such as registration, origination, termination, handover, terminal disconnect, and network disconnect, can be tested using the call processing functionality. Moreover, voice from the mobile terminal can be echoed back while calling to test simple voice communications.

Sequence Monitor (W-CDMA)

Mobile Terminal Report Monitor (GSM)
Perfect RF Adjustment and Test Solution for Mobile Production Lines

Excellent Cost-Performance Solution

Manufacturer Test Suite

Basic Configuration
Call processing functions are not required for RF adjustments, and are only rarely required for RF parametric tests. Consequently, the basic configuration of Manufacturer Test Suite offers signal generator and signal analyzer functions without call processing, and is ideal for making RF adjustments and RF parametric tests in the test mode (mobile controlled by external PC).

W-CDMA
- MT8820B Radio Communication Analyzer
- MT8820B-031 W-CDMA Measurement Hardware Lite
- MX882030C W-CDMA Measurement Software Lite

GSM
- MT8820B Radio Communication Analyzer
- MT8820B-032 TDMA Measurement Hardware Lite
- MX882031C GSM Measurement Software Lite

RF Adjustment
The basic configuration with signal generator and signal analyzer functions supports RF adjustments using traditional adjustment methods. Installing the adjustment software option cuts the RF adjustment time because the chipset adjustment function is used.

RF Parametric Test
The RF parametric tests control the mobile terminal in the test mode or with call processing. The basic configuration performs RF parametric tests in the test mode but installing the call processing software option adds support for RF parametric tests with call processing.

Example of Manufacturer Test Suite Options Stack (W-CDMA)

- MX882030C-001 W-CDMA Voice Codec
- MX882030C-011 HSDPA Measurement Software
- MX882030C-021 HSUPA Measurement Software
- MX882030C-040 W-CDMA High-speed Adjustment
- MX882030C-050 W-CDMA Call Processing Software

Target Phase of Manufacturer Test Suite

- Installing the option supports W-CDMA/HSDPA/HSUPA and GSM/GPRS/EGPRS in Manufacturer Test Suite.
- Manufacturer Test Suite does not support real-time processing functions, such as external packet data and video phone tests.
- MX882030C-001 W-CDMA Voice Codec function requires MT8820B-011.
MT8820B Panel Layout

Preset Key: Starts initializing
Remote Lamp: Lit while in remote control mode
Local Key: Switches remote control to manual control
Copy Key: Copies screen
Power Switch: Switches mode between power-on and standby
Memory Card Slot: For saving/recalling measurement parameters and update software to/from PCMCIA-compliant PC-card-type memory card (Type II)
Handset Connector: For testing end-to-end voice communication between MT8820B and mobile terminal using handset
AF Input/Output Connector: For audio measurement
AUX Output Connector: Outputs RF signal for RF testing mobile terminal (SMA connector)
Main Input/Output Connector: Outputs RF signal for RF testing mobile terminal (N-type connector)

Functions: Displays function menu on screen
Function Key: Executes function menu displayed on right of screen
Page Switch Key: Switches function menu displayed on right of screen
Screen Switch Key: Switches screen
Screen Control: Switches display window for manual operation
Measure: Starts and stops measurement
Channel/Level: Sets channel, frequency, and level
Call: Connects and disconnects call
Utility: Saves and recalls parameters, and displays configuration
Cursor/Data Entry: Moves cursor and sets parameters
GPIB Connector: For remote control of MT8820B
Trigger Output Connector: Outputs event-timing signal to external equipment (BNC connector)
Trigger Input Connector: Inputs trigger signal from external equipment to measure uplink signal from mobile equipment by synchronizing (BNC connector)
Reference Signal Input Connector: Inputs 10/13-MHz reference signal (BNC connector)
Reference Signal Output Connector: Outputs 10-MHz reference signal of MT8820B (BNC connector)
Frequency Adjust: Adjusts frequency of internal reference oscillator
10BASE-T Port: Interface for packet and W-CDMA video communication test
Call Processing Input/Output Port: Interface for BER measurement and synchronization
RS-232C Port: Interface for packet communication test

Grounding Terminal: Connected to ground potential
Main Power Switch: Switches main power on/off. The front-panel power switch enters the standby (Stby) mode when the main power is switched on.
## Specifications

**MT8820B Radio Communication Analyzer**

### General
- **Frequency range:** 30 MHz to 2700 MHz
- **Max. input level:** +35 dBm (Main)
- **Main I/O**
  - Impedance: 50 Ω
  - VSWR: ≤1.2 (<1.6 GHz), ≤1.25 (1.6 GHz to 2.2 GHz), ≤1.3 (>2.2 GHz)
  - Connector: N type
- **AUX output**
  - Impedance: 50 Ω
  - VSWR: ≤1.3 (at SG Output level: ≤–10 dBm)
  - Connector: SMA type
- **Reference oscillator**
  - Frequency: 10 MHz
  - Level: TTL
  - Startup characteristics: ≤±5 x 10^-8 (at 10 min after startup referenced to frequency 24 h after startup)
  - Aging rate: ≤±2 x 10^-9/day, ≤±1 x 10^-7/year (referenced to frequency 24 h after startup)
  - Temperature characteristics: ≤±5 x 10^-8
  - Connector: BNC type
- **External reference input**
  - Frequency: 10 MHz or 13 MHz (±1 ppm)
  - Level: ≥0 dBm
  - Impedance: 50 Ω
  - Connector: BNC type

### RF Signal Generator
- **Frequency**
  - Frequency range: 30 MHz to 2700 MHz (setting range: 0.4 MHz to 2700 MHz)
  - Setting resolution: 1 Hz
  - Accuracy: Due to reference oscillator accuracy
- **Output level**
  - Level range: –140 to –10 dBm (Main), –130 to 0 dBm (AUX)
  - Resolution: 0.1 dB
  - Accuracy: ±1.0 dB (–120 to –10 dBm, Main, after calibration), ±1.0 dB (–110 to 0 dBm, AUX, after calibration)
- **Signal purity**
  - Non-harmonic spurious: ≤–50 dBc
  - Harmonics: ≤–25 dBc
- **Uninterrupted level variation**
  - Variable range: 0 to –30 dB
  - Setting resolution: 0.1 dB

### Others
- **Display**
  - Color 8.4-inch TFT LCD, 640 x 480 dots
- **External control**
  - GPIB: Control from external host with main unit as device (excluding some functions such as power-on),
    - No external device control
  - Interface functions: SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT1, C0, E2

### Power Supply
- 100 to 120 Vac/200 to 240 Vac (–15/+15%, 250 V max.), 47.5 Hz to 63 Hz, ≤550 VA (with all Options)

### Dimensions and Mass
- 426 (W) x 221.5 (H) x 498 (D) mm (excluding projections), ≤26 kg (with all Options)

### Environmental Conditions
- Operating temperature and humidity: 0˚ to +50˚C, ≤95% (no condensation)
- Storage temperature and humidity: –20˚ to +60˚C, ≤95% (no condensation)
- EMC
  - EN61326-1, EN61000-3-2
- LVD
  - EN61010-1
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.

<table>
<thead>
<tr>
<th>Model/Order No.</th>
<th>Name</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>MT8820B-001</td>
<td>W-CDMA Measurement Hardware</td>
<td>(requires MX882030C and MX882030C-011)</td>
</tr>
<tr>
<td>MT8820B-002</td>
<td>TDMA Measurement Hardware</td>
<td>(2 board/set) and one measurement software</td>
</tr>
</tbody>
</table>
| MT8820B-003    | CDMA2000 Measurement Hardware|                            |"