



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



Battery Life



Data
Throughput



Inter-RAT



Roaming



IMS-VoLTE



Messaging



ETWS/CMAS



RCS



Voice
Quality



Wi-Fi Offload



USIM



eCall



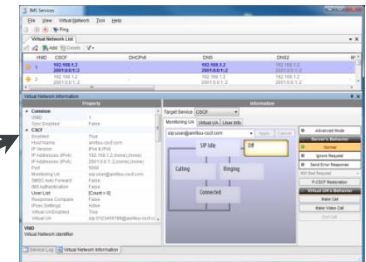
- Device battery life and heat-generation tests
- Strong mobile application tests using simple GUI and built-in IMS server
- Roaming and complex mobility tests

SmartStudio - Easy Operation with State-Machine GUI

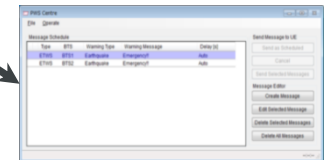
- Interactive test environment **without complex test scripts**
- Built-in IMS server
- Network parameter settings matching user test environment
- Automatic call setting matching DUT ability
- Unique graphical SMS/PWS Centre applications for SMS/CMAS/ETWS service



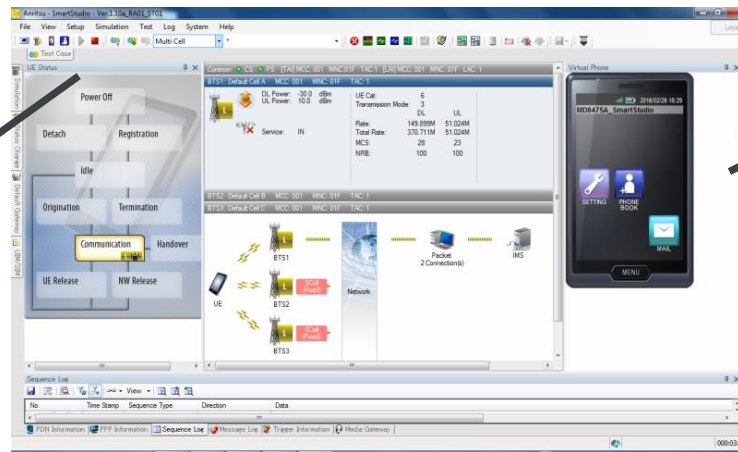
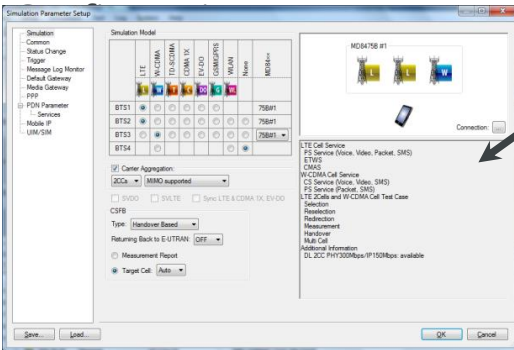
IMS Services



SMS Centre



Various System



Extensive Network Parameters

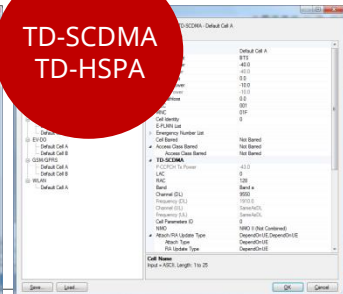
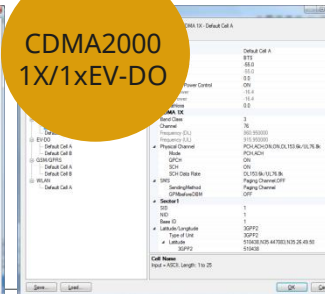
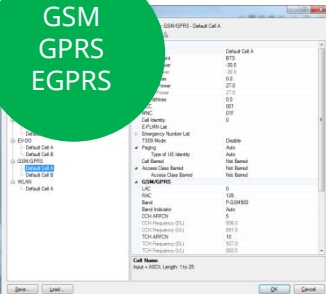
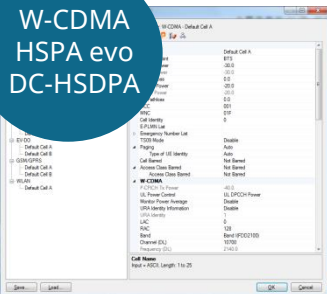
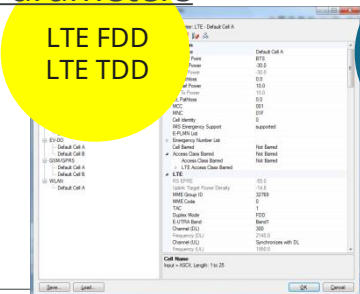
LTE FDD
LTE TDD

