MD8470A
Signalling Tester
MX847030A CDMA2000 Simulation Kit
MX847030A-01 Multi Sector/Multi Carrier

CDMA2000
1X/1xEV-DO Revision A
Mobile applications are becoming increasingly important in today’s global wireless communications market. Success now depends on the ability to bring attractive mobile terminals to market ahead of the competition as well as on basic technology advances. Because it can quickly test a wide range of applications, the MD8470A Signalling Tester accelerates development of mobile terminals and services when time-to-market is critical.

- The behavior of CDMA2000 base stations and PPP negotiation procedures during data communications can be fully defined using scripts.
- By using the flexible network simulation function, the operations of various CDMA2000 1X/1xEV-DO hybrid terminal functions, such as voice call, data communications, and handoff can be verified using a single all-in-one unit.
- All-in-one platform supporting functional testing of mobile terminal applications, including voice and video calling, content download, messaging.
- Simple call processing testing
  - W-CDMA/HSDPA/HSUPA: Voice/Video/Packet/SMS/MMS
  - GSM/GPRS/EGPRS: Voice/Packet/SMS/MMS
  - CDMA2000 1X/1xEV-DO Rev. A:
    - Voice (echo back)/Packet/SMS/EMS/MMS
  - TD-SCDMA: Voice/Packet/SMS
- Multiple communication systems (W-CDMA/HSDPA/HSUPA, GSM/GPRS/EGPRS, CDMA2000 1X/1xEV-DO Rev. A, TD-SCDMA)
- Wide frequency coverage (400 MHz to 2.7 GHz)

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Features

Call Processing using Simple Operations

- W-CDMA/HSDPA/HSUPA: Voice/Video call/Packet/SMS/MMS
- GSM/GPRS/EGPRS: Voice/Packet/SMS/MMS
- CDMA2000 1X/1xEV-DO Rev. A: Voice/Packet/SMS/EMS/MMS
- TD-SCDMA: Voice/Packet/SMS

The MD8470A Signalling Tester supports basic call processing for W-CDMA/HSDPA/HSUPA (Voice call/Video call/Packet Communications/SMS/MMS), GSM/GPRS/EGPRS (Voice call/Packet Communications/SMS/MMS), CDMA2000 1X/1xEV-DO Rev. A (Voice call (echo back)/Packet Communications/SMS/EMS/MMS) TD-SCDMA (Voice call/Packet Communications/SMS). The simulation environment required for testing application is implemented by simple operations.

Multiple Communication Systems Support

- W-CDMA/HSDPA/HSUPA
- GSM/GPRS/EGPRS
- CDMA2000 1X/1xEV-DO Rev. A
- TD-SCDMA

The MD8470A Signalling Tester complies with the GSM/GPRS/EGPRS, W-CDMA/HSDPA/HSUPA, CDMA2000 1X/1xEV-DO Rev. A and TD-SCDMA standards regulating the world’s major 2.5G, 3G and 3.5G mobile communication systems. Seamless coverage of a wide frequency band (400 to 2700 MHz) supports development of multiband mobile terminals and future expanded frequency band.

Platform Architecture

- Base station functions are simulated by installing communication system hardware and control software.
- The user interface (displayed on a 10.4-inch screen) is based on Windows XP Professional, so simulations can be controlled without a remote PC.
- The small-footprint chassis [426 (W) x 221.5 (H) x 281 (D) mm] is ideal for configuring an on-the-bench personal simulation environment.

Windows® is a registered trademarks of Microsoft Corporation in the USA and other countries.
Simulation control software (Protocol Visualization Tool)

Flexible Simulation Environment Using Scripts

The MX847030A CDMA2000 Simulation Kit supports CDMA2000 1X/1xEV-DO defined in the 3GPP2 standards. The operation of CDMA2000 Base stations and PPP negotiation procedures during data communications can be fully defined using a Perl script. The flexible network simulation function enables verification of various CDMA2000 1X/1xEV-DO terminal connections, including voice and data communications, handoff and hybrid operation. An API offers flexible control of the radio condition, protocol message transmission/reception, and data communications condition.

