MD8470A
Signalling Tester
MD8470A Signalling Tester
MX847010A W-CDMA/GSM Simulation Kit

— Product Introduction —

MX847010A-01; EGPRS Software
MX847010A-11; HSDPA Software
MX847010A-12; HSUPA Software

— Benchtop Mobile Communications Network —
— Signalling Tester for Wireless Applications —

Anritsu Corporation
September 2010
Ver 10.00
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2. Anritsu Mobile UE Test Solutions
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1. Present Condition of Mobile UE Application Testing
The focus of UE development is shifting increasingly from fundamental communication technologies to applications due to the sophistication of functions and services for mobile terminals.
This is the current UE application test situation:

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<tr>
<th>Test environment</th>
<th>Advantage</th>
<th>Disadvantage</th>
</tr>
</thead>
</table>
| Real network           | • Actual mobile network  
                       • Realistic                                                        | • Requires on-site testing  
                       (especially for communication systems specific to other countries)  
                       • Communication status cannot be set freely            |
| Test bench             | • Similar to real network  
                       • Status changed freely to some extent                             | • Very expensive  
                       • Wastes time due to small number of in-house facilities and operator test benches       |
| Hardware BTS simulator | • Status changed freely  
                       • Lower cost than test bench                                      | • Expensive  
                       • Limited users  
                       • Restricted supported functions                                 |
| RF Tester base simulator | • Low cost  
                       • Simple operability                                                  | • Many restrictions (only some call processing patterns and parameters can be changed)  
                       • Unsuitable for testing UE applications because specialized for RF measurements |
| Software simulator     | • Handy and very low cost                                               | • No communications support                                                                                 |

The UE application test market requires application testers positioned between Hardware BTS simulators and RF Tester base simulators.
2. Anritsu Test Mobile UE Solutions
Anritsu Mobile UE Test Solutions

Application

Signalling Tester
MD8470A
W-CDMA/HSDPA/HSUPA
GSM/GPRS/EGPRS
CDMA2000 1X/1xEV-DO
TD-SCDMA/TD-HSPA

Signalling Tester
MD8480C
W-CDMA/GSM/GPRS/EGPRS
HSDPA/HSUPA

PTS/RTD
GCF Test Toolkit
MX785201A
MX786201A
MX785220A

Conformance Test System
ME7873/74
W-CDMA/HSPA

Protocol

Radio Communication Analyzer
MT8820B
W-CDMA/HSPA/GSM/GPRS/EGPRS
CDMA2000 1X/1xEV-DO

Service Tester
MT8510B

Baseband

Signal Analyzer
MS2690A/91A/92A
Digital Modulation SG
MG3700A

Anritsu Mobile UE Test Solutions

Discover What’s Possible™

Slide 7
MD8470A-E-I-1
Anritsu Protocol/Application Test Solutions

Demand for Mobile Phone Test

Current

Simple Application Test for Manufacturing

MT8820B +External Packet Data

PTS

ME7873/74

MD8470A

UE Application Development

MD8470A Main Target Market

Chipset Development

Protocol Development

Conformance Test

Discover What’s Possible™

Slide 8
MD8470A-E-I-1
3. Product Overview and Features
Personal Benchtop Global Mobile Communications Network for Wireless Application Developers

Packet data services and 3G systems are growing globally in today’s wireless market. Factors for succeeding in the wireless business are shifting from basic communication technology to the ability to plan and develop attractive mobile devices and services.

The MD8470A Signalling Tester helps wireless application engineers accelerate the development and reduce the test cycle for these products and services.
(1) The all-in-one platform supports functional testing of UE applications such as voice and video calling, contents download, and messaging.

The MD8470A supports the bearers for various applications, such as voice and video calling, packet communications, browsing/contents download, end-to-end UE communications (one MD8470A unit), and SMS/MMS*.

*: Requires separate MMS application server
Support functions (sample scenarios for following connection tests)

<table>
<thead>
<tr>
<th>System</th>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Voice Call</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Handset/Loopback</td>
<td>Performs loopback or handset communication test</td>
</tr>
<tr>
<td></td>
<td>End-to-End</td>
<td>Performs end-to-end voice call test between two sets of MS *Two sets of MD8470A are used.</td>
</tr>
<tr>
<td><strong>Video Call</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Loopback</td>
<td>Performs video call loopback test</td>
</tr>
<tr>
<td></td>
<td>End-to-End</td>
<td>Performs end-to-end video call test between two sets of MS *Uses two sets of MD8470A</td>
</tr>
<tr>
<td><strong>W-CDMA Packet Communications</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Performs application tests utilizing packet data communications by connecting to server *Can change rate (DL:64/128/384 Kbps)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Performs application tests utilizing packet data communications by connecting to server *Uses MX847010A-11 HSDPA Software (option)</td>
<td></td>
</tr>
<tr>
<td><strong>HSUPA (2.0M) Packet Communications</strong></td>
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</tr>
<tr>
<td></td>
<td>Performs application tests utilizing packet data communications by connecting to server *Uses MX847010A-12 HSUPA Software (option) *Provided by MD8470A web download support service (MX847010A-20)</td>
<td></td>
</tr>
<tr>
<td><strong>W-CDMA PPP Packet Communications</strong></td>
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<tr>
<td></td>
<td>Performs PPP (Built-in server/Serial) packet data communication test</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Performs multiple PPP packet communication test</td>
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<td><strong>SMS (Short Message Service)</strong></td>
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<td></td>
<td>Performs SMS (7bit-ASCII, Unicode, Binary) test *Uses SMSC (SMS Centre)</td>
<td></td>
</tr>
<tr>
<td><strong>W-CDMA Cell Broadcast (BMC)</strong></td>
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<td></td>
<td>Performs W-CDMA Cell Broadcast test</td>
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<tr>
<td><strong>UDI (Unrestricted Digital Information)</strong></td>
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<tr>
<td></td>
<td>*Uses MU847090B ISDN Interface (option) *Provided by MD8470A web download support service (MX847010A-20)</td>
<td></td>
</tr>
<tr>
<td><strong>SS (Supplementary Services)</strong></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Offers various sample scenarios for supplementary services, such as Emergency call/Multiparty/Call waiting/USSD, etc. *Provided by MD8470A web download support service (MX847010A-20)</td>
<td></td>
</tr>
<tr>
<td><strong>W-CDMA 2Cell Hard Handover</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Performs W-CDMA Hardhandover test between W-CDMA 2Cells (Voice(Packet DL384k_UL64k). *Uses MX847016A Multi-cell Network Simulator (option) *Provided by MD8470A web download support service (MX847010A-20)</td>
<td></td>
</tr>
</tbody>
</table>

