

MD8475A

Signalling Tester

MX847570A SmartStudio

LTE FDD/W-CDMA/GSM/CDMA2000

Smart Studio



LTE/W-CDMA/CDMA2000/GSM Supports Global UE Networks with One Unit

Mobile phones are evolving quickly to high-speed communications based on the next-generation LTE standard. Many high-speed communication applications will be installed on Smartphones, driving increases in mobile service diversification.

In addition, W-CDMA and CDMA2000 based technologies have become the de facto world standard.

The MD8475A Signalling Tester is a simple bench-top solution helping engineers test and evaluate worldwide mobile systems in the shortest possible time.

Furthermore, a setup of a base station and the check of a verification result can be easily performed by using the user interface "SmartStudio" which does not make it conscious of the scenario which was required for the base station simulator until now.

The logo for SmartStudio features the word "Smart" in a stylized, italicized font with three curved lines above it, followed by the word "Studio" in a bold, sans-serif font. The entire logo is underlined.

Flexible and Expandable Platform

Installing optional units and software in the MD8475A supports all-in-one testing of global systems, including LTE FDD, W-CDMA/HSPA, GSM/GPRS/EGPRS, and CDMA2000 1X/1xEV-DO Rev. A.

It is the perfect R&D solution for supporting various standards, such as triple-system LTE/W-CDMA/GSM/GPRS terminals, and hybrid LTE/CDMA2000 terminals.

Wide Frequency Bandwidth

The wide frequency range supports future expansion of frequencies.

Compact

The space-saving design makes it easy to configure a bench-top personal simulation environment.

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



Supports Various Interfaces

Various data communications are supported by the Gigabit Ethernet and handset interfaces.

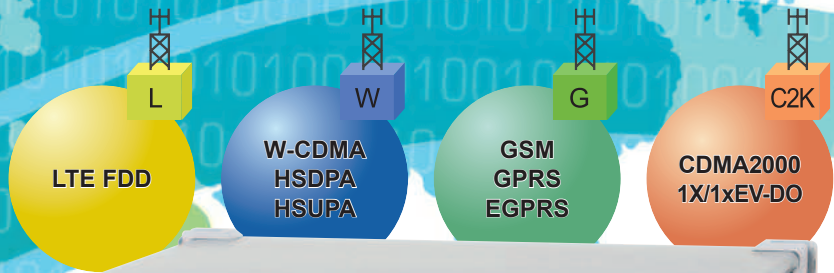
Supports Various Bearers

The bearers required for application R&D using data communications as well as a PPP server for IP networking are pre-installed.

Windows 7 Ultimate Installed

The built-in, high-end PC running Windows 7 Ultimate controls the simulation software without needing an external PC.

Windows® is a registered trademark of Microsoft Corporation in the USA and other countries.



SmartStudio

Scenario-less Test Environment Cuts Evaluation Times

Conventional Base station simulators require many scenarios to perform various tests, and creating as many scenarios as required tests takes time and skill. Moreover, newer multimedia mobiles require even more tests than seen before.



Display UE status as block chart

Change RF TRx power during tests

Simultaneous simulation for two different systems

The screenshot displays the SmartStudio interface with several key components:

- UE Status Flowchart:** A central flowchart showing the state transitions of a UE. States include Power Off, Detach, Registration, Idle, Origination, Termination, Communication, Handover, UE Release, and NW Release. The 'Communication' state is highlighted in orange.
- Power Setup [BTS1]:** A dialog box for adjusting power levels. It features sliders for Downlink Reference Power (ranging from -140 to -10 dBm) and Uplink Reference Power (ranging from -40 to 35 dBm).
- Simultaneous Simulation:** A panel showing simulation models (L01-W01, L01-G01) and a visual representation of two different systems (L and W) connected to a UE.
- UE Status Panel:** Displays real-time data for a UE (L01), including its current state (PS), cell (BTS1:Default Cell A), and various parameters like UE Category (5), Transmission Mode (1), and rates for DL and UL.
- PDN Information Table:** A table showing the configuration of multiple PDNs (Priority, Status, PDN Type, IP version, EBI/NSAPI, QCI, Linked EBI/NSAPI, UE Address).

Real-time display of system under test

The Sequence Log window provides a detailed view of the system's activity. It includes columns for Time Stamp, Direction, and Message. The messages show LTE cell information and power adjustments:

| Time Stamp | Direction | Message |
|------------|-----------|---|
| - | BTS1 | ***** LTE Cell Information ***** |
| - | None | Band = Band 1, DL Channel = 100 (2120.0MHz), UL Channel = 18100 (1830.0MHz), MOC=001, MNC=01F, MME Group ID = 32768, MME Code = 1, TAC = 1, Cell ID = 0, Bandwidth(DL) = 20MHz, Bandwidth(UL) = 20MHz, Integrity(AS/NAS) = Auto/Auto, Cell Barred = Not Barred, Access Class Cell Barred = Not Barred |
| 000:00:50 | BTS1 | DL Power = -40dBm started Attach |
| 000:00:50 | BTS1 | finished Attach |
| - | BTS1 | DL Power = -40dBm |
| - | BTS1 | DL Power = -40dBm |

The SmartStudio with easy-to-operate GUI supports an interactive test environment without scenarios, ranging from simple connection tests, such as voice and packet communications, to complex tests requiring scenarios, such as handover and multi-call tests. Eliminating the time-consuming work of scenario creation makes terminal evaluation easy and fast.

Change some settings during tests

The screenshot shows the main interface with categories for Voice, SMS, Video, and Packet. A detailed configuration window for 'Demo L-02C' is open, showing parameters for Common and LTE sections.

| Section | Parameter | Value | |
|-------------------------|--------------------|----------------------|-------|
| Common | Cell Name | Demo L-02C | |
| | DL Ref Power | -40 | |
| | UL Ref Power | 10 | |
| | MCC | | |
| | MNC | 01F | |
| | E-PLMN I | | |
| | Cell Bared | Not Bared | |
| | Access Class Bared | Not Bared | |
| | LTE | MME Group ID | 32769 |
| | | MME Code | 1 |
| TAC | | 1 | |
| E-UTRA Band | | Band1 | |
| Charinel (DL) | | 100 | |
| Frequency (DL) | | 2120.0 | |
| Channel (UL) | | Synchronizes with DL | |
| Frequency (UL) | | 1930.0 | |
| DL Bandwidth | | 20MHz | |
| UL Bandwidth | | SameAsDL | |
| Number of DL anterr | | 1 | |
| Transmission Mode | | TM1 | |
| Physical Cell ID | | 0 | |
| Packet Mode | | Manual | |
| MCS (DL) | | 23 | |
| MCS (UL) | 20 | | |
| N_RB (DL) | | | |
| N_RB (UL) | 80 | | |
| AS Integrity Algorithm | Auto | | |
| NAS Integrity Algorithm | Auto | | |

Cell Name
Length: 1 to 25
Input = ASCII

Sets call ID for voice termination

The Virtual Phone Setup dialog box is shown with the following settings:

- Phone ID: 0123456789
- Calling Mode: International, Show ID, Hide ID, Unknown ID, Pay Phone
- Auto Answer: (Answering Time: 5)
- SMS Loopback Phone ID: 001122334455
- SMS Access (w/CDMA, GSM/GPRS): CS, PS

SMS message (text, binary) editing/sending/receiving

The Anritsu - MX847501A SMS Centre - 1 interface shows a Message List and various control buttons:

- Message List:

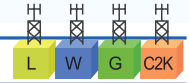
| Test Name | Time Stamp |
|-----------|--------------------|
| Test | 2011/05/06 14:56:5 |
- Buttons: Clear Sending Queue, Send Selected Message(s), Start Continuous Delivery, Create Text SMS, Create Binary SMS, Edit Selected Message(s), Delete Selected Message(s).