Logging and Decoding Analysis Functions

Protocol messages exchanged between the mobile terminal and the MD8470A Signalling Tester during simulation are logged in real time, with built-in support for decoding protocol messages. CDMA2000 protocols and PPP protocols can all be logged and traced.

Supporting BCMCS, 1xEV-DO Revision A

The MX847030A supports 1X Release C, BCMCS, 1xEV-DO Revision A simulation. In addition, support for QoS — a 1xEV-DO Revision A function — has been added as a world first. This supports video-phone services over VoIP, as well as all next-generation IP and interactive services based on high-speed data throughput communications in an on-the-bench environment that greatly reduces development costs.

<table>
<thead>
<tr>
<th>MX847030A CDMA2000 Simulation Kit, MU847030A CDMA2000 1X Signalling Unit, MU847032A CDMA2000 1xEV-DO Signalling Unit</th>
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</thead>
<tbody>
<tr>
<td><strong>1X</strong></td>
</tr>
<tr>
<td><strong>Transmitter characteristics</strong></td>
</tr>
<tr>
<td>Frequency range: 400 to 2700 MHz</td>
</tr>
<tr>
<td>Frequency setting resolution: 100 Hz</td>
</tr>
<tr>
<td>Channel*: Sync, Pilot, PCH, BCCH, CCCH, FCH, DCCCH, SCH, QPCH, OCNS, SCCH</td>
</tr>
<tr>
<td>Channel level setting range: −30 to 0 dB, 0.25-dB step (Relative level for Ior)</td>
</tr>
<tr>
<td>Sector level setting range: −30 to 0 dB, 0.1-dB step (Relative level for Ior)</td>
</tr>
<tr>
<td>AWGN level setting range: −20 to +12 dB (Relative level for Ior)</td>
</tr>
<tr>
<td>Waveform Quality: ≥0.99 (Only Pilot, AWGN OFF)</td>
</tr>
<tr>
<td><strong>Receiver characteristics</strong></td>
</tr>
<tr>
<td>Frequency range: 400 to 2700 MHz</td>
</tr>
<tr>
<td>Input level range: −60 to +34 dBm</td>
</tr>
<tr>
<td>Channel*: ACH, EACH, FCH, DCH, SCH, SCCH</td>
</tr>
<tr>
<td><strong>Applied standard</strong></td>
</tr>
<tr>
<td>CDMA2000 1X Release 0, A, C</td>
</tr>
<tr>
<td><strong>Protocol revision</strong></td>
</tr>
<tr>
<td>PREV6, PREV7, PREV9/10 (non-EVDV)</td>
</tr>
<tr>
<td><strong>Service options</strong></td>
</tr>
<tr>
<td>SO1, SO3 (EVRC), SO6 (SMS), SO14, SO15 (LSPD), SO25 (FCH), SO33 (HSPD), SO36, SO68 (EVRC-B), SO32768</td>
</tr>
<tr>
<td><strong>Data communications</strong></td>
</tr>
<tr>
<td>Transparent IP data transmission/Simple IP/Mobile IP</td>
</tr>
<tr>
<td>PPP Simulation: LCP/IPCP/PAP/CHAP</td>
</tr>
<tr>
<td><strong>Functions</strong></td>
</tr>
<tr>
<td>Transmitter: 3GPP2-compliant channels</td>
</tr>
<tr>
<td>Receiver: 3GPP2-compliant channels</td>
</tr>
</tbody>
</table>