W-CDMA
HSPA evo
DC-HSDPA

GSM
GPRS
EGPRS

CDMA2000
1X/1xEV-DO

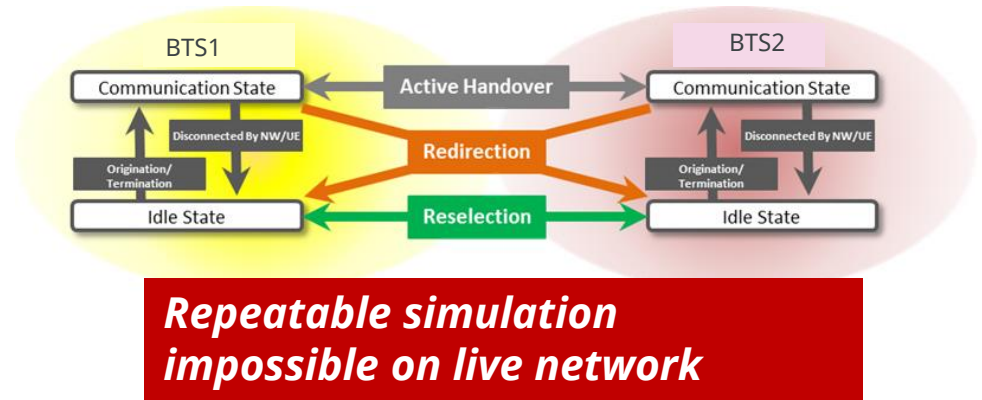
TD-SCDMA
TD-HSPA



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

BTS1 \ BTS2	LTE	W-CDMA	GSM	CDMA2000	TD-SCDMA	WLAN
LTE	✓	✓	✓	✓	✓	✓
W-CDMA	✓	✓	✓	n/a	n/a	✓
GSM	✓	✓	✓	n/a	✓	✓
CDMA2000	✓	n/a	n/a	n/a	n/a	✓
TD-SCDMA	✓	n/a	✓	n/a	✓	✓
WLAN	✓	✓	✓	✓	✓	n/a

- 3-cell Configuration

BTS1/BTS2 \ BTS3	LTE/LTE
LTE	✓
W-CDMA	✓
GSM	✓
CDMA2000	✓
TD-SCDMA	✓

- 4-cell Configuration

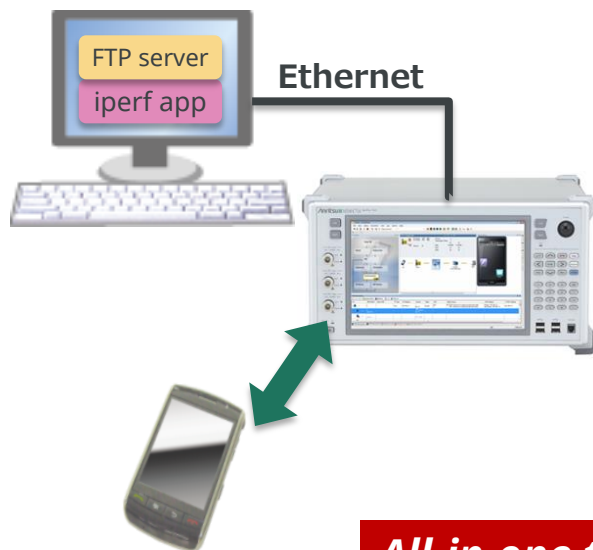
BTS1/BTS2 \ BTS3/BTS4	LTE/LTE
LTE/LTE	✓

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



All-in-one throughput tests up to 1 Gbps

Throughput testing with MD8475B

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



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



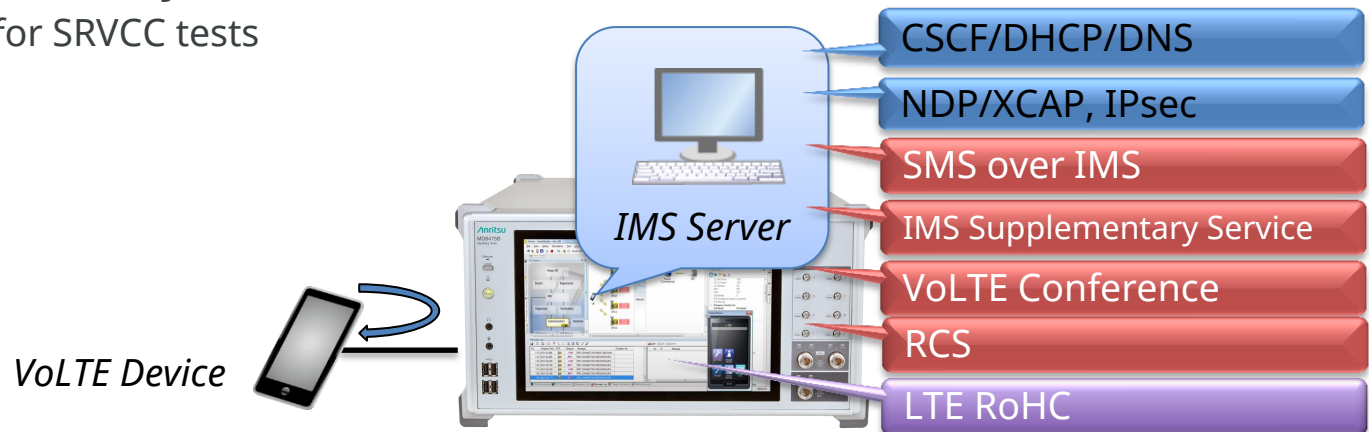
Built-in Servers

- All-in-one IMS and application servers
- Small footprint without external server