Presets up to 8 PDN

The PDN Parameter Setup dialog box is shown with the following settings:

- EBI/NSAPI: 5
- QCI: 9
- UE Address:
 - IPv4: 192.168.1.1
 - IPv6: FE80::C0A8:101
- DNS Address:
 - IPv4(Primary): 192.168.1.2
 - IPv4(Secondary): 192.168.1.2
 - IPv6: FE80::C0A8:102
- Access Point:
 - Depend on UE
 - Name: anritsu1.com

Applications

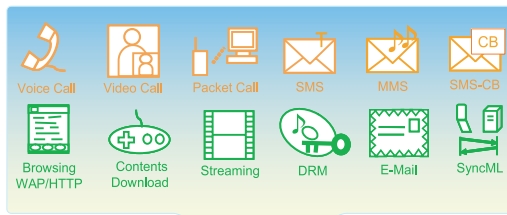


Packet Communication Test

Packet communications have become absolutely necessary for UEs. Conventionally, maximum throughput has been the mainstream test, but service diversification is making simple throughput tests inadequate for evaluating mobile performance. The all-in-one MD8475A makes it easy to configure a packet communications test environment. It also supports easy evaluation of applications and troubleshooting communication bottlenecks to help cut evaluation times.

Popular Server Environment

Because the MD8475A runs Windows 7, commercial application servers are easily installed.

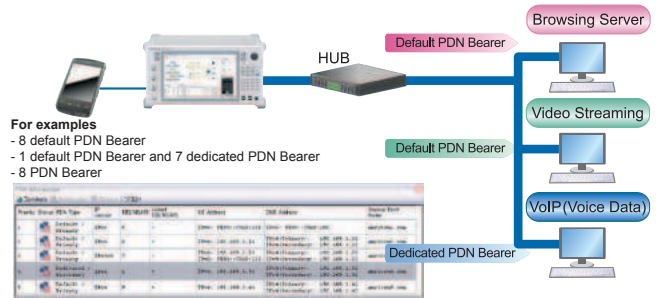


LTE + 2G/3G terminal

Tests using Multiple Servers

The SmartStudio can be installed in established test environments, which are becoming more complex as the number of applications increases. Up to eight PDN Bearer*2 can be set for simple configuration of a test environment supporting various applications.

*2: LTE only; W-CDMA and GSM support one PDN Bearer.
Not support for CDMA2000

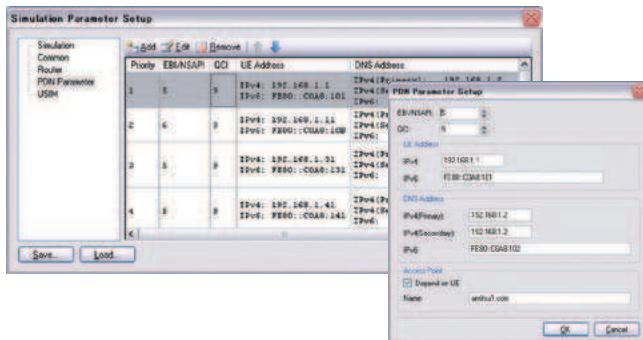


For examples
- 8 default PDN Bearer
- 1 default PDN Bearer and 7 dedicated PDN Bearer
- 8 PDN Bearer

Address Setting

The SmartStudio can set separate IPv4, IPv6*1, and Dual Stack*1 mobile addresses matching the test environment.

*1: Not support for CDMA2000



Status Evaluation

A line of function tools can be used to check communication status, including throughput. Simultaneous checking of multiple layers supports efficient troubleshooting during data communications.

Throughput Monitor*3
Checks data communications each layer for base station

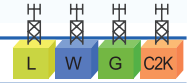
Counter*3
Displays detailed information, including ACK/NACK and MCS



RF Monitor*3
Displays TRx power for frequency and channels

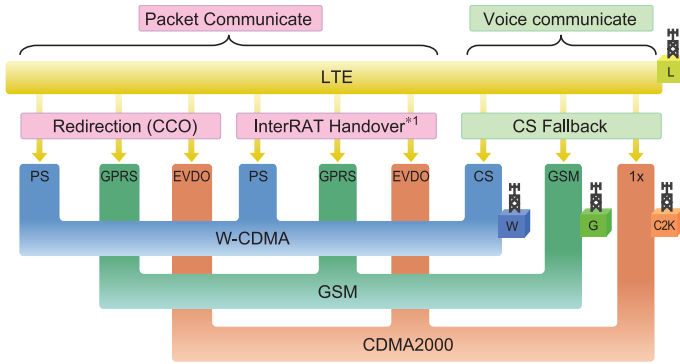


*3: Not support for CDMA2000



Handover Test

The Handover test is a key UE test conventionally requiring many instruments and time-consuming creation of scenarios for Handover tests between LTE and legacy systems. The SmartStudio scenario-less environment cuts test times for faster, more efficient measurements.



• Redirection (CCO: Cell Change Order)

In an LTE network, when a connected UE moves to another network system, Redirection disconnects the LTE network and re-connects to the other system.

• InterRAT Handover*

In an LTE network, when a connected UE moves to another network system, InterRAT Handover disconnects after performing connection processing with the other network system.

• CS Fallback

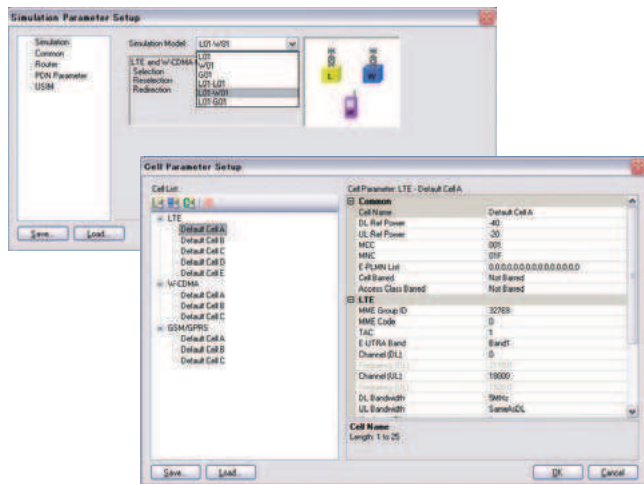
When a mobile connected to an LTE system makes or receives a voice call, CS Fallback is used to connect with other network systems.

