Signalling Tester
MD8475B
MD8475B Overview

MD8475B
Signalling Tester

- LTE-A 3CA/4CA tests with 8 Tx and 4 Rx RF signals (up to 6 GHz)
- 2G to 4G system tests (W/G/C2K/EVDO/TDS/LTE)
- CA mobility tests
- Throughput tests at 1 Gbps
- Easy UE connection using integrated RF front-end
All-in-One Wireless Device Tests

MD8475B Signalling Tester

- Device battery life and heat-generation tests
- Strong mobile application tests using simple GUI and built-in IMS server
- Roaming and complex mobility tests
SmartStudio - Easy Operation with State-Machine GUI

- Interactive test environment **without complex test scripts**
- Built-in IMS server
- Network parameter settings matching user test environment
- Automatic call setting matching DUT ability
- Unique graphical SMS/PWS Centre applications for SMS/CMAS/ETWS service

Various System

 IMS Services

 SMS Centre

Extensive Network Parameters

- LTE FDD
- LTE TDD
- W-CDMA HSPA evo DC-HSDPA
- GSM GPRS EGPRS
- CDMA2000 1X/1xEV-DO
- TD-SCDMA TD-HSPA
### Mobility Test - Multi-System Configuration

SmartStudio supports multi-system simulation without complex test scripts.

- Cell Selection & Reselection
- Handover (Intra/Inter-RAT)
  - Redirection/Active HO
- CSFB/e1xCSFB
- SRVCC
- Roaming

#### 2-cell Configuration

<table>
<thead>
<tr>
<th></th>
<th>BTS1/LTE</th>
<th>BTS1/W-CDMA</th>
<th>BTS1/GSM</th>
<th>BTS1/CDMA2000</th>
<th>BTS1/TD-SCDMA</th>
<th>BTS1/WLAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>LTE</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>W-CDMA</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>n/a</td>
<td>n/a</td>
<td>✓</td>
</tr>
<tr>
<td>GSM</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>n/a</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>CDMA2000</td>
<td>✓</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>TD-SCDMA</td>
<td>✓</td>
<td>n/a</td>
<td>✓</td>
<td>n/a</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>WLAN</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>n/a</td>
</tr>
</tbody>
</table>

#### 3-cell Configuration

<table>
<thead>
<tr>
<th></th>
<th>BTS1/LTE/LTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>LTE</td>
<td>✓</td>
</tr>
<tr>
<td>W-CDMA</td>
<td>✓</td>
</tr>
<tr>
<td>GSM</td>
<td>✓</td>
</tr>
<tr>
<td>CDMA2000</td>
<td>✓</td>
</tr>
<tr>
<td>TD-SCDMA</td>
<td>✓</td>
</tr>
</tbody>
</table>

- 4-cell Configuration

<table>
<thead>
<tr>
<th></th>
<th>BTS1/LTE/LTE</th>
</tr>
</thead>
<tbody>
<tr>
<td>LTE/LTE</td>
<td>✓</td>
</tr>
</tbody>
</table>

#### Repeatability

*Repeatable simulation impossible on live network*
Simple Throughput Test Environment

- Built-in IP packet generator simplifies data throughput test environment
- Easier data throughput test automation with good repeatability

Conventional throughput testing
- Must adjust radio layer and server settings for each application
- Performance depends on PC specifications and Ethernet load

Throughput testing with MD8475B
- Single GUI for adjusting application radio layer and server settings
- Performance independent of PC specifications and Ethernet load

**All-in-one throughput tests up to 1 Gbps**

Use common iperf application for UE Tx and Rx throughput tests
Comprehensive Test Environment - IMS Services

- **Key Unique Points**
  - **Ease-of-use**
    - SmartStudio GUI for easy IMS test configuration and setting
    - No complex test scripts
  - **Comprehensive IMS Tests**
    - Supports wide test range, including irregular and supplementary services tests
    - Add-in Service PSAP supports emergency test and loopback voice data test functions
  - **Analysis and Debug**
    - Simultaneous Wireshark and signalling protocol logging
  - **Built-in Servers**
    - All-in-one IMS and application servers
    - Small footprint without external server
  - **Multi-RAT Expandability**
    - Expandability for SRVCC tests
**IMS Abnormal Test - IMS/XCAP Script Interface**

- Test sequence scripting using script interface to confirm SIP/XCAP operation and perform test

