MD8470A

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

Anritsu

CDMA2000
1X/1xEV-DO Revision A

Excellent Eco Product

On-the-Bench Global Mobile Communications Network for Wireless Application Developers

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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MD8470A
Signalling Tester

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.

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.

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.

MX847030A CDMA2000 Simulation Kit

## 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.
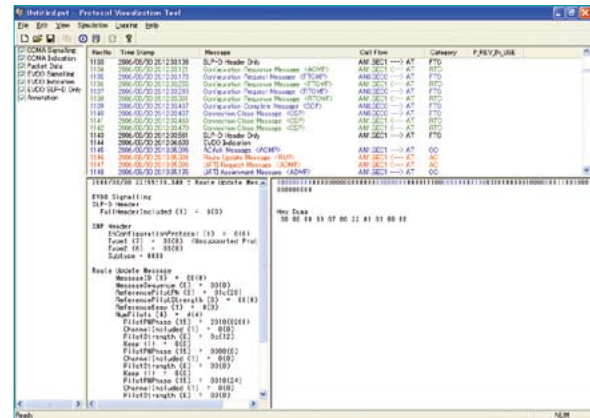
Simulation control software (Protocol Visualization Tool)

● **MX847030A CDMA2000 Simulation Kit, MU847030A CDMA2000 1X Signalling Unit, MU847032A CDMA2000 1xEV-DO Signalling Unit**

1X	Transmitter characteristics	Frequency range: 400 to 2700 MHz Frequency setting resolution: 100 Hz Channel∗: Sync, Pilot, PCH, BCCH, CCCH, FCH, DCCH, SCH, QPCH, OCNS, SCCH Channel level setting range: –30 to 0 dB, 0.25-dB step (Relative level for Ior) 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∗: ACH, EACH, FCH, DCCH, SCH, SCCH
	Applied standard	CDMA2000 1X Release 0, A, C
	Protocol revision	PREV6, PREV7, PREV9/10 (non-EVDV)
	Service options	SO1, SO3 (EVRC), SO6 (SMS), SO14, SO15 (LSPD), SO25 (FCH), SO33 (HSPD), SO36, SO68 (EVRC-B), SO32768
	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
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.

Max. configuration with one set
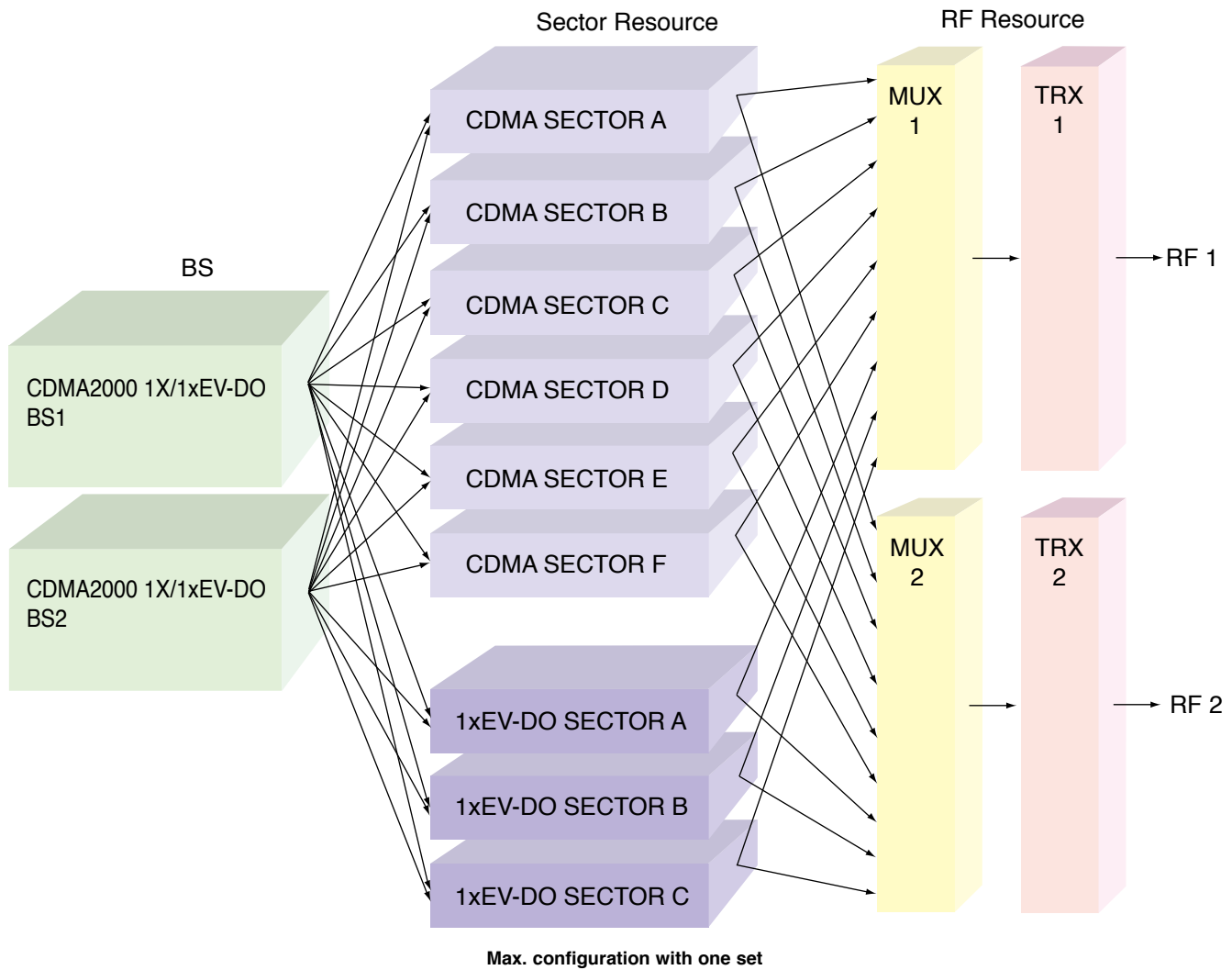
Easy Application Testing