*1: Future support

2-cell Test Environment

Combining the MD8475A-001 2nd RF and the MX847502A Multi-cell Software supports configuration of the 2-cell Test Environment*2 using SmartStudio. Since 32 types of BS setting can be saved for each system, testing is made easy simply by choosing preselected settings, which slashes test setup times.

*2: Not support for CDMA2000



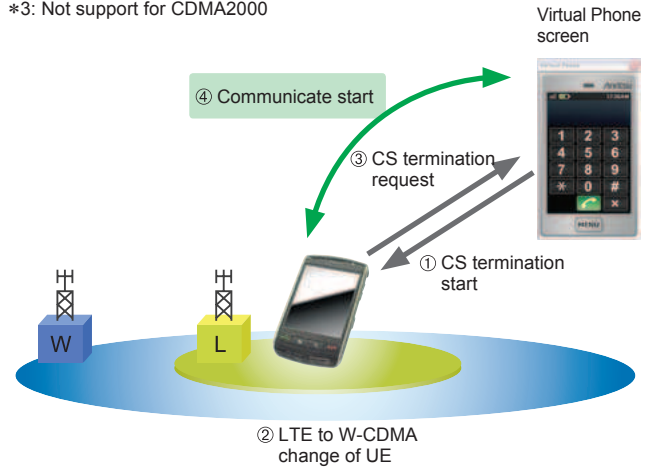
High Stability and High Reproducibility Test Environment

Unlike real networks where various external factors must be considered, the MD8475A assures configuration of a stable and reproducible test environment. Simply setting each communications test status and cell switching conditions assures stable and reliable tests of mobile QoS and connectivity while handing over between cells at any timing. Additionally, troubleshooting is easy because wireless protocols can be logged during testing.

CS Fallback Test

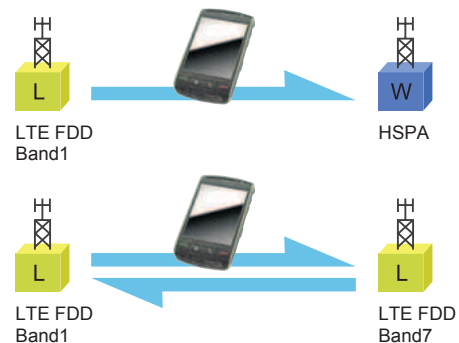
Simplifies CS Fallback test*3 settings, making tests intuitively easy even for end users.

*3: Not support for CDMA2000

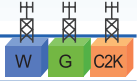


Network Service Connection Verification

When mobiles switch networks in the voice, packet, or multi-call status, this test verifies that the switch is performed as intended. It measures the packet throughput when switching between cells with different rates and supports mobile user interface evaluation, etc.



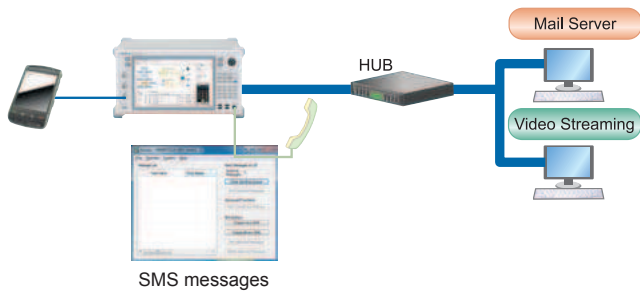
Voice Test, Multi-call Test



The voice communication test is a basic and mandatory test for UEs, which are now becoming more focused on multimedia packet communications. Consequently, it is no longer adequate to just test voice communications during packet communications and whether or not a call can be placed correctly while displaying Web search results. Instead, voice and other tests must be run while executing other operations. To support these needs, the SmartStudio can execute scenario-less packet tests and SMS tests during voice communications.

Scenario-less Test Environment

Testing voice and packet communications as well as SMS applications, etc., using simulators requires time-consuming creation of specialized scenarios. This problem is eliminated by using the SmartStudio supporting scenario-less testing.



W-CDMA

| Status \ Interruption | Voice Call Interruption | Video Call Interruption | SMS Interruption | MMS Interruption |
|-------------------------------|-------------------------|-------------------------|------------------|------------------|
| During Voice Call | | | ✓ | ✓ |
| During Packet Communication*1 | ✓ | ✓ | ✓ | ✓ |
| During Video Call | | | ✓ | ✓ |

✓: Testable

*1: Requires HSPA Software option (MX847510A-001) for HSPA

GSM/CDMA2000

| Status \ Interruption | Voice Call Interruption | SMS Interruption | MMS Interruption |
|-------------------------------|-------------------------|------------------|------------------|
| During Voice Call | | ✓ | ✓ |
| During Packet Communication*2 | ✓*3 | ✓*3 | ✓*3 |

✓: Testable

*2: Requires EGPRS Software option (MX847520A-001) for EGPRS

*3: Only when packet data not transmitted

Voice Communication Test (Handset*/Loopback)

Voice tests during packet communications are supported by connecting the accessory handset to the MD8475A and using SmartStudio. However, this test can also be executed even without a handset by looping-back the voice data.

*: Not support for CDMA2000

Call Blocking, Emergency Call Test

The Voice test also supports the Call Blocking and Emergency Call tests that are so difficult to run on live and test networks.

• Access Class Control

Sometimes, carriers limit access at events where there are too many people trying to call at once or during abnormally busy times like New Year. The SmartStudio uses configure an access control test environment, which is difficult to do on a live network.