*As of September 2010

W-CDMA: Requires MU847010B W-CDMA/HSPA Signalling Unit and MX847010A W-CDMA/GSM Simulation Kit
W-CDMA 2Cell HHO: Requires MD8470A-02 Second RF Option, two MU847010B W-CDMA/HSPA Signalling Units
Basic call processing (voice/video/packet call/SMS/MMS) is supported as standard for W-CDMA/HSDPA/HSUPA, and voice/packet call/SMS/MMS are supported for GSM/GPRS/EGPRS.

**Supported functions (sample scenarios for following connection tests)**

<table>
<thead>
<tr>
<th>System</th>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GSM/GPRS/EGPRS</strong></td>
<td>Voice Call</td>
<td>Performs handset communication test</td>
</tr>
<tr>
<td></td>
<td>Loopback</td>
<td>Performs loopback communication test</td>
</tr>
<tr>
<td></td>
<td>GPRS Packet Communications</td>
<td>Performs application tests utilizing GPRS packet data communications by connecting to server</td>
</tr>
<tr>
<td></td>
<td>EGPRS Packet Communications</td>
<td>Performs application tests utilizing EGPRS packet data communications by connecting to server</td>
</tr>
<tr>
<td></td>
<td>GSM CSD</td>
<td>Performs GSM circuit switched data (CSD) communication test</td>
</tr>
<tr>
<td></td>
<td>DTM (Dual Transfer Mode)</td>
<td>Performs GSM (CS: Voice) + GPRS (PS: Packet) simultaneous communication test</td>
</tr>
<tr>
<td></td>
<td>SMS (Short Message Service)</td>
<td>Performs SMS (7bit-ASCII, Unicode, Binary) test</td>
</tr>
<tr>
<td></td>
<td>GSM Cell Broadcast (SMSCB)</td>
<td>Performs GSM Cell Broadcast test</td>
</tr>
<tr>
<td></td>
<td>SS (Supplementary Services)</td>
<td>Offers various sample scenarios for supplementary services, such as Emergency call/Multiparty/Call waiting/USSD, etc.</td>
</tr>
<tr>
<td></td>
<td>GSM 2Cell Handover</td>
<td>Performs GSM Handover test between GSM 2Cells (Voice: EFS/Packet: GPRS).</td>
</tr>
<tr>
<td></td>
<td>W-CDMA&lt;-&gt;GSM/GPRS/EGPRS</td>
<td>Performs Inter-RAT test between W-CDMA and GSM/GPRS (Cell Reselection/Voice/Packet).</td>
</tr>
<tr>
<td></td>
<td>HSDPA&lt;-&gt;EGPRS</td>
<td>Performs Inter-RAT test between HSDPA and EGPRS.</td>
</tr>
</tbody>
</table>

*As of September 2010

*GSM/GPRS: Requires MU847020B GSM Signalling Unit and MX847010A W-CDMA/GSM Simulation Kit
*GSM 2Cell HHO: Requires MD8470A-02 Second RF Option, two MU847020B GSM Signalling Units
*Inter-RAT: Requires MD8470A-02 Second RF Option, MU847010B W-CDMA/HSUPA Signalling Unit and MU847020B GSM Signalling Unit

MD8470A-E-I-1
Product Overview and Features (4/4)

(3) Supports Multiple Communication Standards (W-CDMA/HSDPA/HSUPA, GSM/GPRS/EGPRS)
Complies with the world’s major 2G, 2.5G, 3G and 3.5G mobile
GSM/GPRS/EGPRS and W-CDMA/HSDPA/HSUPA communications standards

(4) Covers 400 to 2700 MHz Frequency Range
Easily supports further system expansion by covering wide frequency range of
400 to 2700 MHz seamlessly

W-CDMA/HSPA Signalling Unit
GSM Signalling Unit
W-CDMA/GSM Simulation Kit
HSDPA Software
HSUPA Software
EGPRS Software

MD8470A Signalling Tester
4. Platform/Interfaces
Platform/Interfaces (1/2)

- The BTS is simulated by installing the communication system hardware and control software.

- Ethernet, ISDN, Handset, and Serial I/O interfaces supporting various data communication services

- Small-footprint chassis for use in personal benchtop simulation environment (281 (D) x 426 (W) x 221.5 (H) mm)
Platform/Interfaces (2/2)

- Simulations controlled without remote PC (Windows® XP installed in built-in PC*)

*Built-in PC specifications:
  - OS: Windows® XP Professional
  - CPU: Mobile Intel® Pentium® 4 1.7 GHz
  - HDD: 40 GB
  - RAM: 512 MB

*Windows is a registered trademark of Microsoft Corporation in the USA and other countries.
*Intel Pentium is a registered trademark of Intel Corporation in the USA and other countries.

- An application server is installed in the MD8470A built-in PC. A single platform can perform functional testing of applications using packet communications by connecting the Call Proc Ethernet and Ethernet (0 or 1) of the MD8470A built-in PC. (An external server can also be connected.)

A remote control PC is not required and a single platform offers a development environment including the application server.
5. Application Test Examples
**WNS: Wireless Network Simulator**
This application simulates interactive network operations. The user sets the test parameters using a GUI.

**CNS: Couple-UE Network Simulator**
This application simulates interactive network operations. The user performs end-to-end UE testing with the MD8470A using a GUI.

**Script Based Simulation**
Simulations are executed by creating scenarios defining BTS operations at the L3 level.
This application simulates interactive BTS operations. A bearer is started adaptively by the UE request.

Using GUI operations, the user sets the test parameters without editing complex scenarios.