WNS: Wireless Network Simulator

The Wireless Network Simulator (WNS) application software simulates interactive base station operations on the MD8470A Signalling Tester[*1].

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.
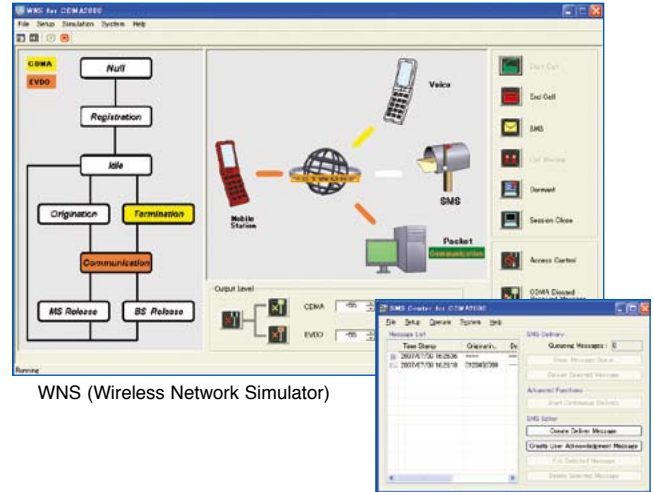
The call status is displayed graphically and calling and answering operations are performed at a virtual terminal.

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[*2].

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

WNS (Wireless Network Simulator)

SMSC (SMS Center)

Main WNS/SMSC Functions[*3]

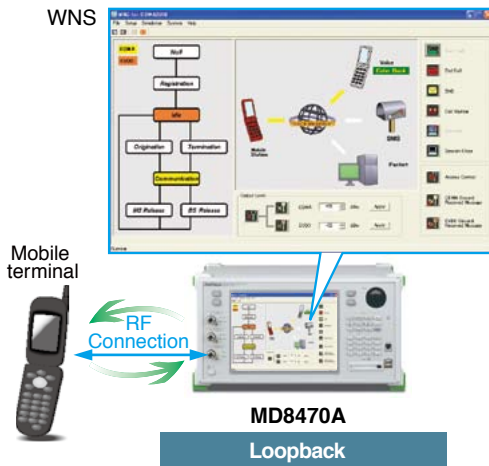| Bearer	CDMA2000 1X/1xEV-DO	• Voice Call (Call/Answer), Packet Communications
Setting Parameters	Common	• IP Address Setting (Client/1X/1xEV-DO)
	1X	• Band Class Setting • Channel Setting • SID/NID Setting • Physical Channel Setting • Dormant Timer Setting • Packet Connection Release Timer Setting
	1xEV-DO	• Band Class Setting • Channel Setting • Sector ID Setting • Dormant Timer Setting • Packet Connection Release Timer Setting • Session Close Timer Setting
	SMS	• Communications Setting (Paging Channel, Traffic Channel)
	Mode	• Simulation Setting (1X Only, 1xEV-DO Only, 1X/1xEV-DO Hybrid)
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[*4] • Connection Status Transition Display/Attach Status Display • Base Station Tx Power Setting (1-dB steps) • Access Control Function (PSIST/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