• Emergency Call Test

Obviously, emergency calls cannot be tested on a live network but this is an essential test that must be evaluated. The SmartStudio operation simplifies emergency call test settings and execution.

| System | Control Method | Operation |
|--------------------|----------------|--|
| W-CDMA/ GSM | Not Normal | No Access Control |
| | Barred | Call blocking for all communications |
| | Emergency | Call blocking for communications except emergency call |
| CDMA2000/ EV-DO | PSIST | Call blocking for 1xEV-DO |
| | ACCT | Call blocking for ACCT1X |

SmartStudio Test Functions



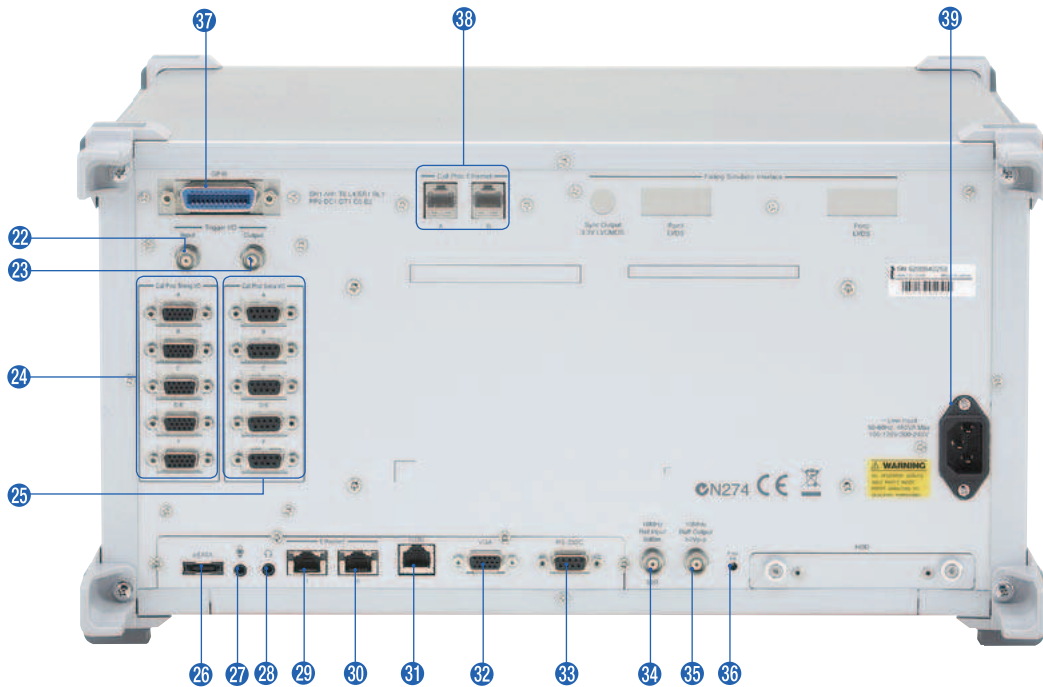
| Function | | Description | LTE FDD | W-CDMA | GSM | CDMA2000 |
|---|--|---|---------|--------|-----|----------|
| General | Location registration | | ✓ | ✓ | ✓ | ✓ |
| | Out of service Setting | Sets BTS Power output to OFF and sets UE to outside NW condition | ✓ | ✓ | ✓ | ✓ |
| | Power Control for SmartStudio | Power control for BS is changed into IDOL and Communication | ✓ | ✓ | ✓ | ✓ |
| | L1/L2 Counter | Measured values indicating the performance of Layer 1 and Layer 2 | ✓ | ✓ | — | — |
| | RF Monitor | The channel power, such as frequency, a frequency error and PDSCH, and PUSCH, is displayed | ✓ | ✓ | ✓ | — |
| | Throughput Monitor | Actual data throughput can be verified at a fixed rate or at a rate determined by UE | ✓ | ✓ | ✓ | — |
| | Trace view | The sequence of each layer is displayed on real time | ✓ | ✓ | ✓ | — |
| Voice/Video Call | W-CDMA/GSM/CDMA2000 | | | | | |
| | UE originated/terminated voice call (Loopback/Echo-back) | Performs loopback communication test*1 | | ✓ | ✓ | ✓ |
| | UE originated/terminated voice call (Handset) | Performs handset communication test | | ✓ | ✓ | — |
| | Emergency Call | Performs Emergency Call test with or without Test SIM*2 | | ✓ | ✓ | ✓ |
| | Voice call released | | | ✓ | ✓ | ✓ |
| | Caller ID Setting | Performs Show ID/Hide ID/Unknown ID/Payphone/International call settings | | ✓ | ✓ | ✓ |
| | Access Class Barred (Release99) [Barred] | Bars all calls according to Release 99 standard | | ✓ | ✓ | |
| | Access Class Barred (Release99) [Emergency] | Bars all calls except emergency calls according to Release 99 standard | | ✓ | ✓ | |
| | Access Class Barred (PSIST/ACCT) | Bars all calls according to CDMA2000 | | | | ✓ |
| | W-CDMA | | | | | |
| | UE originated/terminated video call (Loopback) | Performs loopback communication test*1 | | ✓ | | |
| | Video call released | | | ✓ | | |
| | IPv4 Packet test | Data supporting IPv4 can be sent and received | ✓ | ✓ | ✓ | ✓ |
| | IPv6 Packet test | Data supporting IPv6 can be sent and received | ✓ | ✓ | ✓ | — |
| Packet Preservation/Dormant testing | Releases RRC Connection while maintaining PDN Bearer | ✓ | ✓ | — | ✓ | |
| LTE FDD | | | | | | |
| UE originated SISO/MIMO packet call*3 | Performs application tests utilizing packet data communications by connecting to server | ✓ | | | | |
| UE terminated SISO/MIMO packet call*3 | Performs application tests utilizing packet data communications by connecting to server | ✓ | | | | |
| SISO/MIMO packet call released | | ✓ | | | | |
| Multiple PDN Bearer | Performs Multi Session packet communications test (Maximum 8 pass) | ✓ | | | | |
| W-CDMA | | | | | | |
| UE originated W-CDMA/HSPA packet call*4 | Performs application tests utilizing packet data communications by connecting to server | | ✓ | | | |
| UE terminated W-CDMA/HSPA packet call*4 | Performs application tests utilizing packet data communications by connecting to server | | ✓ | | | |
| W-CDMA/HSPA packet call released | | | ✓ | | | |
| RRC Status Change | The mobile RRC Status can be changed during packet data communications (Cell DCH ⇔ Cell FACH ⇔ Cell PCH) | | ✓ | | | |
| UE originated PPP packet call | Performs PPP (Built-in server) packet data communication test (Not support Serial connection) | | ✓ | | | |
| PPP packet call released | Performs PPP (Built-in server) packet data communication test | | ✓ | | | |
| GSM | | | | | | |
| UE originated GPRS/EGPRS packet call*5 | Performs application tests utilizing packet data communications by connecting to server | | | ✓ | | |
| UE terminated GPRS/EGPRS packet call*5 | Performs application tests utilizing packet data communications by connecting to server | | | ✓ | | |
| GPRS/EGPRS packet call released | | | | ✓ | | |
| CDMA2000 | | | | | | |
| UE originated CDMA2000/EVDO packet call*6 | Performs application tests utilizing packet data communications by connecting to server | | | | ✓ | |
| CDMA2000/EVDO packet call released | | | | | ✓ | |
| Messaging | SMS transmission/reception | Performs SMS (7bit-ASCII, Unicode, Binary) test*1 | ✓ | ✓ | ✓ | ✓ |
| | Continuous SMS Sending | Performs continuous sending of multiple SMS messages to UE | ✓ | ✓ | ✓ | ✓ |
| | MMS transmission/reception*7 | Performs MMS transmission/reception test | ✓ | ✓ | ✓ | ✓ |
| 2-cell Testing*8,*9 | Cell Selection/Reselection (LTE FDD → LTE FDD) | Performs Cell Selection/Reselection tests between two LTE FDD cells | ✓ | — | — | — |
| | Cell Redirection (LTE FDD → W-CDMA) | Performs tests between W-CDMA system from LTE FDD system without continuous packet connectivity | ✓ | ✓ | | |
| | Cell Change Order (LTE FDD → GSM) | Performs tests between GSM system from LTE FDD system without continuous packet connectivity | ✓ | | ✓ | |
| | CS Fallback (LTE FDD → W-CDMA) | Performs tests between W-CDMA system from LTE FDD system for voice | ✓ | ✓ | | |
| | CS Fallback (LTE FDD → GSM) | Performs tests between GSM system from LTE FDD system for voice | ✓ | | ✓ | |