| **1xEV-DO** |
| **Transmitter characteristics** |
| Frequency range: 400 to 2700 MHz |
| Frequency setting resolution: 100 Hz |
| Channel*: Pilot, MAC, Control, Traffic |
| Sector level setting range: −30 to 0 dB, 0.1-dB step (Relative level for Ior) |
| AWGN level setting range: −20 to +12 dB (Relative level for Ior) |
| Waveform Quality: ≥0.99 (Only Pilot, AWGN OFF) |
| **Receiver characteristics** |
| Frequency range: 400 to 2700 MHz |
| Input level range: −60 to +34 dBm |
| Channel*: Access, Traffic |
| **Standard** |
| CDMA2000 1xEV-DO Revision 0, A, BCMCS |
| **Data communications** |
| Transparent IP data transmission/Simple IP/Mobile IP |
| PPP Simulation: LCP/IPCP/PAP/CHAP |
| **Functions** |
| Transmitter: 3GPP2-compliant channels |
| Receiver: 3GPP2-compliant channels |

| **Operating temperature** |
| +5° to +40°C, Humidity ≤95% (no condensation) |
| **Storage temperature** |
| −20° to +65°C, Humidity 95% (no condensation) |

*: Restrictions on combination of frame duration, rate, and channel combination
Handoff Test with Multi Sector/Multi Carrier

The MX847030A-01 Multi Sector/Multi Carrier software supports simulation with multiple sectors (1X: 6 max., 1xEV-DO: 3 max.) and multiple carriers (1X/1xEV-DO: 2 max.). These resources can be configured dynamically to support various handoff tests, such as Soft, Softer, Hard, Idle, and Access handoff.

The MD8470A Signalling Tester offers a multi-sector/multi-carrier environment in an all-in-one instrument and greatly improves the efficiency of development verification, interoperability tests and pre-field testing.

Various handoff tests can be performed using several sets of MD8470A simultaneously with multiple carriers (max. 2 → 4").

*: When using two sets together

PPP Simulation Function

The MX847030A CDMA2000 Simulation Kit includes a simulation function for PPP negotiations—the packet transmission connection protocol. Using this function, one script handles simulation of both CDMA2000 signalling and PPP simultaneously. The resulting common log makes it easy to troubleshooting problems.

Using the all-in-one MD8470A Signalling Tester with optional MX847030A-01 Multi Sector/Multi Carrier Software supports easy configuration of PPP and data communication tests during handoff operations.
Easy Application Testing

WNS: Wireless Network Simulator

The Wireless Network Simulator (WNS) application software simulates interactive base station operations on the MD8470A Signalling Tester. An application test environment is easily configured because the bearer starts in response to requests from the mobile terminal connected to the MD8470A Signalling Tester. Basic communications parameters can be set by simple GUI-based operations. The call status is displayed graphically and calling and answering operations are performed at a virtual terminal. In addition, WNS supports the network functions required for simulating the increasingly popular Multimedia Messaging Service (MMS).

Configuring a system combining an MMS test server with a WAP gateway supports MMS Submit and MMS Notification/MMS Retrieval function tests using the WNS interactive test environment. Setting the test system permits MMS tests using loopback as well as MMS Tx/Rx tests between terminals.

+1: Operation not guaranteed for all mobile terminal models
+2: Requires two MD8470A units

Main WNS/SMSC Functions

<table>
<thead>
<tr>
<th>Bearer</th>
<th>Setting Parameters</th>
<th>Other Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDMA2000</td>
<td>Common</td>
<td>• Voice Call (Call/Answer), Packet Communications</td>
</tr>
<tr>
<td>1X/1xEV-DO</td>
<td>1X</td>
<td>• IP Address Setting (Client/1X/1xEV-DO)</td>
</tr>
<tr>
<td></td>
<td>1xEV-DO</td>
<td>• Band Class Setting • Channel Setting • SID/NID Setting • Physical Channel Setting • Dormant Timer Setting • Packet Connection Release Timer Setting</td>
</tr>
<tr>
<td></td>
<td>SMS</td>
<td>• Band Class Setting • Channel Setting • Sector ID Setting • Dormant Timer Setting • Packet Connection Release Timer Setting • Session Close Timer Setting</td>
</tr>
<tr>
<td>Mode</td>
<td></td>
<td>• Communications Setting (Paging Channel, Traffic Channel)</td>
</tr>
</tbody>
</table>