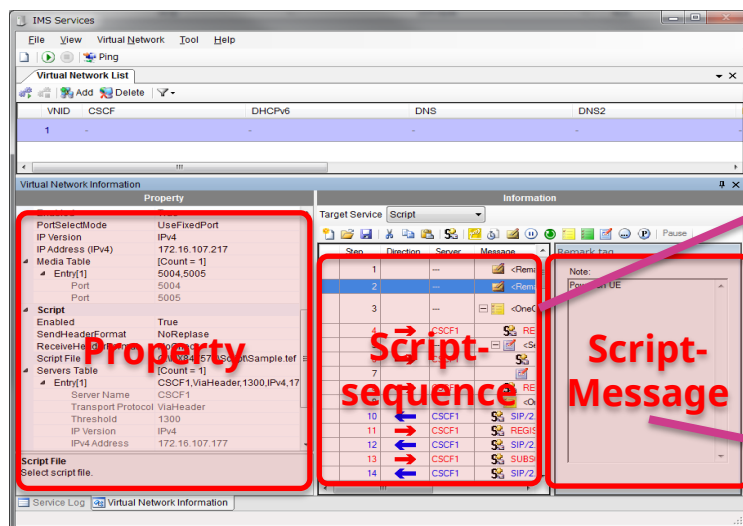
Multi-RAT Expandability

- Expandability for SRVCC tests



IMS Abnormal Test - IMS/XCAP Script Interface

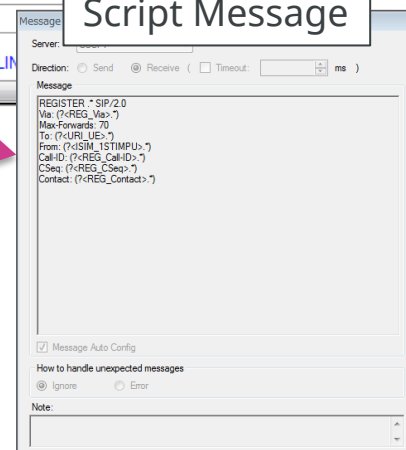
- Test sequence scripting using script interface to confirm SIP/XCAP operation and perform test



Script Sequence

Step	Direction	Server	Message	Note
23			<Wait> 1000ms	
24			<Sentence> End	
25			<OneOf> End	
26	→	CSCF1	REGISTER.* SIP/2.0	
27	←	CSCF1	SIP/2.0 200 OK	
28			<Pause> ContinueNextStep	
29			<Remark>	Power on UE
30	→	CSCF1	REGISTER.* SIP/2.0	1st REGISTER
31	←	CSCF1	SIP/2.0 401 Unauthorized	Unauthorized
32	→	CSCF1	REGISTER.* SIP/2.0	2nd REGISTER
33	←	CSCF1	SIP/2.0 200 OK	REGISTER
34	→	CSCF1	SUBSCRIBE.* SIP/2.0	
35	←	CSCF1	SIP/2.0 200 OK	
36	←	CSCF1	NOTIFY tel:%DEFINE.CALLIN SIP/2.0	

Script Message



Property Area:

- Set network parameters such as IP Address

Script Area:

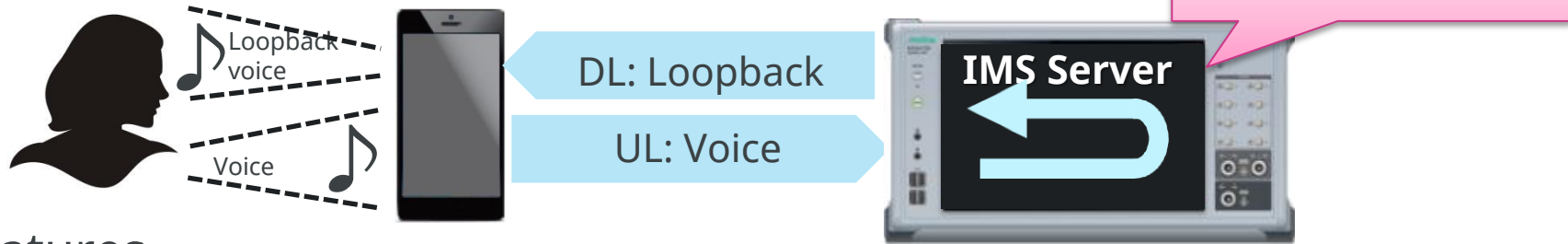
- Edit and run message sequence between UE and CSCF, and UE and server (Ut interface)

Sample Script:

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

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



DL: Loopback voice/video

UL: Voice/video



Loopback data delay and loss also supported
(Delay, Loss, Edit CMR (Codec Mode Request))

**Supported by this option*

■ Mute/Silent (DTX)

Send SID frame periodically to UE.