- *1: The opposite examination using two sets of move machines cannot be performed.
- *2: Test USIM does not use by CDMA2000
- *3: Requires MIMO option (MD8475A-001, MX847550A-020)
- *4: Requires HSPA option (MX847510A-001)
- *5: Requires EGPRS option (MX847520A-001)
- *6: Requires 1xEV-DO option (MD8475A-032)
- *7: Requires separate MMS application sever
- *8: Requires 2nd RF option (MD8475A-001) and Multi-cell Software (MX847502A)
- *9: Not support for CDMA2000

Panel Layout



- 1 **Power switch**
Switches power-on and standby
- 2 **[RF Main] N-type Main I/O connector**
Used as input connector when Input lit, as output connector when Output lit, and as I/O connector when both Input and Output lit
- 3 **[RF Aux1] N-type auxiliary I/O connector 1**
Used as input connector when Input lit, as output connector when Output lit, and as I/O connector when both Input and Output lit
- 4 **[RF Aux2] N-type auxiliary I/O connector 2**
Used as input connector when Input lit, as output connector when Output lit, and as I/O connector when both Input and Output lit
- 5 **Left keys**
Same operation as left mouse click
- 6 **Right keys**
Same operation as right mouse click
- 7 **[Pointer] Pointer**
Moves screen pointer
- 8 **Cursor keys**
Same function as keyboard cursor keys
- 9 **Enter key**
Same function as keyboard Enter key
- 10 **Off-hook key**
Simulates off-hook operation with supporting control software and same as keyboard [Shift + Ctrl + F1]
- 11 **On-hook key**
Simulates on-hook operation with supporting control software and same as keyboard [Shift + Ctrl + F2]
- 12 **Prev key**
Moves cursor to item before currently selected item and same as keyboard [Shift + Tab]
- 13 **Next key**
Moves cursor to item after currently selected item and same as keyboard [Tab]
- 14 **Help key**
Displays on-screen help and same as keyboard [F1]
- 15 **Keyboard key**
Displays on-screen keyboard
- 16 **Shift key**
Shifts key function to description in blue on panel
Key lamp lights when Shift key enabled
- 17 **[HDD] Hard disk access lamp**
Lights when internal hard disk accessed
- 18 **Backspace key**
Deletes previous character and same as keyboard [Backspace]
- 19 **Numeric keypad, symbol keys**
Input numerical values
Inputs A–F hexadecimal numbers
- 20 **[Handset] Handset connector**
Connector for handset
- 21 **[USB] USB connectors**
Connectors for USB devices



- 22 **[Trigger I/O Input] Trigger input connector**
BNC connector for inputting trigger from external device and performing UE transmission measurement synchronized with external devices
- 23 **[Trigger I/O Output] Trigger output connector**
BNC connector for outputting event timing to external devices
- 24 **[Call Proc Timing I/O A to F] Timing I/O connectors for call processing**
15-pin mini D-Sub connectors for call processing (shared connectors D/E)
- 25 **[Call Proc Serial I/O A to F] Serial I/O connectors for call processing**
These are 9-pin D-Sub connectors for call processing (shared connectors D/E).
- 26 **[eSATA] eSATA connector**
eSATA (external Serial ATA) connector
- 27 **Microphone**
3.5-mm dia. microphone jack
- 28 **Headphone**
3.5-mm dia. headphone jack
- 29 **[Ethernet 1] Ethernet 1 connector**
RJ-45 connector for connecting external PC via LAN
- 30 **[Ethernet 0] Ethernet 0 connector**
RJ-45 connector for connecting external PC via LAN
- 31 **[ISDN] ISDN connector**
RJ-45 connector ISDN for Video Call Test (BRI)
<option>
- 32 **[VGA] VGA connector**
15-pin mini D-Sub connector for connecting VGA monitor
- 33 **[RS-232C] RS-232C connector**
9-pin D-Sub connector for connecting VGA monitor
- 34 **[10 MHz Ref Input] Reference signal input connector**
BNC connector for inputting external reference signal
- 35 **[10 MHz Buff Output] Reference signal input connector**
BNC connector for outputting internal reference signal
- 36 **[Freq Adj] Frequency adjustment**
Adjuster for trimming reference oscillator frequency
- 37 **[GPIB] GPIB connector**
Not used
- 38 **[Call Proc Ethernet] Call Proc Ethernet I/O Port**
RJ-45 connector for call processing
There are A and B connectors.
- 39 **Power inlet**
Power cable connector for 100 Vac to 120 Vac/200 Vac to 240 Vac (50 Hz/60 Hz) (auto-switching)
≤480 VA power consumption

System Configurations/Option/Software

LTE FDD

Basic Configuration

MD8475A-050 LTE Signalling Unit
MX847550A LTE Simulation Software
MX847550A-010 LTE FDD Option
MX847570A-050 LTE FDD Option

Basic Configuration for LTE FDD Tests.
 This is the basic LTE FDD configuration. These tests support confirmation of connections with LTE terminals during SISO, packet communications, and SMS sending/receiving. In addition, 2-cell tests are supported by installing the MX847502A Multi-cell Software.

3GPP TS 36.306 V8.4.0 (2009-06) Category List

The MD8475A supports UE categories 1 to 3 and will support all new future categories.

LTE (DL)

| UE Category | Maximum number of DL-SCH transport block bits received within a TTI | Maximum number of bits of a DL-SCH transport block received within a TTI | Total number of soft channel bits | Maximum number of supported layers for spatial multiplexing in DL |
|-------------|---|--|-----------------------------------|---|
| 1 | 10296 | 10296 | 250368 | 1 |
| 2 | 51024 | 51024 | 1237248 | 2 |
| 3 | 102048 | 75376 | 1237248 | 2 |
| 4 | 150752 | 75376 | 1827072 | 2 |
| 5 | 299552 | 149776 | 3667200 | 4 |

LTE (UL)

| UE Category | Maximum number of bits of an UL-SCH transport block transmitted within a TTI | Support for 64QAM in UL |
|-------------|--|-------------------------|
| 1 | 5160 | No |
| 2 | 25456 | No |
| 3 | 51024 | No |
| 4 | 51024 | No |
| 5 | 75376 | Yes |

Options

MX847550A-020 LTE 2x2 MIMO Option

Installing the MD8475A-001 2nd RF option configures an environment*1 using 2x2 MIMO for testing maximum throughput, etc.