The call processing state is displayed graphically.

The virtual UE performs origination and termination.

*1: The WNS may not support all mobile terminals.
This application simulates interactive BTS operations*1. A user can perform end-to-end UE tests with a MD8470A by simple GUI operations*2.

A bearer is started adaptively by the UE request.

Using GUI operations, the user sets the test parameters without editing complex scenarios.

The call processing state is displayed graphically.

*1: The CNS may not support all mobile terminals.
*2: Requires Second RF option and two W-CDMA Signalling Units or two GSM signalling Units.
• Provides library function for creating C scenarios compatible with MD8480A/B to define simulations freely at L3 level

• Supports bearers such as voice call, packet communications, and video call (W-CDMA)

• Control software supports execution of simulations, real-time data trace, and decode analysis of protocol messages

• Provides sample reference scenarios
### Application Test Examples

**MD8470A Application Test Examples**

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<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>5-1.</strong></td>
<td>Application test environment accomplished by very simple operation</td>
</tr>
<tr>
<td></td>
<td>-WNS (Wireless Network Simulator)-</td>
</tr>
<tr>
<td><strong>5-2.</strong></td>
<td>End-to-end test environment accomplished by very simple operation</td>
</tr>
<tr>
<td></td>
<td>-CNS (Couple-UE Network Simulator)-</td>
</tr>
<tr>
<td><strong>5-3.</strong></td>
<td>Voice Call (Handset/Loopback/End-to-End UE Test)</td>
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<tr>
<td><strong>5-4.</strong></td>
<td>Access Class Barred (Rel. 99)</td>
</tr>
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<td><strong>5-5.</strong></td>
<td>Web Browsing/Contents Download</td>
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<tr>
<td><strong>5-6.</strong></td>
<td>UMTS Video Call (Loopback/End-to-End UE Test)</td>
</tr>
<tr>
<td><strong>5-7.</strong></td>
<td>Messaging (SMS/MMS)</td>
</tr>
<tr>
<td><strong>5-8.</strong></td>
<td>Cell Broadcast (SMSCB/BMC)</td>
</tr>
<tr>
<td><strong>5-9.</strong></td>
<td>Service Interruption Test</td>
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<tr>
<td><strong>5-10.</strong></td>
<td>Inter-System Handover Test (Inter-RAT)</td>
</tr>
<tr>
<td><strong>5-11.</strong></td>
<td>Supplementary Services (SS) Test (Emergency Call/Multiparty/Call Waiting/USSD...)</td>
</tr>
<tr>
<td><strong>5-12.</strong></td>
<td>Protocol Analysis (RRC, NAS (RR,MM,CC,GMM,SM), SS, SMS, IP, WAP, H.245)</td>
</tr>
</tbody>
</table>
5-1. Application Test Environment by Simple GUI Operation

WNS: Wireless Network Simulator
5-1. WNS: Wireless Network Simulator (1/8)

- Simulates interactive BTS operations*1
  The basic connection tests can be performed without knowledge of scenarios. (W-CDMA/HSDPA (1.8M/3.6M/7.2M/10.2M/14.4Mbps)/HSUPA (1.46M/2.0M/5.76Mbps), and GSM/GPRS/EGPRS are supported).
- Effective for testing UE applications (on U-plane)
  - Voice call, Video call, Browsing/contents download,
  - SMS (7-bit ASCII, Unicode, Binary), MMS, Service Interruption Test, etc.

–Features –
- Interactive operation through simple UE connections*1
- Implements actions from network and UE sides

*1: The WNS may not support all mobile terminals.
Automatically responds to voice and videophone call origination and disconnection from UE side and performs call setup and termination. Supports browsing and SMS/MMS.

Displays call processing status in three windows (status transition, network structure, and virtual end-to-end UE) for easy viewing.

NW (MD8470A) side can make UE side receive call by issuing instruction for voice and video call origination. Disconnection also supported.

Mobile UE
## 5-1. WNS: Wireless Network Simulator (3/8)

### Main WNS Features

<table>
<thead>
<tr>
<th>Supported Bearers</th>
<th>W-CDMA/HSDPA (*1)</th>
</tr>
</thead>
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<tr>
<td></td>
<td><strong>HSUPA(“2)”</strong></td>
</tr>
<tr>
<td></td>
<td><strong>GSM/GPRS/EGPRS(“3)”</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Setting Parameters</th>
<th>Common</th>
<th>W-CDMA/HSDPA (“1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>HSUPA(“2)”</strong></td>
<td><strong>GSM/GPRS/EGPRS(“3)”</strong></td>
</tr>
</tbody>
</table>

| USIM               | **USIM Parameter Setting (MCC, MNC, IMSI, Test USIM_MODE, K, RAND, AUTN, IK)** |

<table>
<thead>
<tr>
<th>Other Functions</th>
<th><strong>Edit and Transmission of SMS(CS/PS)/Display of Received SMS (7-bit ASCII/ Unicode/Binary)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>SMS Status Report Function</strong></td>
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<tr>
<td></td>
<td><strong>Continuous SMS Sending Function</strong></td>
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<tr>
<td></td>
<td><strong>SMS Output Interface</strong></td>
</tr>
<tr>
<td></td>
<td><strong>MMS Transmission/Reception Test (Requires Separate MMS Application Server)</strong></td>
</tr>
<tr>
<td></td>
<td><strong>BTS Output Power Setting by GUI (1-dB Step)</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Emergency Call New</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Access Class Barred (Rel. 99) (Normal/Barred/Emergency)</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Out-of-Service Setting</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Packet Preservation Setting Function</strong></td>
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<td></td>
<td><strong>RRC Status Change setting (Cell DCH ↔ Cell FACH ↔ Cell PCH)</strong></td>
</tr>
<tr>
<td></td>
<td><strong>State Transition Diagram for Call Processing/CS/PS Attach Status Indicator</strong></td>
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<td></td>
<td><strong>MO/MT (Manual and Auto Answer) Operation by Virtual Terminal</strong></td>
</tr>
<tr>
<td></td>
<td><strong>International Phone ID Function</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Show ID/Hide ID/Unknown ID/Payphone Termination Setting</strong></td>
</tr>
<tr>
<td></td>
<td><strong>DTMF Checking by Tone and Display</strong></td>
</tr>
<tr>
<td></td>
<td><strong>WNS External Control Interface</strong></td>
</tr>
</tbody>
</table>