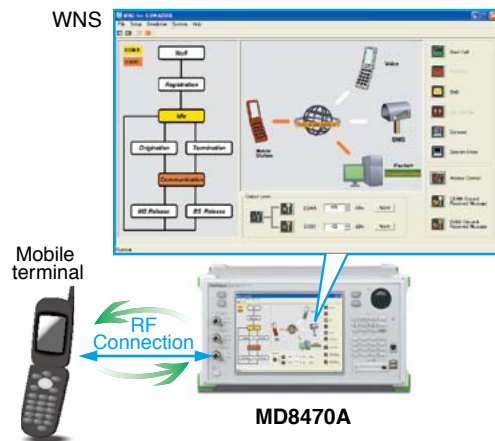Using the WNS supports loopback testing by looping-back voice data. Additionally, both call waiting and multi party calls are supported too.

WNS

Mobile terminal

RF Connection

MD8470A

Loopback

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)

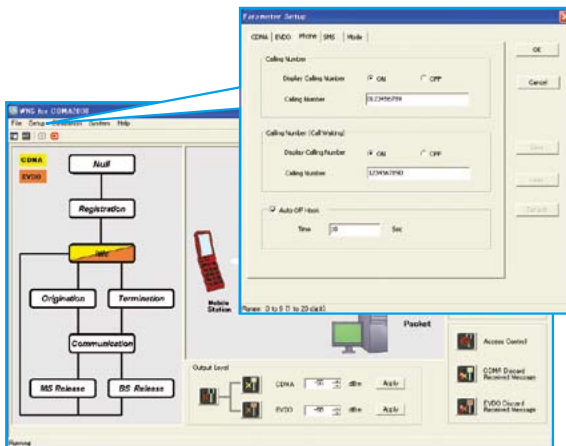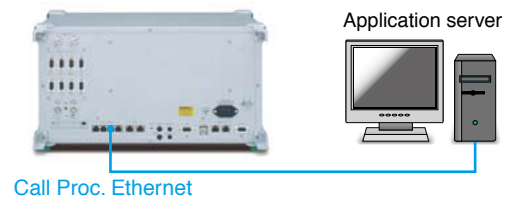# Packet Communication Testing

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.

WNS

Mobile terminal

RF Connection

MD8470A

Server Connection Example

Using application server installed in MD8470A built-in PC

Connect Call Processsing Ethernet to Ethernet (0 or 1) of MD8470A built-in PC
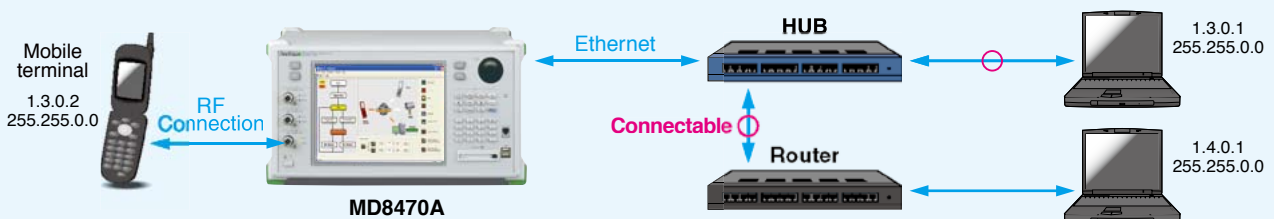
**Using external application server**

Application server

Call Proc. Ethernet

Router Setting

The MD8470A's router connection function supports packet transmission to a different subnet via a router.

Mobile terminal
1.3.0.2
255.255.0.0

RF Connection

MD8470A

Ethernet

HUB

Connectable

Router

1.3.0.1
255.255.0.0

1.4.0.1
255.255.0.0

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.

**Dormant**

Session Close
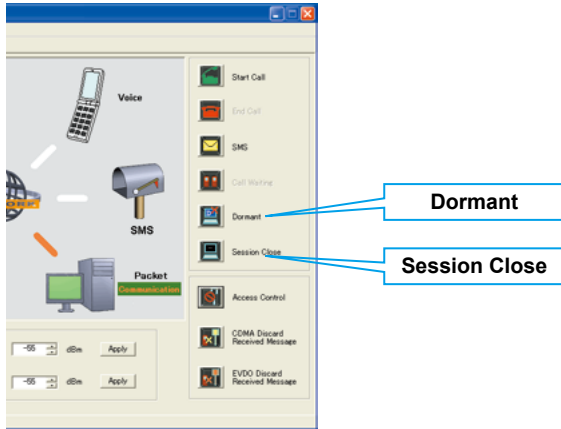
SMS Testing

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.