Other Functions:

• SMS Edit and Sent/Received SMS Display (7-bit ASCII/Unicode/Shift-JIS/Binary)
• SMS Continuous Send Function
• SMS Forward Function
• EMS Tx/Rx Function
• MMS Tx/Rx Function
• Connection Status Transition Display/Attach Status Display
• Base Station Tx Power Setting (1-dB steps)
• Access Control Function (PSI/ST/ACCT)
• Out-of-Cell (Out-of-Range) Function (Lost Network)
• Calling/Answering using Virtual Terminal (manual and Automatic)
• Call Waiting/Multi Party Call Function
• Caller ID Function
• Caller ID Function (Multi Party Call)
• Dormant Function
• 1xEV-DO Session Close Function
• Non-Responsive Base Station Function

+3: 1xEV-DO Rev. A is not supported. Use it or the MX847031A CDMA2000 AppEase software to create test scenarios.
+4: Requires separate MMS application server
**Voice Call Testing (Loopback)**

**Voice Call Testing**

Using the WNS supports loopback testing by looping-back voice data. Additionally, both call waiting and multi party calls are supported too.

**Packet Communication Testing**

**Packet Communication Testing**

Application functions that use packet communication can be tested on a single platform by installing the application server in the MD8470A’s built-in PC. (Application servers can also be connected externally.) Furthermore, the user trace data can be saved when a packet communication test is performed.

**Caller ID Setting**

Each caller ID can be set for voice calling from the WNS Virtual Phone to the mobile terminal. (Normal Call/Call Waiting)

**Server Connection Example**

Using application server installed in MD8470A built-in PC

Connect Call Processing Ethernet to Ethernet (0 or 1) of MD8470A built-in PC

Using external application server

**Router Setting**

The MD8470A’s router connection function supports packet transmission to a different subnet via a router.
Dormant, Session Close Testing

WNS makes it easy to perform both switching to dormant status and the 1xEV-DO session close operation during packet communications. In addition, automated execution using a timer is supported.

Continuous SMS Sending Function

The Continuous Delivery Setup function supports continuous delivery of multiple messages from the SMSC to the mobile in a single procedure. This function allows users to perform message memory full and stress testing by a simple operation.

SMS Testing

SMS Testing

Using the SMSC (SMS Center) software to simulate SMS (Short Message Service) supports SMS transmission/reception and SMS loopback tests. The SMSC software has a simple GUI for creating and sending text SMS (7-bit ASCII, Unicode, Shift-JIS) and binary SMS messages. The GUI also supports checking the content of messages received from mobile terminal.

SMS External Interface

SMS Reception Interface

Using the SMS reception interface supports SMS sending from an external application. When used in combination with an external application, both WAP Push and MMS tests are supported.

SMS Forward Interface

This Signalling Tester transfers SMS received from a mobile terminal automatically to the SMSC with the specified IP address. End-to-End MS Tests are supported using two MD8470A units. SMS loopback tests are supported by specifying a local host.
MMS Testing

MMS Testing using Application Server

Combining the separate MMSC (MMS Center) application server and SMSC (SMS Center) supports testing of the MMS Submit and MMS Notification/MMS Retrieval functions. Additionally, when the MMSC software is installed in the MD8470A, MMS testing can be performed on one unit.

*: Requires separate MMS application server

Service Interruption Testing

Service Interruption Testing

The behavior of applications during service interruptions can be evaluated by using WNS to simulate interactive base station operations such as incoming voice or video calls during packet communication, or SMS/MMS reception during voice calls, video calls, or packet communication.