Notes:
- *1: Requires MX847010A-11 HSDPA Software Option
- *2: Requires MX847010A-12 HSUPA Software Option
- *3: Requires MX847010A-01 EGPRS Software Option
5-1. WNS: Wireless Network Simulator (4/8)

Basic Call Processing Support
Supports following basic call processing:
- **W-CDMA/HSDPA/HSUPA:**
  Voice Call/Video Call/Packet Call/ Multi-call/SMS/MMS
- **GSM/GPRS/EGPRS:**
  Voice Call/Packet Call/SMS/MMS

Displaying Status and Connection
When a UE or connection target performs the process, a line showing the connection target lights or flashes. In addition, the corresponding process is highlighted, so the user can confirm the connection status visually between the UE and connection target.
BTS Output Power Setting

During simulation, the (DL) RF signal power output from the BTS simulator can be changed (1dB steps) easily at the BTS Power window.\(^1\)

\(^1\): Only supported when UE status set to Power Off, Idle, or Communication

- Min. value (-120 dBm)
- Mean value (-70 dBm)
- Max. value (-20 dBm)
- Any power value can be input.
5-1. WNS: Wireless Network Simulator (6/8)

Out-of-Service Setting

The WNS can simulate out-of-service operation by selecting Out of Service in the Virtual Phone command mode*1.

*1: Only when UE status set to Power Off, Idle, or Communication

Out-of-Service

(BTS output power turned off)

When the OK button on the out-of-service confirmation window is clicked, the BTS power is turned on. If the WNS is in the Communication state at this time, it changes to the Idle state.
5-1. WNS: Wireless Network Simulator (7/8)

Operation/Display by Virtual Phone

The virtual phone performs UE termination and NW release of a voice call, packet communication, and video call loopback.

The Virtual Phone Setup window is used to set the phone number (domestic/international), Show ID, Hide ID, Unknown ID, Payphone, automatic/manual answering for incoming voice calls, and automatic answering time.
5-1. WNS: Wireless Network Simulator (8/8)

Call Processing State Transition Diagrams

- UE Power On
- Registration
- Idle
- Originate
- Terminate
- Voice Call
- Packet Communications
- Videophone Call
- Voice Termination during Packet Comm.
- Multi-call (Voice + Packet)
- Voice Release from NW
5-2. End-to-End Test Environment by Simple GUI Operation
CNS (Couple-UE Network Simulator)
The CNS application software allows the user to perform end-to-end UE application tests with one MD8470A unit. Using the CNS and additional hardware options, one MD8470A unit supports the network simulation functions for voice call, video call and SMS/MMS*1 between two UE units (even different operators).

This unique solution provides an effective test environment to verify application connectivity.

*1: Requires separate MMS application server.
Merits of CNS

- End-to-end UE tests using only one MD8470A unit with small footprint for configuring personal benchtop simulation environment
- End-to-end UE tests by simple GUI operation
- Interactive BTS operations*1 without knowledge of scenarios
- End-to-end SMS/MMS*2 tests between UE sets of different systems (W-CDMA<->GSM)
- IP Packet communications from two UE sets to one application server simultaneously
- Service interruption tests, such as voice call termination from other UE during IP packet communications
- Control software executed for each UE in CNS to save and analyze trace logs for each UE after end-to-end tests

*1: The CNS may not support all mobile terminals.
*2: Requires separate MMS application server.
### CNS Supported End-to-End UE Tests

<table>
<thead>
<tr>
<th>CNS Supported End-to-End UE Tests</th>
<th>Required Hardware Option</th>
<th>Supported End-to-End UE Tests</th>
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<td><strong>W-CDMA End-to-End UE Test</strong></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>- MU847010B W-CDMA Signalling Unit</td>
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<tr>
<td></td>
<td>- MU847010B W-CDMA Signalling Unit</td>
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<tr>
<td></td>
<td>Voice Call</td>
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<tr>
<td></td>
<td>Video Call</td>
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</tr>
<tr>
<td></td>
<td>SMS, MMS*1</td>
<td></td>
</tr>
<tr>
<td><strong>GSM End-to-End UE Test</strong></td>
<td>- MD8470A-02 2nd RF Option</td>
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</tr>
<tr>
<td></td>
<td>- MU847020B GSM Signalling Unit</td>
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</tr>
<tr>
<td></td>
<td>- MU847020B GSM Signalling Unit</td>
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<tr>
<td></td>
<td>Voice Call</td>
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</tr>
<tr>
<td></td>
<td>SMS, MMS*1</td>
<td></td>
</tr>
<tr>
<td><strong>W-CDMA/GSM End-to-End UE Test</strong></td>
<td>- MD8470A-02 2nd RF Option</td>
<td></td>
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<tr>
<td></td>
<td>- MU847010B W-CDMA Signalling Unit</td>
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<tr>
<td></td>
<td>- MU847020B GSM Signalling Unit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SMS, MMS*1</td>
<td></td>
</tr>
</tbody>
</table>

*1: Requires separate MMS application server.
5. Application Test Examples

5-3. Voice Call
Handset, Loopback, End-to-End UE Tests
5-3. Voice Call –Handset/Loopback/End-to-End UE Test– (1/3)

Voice Call Test (Handset/Loopback)
A voice call test is performed between a UE and handset by connecting the handset (standard accessory) to the MD8470A. Also, voice loopback*1 in the MD8470A performs a voice call test.

*1: Loopback supported by sample scenario.

Each caller ID can be set for voice calls from the WNS virtual phone to the mobile terminal.