DL: SID frame

UL: Voice



**Supported by this option*

■ Fixed Pattern

Send fixed voice data pattern to UE



DL: Fixed pattern

UL: Voice



**Supported by this option*

■ No Data

Supports UE connection but does not send any data



DL: No data

UL: Voice

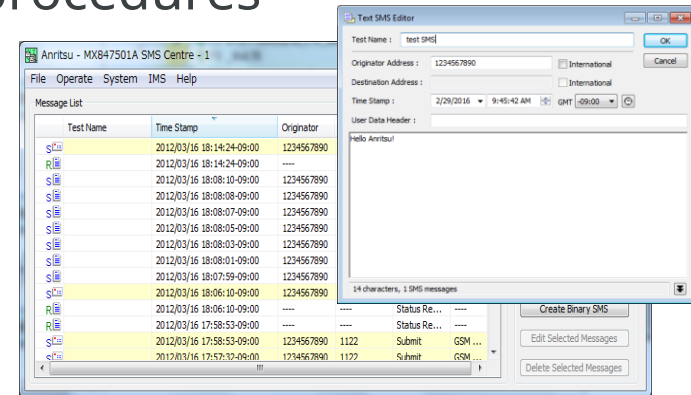


**Supported by this option*

Requires RTP frame control option

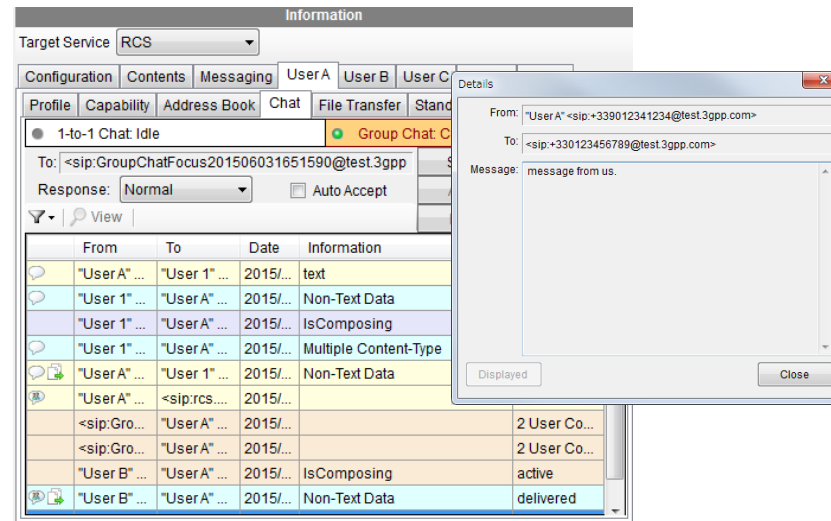
Message Service Test - SMS/RCS

- Built-in SMS Centre supports both procedures
 - SMS over SGSN
 - SMS over IMS



SMS Centre

- Built-in IMS server supports RCS features
 - 1-to-1 chat
 - Group chat
 - Standalone messaging



RCS Service

Requires RCS option

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



PWS Centre

File Operate

Message Schedule

Type	BTS	Warning Type	Warning Message	Delay [s]
ETWS	BTS1	Earthquake	Emergency!!	Auto
ETWS	BTS2	Earthquake	Emergency!!	Auto

ETWS (LTE/W)

Send Message to UE

Message Editor

System: LTE/W-CDMA Type: ETWS BTS1 BTS2

Delay Time: Auto Manual 1 [s]

Common Setting

Serial Number: 3000 Edit

Message ID: 1100

Warning Type Value: Earthquake

☒ Activate Emergency User Alert

☒ Activate Popup on the Display

☐ Add Warning Security Information

Time Stamp: 2012/09/13 21:43:26 GMT: -09:00

☒ Secondary Notification

Message ID: 1100 ☒ Same Primary Notification

Repetition Period: 2 [s]

Number of Broadcasts Requested: 1

Si-Periodicity: 32

☐ Send Schedule Message

Message Contents Type: Text

Data Coding Scheme: 01 Language Code:

Number of Segments: Auto Manual 1

Warning Message: Emergency!!

PWS Centre

CMAS (LTE/W/G)

Message Editor

System: LTE/W-CDMA Type: CMAS BTS1 BTS2

Delay Time: Auto Manual 1 [s]

Common Setting

Serial Number: 3000 Edit

Message ID: 1100

Repetition Period: 2 [s]

Number of Broadcasts Requested: 1

Si-Periodicity: 32

☐ Send Schedule Message

Message Contents Type: Text

Data Coding Scheme: 01 Language Code:

Number of Segments: Auto Manual 1

Warning Message: Emergency!!

CMAS (CDMA2000)

Message Editor

System: CDMA2000 Type: CMAS BTS1 BTS2

Delay Time: Auto Manual 1 [s]

☐ Message Center Time Stamp (UTC) ☐ Validity Period Absolute (UTC)

2012/09/13 21:45:03 Auto 2012/09/13 21:45:03

☐ Validity Period Relative

Valid until specified time 5 minutes

☒ Priority Indicator Emergency ☒ Language Indicator Unknown or unspecified

☒ Alert on Message Delivery Use Mobile default alert

☒ Category Presidential-Level Alert

☐ Call-Back Number

Address:

Digit Mode: 4-bit DTMF digits Number Type: Unknown

Number Plan: Unknown

☒ Message Display Mode Immediate Display

User Data

☒ recordType02

identifier 1100 alert handling Presidential-Level Alert

expires 2012/07/0 20:40:06 language Unknown or unspecified

☒ recordType01

category Geo response type Shelter severity Extreme

urgency Immediate certainty Observed

☒ recordType00 (Alert text)

char set 7-bit ASCII

Emergency!!

Network Failure Simulation - UE/Network Trigger (1/2)