SMSC
(SMS Center)

Mobile
terminal

RF
Connection

WNS

MD8470A
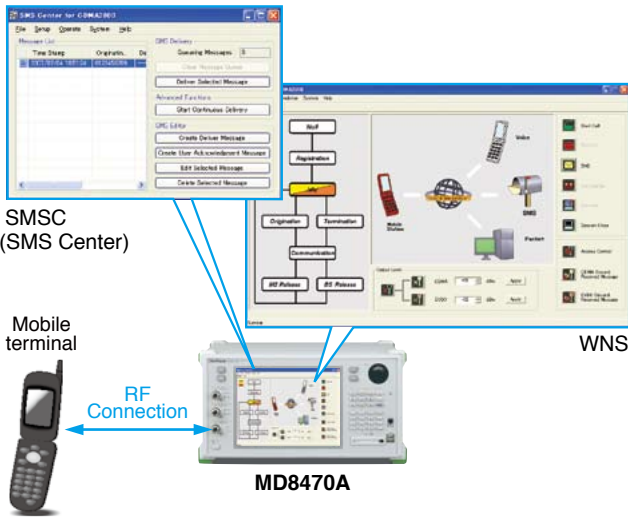
Continuous SMS Sending Function

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.

Mobile
terminal

RF
Connection

MD8470A
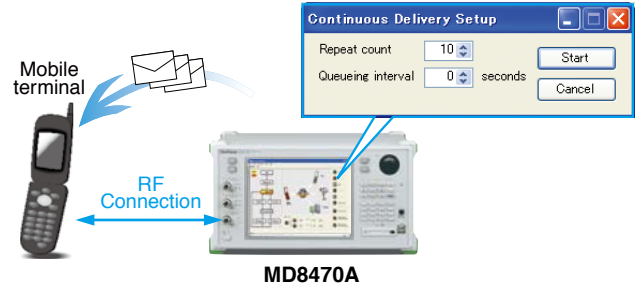
SMS External Interface

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.