<table>
<thead>
<tr>
<th>Phone ID Setting</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID</td>
<td>Sets phone number of virtual phone</td>
</tr>
<tr>
<td>International</td>
<td>Sets international call</td>
</tr>
<tr>
<td>Show ID</td>
<td>Sets announcement of caller’s phone number</td>
</tr>
<tr>
<td>Hide ID</td>
<td>Hides announcement of caller’s phone number</td>
</tr>
<tr>
<td>Unknown ID</td>
<td>Disables announcement of caller’s phone number</td>
</tr>
<tr>
<td>Payphone</td>
<td>Sets caller’s phone number to payphone</td>
</tr>
</tbody>
</table>
5-3. Voice Call –Handset/Loopback/End-to-End UE Test– (2/3)

Emergency Call Test

- WNS provides a function to test emergency calls originated from a mobile UE.
- Emergency is displayed on the WNS virtual phone after the mobile UE originates the emergency.
- Emergency call testing is supported with or without a Test USIM.
5-3. Voice Call – Handset/Loopback/End-to-End UE Tests – (3/3)

Voice Call Test (End-to-End UE Test)

By using CNS (Couple-UE Network Simulator), an end-to-end voice call test can be performed with one MD8470A*1 using a simple GUI.

*1: See slide 36 for required hardware and supported tests.

Also, end-to-end UE voice call testing*2 can be performed between two mobile UE sets by connecting them to two MD8470A sets connected by an Ethernet LAN cable (crossover type).

*2: The end-to-end UE test is supported by a sample scenario.
5-4. Access Class Barred (Rel. 99)
Normal, Barred, Emergency
5-4. Access Class Barred (Rel. 99)

Access Class Barred

- When the network sets access control parameters in the system information, call origination is restricted.
- Release 99-compliant restriction conditions can be set using the WNS Access Class Control window.
- Many application tests can be performed under restriction conditions, which is difficult on a live network.

Restriction conditions can be set at the WNS Access Class Control window. (See table on right.)

<table>
<thead>
<tr>
<th>Access Class Control</th>
<th>Normal: Origination from mobile station not restricted</th>
<th>Barred: Origination from mobile station restricted</th>
<th>Emergency: Origination from mobile station restricted excluding emergency calls</th>
</tr>
</thead>
</table>

Access Class Control Diagram:
- Normal: Call origination is allowed.
- Barred: Call origination is restricted.
- Emergency: Only emergency calls are allowed.

Virtual Phone Interface:
- Display shows access class options: Normal, Barred, Emergency.
5. Application Test Examples

5-5. Web Browsing, Contents Download
5-5. Web Browsing/Contents Download (1/11)

Packet Communication Test (Internal Server)

A single platform can perform functional testing of applications utilizing packet communications when an application server is installed in the MD8470A built-in PC.

*Using application server installed in MD8470A built-in PC

Connect Call Proc Ethernet to the Ethernet (0 or 1) of the MD8470A built-in PC.
External connection of various application servers supports functional tests of applications using packet communications.

*Using external application server

The standard-installed router connect function offers packet transmission to a different subnet via a router.

*Diagram of packet communications via router
5-5. Web Browsing/Contents Download (3/11)

Packet Rate Setting

- Using WNS supports setting of W-CDMA/HSDPA*1/HSUPA*2 Packet Rate at test start
- Easy packet communications testing for each bearer environment

*1: Requires MX847010A-11 HSDPA Software Option.
*2: Requires MX847010A-12 HSUPA Software Option.

<table>
<thead>
<tr>
<th>Packet Rate Setting</th>
<th>DL: 64k/UL: 64k</th>
<th>DL: 1.8M/UL: 1.46M</th>
</tr>
</thead>
<tbody>
<tr>
<td>DL: 128k/UL: 64k</td>
<td>DL: 1.8M/UL: 2.0M</td>
<td></td>
</tr>
<tr>
<td>DL: 384k/UL: 64k</td>
<td>DL: 1.8M/UL: 5.76M</td>
<td></td>
</tr>
<tr>
<td>DL: 384k/UL: 128k</td>
<td>DL: 3.6M/UL: 1.46M</td>
<td></td>
</tr>
<tr>
<td>DL: 384k/UL: 384k</td>
<td>DL: 3.6M/UL: 2.0M</td>
<td></td>
</tr>
<tr>
<td>DL: HS-Auto/UL: 384k</td>
<td>DL: 3.6M/UL: 5.76M</td>
<td></td>
</tr>
<tr>
<td>DL: 1.8M/UL: 384k</td>
<td>DL: 7.2M/UL: 1.46M</td>
<td></td>
</tr>
<tr>
<td>DL: 3.6M/UL: 384k</td>
<td>DL: 7.2M/UL: 5.76M</td>
<td></td>
</tr>
<tr>
<td>DL: 7.2M/UL: 384k</td>
<td>DL: 10.2M/UL: 1.46M</td>
<td></td>
</tr>
<tr>
<td>DL: 10.2M/UL: 384k</td>
<td>DL: 10.2M/UL: 2.0M</td>
<td></td>
</tr>
<tr>
<td>DL: 14.4M/UL: 384k</td>
<td>DL: 14.4M/UL: 5.76M</td>
<td></td>
</tr>
<tr>
<td>DL: 14.4M/UL: 2.0M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DL: 14.4M/UL: 5.76M</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5-5. Web Browsing/Contents Download (4/11)

Data Throughput Testing (Throughput Monitor Function)

- The built-in Throughput Monitor function\(^{(*)1}\) supports monitoring of IP data throughput performance and MAC-hs/e performance\(^{(*)2}\) in real time.
- Actual data throughput performance can be verified at a fixed rate or at a rate set decided by UE category and CQI value in HSDPA/HSUPA.
- An efficient development environment for optimizing terminal throughput is easily configured.