- Abnormal testing with easy setup

- Attach Reject

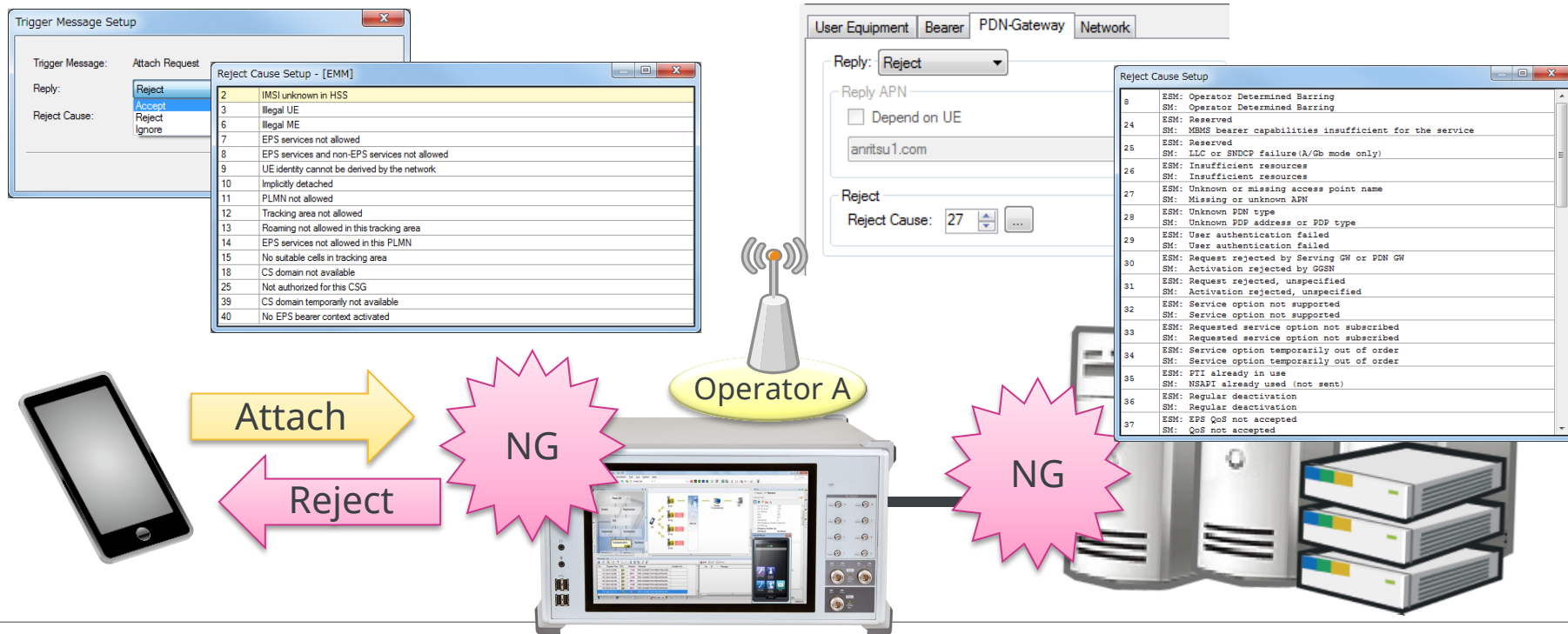
Setting specific messages when the terminal connects to the base station can be used to reject terminal connection requests.

(LTE, W-CDMA, GSM, TD-SCDMA systems supported)

- APN Reject

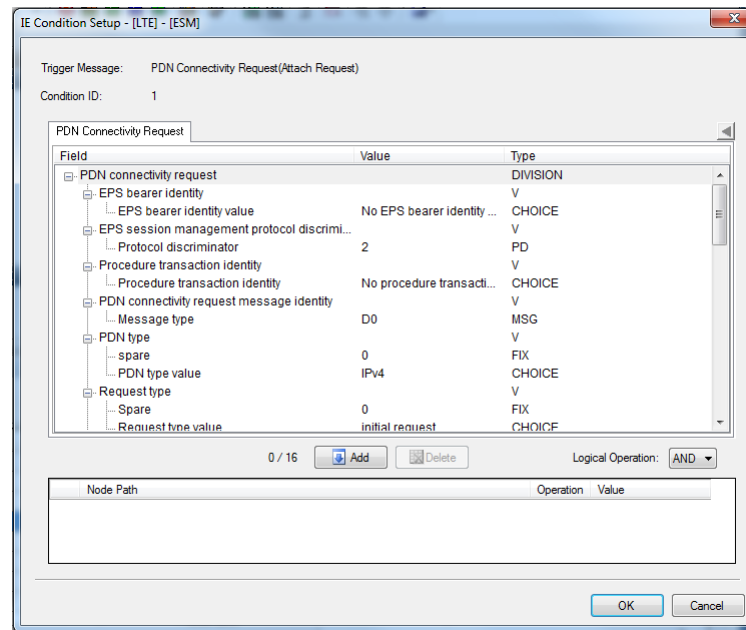
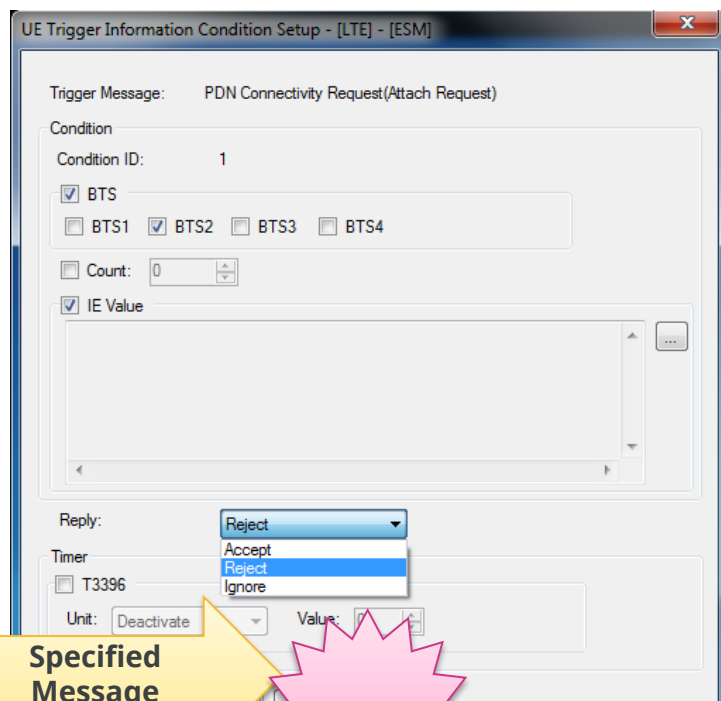
Setting specific messages when the terminal connects to the network server can be used to reject terminal connection requests.