Mobile
terminal

RF
Connection
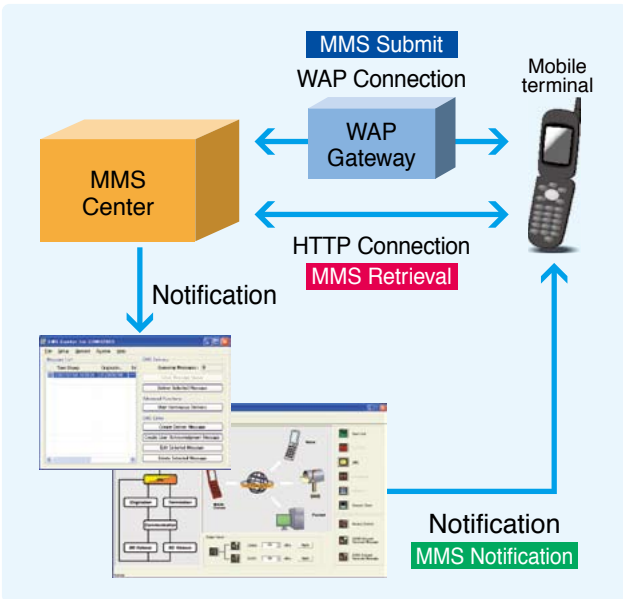
MD8470A

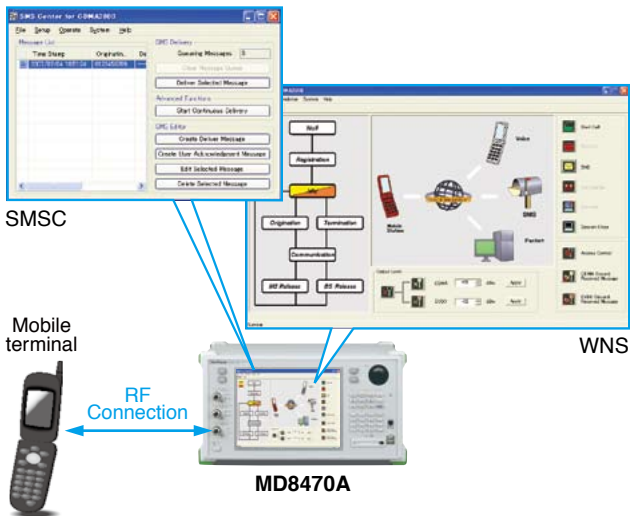HTTP I/F

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

SMSC

Mobile terminal

RF Connection

WNS

MD8470A

MMS Submit
WAP Connection
Mobile terminal

WAP Gateway

MMS Center

HTTP Connection
MMS Retrieval

Notification

Notification
MMS Notification

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

Interruption / Status	Voice Call Interruption	SMS Interruption	MMS Interruption
During Voice Call	√	√	√
During Packet Communication	√	√	√

√: Testable

WNS

Mobile terminal

RF Connection

MD8470A
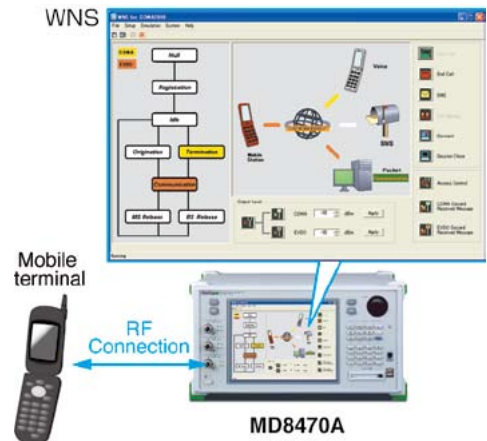
Other

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.
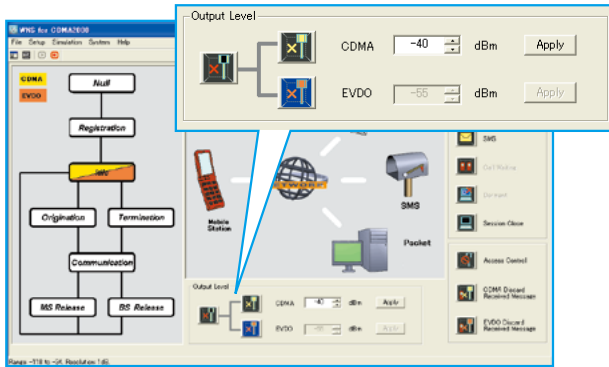
Access Control Tests

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.
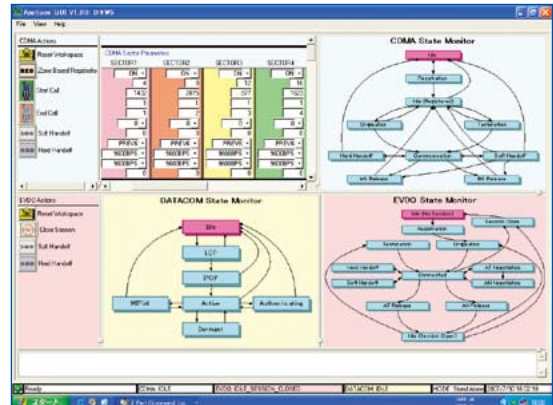

- Supports communication functions, such as voice, packets, SMS/EMS/MMS, etc.
- Supports handoff tests, such as Soft, Hard, Idle, etc., as well as 1X/1xEV-DO hybrid operation tests.
- Supports throughput performance tests for high-speed packets.
- Supports test system automation using APIs.
- Provides 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.
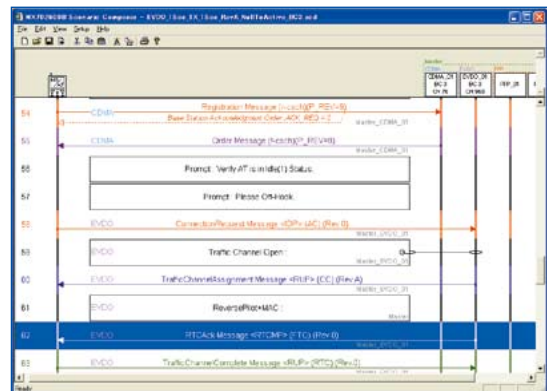
- Offers flexible setting for 1X sectors and 1xEV-DO sectors as well as channel configuration in accordance with the test objectives.
- Supports editing and setting of Overhead Messages for each sector
- Supports editing of transmitted and received protocol message
- Supports definition of network operations, including PPP sequence.
- Offers easy test sequence re-use using copy and paste functions.
- ∗: Read the MX702600B catalog for details.