*1: Requires Version 6.00 or later of MX847010A W-CDMA/GSM Simulation Kit.
*2: Requires Version 7.00 of MX847010A W-CDMA/GSM Simulation Kit.
5-5. Web Browsing/Contents Download (5/11)

Measure Function

- The new built-in measure function on MX847010A V7.00 supports monitoring of Layer 1 and Layer 2 communication performance.
- Since some parameters such as CQI, ACK/NACK, BLER can be measured on the newly designed GUI, it allows users to configure effective test environment for determining failure during data throughput test by combining existing throughput monitor.
- Collected data using measure function can be saved as CSV format which offers offline analysis after testing.
Packet Preservation Function

- The PDP Context Preservation state occurs frequently on live networks when radio communications are broken off in tunnels, etc., or when the network is conserving radio resources.
  - Important to confirm normal mobile UE application operation when packet communications re-established
  - Network-indicated PDP Context Preservation executed easily using WNS

- RRC Connection released while maintaining PDP Context by pressing WNS Packet Preservation button during packet communications
- When mobile UE starts packet communications again, RRC Connection re-established without PDP Context Activation
RRC Status Change (1/2)

- The status of the Cell used by the mobile terminal is transitioned while packets are not moving during packet communications and the mobile terminal RRC Status is changed.
- A test environment emulating a live network can be configured at application testing using packet communications.

RRC Status Change Setting
When the time set for no communications after packet communications has elapsed, the RRC Status transitions from “CELL DCH” via “CELL FACH” to “CELL PCH”.

In addition, when packet communications is reopened from either the network side or mobile side while there is no packet communications, the RRC status returns to “CELL DCH” via “CELL FACH” from “CELL PCH”.

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5-5. Web Browsing/Contents Download (9/11)

Multiple PDP Context

- The Multiple PDP Context is supported in scenario-based W-CDMA and GPRS/EGPRS*1 testing  
  *1: Requires MX847010A-01EGPRS Software Option.

Multiple PDP Context Support Functions

- The Multiple PDP Contexts listed below are supported for W-CDMA and GPRS/EGPRS.
  - Primary PDP Context
  - Primary PDP Context + Primary PDP Context
  - Primary PDP Context + Secondary PDP Context

- The following resources are allocated to each PDP Context.
  - W-CDMA: DTCH for each separate Logical Channel Number (8PDP max.)
  - GPRS/EGPRS: Each separate NSAPI (8 types max.)

- Each PDP Context is identified using the following information.
  - IPv4 Source address type
  - IPv6 Source address type
  - Protocol identifier/ Next header type
  - Single destination port type
  - Destination port range type
  - Single source port type
  - Source port range type
5-5. Web Browsing/Contents Download (10/11)

Application Example (1): Video Streaming Test

A separate streaming server supports streaming tests using the MD8470A’s packet communications function.

*Using streaming server installed in MD8470A built-in PC

*Using external streaming server
Using CNS (Couple-UE Network Simulator), supports IP packet communications from two UE sets to one application server simultaneously\(^*1\). It is also possible to configure an even smaller footprint personal simulation environment by using the built-in PC as an application server.

- Connect Call Proc Ethernet to Ethernet (0 or 1) of MD8470A built-in PC.
- \(^*1\): Requires Second RF Option and two W-CDMA Signalling Units or two GSM Signalling Units.
5-6. UMTS Video Call Loopback, End-to-End UE Tests
Video Call Test (Loopback)

The video call loopback test is performed using WNS.

- Each caller ID can be set for video calls (loopback) from the WNS virtual phone to the mobile terminal.
Video Call Test (End-to-End UE Test)

Using CNS (Couple-UE Network Simulator), supports end-to-end video call tests with a MD8470A\(^1\) using simple GUI operation.

\(^1\): See slide 36 for the required hardware and supported tests.

Also, end-to-end UE video call testing\(^2\) can be performed between two mobile UE sets by connecting them to two MD8470A sets connected by an Ethernet LAN cable (crossover type).

\(^2\): The end-to-end UE test is supported by a sample scenario.
5-7. Messaging (SMS/MMS)
5-7. Messaging (SMS/MMS) (1/10)

MMS Test System Simulation Model
The MD8470A supports the testing of MMS (Multimedia Messaging Service), which is becoming more common in GSM/GPRS/W-CDMA (UMTS).
5-7. Messaging (SMS/MMS) (2/10)

MMS Test System Architecture [1]
Establishment of a test system combining the WNS (Wireless Network Simulator), SMSC (SMS Centre), MMSC (MMS Centre)*1 and WAP Gateway supports testing of MMS transmit functions (MMS Submit) and receive functions (MMS Notification/MMS Retrieval).

*1: Requires separate MMS application server.
5-7. Messaging (SMS/MMS) (3/10)

MMS Test System Architecture [2]

- When the MMSC*1 is installed in the MD8470A built-in PC, one MD8470A unit can perform MMS testing.
- The WAP Gateway (Kannel) is installed in MD8470A and is supported when the MMSC is running in the MD8470A.

*1: Requires MMS application server.
5-7. Messaging (SMS/MMS) (4/10)

What is SMSC?

- SMSC is software that runs as a SMS Centre and mediates SMS messages between an MMSC and WNS.
- The contents of received messages can be confirmed by the GUI.

*SMSC is installed as standard in the MD8470A.*
5-7. Messaging (SMS/MMS) (5/10)

What is SMSC?

- **Text/Binary SMS Editor**
  - SMSC is used for transmission/reception tests of SMS messages without MMSC. With a simple user interface, it can create and send arbitrary messages (Text SMS [7-bit ASCII, Unicode], Binary SMS) using GUI-based operation.
  - Possible to configure detailed settings such as Message Class (No Class, Class 0, Class 1, Class 2, Class 3) and confirm SMS Status Report requests (On/Off).

- **SMS Access setting**
  - Set the SMS message termination mode on Virtual Phone Setup of WNS
    - CS: SMS messages are terminated in CS mode.
    - PS: SMS messages are terminated in PS mode.
What is SMSC?

- **SMS Status Report Function**
  - This function supports sending of SMS messages requesting SMS-STATUS-REPORT from a mobile UE. In addition, the contents of the received report message (SMS-STATUS-REPORT) can be checked and edited in the Status Report Editor window.

- **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.
What is SMSC?

- **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 supports auto-sending of an SMS message from a mobile UE to an external application meeting the conditions for the received SMS destination address, permitting SMS data management at the external application as well as automatic testing.
5-7. Messaging (SMS/MMS) (8/10)

Supported MMS Test Variations [1]
Various MMS evaluation tests are supported using the MD8470A.