LTE 2x2 MIMO Correspondence Function

| | 2x2 MIMO without option | 2x2 MIMO with option |
|------------------------------|-------------------------|---|
| TransmissionMode | TM1 | TM1, TM2, TM3 |
| Maximum TBS of each subframe | 75376 | 75376 (per 1CW) 102048 (sum of 2CWs) |

Support Service

MX847550A-SS110 MX847550A 1Year Support Service

This service supports Help enquiries and maintenance releases (bug fixes) for 1 year.

W-CDMA

Basic Configuration

MD8475A-010 W-CDMA/HSPA Signalling Unit
MX847510A W-CDMA Simulation Software
MX847570A-010 W-CDMA Option

Basic Configuration for W-CDMA Tests.
 This is the basic W-CDMA configuration. These tests support voice, videophone, packet, and SMS communications.

Options

MX847510A-001 HSPA Option

This option performs evaluation of all HSPA UE categories defined by the 3GPP Release 5/Release 6 standards.

3GPP TS 25.306 Category List

HSDPA

| HS-DSCH Category | HS-DSCH Codes | Minimum Inter-TTI | TB-Sizes | Total Number of Soft Channel Bits | Modulation | Maximum Throughput [bps] |
|------------------|---------------|-------------------|----------|-----------------------------------|------------|--------------------------|
| 1 | 5 | 3 | 7298 | 19200 | QPSK/16QAM | 1216333 |
| 2 | 5 | 3 | 7298 | 28800 | QPSK/16QAM | 1216333 |
| 3 | 5 | 2 | 7298 | 28800 | QPSK/16QAM | 1824500 |
| 4 | 5 | 2 | 7298 | 38400 | QPSK/16QAM | 1824500 |
| 5 | 5 | 1 | 7298 | 57600 | QPSK/16QAM | 3649000 |
| 6 | 5 | 1 | 7298 | 67200 | QPSK/16QAM | 3649000 |
| 7 | 10 | 1 | 14411 | 115200 | QPSK/16QAM | 7205500 |
| 8 | 10 | 1 | 14411 | 134400 | QPSK/16QAM | 7205500 |
| 9 | 15 | 1 | 20251 | 172800 | QPSK/16QAM | 10125500 |
| 10 | 15 | 1 | 27952 | 172800 | QPSK/16QAM | 13976000 |
| 11 | 5 | 2 | 3630 | 14400 | QPSK | 907500 |
| 12 | 5 | 1 | 3630 | 28800 | QPSK | 1815000 |

HSUPA

| E-DCH Category | E-DCH Codes | Minimum Spreading Factor | Support for 10 and 2 ms TTI EDCH | TB-Sizes within 10 ms E-DCH TTI | TB-Sizes within 2 ms E-DCH TTI | Maximum Throughput [bps] |
|----------------|-------------|--------------------------|----------------------------------|---------------------------------|--------------------------------|--------------------------|
| 1 | 1 | SF4 | 10 ms TTI only | 7110 | - | 729600 |
| 2 | 2 | SF4 | 10 ms and 2 ms TTI | 14484 | 2798 | 1459200 1459500 |
| 3 | 2 | SF4 | 10 ms TTI only | 14484 | - | 1459200 |
| 4 | 2 | SF2 | 10 ms and 2 ms TTI | 20000 | 5772 | 2000000 2918500 |
| 5 | 2 | SF2 | 10 ms TTI only | 20000 | - | 2000000 |
| 6 | 4 | SF2 | 10 ms and 2 ms TTI | 20000 | 11484 | 2000000 5760000 |

MX847510A-050 W-CDMA Ciphering Option

This options adds the W-CDMA ciphering function to the MD8475A*2, *3 and support KASUMI (3GPP-recommended algorithm).

Support Service

MX847510A-SS110 MX847510A 1Year Support Service

This service supports Help enquiries and maintenance releases (bug fixes) for 1 year.

GSM

Basic Configuration

MD8475A-020 GSM Signalling Unit
MX847520A GSM/GPRS Simulation Software
MX847570A-020 GSM Option

This is the basic GSM/GPRS configuration.
These tests support voice, video phone, packet, and SMS tests.

Options

MX847520A-001 EGPRS Option

This option supports EGPRS evaluation — a GPRS high-speed, data communication method. Application tests using EGPRS communications are supported.

EGPRS Supported Specifications

| | | |
|------------|------------------------------|---|
| Layer 1 | Frequency Bandwidth | 850, 900, 1800, 1900 MHz |
| | Modulation & Coding Scheme | MCS 1, 2, 3, 4 (GMSK) MCS 5, 6, 7, 8, 9 (8PSK) |
| | Number of Slots | Up to Multi Slot Class 12 (DL: 4 / UL: 4 / SUM: 5) |
| | Channel Combination | Combination 11 & 13 |
| Layer 2, 3 | Broadcasting Control Channel | BCCH/CCCH, PBCCH/PCCH |
| | ARQ Type | Type 1 |
| | Window Size | 64 to 192 |
| Standard | 3GPP Release99 | |

MX847520A-050 GSM/GPRS Ciphering Option

This option adds the GSM/GPRS ciphering function*^{2, *4} and supports both the GSM A5/1, A5/2, and A5/3 ciphering algorithms as well as the GPRS GEA/1, GEA/2, and GEA/3 ciphering algorithms.

Support Service

MX847520A-SS110 MX847520A 1Year Support Service

This service supports Help enquiries and maintenance releases (bug fixes) for 1 year.

Software/Hardware

MX847502A Multi Cell Software

Combining this software and the MD8475A-001 2nd RF simultaneously starts two cells. Tests using this software are Handover tests within system and InterRAT tests between different systems.

MX847570A SmartStudio

This software supports basic connection tests for systems installed in the MD8475A without needing to understand scenarios. The required system license option must be installed.

CDMA2000

Basic Configuration

MD8475A-030 CDMA2000 1X Signalling Unit
MD8475A-032 CDMA2000 1xEV-DO Signalling Unit
MX847530A CDMA2000 Simulation Software
MX847570A-030 CDMA2000 Option

This is the basic CDMA2000 1X/1xEV-DO configuration.
These tests support voice communications (echo-back), packet, and SMS tests. Combination with the MD8475A-001 2nd RF option configures a hybrid environment.