Units/Options/Software

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.
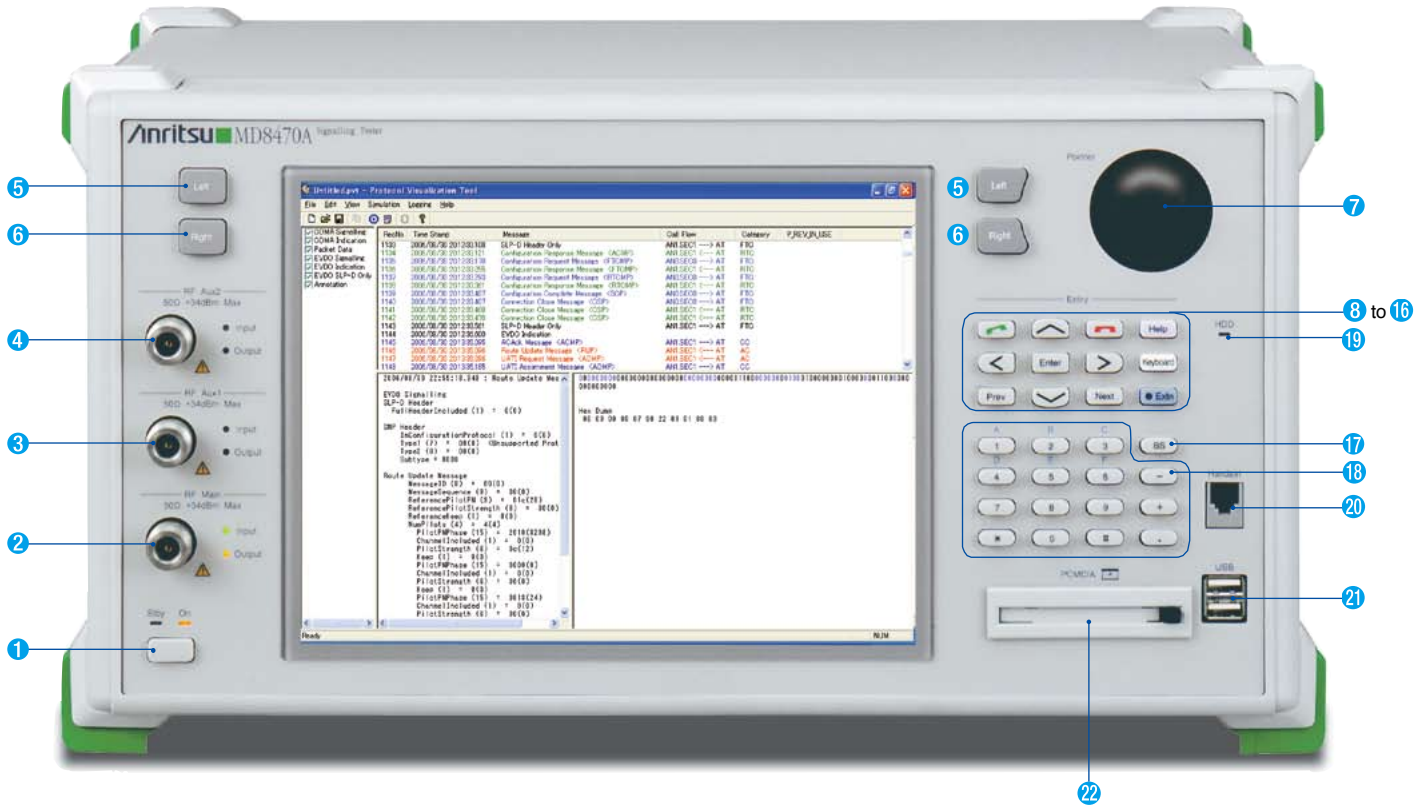
Software Maintenance Contract

● **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.