(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

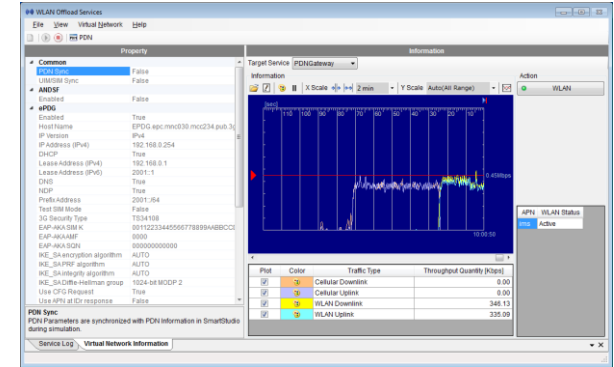
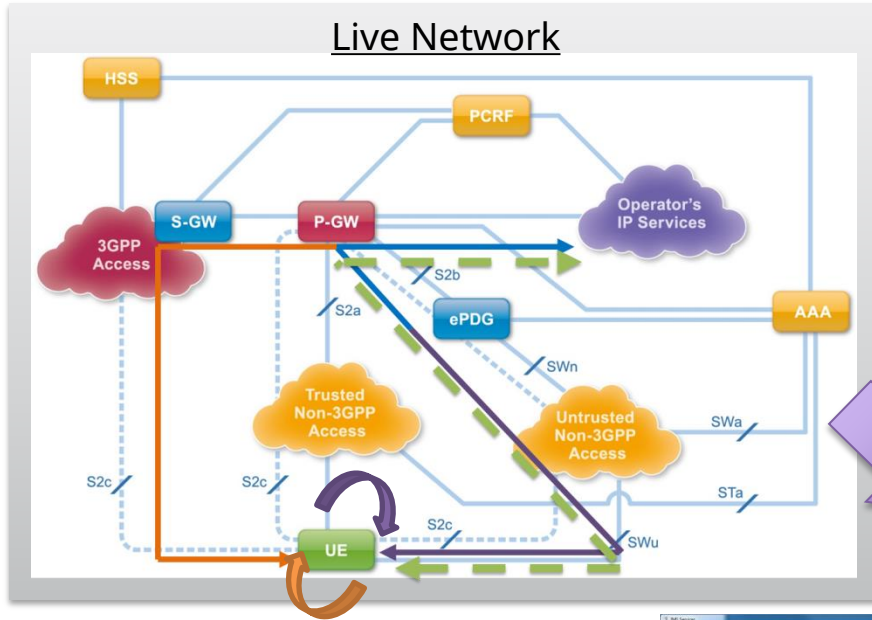


Note: The UE Trigger Information Condition can specify several conditions at one UE Message to Accept, Reject or Ignore according to setting.

**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



WLAN Offload Services



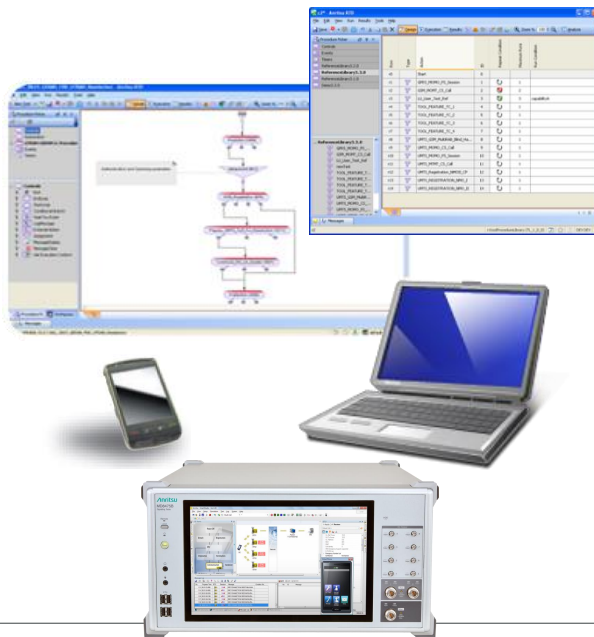
- *Note: ePDG might be on external PC due to downlink data switching method*
- *Requires commercial WLAN-AP (CISCO AIR-SAP2602E-x-K9 recommended)*

Test Automation Framework - SmartStudio Manager

Helps cut UE verification cycle and improves regression test efficiency

- Minimize field/drive testing, characterize performance, test applications

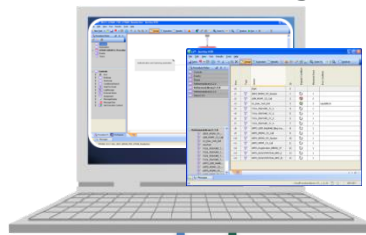
- ✓ Easy to use without requiring specialist knowledge of 3GPP protocols
 - Intuitive GUI to expedite creation and execution of test cases
- ✓ Evaluates application behavior under different network conditions
 - Simulate different QoS, data throughput and mobility scenarios
- ✓ Captures logs and reports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