Options

MX847530A-001 Multi-Sector/Multi-Carrier Option

This software option supports simulation of various handover tests including Soft, Softer, Hard, Idle, and Access, by dynamically changing the CDMA2000 1X/1xEV-DO multi-carrier (Max. 2) and multi-sector (1X: Max. 6, 1xEV-DO: Max. 3). One MD8475A unit supports testing in multi-carrier/multi-sector environments where verification using a live network is difficult. It improves the efficiency of operation verification, the Inter Operability Test (IOT) at mobile R&D, and the field-testing pre-verification.

Support Service

MX847530A-SS110 MX847530A 1Year Support Service

This service supports Help enquiries and maintenance releases (bug fixes) for 1 year.

MD8475A-001 Second RF

This option is the hardware to simulate base station behavior using two RF signals. Usage differs depending on the simulation software.

*1: Handover tests not supported when testing 2x2 MIMO

*2: Not support for MX847570A

*3: The Integrity function does not require the MX847510A-050

*4: The Integrity function does not require the MX847520A-050

Specifications

MD8475A Signalling Tester

| | |
|------------------------------|---|
| RF Connector | <p>RF input/output connector (RF Main, RF Aux1, RF Aux2) Connector: N type, Impedance: 50 Ω, VSWR: ≤1.5 (500 MHz to 3 GHz)</p> <p>Reference oscillator Frequency: 10 MHz Level: TTL level Connector: BNC type Startup characteristics: $\pm 5 \times 10^{-6}$ (5 minutes after power-on, referenced to frequency 24 hours after power-on) Aging rate: 2×10^{-6}/day, $\leq 1 \times 10^{-7}$/year (referenced to frequency 24 hours after power-on) Temperature characteristics: $\leq \pm 2 \times 10^{-8}$</p> <p>External reference input Frequency: 10 MHz, Acceptable frequency range: ± 0.5 ppm, Level: ≥ 0 dBm, Impedance: 50 Ω, Connector: BNC type</p> |
| Transmission Characteristics | <p>Frequency Frequency range: 350 MHz to 3.6 GHz Setting resolution: 100 kHz (Depending on MX847501A used) Accuracy: Based on reference oscillator accuracy</p> <p>Output level Level range: -130 to -10 dBm (Main, Aux1, Aux2) Resolution: 0.1 dB Level accuracy: ± 1.0 dB (-120 dBm \leq Output level, 350 MHz \leq Frequency \leq 3 GHz) ± 1.2 dB (-120 dBm \leq Output level, 3 GHz < Frequency \leq 3.6 GHz)</p> <p>Signal purity Non-harmonic spurious: ≤ -40 dBc (at ≥ 500 kHz frequency offset) Harmonics: ≤ -25 dBc Modulation accuracy W-CDMA: $\leq 3.5\%$ rms (with MD8475A-010) GSM: $\leq 1.5\%$ rms (with MD8475A-020) LTE: $\leq 3.5\%$ rms (with MD8475A-050) CDMA2000 1X: $\rho > 0.995$ (with MD8475A-030) 1xEV-DO: $\rho > 0.995$ (with MD8475A-032)</p> |
| Reception Characteristics | <p>Frequency Frequency range: 350 MHz to 3.6 GHz Setting resolution: 100 kHz (Depending on MX847501A used)</p> <p>Level Maximum input level: +35 dBm (Average) Input level range: -60 to +35 dBm (with MD8475A-010, MD8475A-030, MD8475A-032, MD8475A-050) -30 to +40 dBm (in-burst average power) (with MD8475A-020)</p> <p>Reference level: -60 to +35 dBm</p> <p>Variable range Rx level setting resolution: 1 dB</p> |
| General | <p>Display: Color TFT LCD screen, 12.1 inches (wide type), 1280 × 800 dots</p> <p>External interface Trigger I/O: BNC Call Proc Timing I/O: 15-pin mini D-Sub connector Call Proc Serial I/O: D-sub connector, RS-232C level Call Proc Ethernet A: RJ45 connector, 10/100/1000BASE-T level Call Proc Ethernet B: RJ45 connector, 10/100/1000BASE-T level Handset: RJ-11 connector Headphone: 3.5-mm dia. headphone jack Microphone: 3.5-mm dia. microphone jack USB: USB2.0, Type A, 4 ports RS-232C: D-sub connector, conforms to RS-232C GPIO: IEEE488 connector VGA: Mini D-Sub connector Ethernet: RJ-45 connector 10/100/1000BASE-T, 2 ports</p> |
| Power Supply | 100 Vac to 120 Vac ($\pm 10\%$)/200 Vac to 240 Vac ($-15\%/+10\%$, Max.: 250 Vac), 50 Hz to 60 Hz (Rating), ≤ 480 VA (Max.) |
| Dimensions and Mass | 426 (W) × 221.5 (H) × 398 (D) mm (excl. protrusions), < 25 kg (with all options) |
| Temperature Range & Humidity | Operation: +5° to +40°C, Storage: -20° to +60°C, $\leq 90\%$ (no condensation) |
| EMC | EN 61326-1, EN 61000-3-2 |
| LVD | EN 61010-1 |

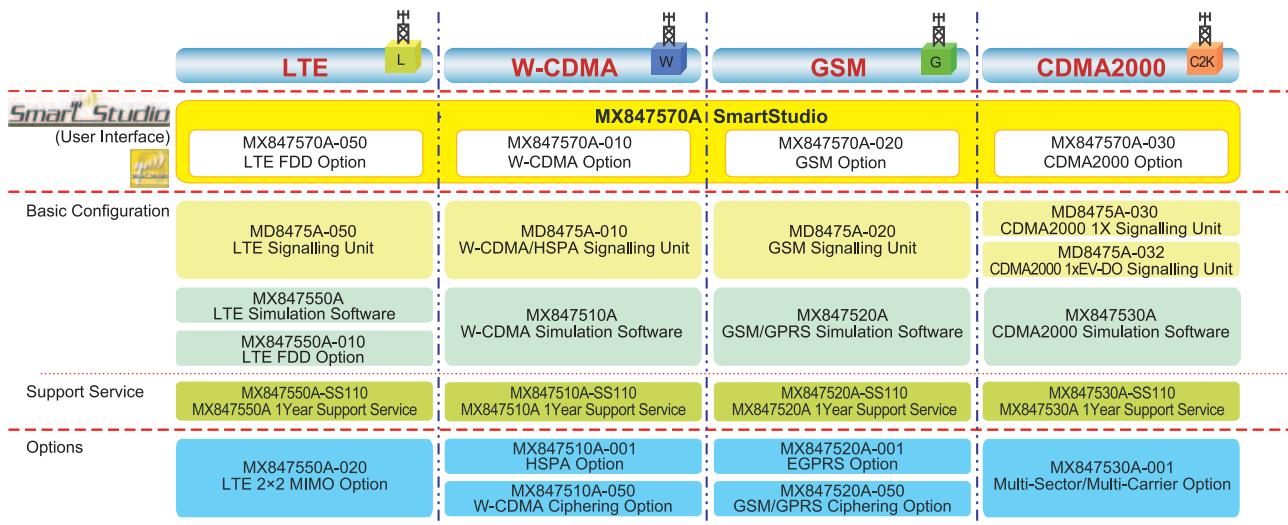
Ordering Information

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.