Service Interruption Test Examples

<table>
<thead>
<tr>
<th>Status</th>
<th>Voice Call Interruption</th>
<th>SMS Interruption</th>
<th>MMS Interruption</th>
</tr>
</thead>
<tbody>
<tr>
<td>During Voice Call</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>During Packet Communication</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

*: Testable
Other

Setting BS Tx Power and Out-of-Range (Lost Network) Test

During simulation using WNS, the Tx power for both 1X and 1xEV-DO base stations can either be switched in real time or set to OFF. As a result, Hand down/Hand up tests during packet communications, lost network (out-of-range) tests during voice communications, etc., can be performed intuitively.

Access Control Tests

The access control status can be simulated by setting PSIST (1X, 1xEV-DO), and ACCT (1X).

Non-Responsive Base Station Test

The failure of a base station to respond to a message from a mobile terminal can be simulated.

MX847031A CDMA2000 AppEase

For Efficient Network Simulation Including Handoff and Automation

The CDMA2000 AppEase software application provides flexible simulation of various network conditions by setting various parameters. Various handoff tests, hybrid operation tests, system determination, etc., can be performed easily in multi-sector and multi-carrier environments. Each function is remotely controlled using APIs, offering strong support for automating test systems.

- Supports communication functions, such as voice, packets, SMS/EMS/MMS, etc.
- Supports handoff tests, such as Soft, Hard, Idle, etc., as well as 1X/1xEV-DO hybrid operation tests.
- Supports throughput performance tests for high-speed packets.
- Supports test system automation using APIs.
- Provides integrated simulation environment, including PPP, Mobile IP.

*: Read the MX847031A catalog for details.

MX702600B CDMA2000 Scenario Composer

For Rigorous Verification of Protocol Behavior

The MX702600B Scenario Composer software is for editing protocol sequence in ladder diagram format to create test cases required to test CDMA2000 terminal protocol. Test sequences emulating quasi-normal and abnormal conditions are easily created by simple operations, greatly cutting times needed for development of test sequences for improving connection quality. Various functions support efficient editing and modification operation.

- Offers flexible setting for 1X sectors and 1xEV-DO sectors as well as channel configuration in accordance with the test objectives.
- Supports editing and setting of Overhead Messages for each sector.
- Supports editing of transmitted and received protocol message.
- Supports definition of network operations, including PPP sequence.
- Offers easy test sequence re-use using copy and paste functions.

*: Read the MX702600B catalog for details.
Hardware

- **CDMA2000 1X Signalling Unit (MU847030A)**
  This hardware unit simulates operation of CDMA2000 1X base stations.

- **CDMA2000 1xEV-DO Signalling Unit (MU847032A)**
  This hardware unit simulates operation of CDMA2000 1xEV-DO base stations.

- **Second RF Option (MD8470A-01/02)**
  This hardware unit supports simulation using two RF signals. This hardware option is required when testing using one unit in either a 1X/1xEV-DO hybrid environment or a multi-sector/multi-carrier environment.

Software

- **CDMA2000 Simulation Kit (MX847030A)**
  This software is required for CDMA2000 simulation. It includes the scripting interface, control software for script execution and tracing/analysis, sample scenarios for basic call processing, and user manuals.

- **Multi Sector/Multi Carrier (MX847030A-01)**
  This software is required for performing handoff tests under conditions emulating multi-carriers (2 max.) and multi-sectors (1X: 6 max; 1xEV-DO: 3 max).

- **CDMA2000 AppEase (MX847031A)**
  This software supports basic call processing and various handover tests in a multi-sector/multi-carrier environment. In addition to setting various network parameters at the GUI, an automated test system is easily configured using the Anritsu-provided AppEase API.

- **CDMA2000 Scenario Composer (MX702600B)**
  This software increases the productivity of test scenario creation and editing. Test sequences created using the editor can be converted to Perl test sequences and output for execution at the MX847030A.