● **Configurations**

Units/Options/Software ⟍ Configuration	MU847030A CDMA2000 1X Signalling Unit	MU847032A CDMA2000 1xEV-DO Signalling Unit	MD8470A-01/02 Second RF Option	MX847030A CDMA2000 Simulation Kit	MX847030A-01 Multi Sector/ Multi Carrier
CDMA2000 1X Test Configuration	Required			Required	
CDMA2000 1X + Multi Sector/ Multi Carrier Test Configuration	Required		Required	Required	Required
CDMA2000 1X/1xEV-DO Test Configuration	Required	Required	Required	Required	
CDMA2000 1X/1xEV-DO + Multi Sector/ Multi Carrier Test Configuration	Required	Required	Required	Required	Required

• 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

Panel Layout

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

❷ [RF Main] Main input/output connector
Main N-type input/output connector

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

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

❺ Left key
Performs same operation as left mouse click

❻ Right key
Performs same operation as left mouse click

❼ [Pointer] Pointer
Moves screen pointer

❽ Cursor key
Performs same operation as keyboard cursor key

❾ Enter key
Performs same operation as keyboard Enter key

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

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

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

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

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

⓯ Keyboard key
Displays on-screen keyboard

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

⓱ BackSpace key
Deletes previous letter in same operation as BackSpace on keyboard

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

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

⓴ [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
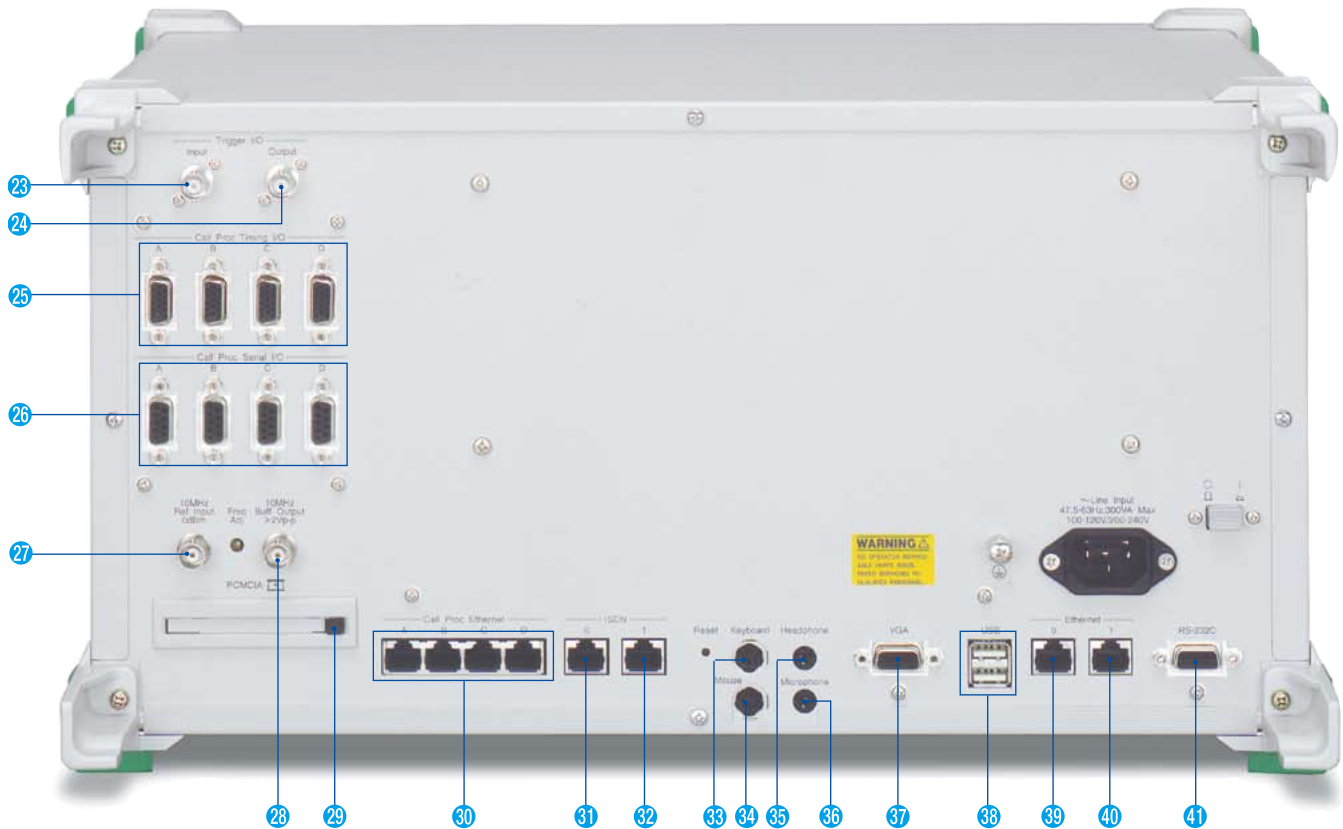
㉓ [Trigger I/O Input] Trigger input connector
BNC connector for trigger signal from external devices and mobile terminal transmission measurement in sync with external devices

㉔ [Trigger I/O Output] Trigger output connector
BNC connector for event timing output to external devices

㉕ [Call Proc Timing I/O A to D] Timing input/output port for call processing
Mini D-sub 15-pin connector for call processing

㉖ [Call Proc Serial I/O A to D] Serial input/output port for call processing
D-sub 9-pin connector for call processing

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

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

㉙ [PCMCIA] PCMCIA slot
Slot for Type I or II PCMCIA memory card

㉚ [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.