Supports MMS Submit & Retrieval with Test Server
Loopback
5-7. Messaging (SMS/MMS) (9/10)

Supported MMS Test Variations [2]
Various MMS evaluation tests are supported using the MD8470A.

- MMS Submit
- MMS Retrieval
- Ethernet
- UE-to-UE

And...
5-7. Messaging (SMS/MMS) (10/10)

End-to-End SMS/MMS Test with MD8470A

Using CNS (Couple-UE Network Simulator) end-to-end SMS/MMS*¹ tests can be performed with a MD8470A*² using simple GUI settings. End-to-end SMS/MMS tests between UE of different systems (W-CDMA<=>GSM) are also supported.

*²: See slide 36 for required hardware and supported tests.

*¹: Requires separate MMS application server.
5-8. Cell Broadcast (SMSCB/BMC)
The MD8470A can send SMSCB Messages by using the CBC (Cell Broadcast Centre) application and dedicated sample scenario for CBC. Various SMSCB tests are performed by setting the transmission interval, number of retransmission times, and various other parameters.
5-8. Cell Broadcast (SMSCB/BMC) (2/2)

W-CDMA Cell Broadcast: BMC
(Broadcast and Multicast Control)

The MD8470A supports W-CDMA Cell Broadcast testing. Users edit and run test scenarios to send CBS Messages and Schedule Messages using a new scenario library (SndBMCMMessage). A sample test scenario is provided for programming reference.
5-9. Service Interruption Test
5-9. Service Interruption Test (1/4)

Service Interruption Test

SMS interruptions during voice call and voice call interruption during packet communications, etc., are easily tested using WNS.

*Using external application server
## 5-9. Service Interruption Test (2/4)

### Service Interruption (Multi-Call) Test

The following service interruption tests can be performed using WNS.

#### WNS(W-CDMA/HSDPA/HSUPA)

<table>
<thead>
<tr>
<th>Status</th>
<th>Voice Call Interruption</th>
<th>Video Call Interruption</th>
<th>SMS Interruption</th>
<th>MMS Interruption</th>
</tr>
</thead>
<tbody>
<tr>
<td>During Voice Call</td>
<td>O</td>
<td></td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>During Packet Comm.*1</td>
<td>O</td>
<td></td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>During Video Call</td>
<td></td>
<td></td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

O: Testable (WNS)  O: Testable (Sample Scenario)

*1: Requires MX847010A-11 HSDPA Software Option for HSDPA and MX847010A-12 HSUPA Software Option for HSUPA

#### WNS(GSM/GPRS/EGPRS)

<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>O</td>
<td>O</td>
</tr>
<tr>
<td>During Packet Comm.*2</td>
<td>O *3</td>
<td>O *3</td>
<td>O *3</td>
</tr>
</tbody>
</table>

O: Testable (WNS)  O: Testable (Sample Scenario)

*2: Requires MX847010A-01 EGPRS Software Option for EGPRS
*3: Only when packet data not sent

Since the MD8470A implements a web server and video call loopback function, one MD8470A unit supports some interruption tests without external equipment.
5-9. Service Interruption Test (3/4)

Service Interruption (Multi-Call) Test in End-to-End Test Environment

Using CNS (Couple-UE Network Simulator), it is possible to perform various service interruption tests in an end-to-end test environment*1 with an MD8470A, such as voice call termination from another UE during IP packet communication.

*1: See slide 36 for required hardware and supported tests.

CNS (W-CDMA/HSDPA/HSUPA UE to W-CDMA/HSDPA/HSUPA UE)

<table>
<thead>
<tr>
<th>Status</th>
<th>Voice Call Interruption</th>
<th>Video Call Interruption</th>
<th>SMS Interruption</th>
<th>MMS Interruption</th>
</tr>
</thead>
<tbody>
<tr>
<td>During E-to-E Voice Call</td>
<td>O</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>During Packet Comm.*2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>During E-to-E Video Call</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

O: Testable (CNS)

*2: Requires MX847010A-11 HSDPA Software Option for HSDPA and MX847010A-12 HSUPA Software Option for HSUPA

CNS (GSM/GPRS/EGPRS UE to GSM/GPRS/EGPRS UE)

<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 E-to-E Voice Call</td>
<td>0</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>During Packet Comm.*3</td>
<td>O *4</td>
<td>O *4</td>
<td>O *4</td>
</tr>
</tbody>
</table>

O: Testable (CNS)

*3: Requires MX847010A-01 EGPRS Software option for EGPRS case

*4: Only when packet data not sent
5-9. Service Interruption Test (4/4)

DTM (Dual Transfer Mode)

- This function supports simultaneous scenario-based Dual Transfer Mode (DTM) testing for both GSM (CS: Voice) and GPRS (PS: packet communications)*1. And adding the MX847010A-01 EGPRS Software option supports DTM testing for GSM (CS) + EGPRS (PS).

- Moreover, the operation of applications using packet communications during voice calling can be verified.

*1: Requires MU847020B GSM Signalling Unit.

Supported DTM Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Features</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Layer 1</td>
<td>CS/PS Frequency</td>
<td>Same frequency for CS/PS</td>
</tr>
<tr>
<td></td>
<td>Transmission Power Setting</td>
<td>CS and PS set separately</td>
</tr>
<tr>
<td></td>
<td>Slot Operation</td>
<td>Multislot operation only supported. (Single slot operation not supported)</td>
</tr>
<tr>
<td></td>
<td>DTM Multislot Class</td>
<td>5, 9, 11</td>
</tr>
<tr>
<td>Signalling Procedure</td>
<td></td>
<td>Both of CS⇔CS+PS, PS⇔PS+CS supported</td>
</tr>
<tr>
<td>EGPRS Capability</td>
<td></td>
<td>Voice + EGPRS supported*2</td>
</tr>
<tr>
<td>Reference Version for 3GPP</td>
<td></td>
<td>3GPP Rel. 99</td>
</tr>
</tbody>
</table>

*2: Requires MX847010A-01 EGPRS Software option.
5. Application Test Examples

5-10. Inter-System Handover Test (Inter-RAT)
5-10. Inter-System Handover Test (Inter-RAT)

Inter-RAT Test (W-CDMA/HSDPA ↔ GSM/GPRS/EGPRS)

• The rapid spread of dual-mode W-CDMA/GSM mobile sets means Inter-RAT is becoming a key technology in completing network compatibility.