**Configurations**

<table>
<thead>
<tr>
<th>Configuration</th>
<th>MU847030A 1X Signalling Unit</th>
<th>MU847032A 1xEV-DO Signalling Unit</th>
<th>MD8470A-01/02 Second RF Option</th>
<th>MX847030A CDMA2000 Simulation Kit</th>
<th>MX847030A-01 Multi Sector/Multi Carrier</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDMA2000 1X Test Configuration</td>
<td>Required</td>
<td></td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>CDMA2000 1X + Multi Sector/Multi Carrier Test Configuration</td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>CDMA2000 1X/1xEV-DO Test Configuration</td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
</tr>
<tr>
<td>CDMA2000 1X/1xEV-DO + Multi Sector/Multi Carrier Test Configuration</td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
<td>Required</td>
</tr>
</tbody>
</table>

- **CDMA2000 1X Test Configuration**: Simulate CDMA2000 1X with one carrier and one sector
- **CDMA2000 1X + Multi Sector/Multi Carrier Test Configuration**: Simulate CDMA2000 1X with multi carrier and multi sectors
- **CDMA2000 1X/1xEV-DO Test Configuration**: Simulate CDMA2000 1X/1xEV-DO with one carrier and one sector
- **CDMA2000 1X/1xEV-DO + Multi Sector/Multi Carrier Test Configuration**: Simulate CDMA2000 1X/1xEV-DO with multi carrier and multi sectors

Software Maintenance Contract

- **MX847030A Support Service (1 year) (MX847030A-20)**
  This contract supports user troubleshooting and software maintenance releases. It is the software maintenance contract for the MX847030A.

- **MX847031A Support Service (1 year) (MX847031A-20)**
  This contract supports user troubleshooting and software maintenance releases. It is the software maintenance contract for the MX847031A.

- **MX702600B Support Service (1 year) (MX702600B-SS110)**
  This contract supports user troubleshooting and software maintenance releases. It is the software maintenance contract for the MX702600B.
Panel Layout

1. Power switch
   Switches mode between power-on (On) and standby (Stby)

2. [RF Main] Main input/output connector
   Main N-type input/output connector

3. [RF Aux1] Aux1 input/output connector
   Auxiliary N-type input/output connector

4. [RF Aux2] Aux2 input/output connector
   Auxiliary N-type input/output connector

5. Left key
   Performs same operation as left mouse click

6. Right key
   Performs same operation as left mouse click

7. [Pointer] Pointer
   Moves screen pointer

8. Cursor key
   Performs same operation as keyboard cursor key

9. Enter key
   Performs same operation as keyboard Enter key

10. Off-Hook key
    Performs same Off-Hook operation as Shift + Ctrl + F1 on keyboard

11. On-Hook key
    Performs same On-Hook operation as Shift + Ctrl + F2 on keyboard

12. Previous key
    Moves cursor to item before current selection in same operation as Shift + Tab on keyboard

13. Next key
    Moves cursor to item after current selection in same operation as Tab on keyboard

14. Help key
    Displays on-screen Help window in same operation as F1 on keyboard

15. Keyboard key
    Displays on-screen keyboard

16. Extender key
    Changes keyboard key functions to descriptions in blue while key lamp lit

17. BackSpace key
    Deletes previous letter in same operation as BackSpace on keyboard

18. Ten keys
    Input numeric values for parameters and A to F in hexadecimal

19. [HDD] Hard disk access lamp
    Lights during main-frame HDD access

20. [Handset] Handset connector
    Handset (standard accessory) connector
    (Not supported for CDMA2000)

21. [USB] USB connector
    USB connector for USB1.1 devices

22. [PCMCIA] PCMCIA slot
    Slot for Type I or II PCMCIA memory card
### [Trigger I/O Input] Trigger input connector
BNC connector for trigger signal from external devices and mobile terminal transmission measurement in sync with external devices

### [Trigger I/O Output] Trigger output connector
BNC connector for event timing output to external devices

### [Call Proc Timing I/O A to D] Timing input/output port for call processing
Mini D-sub 15-pin connector for call processing

### [Call Proc Serial I/O A to D] Serial input/output port for call processing
D-sub 9-pin connector for call processing

### [10 MHz Ref Input] Reference signal input connector
BNC connector for external reference signal input

### [10 MHz Buff Output] Reference signal output connector
BNC connector for built-in reference signal output

### [PCMCIA] PCMCIA slot
Slot for Type I or II PCMCIA memory card

### [Call Proc Ethernet A to D] Ethernet input/output port for call processing
RJ-45 connector and Ethernet port for call processing for packet communications, etc.