**Property Area:**
- Set network parameters such as IP Address

**Script Area:**
- Edit and run message sequence between UE and CSCF, and UE and server (Ut interface)

**Sample Script:**
- Registration
- Voice (VoLTE) MO/MT
- SMS (over IMS) send/receive
- Communication barring

---

**Script Sequence**

<table>
<thead>
<tr>
<th>Step</th>
<th>Direction</th>
<th>Server</th>
<th>Message</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td></td>
<td></td>
<td>&lt;Wait&gt; 1000ms</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td></td>
<td></td>
<td>&lt;Sentence&gt; End</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td></td>
<td></td>
<td>&lt;OnCall&gt; End</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>→</td>
<td>CSCF1</td>
<td>REGISTER * SIP/2.0</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>←</td>
<td>CSCF1</td>
<td>SIP/2.0 200 OK</td>
<td>1st REGISTER</td>
</tr>
<tr>
<td>28</td>
<td></td>
<td></td>
<td>&lt;Pause&gt; ContinueNextStep</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td></td>
<td></td>
<td>&lt;Remake&gt;</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>→</td>
<td>CSCF1</td>
<td>REGISTER * SIP/2.0</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>←</td>
<td>CSCF1</td>
<td>SIP/2.0 401 Unauthorized</td>
<td>Unauthorized</td>
</tr>
<tr>
<td>32</td>
<td></td>
<td></td>
<td>&lt;Pause&gt; ContinueNextStep</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>←</td>
<td>CSCF1</td>
<td>REGISTER * SIP/2.0</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td></td>
<td></td>
<td>SIP/2.0 200 OK</td>
<td>2nd REGISTER</td>
</tr>
<tr>
<td>35</td>
<td>←</td>
<td>CSCF1</td>
<td>REGISTER * SIP/2.0</td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>←</td>
<td>CSCF1</td>
<td>SIP/2.0 200 OK</td>
<td></td>
</tr>
</tbody>
</table>

**Script Message**

- How to handle unexpected messages

---

- Anritsu envision: ensure
VoLTE Quality Test - RTP Frame Control

Check operation at abnormal condition and establish current consumption at stable call

Features

- **VoLTE Loopback**
  - Loopback voice and video data to UE
  - **UL:** Voice/video
  - **DL:** Loopback voice/video
  - Loopback data delay and loss also supported
    - (Delay, Loss, Edit CMR (Codec Mode Request))
  - *Supported by this option*

- **Fixed Pattern**
  - Send fixed voice data pattern to UE
  - **DL:** Fixed pattern
  - **UL:** Voice
  - *Supported by this option*

- **Mute/Silent (DTX)**
  - Send SID frame periodically to UE.
  - **UL:** Voice
  - **DL:** SID frame
  - *Supported by this option*

- **No Data**
  - Supports UE connection but does not send any data
  - **UL:** Voice
  - **DL:** No data
  - *Supported by this option*

Requires RTP frame control option

Customize RTP Frame

IMS Server

Loopback voice

Voice

VoLTE Loopback

Send fixed pattern to UE
Message Service Test - SMS/RCS

- Built-in SMS Centre supports both procedures
  - SMS over SGSN
  - SMS over IMS
- Built-in IMS server supports RCS features
  - 1-to-1 chat
  - Group chat
  - Standalone messaging
Message Service Test - Public Warning System

- Public Warning System (PWS) message test
  - Earthquake Tsunami Warning System (ETWS) on LTE/WCDMA
    - Primary Notification
    - Secondary Notification
  - Commercial Mobile Alert Service (CMAS) on LTE/W-CDMA/CDMA2000/GSM
Network Failure Simulation - UE/Network Trigger (1/2)

- Abnormal testing with easy setup

  - Attach Reject
    Setting specific messages when the terminal connects to the base station can be used to reject terminal connection requests.
    (LTE, W-CDMA, GSM, TD-SCDMA systems supported)

  - APN Reject
    Setting specific messages when the terminal connects to the network server can be used to reject terminal connection requests.
    (LTE, W-CDMA, GSM, TD-SCDMA, EVDO systems supported)
Network Failure Simulation - UE/Network Trigger (2/2)

• Abnormal testing with easy setup
  – UE Message Reject
    Sets reject condition when MD8475A receives specified message from UE

Note: The UE Trigger Information Condition can specify several conditions at one UE Message to Accept, Reject or Ignore according to setting.

  e.g. One Specified Message -> Condition A -> Reject
       -> Condition B -> Ignore
       -> Condition C -> Accept
WLAN Calling - WLAN Offload Application

SmartStudio supports various IMS and ePDG parameters required for application tests