㉛ [ISDN 0] ISDN 0 port
RJ-45 connector for ISDN for video call test, etc. (BRI) <Option>

㉜ [ISDN 1] ISDN 1 port
Reserved

㉝ [Keyboard] Keyboard
Keyboard connector (standard accessory)

㉞ [Mouse] Mouse
Mouse connector (standard accessory)

㉟ [Headphone] Headphone
Headphone connector for 3.5-mm mini-jack

㊱ [Microphone] Microphone
Microphone connector for 3.5-mm mini-jack

㊲ [VGA] VGA connector
Mini D-sub 15-pin connector for external monitor

㊳ [USB] USB connector
USB connector for USB 2.0/1.1 devices

㊴ [Ethernet 0] Ethernet 0 port
Ethernet port for built-in PC

㊵ [Ethernet 1] Ethernet 1 port
Ethernet port for built-in PC

㊶ [RS-232C] RS-232C port
D-sub 9-pin connector for external PC

㊷ 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 −18 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^{-8}/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 ≤95% (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.

Model/Order No.	Name
	— Main frame —
MD8470A	Signalling Tester
	— Standard accessories —
	Power Cord, 2.6 m
Z0741	MD8470A Operation Manual (CD-ROM)
	Keyboard (Japanese or English)∗
G0134	Mouse
A0013	Handset
MX847000A	Platform Software
	— Units / Options —
MD8470A-01/02	Second RF Option
MU847030A	CDMA2000 1X Signalling Unit
MU847032A	CDMA2000 1xEV-DO Signalling Unit
	(requires MD8470A-01/02, MU847030A)
Z0714	English OS Option
Z0715	Japanese OS Option
Z0716A/B	Retrofit Option
MD8470A-90	Extended Three Year Warranty Service
MD8470A-91	Extended Five Year Warranty Service
	— Software —
MX847030A	CDMA2000 Simulation Kit (require MU847030A)
MX847030A-01	Multi Sector/Multi Carrier
	(requires MD8470A-01/02, MU847030A, MX847030A)
MX847031A	CDMA2000 AppEase (requires MU847030A, MX847030A)
MX702600B	CDMA2000 Scenario Composer
Z0728	Software Installation Kit

∗: Selected by Z0714 or Z0715 OS option

Model/Order No.	Name
	— Support service —
MX847030A-20	MX847030A Support Service (1 year)
MX847031A-20	MX847031A Support Service (1 year)
MX702600B-SS110	MX702600B Support Service (1 year)
	— Application parts —
J1261A	Ethernet Cable (Shield type, Straight), 1 m
J1261B	Ethernet Cable (Shield type, Straight), 3 m
J1261C	Ethernet Cable (Shield type, Cross), 1 m
J1261D	Ethernet Cable (Shield type, Cross), 3 m
J1262A	RS-232C Cable (Straight), 2 m
J1262B	RS-232C Cable (Cross), 2 m
J0576B	Coaxial Cord (N-P · 5D-2W · N-P), 1 m
J0576D	Coaxial Cord (N-P · 5D-2W · N-P), 2 m
J0127A	Coaxial Cord (BNC-P · RG58A/U · BNC-P), 1 m
J0127B	Coaxial Cord (BNC-P · RG58A/U · BNC-P), 2 m
J1264	N-SMA Adapter
J1265	Adapter (Serial Connector)
J0658	Adapter (SMA, L Type)
B0543	Carrying Case
B0329D	Front Cover for 1MW 5U
Z0749	MN8110B + Inch Screw Cable
J1287	HDD-SUB15P Cable (Milli-Inch)
J1333A	HDD-SUB15P Cross Cable (Inch)

Anritsu

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

• **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
Unit No. S-3, Second Floor, Esteem Red Cross Bhavan,
No. 26, Race Course Road, Bangalore 560 001, India
Phone: +91-80-32944707
Fax: +91-80-22356648

• **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 1515, Beijing Fortune Building,
No. 5, Dong-San-Huan Bei Road,
Chao-Yang District, Beijing 10004, 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:

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