Registration	Service_W_AccessClassBarred	SMS_C_SMSoverSGs_MO	Mobility_GG_SelResel	T-pust test	TS09
Registration_L_Attach	Service_W_AccessClassBarred	SMS_L_SMSoverSGs_MT	Mobility_TT_SelResel	Service_L_Tput	TS09_GSM_StandbyTime
Registration_W_Attach	Service_T_AccessClassBarred	SMS_W_SMSoverSGs_MT	Mobility_WG_SelResel	Service_LL_CA_SISO_Tput	TS09_G_StandbyTime
Registration_G_Attach	Service_C_PSISt_Barred	SMS_C_SPSISt_Barred	Mobility_TG_SelResel	Service_CA_MMO_Tput	TS09_W_StandbyTune
Registration_L_OutOfService	Service_D_PSISt_Barred	SMS_T_SMSoverSGs_MT	Mobility_TT_RAULAU	Service_W_Tput	TS09_GSM_W_StandbyTime
Registration_W_OutOfService		SMS_C_SMSoverSGs_MT	Mobility_WW_Voice_Hard_Handover	Service_GPRS_Tput	TS09_G_W_StandbyTime
Registration_G_OutOfService	Emergency Call		Mobility_WW_Video_Hard_Handover	Service_T_Tput	TS09_W_G_StandbyTime
Registration_T_OutOfService	Service_W_Emergency	Mobility	Mobility_WW_Packet_Hard_Handover	Service_D_Tput	TS09_L_StandbyTime
Registration_C_OutOfService	Service_GSM_Emergency	Mobility_LL_SelResel	Mobility_LL_Voice_Packet_Hard_Handover		TS09_GSM_TalkTime_MO_MNR
	Service_T_Emergency	Mobility_LL_SelResel	Mobility_WW_Video_Packet_Hard_Han	IMS	TS09_GSM_TalkTime_MT_NR
Voice Call	Service_C_Emergency	Mobility_LG_SelResel	Mobility_WW_Voice_Soft_Handover	IMS_L_SMSoverIMS_MO	TS09_W_TalkTime_MO_NR
Service_W_Voice	Service_L2C_FBF_Emergency	Mobility_LL_Redirection	Mobility_WW_Video_Soft_Handover	IMS_L_SMSoverIMS_MT	TS09_W_TalkTime_MT_NR
Service_SMT	Service_L2C_FBF_Emergency	Mobility_LD_Redirection	Mobility_LL_Voice_Packet_Hard_Handover	IMS_L_SMSoverIMS_MT	TS09_GS_Transfer
Service_T_Voice	Service_L2C_FBF_Emergency	Mobility_LL_Redirection	Mobility_WW_Voice_Packet_Hard_Handover	IMS_L_SMSoverIMS_MT	TS09_W_PacketSwitchedTransfer_FileDownload
Service_C_Voice	Service_L2C_CSFB_Emergency	Mobility_LW_Redirection	Mobility_WW_Video_Packet_Soft_Hanc	IMS_L_Video_MO/MR	TS09_L_PacketSwitchedTransfer_FileDownload
		Mobility_LG_Redirection	Mobility_GG_Voice_Handover	IMS_L_Video_MTNr	TS09_L_PacketSwitchedTransfer_FileUpload
Packet Call	ETWS	Mobility_LL_Redirection	Mobility_GG_CellChange	IMS_L_TFIP_MCMArr	TS09_L_PacketSwitchedTransfer_Parallel
Service_W_Packet	Service_L2C_ETWS_Secondary	Mobility_LD_Redirection	Mobility_LL_Video_Packet_Hard_Handover	IMS_L_TFIP_MCMArr	TS09_W_HTMLBrowsing
Service_GPRS_Packet	Service_L2C_ETWS_Secondary	Mobility_LG_Handover	Mobility_TT_Voice_Packet_Hard_Handover	IMS_L_TFIP_MCMArr	TS09_W_HTMLBrowsing_Full
Service_L_Packet	Service_L_ETWS_PrimarySecondary	Mobility_LW_Handover	Mobility_TT_Packet_Hard_Handover	IMS_L_TTIMOR	TS09_L_StreamingContent_Video
Service_D_Packet	Service_W_ETWS_Primary	Mobility_LG_CellChange	Mobility_TT_Voice_Packet_Hard_Hand	IMS_L_CFU_MMOR	TS09_L_StreamingContent_Audio
	Service_GPRS_PrimarySecondary	Mobility_LL_Voice_Packet_Hard_Handover	Mobility_TT_Voice_Packet_Hard_Handover	IMS_L_Video_Packet_Hard_Handover	TS09_L_VideoTelephony
CSFB	Service_GPRS_PrimarySecondary	Mobility_LL_Voice_Packet_Hard_Handover	Mobility_TG_Voice_Packet_Hard_Handover	IMS_L_Video_Packet_Hard_Handover	TS09_L_VideoDownload
Service_L2C_CSFB_MO/MR	Service_G_ETWS_Primary	Mobility_LWL_Voice_Handover	Mobility_WG_CellChange	IMS_L_Atch_Script	TS09_GPRS_FTPDownload
Service_G2C_CSFB_MO/MR	Service_G_ETWS_Secondary	Mobility_LL_Voice_Handover	Mobility_TG_Voice_Handover	IMS_L_GBA_Authentication	
Service_L2C_CSFB_MO/MR	Service_G_ETWS_PrimarySecondary	Mobility_LD_SystemLost	Mobility_TG_CellChange	IMS_L_EarlyMedia	
Service_L2C_CSFB_MO/MR		Mobility_LW_SRVCC_MO/MR		RCS	
Service_L2C_CSFB_MTNR	CMA5	Mobility_LG_SRVCC_MO/MR	Stress test	RCS_L_Registration	
Service_L2G_CSFB_MTNR	Service_L_CMAS_Concurrent	Mobility_LW_SRVCC_MTNR	Service_W_Voice_Stress		
Service_L2T_CSFB_MTNR	Service_W_CMAS_Concurrent	Mobility_LG_SRVCC_MTNR	Service_GSM_Voice_Stress		
Service_L2C_CSFB_MTNR	Service_G_CMAS_Concurrent	Mobility_LW_vSRVCC_MO/MR	Service_T_Voice_Stress	WLAN Offload	
	Service_C_CMAS	Mobility_LW_vSRVCC_MTNR	Service_C_Voice_Stress	WLAN_LWL_Untrusted_Access	
		Mobility_LL_TAU	Mobility_LL_Handover_Stress	WLAN_LWL_Trusted_Access	
Access Control	SMS	Mobility_WW_RAULAU	Mobility_LW_Handover_Stress		
Service_LL_CellBarred	SMS_L_SMSoverSGs_MO	Mobility_GG_RAULAU	Mobility_LT_Handover_Stress	DSDS	
Service_WW_CellBarred					
Service_GG_CellBarred	SMS_W_SMSoverSGs_MO	Mobility_LL_CA_SCell_AddDel	Mobility_LG_CellChange_Stress	Service_L_Packet_G_Attach_DS	
Service_TT_CellBarred	SMS_G_SMSoverSGs_MO	Mobility_LL_CA_SCell_AddDel	Mobility_LD_Handover_Stress		
Service_L_AccessClassBarred	SMS_T_SMSoverSGs_MO	Mobility_WW_SelResel			