- Note: ePDG might be on external PC due to downlink data switching method
- Requires commercial WLAN-AP (CISCO AIR-SAP2602E-x-K9 recommended)
**Test Automation Framework - SmartStudio Manager**

Helps cut UE verification cycle and improves regression test efficiency
- Minimize field/drive testing, characterize performance, test applications

- Easy to use without requiring specialist knowledge of 3GPP protocols
  - Intuitive GUI to expedite creation and execution of test cases
- Evaluates application behavior under different network conditions
  - Simulate different QoS, data throughput and mobility scenarios
- Captures logs and reports results to application developer
  - Provides protocol log of message sequence for analysis

---

<table>
<thead>
<tr>
<th>Service</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobility_GG_Voice_Handover</td>
<td>Test Automation Framework - SmartStudio Manager</td>
</tr>
<tr>
<td>Mobility_LL_Handover</td>
<td>Helps cut UE verification cycle and improves regression test efficiency</td>
</tr>
<tr>
<td>Mobility_TT_Voice_Packet_Hard_Handover</td>
<td>Minimize field/drive testing, characterize performance, test applications</td>
</tr>
<tr>
<td>Mobility_SelResel</td>
<td>Easy to use without requiring specialist knowledge of 3GPP protocols</td>
</tr>
<tr>
<td>Mobility_LL_Redirection</td>
<td>Intuitive GUI to expedite creation and execution of test cases</td>
</tr>
<tr>
<td>Mobility_TG_SelResel</td>
<td>Evaluates application behavior under different network conditions</td>
</tr>
<tr>
<td>Mobility_TT_SelResel</td>
<td>Simulate different QoS, data throughput and mobility scenarios</td>
</tr>
<tr>
<td>Mobility_WW_Voice_Hard_Handover</td>
<td>Captures logs and reports results to application developer</td>
</tr>
<tr>
<td>Mobility_WW_Voice_Soft_Handover</td>
<td>Provides protocol log of message sequence for analysis</td>
</tr>
</tbody>
</table>

---

**More than 180 various sample test cases for fully automated regression and stress tests**
Battery Consumption Test - SmartStudio Manager

Basic TS09 Tests
• Stand-by Test
• Talk Time Test
• Packet Switch Transfer Test
• Browsing Test
• Streaming Content Test
• Video Telephony Test
• FTP Download Test

SmartStudio Manager

Current consumption vs time plot

Running average and latest measured current value

Each raw data sample saved to Report folder as CSV file

MD8475B

Power Supply

Anritsu envision: ensure
Application Test - Internet Connection

Easily simulation for complex applications
➢ Stable operation check and current consumption under real Smartphone usage conditions

- Ethernet A (LTE data)
- Ethernet 0 (192.168.137.1)
- Ethernet 1 (Auto Setting)
- Internet connection
- MD8475B
- Test device (192.168.137.2)
- Current Consumption
MD8475B Product Overview

- 8 Tx and 4 Rx RF Signals for CA
- 1.2 Gbps Throughput Test for 3CCs 4x4MIMO in All-in-One MD8475B

Multi-system Platform
- W-CDMA/HSPA/HSPA evo/DC-HSDPA, GSM/GPRS/EGPRS
- CDMA2000 1X/EV-DO, TD-SCDMA/HSPA

Easy Operation with State-Machine Based “SmartStudio” GUI

2-cell IntraRAT/InterRAT Platform
- 2-cell/3-cell IntraRAT: LTE 3-cell, W-CDMA 2-cell, GSM 2-cell , TDS 2-cell
- 2 system InterRAT: LTE/LTE/W, LTE/LTE/G, LTE/LTE/C2K, LTE/LTE/TD

Built-in IMS Service Functions
- CSCF/DHCP/DNS Server Functions
- NDP/XCAP/GBA/Early Media Functions
- IMS Supplementary Services
- RTP Control for VoLTE Quality Test
- RCS (Rich Communication Suite)
- Script-based I/F for Advanced Tests

Built-in SMS Centre

Built-in PWS Centre
- ETWS (LTE/W-CDMA/GSM)
- CMAS (LTE/W-CDMA/GSM/cdma2000)

Built-in UE/Network Trigger Functions
- Sub-normal conditions (LTE/W-CDMA/GSM/TD-SCDMA)

- WLAN Offloadding
  - EAP Authentication
  - ePDG Access
  - ANDSF Policy Distribution

Automation
- Remote SmartStudio Control
- Script-based Automation Engine
- More than 160 sample test cases included