### [ISDN 0] ISDN 0 port
RJ-45 connector for ISDN for video call test, etc. (BRI) <Option>

### [ISDN 1] ISDN 1 port
Reserved

### [Keyboard] Keyboard
Keyboard connector (standard accessory)

### [Mouse] Mouse
Mouse connector (standard accessory)

### [Headphone] Headphone
Headphone connector for 3.5-mm mini-jack

### [Microphone] Microphone
Microphone connector for 3.5-mm mini-jack

### [VGA] VGA connector
Mini D-sub 15-pin connector for external monitor

### [USB] USB connector
USB connector for USB 2.0/1.1 devices

### [Ethernet 0] Ethernet 0 port
Ethernet port for built-in PC

### [Ethernet 1] Ethernet 1 port
Ethernet port for built-in PC

### [RS-232C] RS-232C port
D-sub 9-pin connector for external PC

### Main power switch
Switches main power on and off; front-panel Power switch enters Stby mode while main power on
Specifications

MD8470A Signalling Tester

Transmitter Characteristic
- Frequency range: 400 to 2700 MHz
- Frequency setting resolution: 100 Hz
- Output level range: –120 to –19 dBm (RF Main), –106 to –4 dBm (RF Aux1 when Tx mode)
- Level setting resolution: 0.1 dB
- Output level accuracy: ±3 dB (Output level: ≥–50 dBm, +18 to +28˚C)
- Modulation accuracy: ≤7%rms (when MU847010A/B is mounted)
- Phase error: ≤4˚rms (when MU847020A/B is mounted)

Receiver Characteristic
- Frequency range: 400 to 2700 MHz
- Frequency setting resolution: 100 Hz
- Maximum input level: +34 dBm (Average)
- Reference setting range: –30 to +20 dBm (RF Main)

External Interface
- RF Main/RF Aux1/RF Aux2: N type connector, Impedance: 50 Ω
- Trigger I/O: BNC connector, TTL, Event trigger input/output
- Call Proc. Timing I/O A to D: Mini D-Sub 15-pin connector, TTL, Timing signal for call processing
- Call Proc. Serial I/O A to D: D-Sub 9-pin connector, RS-232C, Serial interface for data communications
- Call Proc. Ethernet A to D: RJ-45 connector, 10BASE-T, Ethernet interface for data communications
- ISDN 0/1: RJ-45 connector (Option), ISDN interface for data communications (I.430), ISDN1 is reserved
- Handset: Modular jack, Handset interface (incl. the dedicated handset)

Reference Oscillator
- 10 MHz Buff Output
  - Frequency: 10 MHz
  - Level: TTL level
  - Connector: BNC type
  - Startup characteristics: ≤±5 x 10^-8 (5 minutes after power-on, reference to 24 hours after power-on)
  - Aging rate: ≤±1 x 10^-9/day, ≤±1 x 10^-7/year (reference to 24 hours after power-on)
  - Temperature characteristics: ≤±2 x 10^-8

External Reference Input
- 10 MHz Ref Input
  - Frequency: 10 MHz (±0.5 ppm)
  - Level: ≥0 dBm
  - Impedance: 50 Ω
  - Connector: BNC Type

Built-in Personal Computer
- OS: Windows XP Professional operating system
- CPU: Mobile Intel Pentium 4 processor 1.7 GHz
- HDD: 40 GB
- Memory: 512 MB