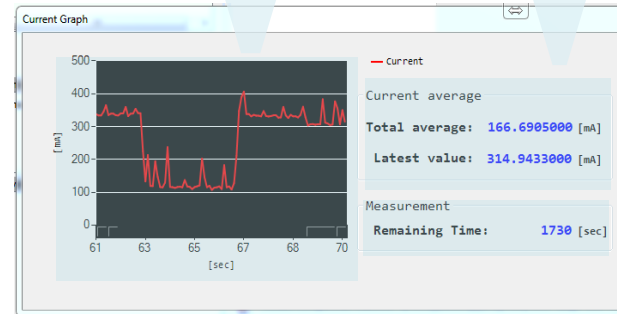
Battery Consumption Test - SmartStudio Manager

SmartStudio Manager

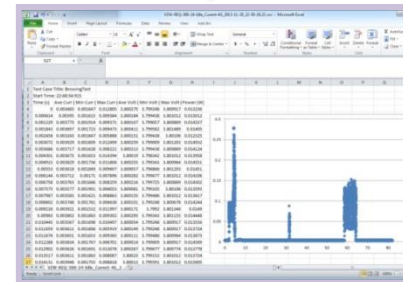


Current consumption vs time plot

Running average and latest measured current value



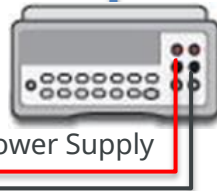
Each raw data sample saved to Report folder as CSV file



MD8475B



Power Supply



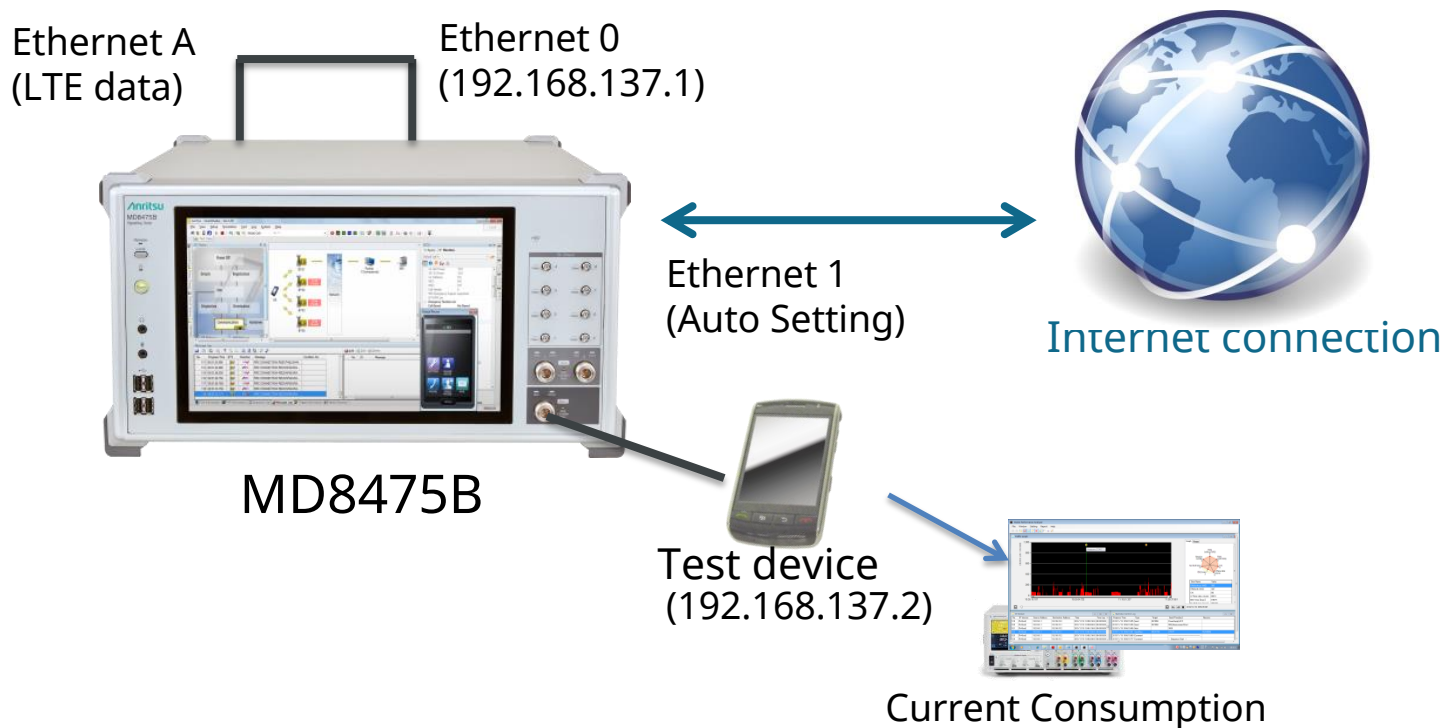
Basic TS09 Tests

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

Application Test - Internet Connection

Easily simulation for complex applications

- Stable operation check and current consumption under real Smartphone usage conditions



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 Offloading**
 - EAP Authentication
 - ePDG Access
 - ANDSF Policy Distribution
- ◆ **Automation**
 - Remote SmartStudio Control
 - Script-based Automation Engine
 - More than 160 sample test cases included