• The MD8470A offers the following scenario-based Inter-RAT (W-CDMA/HSDPA ↔ GSM/GPRS/EGPRS) testing*1 plus wide support for application function testing and general operation verification testing of W-CDMA/GSM dual-mode mobile terminals.

*1: Requires Second RF Option, W-CDMA Signalling Unit and GSM Signalling Unit.

Inter-RAT Handover

- Inter system cell reselection to UTRAN
- Inter system cell reselection from UTRAN
- Inter system handover from UTRAN/To GSM/Speech
- Inter system handover to UTRAN/From GSM/Speech
- Inter-RAT cell change order from UTRAN/To GPRS
- Inter-RAT cell change order to UTRAN/From GPRS
- Inter-RAT cell reselection to UTRAN/From GPRS
- Inter-RAT cell change order from UTRAN/To EGPRS
- Inter-RAT cell change order to UTRAN/From EGPRS
- Inter-RAT cell reselection to UTRAN/From EGPRS
5-11. Supplementary Services (SS) Tests
Emergency Call, Multiparty, Call Waiting, USSD…
5-11. Supplementary Services (SS) Test
–Emergency Call/Multiparty/Call Waiting/USSD–

Supplementary Services Functional Tests

A scenario can freely describe the transmission/reception of messages at the Layer 3 level. Therefore, creation of corresponding scenarios supports functional tests of supplementary services.

Sample scenarios for supplementary services for GSM/GPRS and W-CDMA can be downloaded from the dedicated MD8470A web site.
5. Application Test Examples

5-12. Protocol Analysis
– RRC, NAS (RR, MM, CC, GMM, SM), SS, SMS, IP, WAP, H.245 –
5-12. Protocol Analysis <RRC, NAS (RR, MM, CC, GMM, SM), SS, SMS> (1/3)

- When edited and compiled scenarios are loaded to the dedicated control software and executed, simulations are performed by controlling the MD8470A.
- After the test, the decode function for protocol messages (RRC, NAS [RR, CC, MM, GMM, SM], SMS, SS [Supplementary Services] Config) and a filtering function support analysis of simulation results.
TCP/IP Data Analysis

Combined use with Ethereal captures, decodes, and displays TCP/IP data at packet communications.

Displays captured TCP/IP data
The additional function offers offline analysis of the log of the H.245 video call control protocol. When a video call test is performed, just the H.245 trace data can be saved in the pcap format used by Ethereal, etc. Combined use with Ethereal supports decoded display of H.245 data.
6. External Control Interface
**MX847010A External Control Interface**

**Optimum for R&D/UE Verification**
- Supports Automatic and Continuous Testing

- The provided DLL library allows external applications to control the MX847010A Control Software. Using this library, external applications can control scenario loading, parameter setting, and simulation execution to support multiple scenarios, repeated testing, and automated test systems.

---

The Scenario Scheduler application software is bundled with the MD8470A to execute scenarios continuously using the MX847010A Control Software external control function.
WNS External Control Interface

Optimum for R&D/UE Verification
- Supports Automatic and Continuous Testing

- WNS can be controlled from an external application by calling a WNS function from the MX847010A Control Software external control library (RmtSvcLib.dll).
- Voice, Video, Packet, SMS, MMS and Out-of-Service tests can be executed automatically by calling WNS External Control APIs from the external application.
- The external application can obtain UE registration and bearer establishment status by using the Status Notification function.
7. Units, Options, Software
Units/Options/Software (1/2)

Main Frame
- MD8470A Signalling Tester

Hardware Options
- MU847010B W-CDMA/HSPA Signalling Unit
- MU847020B GSM Signalling Unit
- MU847090B ISDN Interface Unit
- MD8470A-02 Second RF Option

Software Options
- MX847010A W-CDMA/GSM Simulation Kit
- MX847010A-01 EGPRS Software
- MX847010A-11 HSDPA Software
- MX847010A-12 HSUPA Software
- MX847011A W-CDMA Ciphering Software
- MX847021A GSM/GPRS Ciphering Software

Software Support Contract
- MX847010A-20 MX847010A Support Service (One Year)

Service Options
- MD8470A-90 Extended Three-year Warranty Service
- MD8470A-91 Extended Five-year Warranty Service
**Units/Options/Software (2/2)**

### Examples of Test Configurations

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>W-CDMA Test Configuration</td>
<td>v</td>
<td>v</td>
<td>*1</td>
<td>v</td>
<td>v</td>
<td>*1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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*1: Optional
*2: End to End UE test can be performed in a MD8470A (CNS: Couple-UE Network Simulator)
*3: Minimum configuration
*4: End to end voice call, video call, SMS and MMS test can be performed (MMS application server is separately required.)
*5: End to end voice call, SMS and MMS test can be performed (MMS application server is separately required.)
*6: End to end SMS and MMS test can be performed (MMS application server is separately required.)
*7: Refer to the above *4, *5, *6 about feasible end to end test.

- Compiling test scenarios requires Microsoft® Visual C++®.net (Standard 2003) or Microsoft® Visual Studio® 2005 Standard Edition*. Also, a USB CD or DVD drive is required to install Visual C++®.net (Standard 2003) or Visual Studio® 2005 Standard Edition in the MD8470A.
- Order either English or Japanese Windows® XP when ordering the MD8470A.

*1: Version 5.00 or higher of the MX847010A W-CDMA/GSM Simulation Kit is required.

*Microsoft Visual C++ and Visual Studio are registered trademarks of Microsoft Corporation in the USA and other countries.
*Windows is a registered trademark of Microsoft Corporation in the USA and other countries.
8. Outline of Support Service
MX847010A-20: MX847010A Support Service (One Year)

- **Basic Policy**
  - One-year support contract

- **Support Details**
  - Responses to enquiries
    - Dedicated mail address for enquiries
  - Software version upgrades for duration of contract (Web download)
  - Maintenance releases (including bug fixes)

Please note this option is mandatory.