User Interface
- Display: Color TFT LCD monitor, 10.4 inch, XGA
- Headphone: 3.5-mm headphone jack
- Microphone: 3.5-mm microphone jack
- USB: USB1.1 (Front panel), USB2.0/1.1 (Rear panel)
- RS-232C: D-Sub 9-pin connector
- PCMCIA: Type I, II compliant (Front/Rear panel)
- Keyboard: PS/2
- Mouse: PS/2
- VGA: Mini D-Sub 15-pin connector
- Ethernet 0/1: RJ-45 connector (10BASE-T/100BASE-TX)

Dimensions
- 426 (W) x 221.5 (H) x 281 (D) mm  +Excluding protrusions

Mass
- ≤17 kg (when all options)

Power Supply
- 100 to 120 V/200 to 240 Vac (−15%/+10%, Max: 250 V), 47.5 to 63 Hz, ≤300 VA

Operating Temperature
- +5 to +40˚C, Humidity ≤85% (no condensation)

Storage Temperature
- –20 to +65˚C, Humidity ≤95% (no condensation)

EMC
- EN61326, EN61000-3-2

LVD
- EN61010-1

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# Ordering Information

Please specify the model/order number, name and quantity when ordering. The following names are used for orders; the actual product names may be different.

<table>
<thead>
<tr>
<th>Model/Order No.</th>
<th>— Main frame —</th>
<th>— Standard accessories —</th>
<th>— Units / Options —</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD8470A</td>
<td>Signalling Tester</td>
<td>Power Cord, 2.6 m</td>
<td>MD8470A-01/02</td>
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<tr>
<td>Z0741</td>
<td>MD8470A Operation Manual (CD-ROM)</td>
<td>Keyboard (Japanese or English)*</td>
<td>CDMA2000 1X Signalling Unit</td>
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<td></td>
<td>G0134 Mouse</td>
<td>CDMA2000 1xEV-DO Signalling Unit</td>
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<td>A0013 Handset</td>
<td>Z0714 English OS Option</td>
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<td>MX847000A Platform Software</td>
<td>Z0715 Japanese OS Option</td>
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<td>— Software —</td>
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<td>MX847031A</td>
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<td>MX702600B</td>
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* : Selected by Z0714 or Z0715 OS option

<table>
<thead>
<tr>
<th>Model/Order No.</th>
<th>— Support service —</th>
<th>Name</th>
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<tbody>
<tr>
<td>MX847030A-20</td>
<td>MX847030A Support Service (1 year)</td>
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<tr>
<td>MX847031A-20</td>
<td>MX847031A Support Service (1 year)</td>
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<tr>
<td>MX702600B-SS10</td>
<td>MX702600B Support Service (1 year)</td>
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<tr>
<th>Model/Order No.</th>
<th>— Application parts —</th>
<th>Name</th>
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<tbody>
<tr>
<td>J1261A</td>
<td>Ethernet Cable (Shield type, Straight), 1 m</td>
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<tr>
<td>J1261B</td>
<td>Ethernet Cable (Shield type, Straight), 3 m</td>
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<tr>
<td>J1261C</td>
<td>Ethernet Cable (Shield type, Cross), 1 m</td>
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<tr>
<td>J1261D</td>
<td>Ethernet Cable (Shield type, Cross), 3 m</td>
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<tr>
<td>J1262A</td>
<td>RS-232C Cable (Straight), 2 m</td>
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<tr>
<td>J1262B</td>
<td>RS-232C Cable (Cross), 2 m</td>
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<td>J0576B</td>
<td>Coaxial Cord (N-P · 5D-2W · N-P), 1 m</td>
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<td>J0576D</td>
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<td>N-SMA Adapter</td>
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<td>J0658</td>
<td>Adapter (SMA, L Type)</td>
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<td>MN8110B + Inch Screw Cable</td>
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<td>J1287</td>
<td>HDD-SUB15P Cable (Milli-Inch)</td>
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<tr>
<td>J1333A</td>
<td>HDD-SUB15P Cross Cable (Inch)</td>
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