| Model/Order No. | Name |
|---|---|
| MD8475A | Main frame Signalling Tester |
| MX847500A MX847501A | Standard accessories Platform Software (factory-installed) Control Software (factory-installed) Power Cord MD8475A CD-ROM (Operation Manual) W-CDMA/GSM Test USIM (Standard UICC Size) LAN Cable (3 m) USB Mouse Z0541A Z0975A Keyboard (USB) A0058A Handset |
| MD8475A-001 | Hardware option 2nd RF |
| MX847502A | Software option Multi-cell Software (License) |
| MX847570A MX847570A-010 MX847570A-020 MX847570A-030 MX847570A-050 | User interface SmartStudio (License) W-CDMA Option (License) GSM Option (License) CDMA2000 Option (License) LTE FDD Option (License) |
| MD8475A-050 MX847550A MX847550A-010 MX847550A-020 | LTE system LTE Signalling Unit LTE Simulation Software (License) LTE FDD Option (License) LTE 2x2 MIMO Option (License) |
| MD8475A-010 MX847510A MX847510A-001 MX847510A-050 MD8475A-090 | W-CDMA system W-CDMA/HSPA Signalling Unit W-CDMA Simulation Software (License) HSPA Option (License) W-CDMA Ciphering Option (License) ISDN Interface |
| MD8475A-020 MX847520A MX847520A-001 MX847520A-050 | GSM system GSM Signalling Unit GSM/GPRS Simulation Software (License) EGPRS Option (License) GSM/GPRS Ciphering Option (License) |
| MD8475A-030 MD8475A-032 MX847530A MX847530A-001 | CDMA2000 system CDMA2000 1X Signalling Unit CDMA2000 1xEV-DO Signalling Unit CDMA2000 Simulation Software (License) Multi-sector/Multi-carrier Option (License) |

| Model/Order No. | Name |
|---|---|
| MX847510A-SS110 MX847520A-SS110 MX847530A-SS110 MX847550A-SS110 MC0011A | Software support services MX847510A 1Year Support Service (License) MX847520A 1Year Support Service (License) MX847530A 1Year Support Service (License) MX847550A 1Year Support Service (License) Web Access Key (USB dongle) |
| MD8475A-ES210 MD8475A-ES310 MD8475A-ES510 | Warranty 2 Years Extended Warranty Service 3 Years Extended Warranty Service 5 Years Extended Warranty Service |
| B0651A B0329D Z0749 J0004 J0127A J0127B J0576B J0576D J0658 J1262A J1262B J1263 J1265 J1287 J1333A J1440A J1524A P0035B P0035B7 J1334A | Application parts Carrying Case Front Cover for 1MW 5U MN8110B + Inch Screw Cable (for call processing I/O) Coaxial Adaptor (N (male)-SMA (female)) Coaxial Cord, 1.0 m (BNC-P · RG58A/U · BNC-P) Coaxial Cord, 2.0 m (BNC-P · RG58A/U · BNC-P) Coaxial Cord, 1.0 m (N-P · 5D-2W · N-P) Coaxial Cord, 2.0 m (N-P · 5D-2W · N-P) Adapter (SMA male-female L-type) RS-232C Cable (Straight 2 m, male-female) RS-232C Cable (Crossover 2 m, male-female) W-CDMA Interface Cable (Terminal connection cable) Adapter (Serial connector, male-male) HDD-SUB15P Cable (milli-inch, for connecting MN8110B) HDD-SUB15P Crossover Cable (inch) LAN Cable Dsub15-BNC Conversion Cable W-CDMA/GSM Test USIM (Standard UICC Size) W-CDMA/GSM Test USIM (Micro UICC Size) CDMA2000 Cable |

B0651A Carrying Case



MD8475A Signalling Tester

MD8475A-001 2nd RF

MX847502A Multi-cell Software

Anritsu Corporation

5-1-1 Onna, Atsugi-shi, Kanagawa, 243-8555 Japan
Phone: +81-46-223-1111
Fax: +81-46-296-1238

• 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.

Praça Amadeu Amaral, 27 - 1 Andar
01327-010 - Bela Vista - São Paulo - SP - 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.

12 avenue du Québec, Bâtiment Iris 1- Silic 612,
91140 VILLEBON SUR YVETTE, 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.r.l.

Via Elio Vittorini 129, 00144 Roma, Italy
Phone: +39-6-509-9711
Fax: +39-6-502-2425

• Sweden

Anritsu AB

Borgarfjordsgatan 13A, 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 (Service Assurance)

Anritsu AB (Test & Measurement)

Kay Fiskers Plads 9, 2300 Copenhagen S, Denmark
Phone: +45-7211-2200
Fax: +45-7211-2210

• Russia

Anritsu EMEA Ltd.

Representation Office in Russia

Tverskaya str. 16/2, bld. 1, 7th floor.

Russia, 125009, Moscow

Phone: +7-495-363-1694

Fax: +7-495-935-8962

• United Arab Emirates

Anritsu EMEA Ltd.

Dubai Liaison Office

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

• Singapore

Anritsu Pte. Ltd.

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

• India

Anritsu Pte. Ltd.

India Branch Office

3rd Floor, Shri Lakshminarayan Niwas, #2726, 80 ft Road,
HAL 3rd Stage, Bangalore - 560 075, India
Phone: +91-80-4058-1300
Fax: +91-80-4058-1301

• P.R. China (Hong Kong)

Anritsu Company Ltd.

Units 4 & 5, 28th Floor, Greenfield Tower, Concordia Plaza,
No. 1 Science Museum Road, Tsim Sha Tsui East,
Kowloon, Hong Kong
Phone: +852-2301-4980
Fax: +852-2301-3545

• P.R. China (Beijing)

Anritsu Company Ltd.

Beijing Representative Office

Room 2008, Beijing Fortune Building,
No. 5, Dong-San-Huan Bei Road,
Chao-Yang District, Beijing 100004, P.R. China
Phone: +86-10-6590-9230
Fax: +86-10-6590-9235

• Korea

Anritsu Corporation, Ltd.

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

• Australia

Anritsu Pty. Ltd.

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

• Taiwan

Anritsu Company Inc.

7F, No. 316, Sec. 1, NeiHu Rd., Taipei 114, Taiwan
Phone: +886-2-8751-1816
Fax: +886-2-8751-1817

Please Contact: