



Signalling Tester MD8475A

USED4TEST

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Test Solutions throughout Development Cycle



RF Parametric test



RF Conformance Test



Smartphone Integration and Verification



Protocol Conformance Test
Carrier Acceptance Test



Chipset/Protocol Verification



UE Production

Efficient Smartphone Development

Signalling Tester MD8475A provides efficient environment for Smartphone integration and verification.



MD8475A
Signalling Tester

Multi-standard Network Simulation

- LTE-FDD/TD-LTE/LTE-Advanced
- W-CDMA/HSPA/HSPA Evolution
- GSM/GPRS/EGPRS
- CDMA2000 1X/1xEV-DO
- TD-SCDMA/HSPA

Easy-to-use GUI-based Operation

- Remote interface for test automation

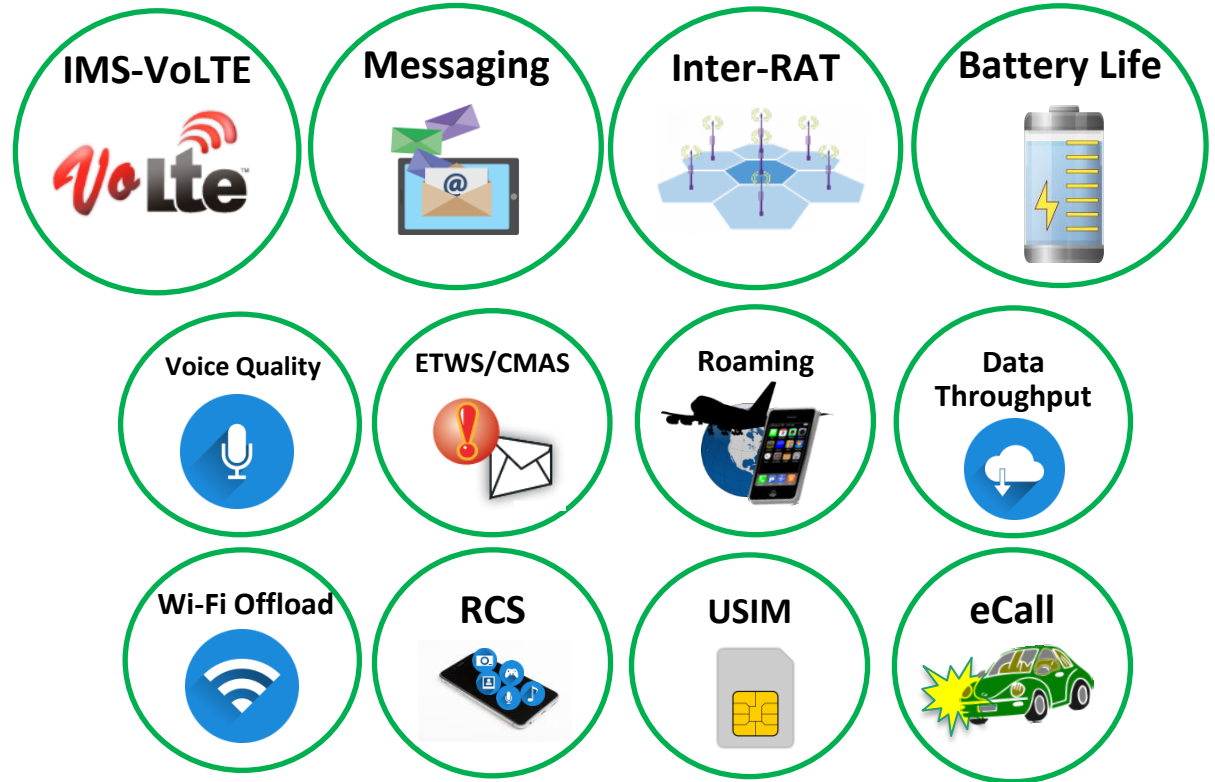
Main Applications

- Call Processing Function Verification
- VoLTE/RCS/IMS/Supplementary Services
- Wi-Fi Offload
- Battery Life Test
- Multi-RAT Mobility and Roaming
- Mobile Service Integration

Support the Smartphone test by one box



MD8475A
Signalling Tester



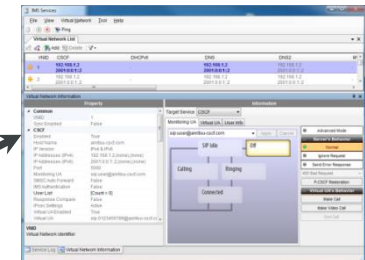
- Smartphone application test is supported strongly by simple GUI and built-in IMS server
- Support the roaming test and complicated mobility test

SmartStudio - Easy Operation with State-machine GUI

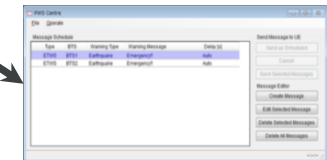
- Interactive test environment without complicated test scripts
- Synchronize built-in IMS server
- Set various network parameters according to user test environment
- Automatic call setting is performed according to DUT capability
- Unique graphical SMS/PWS center application available for SMS/ CMAS/ETWS service



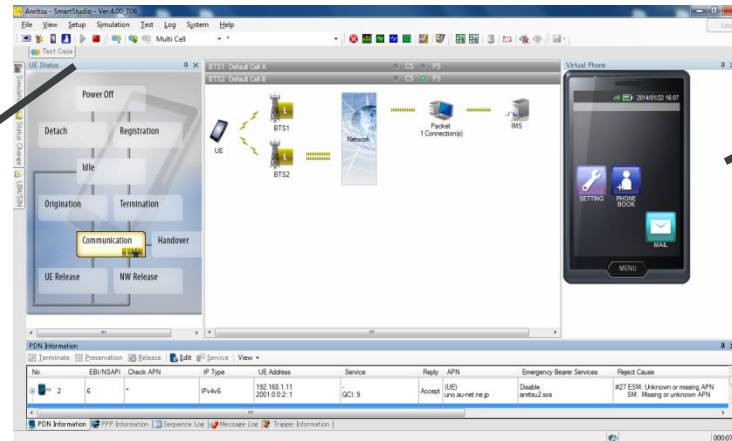
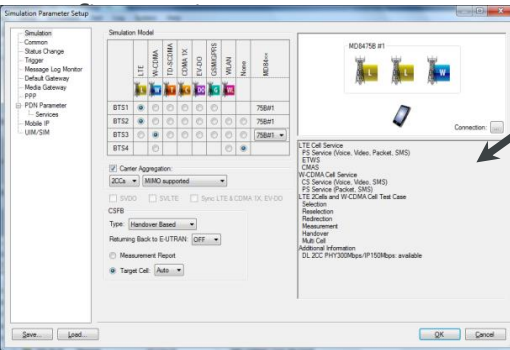
IMS Services



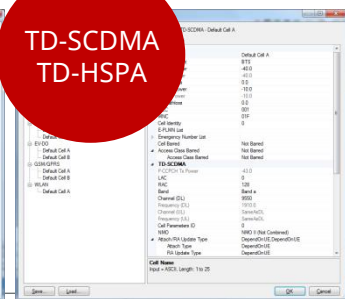
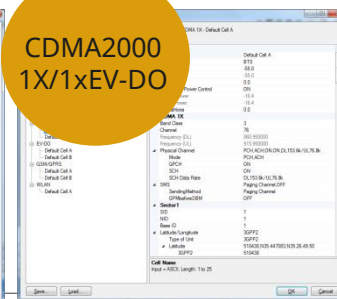
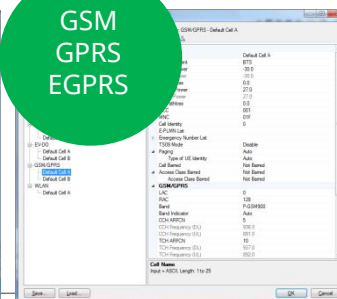
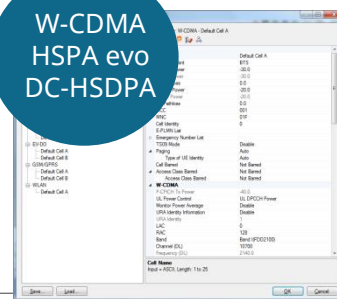
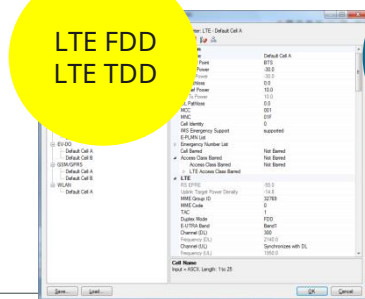
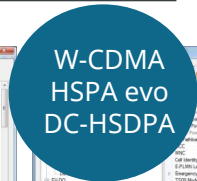
SMS Centre



Various system



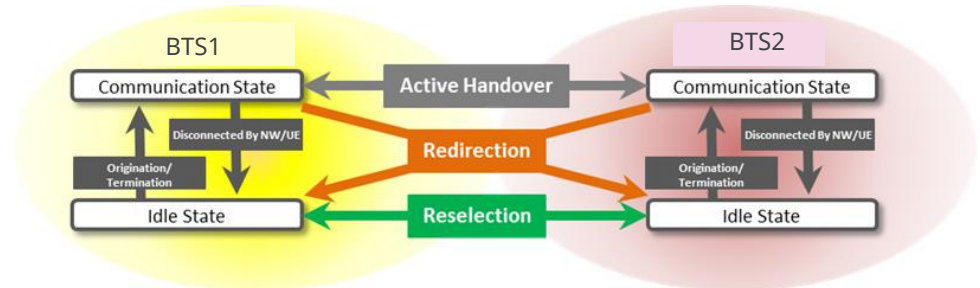
Extensive network parameters



Mobility Test – Multi system configuration

SmartStudio supports multi-system simulation without complicated test script.

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



Repeatable simulation cannot be realized on the Real Network

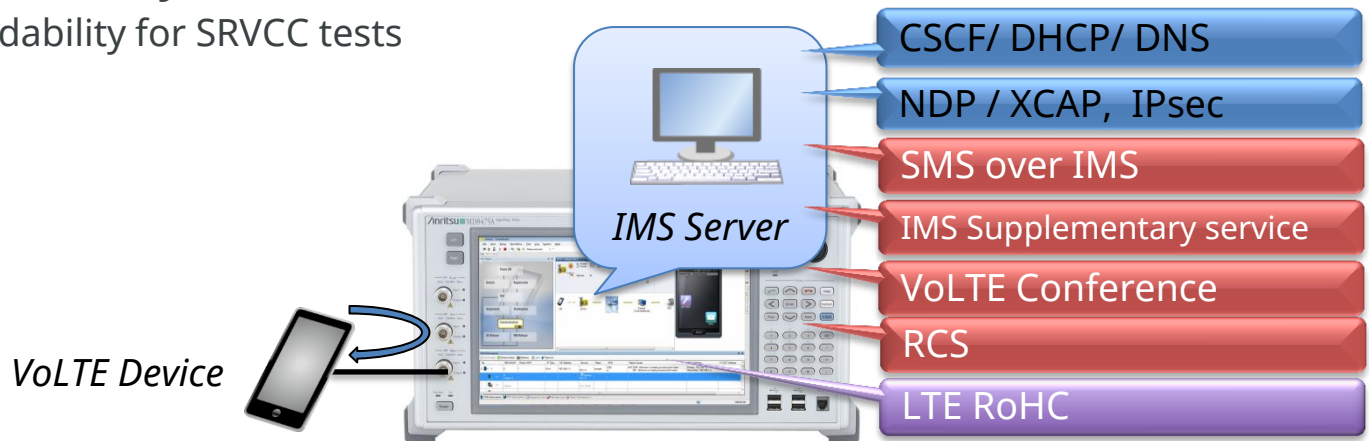
- 2-cell configuration

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

Comprehensive Test Environment - IMS Services

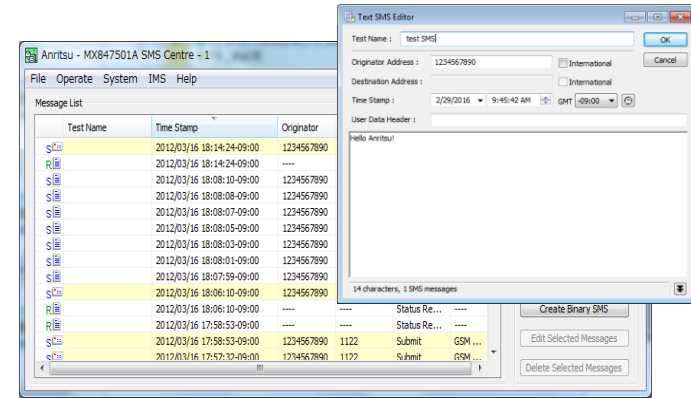
■ Key Unique Points

- ✓ **Ease of use**
 - SmartStudio GUI allows users to set and configure the IMS test easy
 - No complicated test scripts are required for IMS setting
- ✓ **Comprehensive IMS Test**
 - Supports a lot of tests including irregular tests and supplementary service
 - PSAP of Add-in Service has functions to emergency test and loop back voice data
- ✓ **Analysis and Debug**
 - Wireshark and Signalling protocol logging can be checked simultaneously
- ✓ **Built-in Servers**
 - IMS and relevant application server can be installed within single platform
 - No external server required then realize small-footprint environment
- ✓ **Multi-RAT Expandability**
 - Enough expandability for SRVCC tests



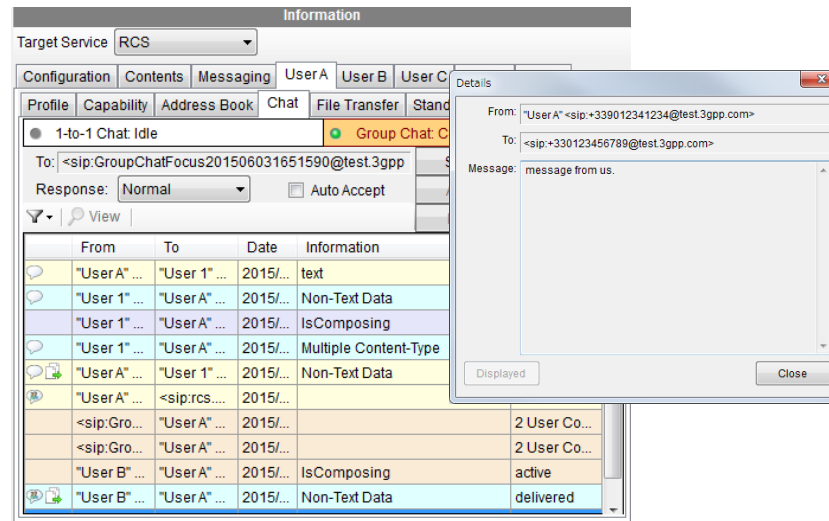
Message Service Test – SMS/RCS

- Built-in SMS Centre support 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

RCS option is required.

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



ETWS (LTE/W)

Send Message to UE

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

Message Editor

System: LTE/W-CDMA Type: ETWS [x] BTS1 [x] BTS2 [] OK Cancel

Delay Time: [x] Auto [] Manual [] [1] [s]

Common Setting
Serial Number: 3000 [Edit]

Primary Notification
Message ID: 1100
Warning Type Value: Earthquake
 Activate Emergency User Alert
 Activate Pop-up 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: [x] Auto [] Manual [] [1]
Warning Message:
Emergency!!

PWS Centre

CMAS (LTE/W/G)

Message Editor

System: LTE/W-CDMA Type: CMAS [x] BTS1 [x] BTS2 [] OK Cancel

Delay Time: [x] Auto [] Manual [] [1] [s]

Common Setting
Serial Number: 3000 [Edit]

Concurrent Warning Notification
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: [x] Auto [] Manual [] [1]
Warning Message:
Emergency!!

CMAS (CDMA2000)

Message Editor

System: CDMA2000 Type: CMAS [x] BTS1 [x] BTS2 [] OK Cancel

Delay Time: [x] Auto [] Manual [] [1] [s]

Message Center Time Stamp (UTC) [] Validity Period Absolute (UTC)
2012/09/13 21:45:03 [] [x] 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 20:40:00 [] 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 can be performed by easy setup.

- Attach Reject

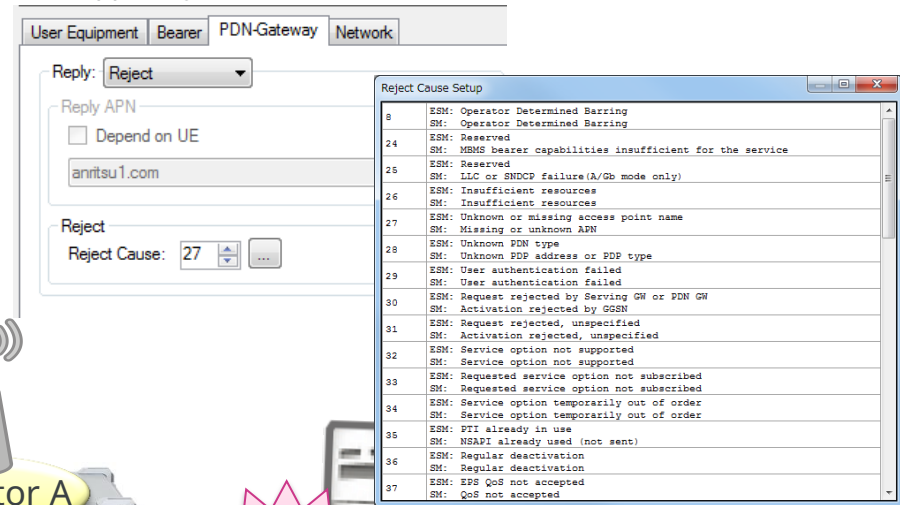
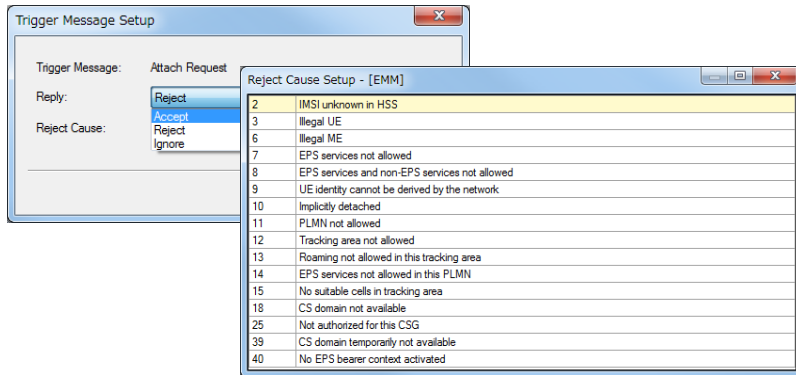
Setting specific tracking messages when the terminal connects to the base station can be used to reject terminal connection requests.

(Support system are LTE, W-CDMA, GSM, TD-SCDMA)

- APN Reject

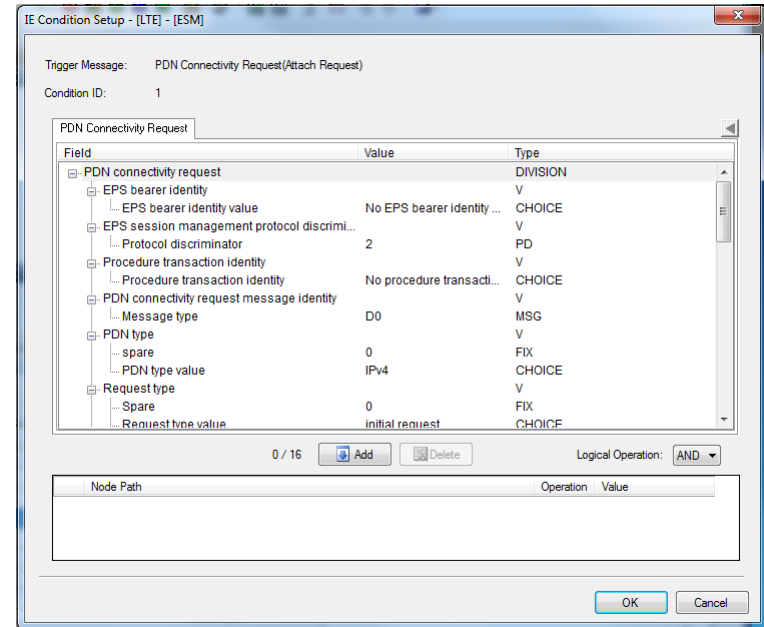
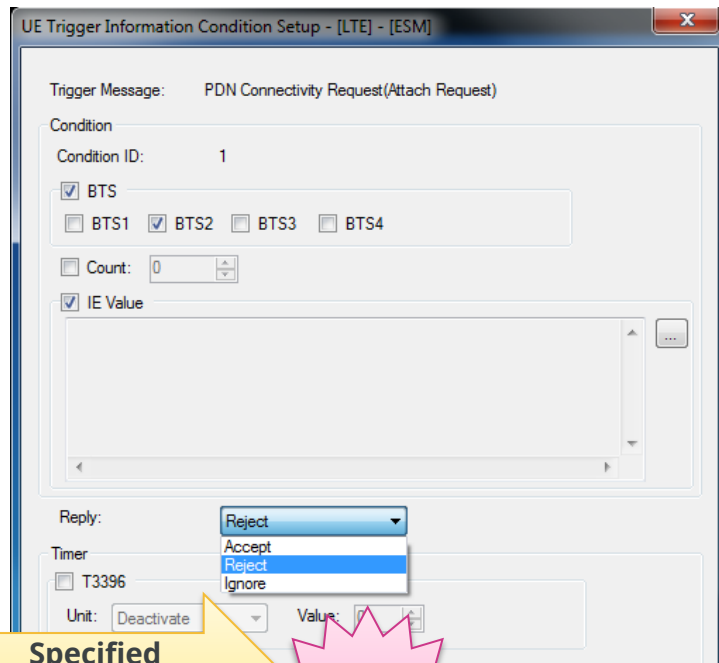
Setting specific messages when the terminal connects to the network server can be used to reject terminal connection requests.

(Support system are LTE, W-CDMA, GSM, TD-SCDMA, EVDO)



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

- Abnormal testing can be performed by easy setup.
 - UE Message Reject
 - Setting to reject by the condition when MD8475A receives a specified message from UE.

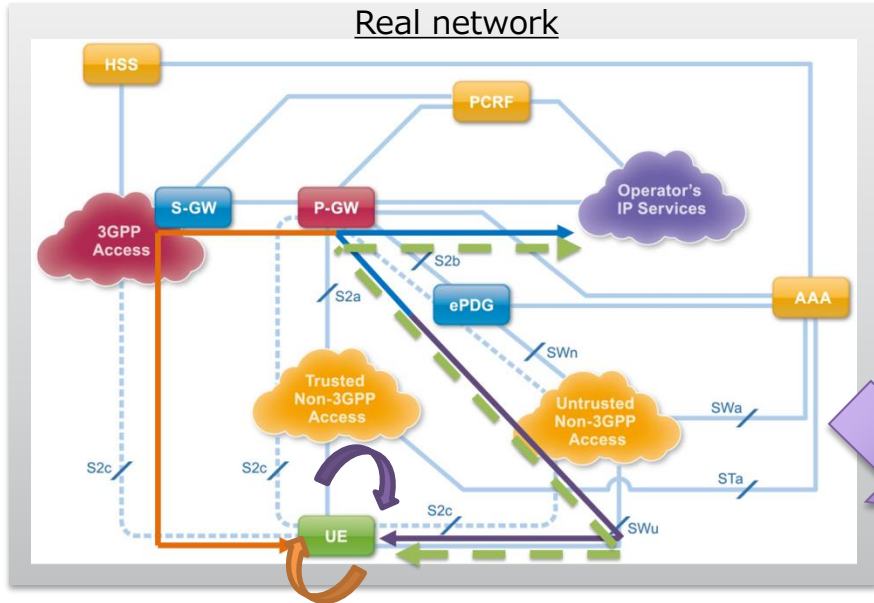


Note: UE Trigger Information Condition can specify several conditions to one UE Message and it perform Accept or Reject or Ignore according to the setting.

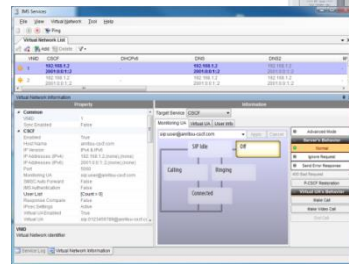
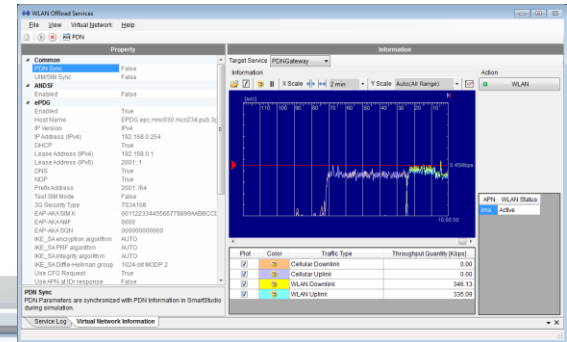
- e.g. One Specified Message -> Condition A -> Reject
- > Condition B -> Ignore
- > Condition C -> Accept

WLAN Calling

SmartStudio supports various IMS and ePDG parameters required for the application test.



WLAN Offload services



IMS services

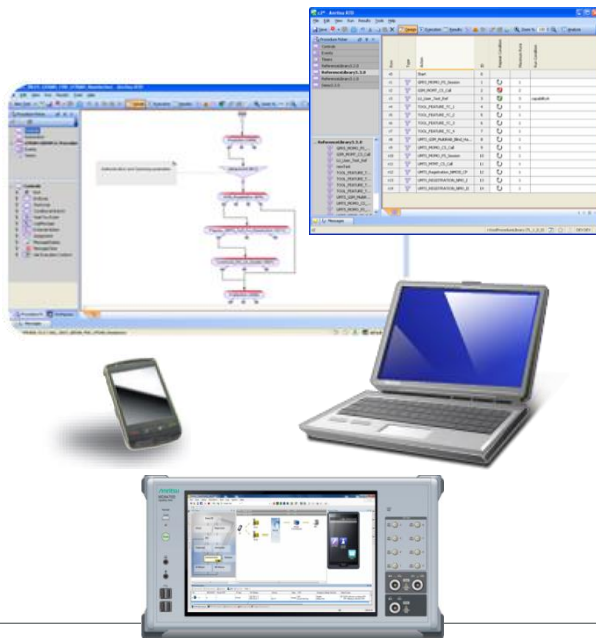
- Note: This solution needs to use commercial WLAN-AP. (Recommended model : CISCO AIR-SAP2602E-x-K9)

Test Automation Framework - SmartStudio Manager

Contribute to the reduction of UE verification cycle and to efficiency of regression test

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

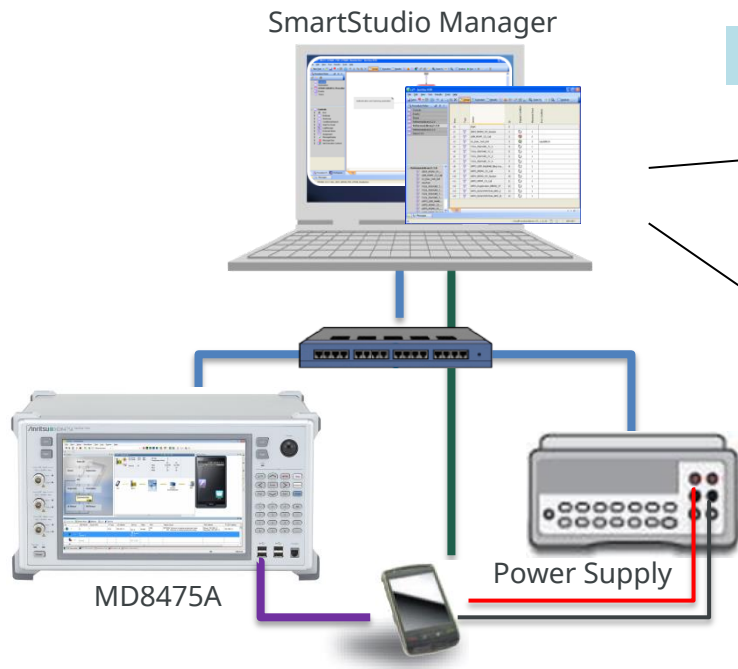
- ✓ Ease of use, without requiring in depth knowledge of 3GPP protocols
 - Intuitive graphical user interface to expedite creation and execution of test cases
- ✓ Evaluates application behavior under different network conditions
 - Simulate different QoS, data throughput and mobility scenarios
- ✓ Captures 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-put test	TS09
Registration_L_Attach	Service_G_AccessClassBarred	SMS_L_SMSoverSGs_MT	Mobility_TT_SelResel	Service_LL_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_PERSIST_Barred	SMS_G_SMSoverSGs_MT	Mobility_TG_SelResel	Service_LL_CA_MMO_Tput	TS09_W_StandbyTime
Registration_L_OutOfService	Service_D_PERSIST_Barred	SMS_T_SMSoverSGs_MT	Mobility_TT_RAULAU	Service_W_Tput	TS09_GSM_W_StandbyTime
Registration_W_OutOfService	Emergency Call	SMS_C_SMSoverSGs_MT	Mobility_WW_Voice_Hard_Handover	Mobility_WW_Voice_GPRS_Tput	TS09_G_W_StandbyTime
Registration_G_OutOfService	Service_W_Emergency	Mobility	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_WW_Voice_Packet_Hard_Handover		TS09_GSM_TalkTime_MO_MR
Voice Call	Service_T_Emergency	Mobility_LW_SelResel	Mobility_WW_Video_Packet_Hard_Han IMS		TS09_GSM_TalkTime_MT_NR
Service_W_Voice	Service_C_Emergency	Mobility_LG_SelResel	Mobility_WW_Voice_Soft_Handover	IMS_L_SMSoverIMS_MO	TS09_W_TalkTime_MO_MR
Service_GSM	Service_L2C_CSF3B_Emergency	Mobility_LL_SelResel	Mobility_WW_Video_Soft_Handover	IMS_L_SMSoverIMS_MT	TS09_W_TalkTime_MT_NR
Service_T_Voice	Service_G_L2C_CSF3B_Emergency	Mobility_LW_Redirection	Mobility_WW_Voice_Packet_Hard_Handover	IMS_L_SMSoverIMS_MTNR	TS09_W_PacketSwitchedTransfer_FileDown
Service_C_Voice	Service_L2C_CSF3B_Emergency	Mobility_LG_Redirection	Mobility_WW_Video_Packet_Soft_Handover	IMS_L_SMSoverIMS_MTNR	TS09_W_PacketSwitchedTransfer_FileUp
Packet Call	Service_G_L2C_CSF3B_Emergency	Mobility_LW_Redirection	Mobility_WW_Video_Packet_Soft_Handover	IMS_L_SMSoverIMS_MTNR	TS09_W_PacketSwitchedTransfer_FileUp
Service_W_Packet	Service_L_ETWS_PrimarySecondary	Mobility_LG_Redirection	Mobility_WW_Video_Packet_Soft_Handover	IMS_L_SMSoverIMS_MTNR	TS09_W_PacketSwitchedTransfer_FileUp
Service_GPRS_Packet	Service_L_ETWS_Primary	Mobility_LG_Redirection	Mobility_WW_Video_Packet_Soft_Handover	IMS_L_SMSoverIMS_MTNR	TS09_W_PacketSwitchedTransfer_FileUp
Service_T_Packet	Service_G_ETWS_PrimarySecondary	Mobility_LW_Handover	Mobility_TT_Packet_Hard_Handover	IMS_L_TIR_MOMR	TS09_L_StreamingContent_Video
Service_D_Packet	Service_G_ETWS_Primary	Mobility_LG_CellChange	Mobility_TT_Voice_Packet_Hard_Handover	IMS_L_TIR_MOMR	TS09_L_StreamingContent_Audio
CSFB	Service_G_ETWS_Primary	Mobility_LW_Voice_Handover	Mobility_WG_CellChange	IMS_L_Attach_Script	TS09_W_GPRS_FTPdownload
Service_L2W_CSF3B_MOMR	Service_G_ETWS_Secondary	Mobility_LL_Voice_Handover	Mobility_TG_Voice_Handover	IMS_L_GBA_Authentication	
Service_L2G_CSF3B_MOMR	Service_G_ETWS_Secondary	Mobility_LL_Voice_Handover	Mobility_TG_Voice_Handover	IMS_L_Early Media	
Service_L2C_CSF3B_MOMR	Service_G_ETWS_PrimarySecondary	Mobility_LD_SystemLost	Mobility_TG_CellChange		
Service_L2W_CSF3B_MOMR	CMAS	Mobility_LW_SRVCC_MOMR		Stress test	RCS
Service_L2G_CSF3B_MOMR	Service_L_CMAS_Concurrent	Mobility_LG_SRVCC_MOMR		Service_W_Voice_Stress	RCS_L_Registration
Service_L2C_CSF3B_MOMR	Service_W_CMAS_Concurrent	Mobility_LW_SRVCC_MTNR		Service_GSM_Voice_Stress	
Service_L2W_CSF3B_MOMR	Service_G_CMAS_Concurrent	Mobility_LG_SRVCC_MTNR		Service_T_Voice_Stress	WLAN Offload
Service_L2C_CSF3B_MOMR	Service_C_CMAS	Mobility_LW_VSRVCC_MOMR		Service_C_Voice_Stress	WLAN_LW_Untrusted_Access
Access Control	SMS	Mobility_LL_TAU		Mobility_LL_Handover_Stress	WLAN_LW_Trusted_Access
Service_LL_CellBarred	SMS_L_SMSoverSGs_MO	Mobility_WW_RAULAU		Mobility_LW_Handover_Stress	
Service_WW_CellBarred	SMS_W_SMSoverSGs_MO	Mobility_GG_RAULAU		Mobility_LT_Handover_Stress	DSDS
Service_TT_CellBarred	SMS_G_SMSoverSGs_MO	Mobility_LL_CA_SCell_AddDel		Mobility_LD_Handover_Stress	Service_L_Packet_G_Attach_DS
Service_L_AccessClassBarred	SMS_T_SMSoverSGs_MO	Mobility_LL_CA_SCell_AddDel		Mobility_LD_Handover_Stress	
		Mobility_WW_SelResel			

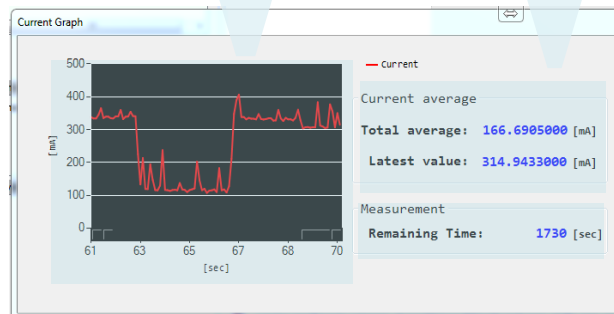
More than 180 various sample test cases available for fully automated Regression Test and Stress Test

Battery Consumption Test - SmartStudio Manager

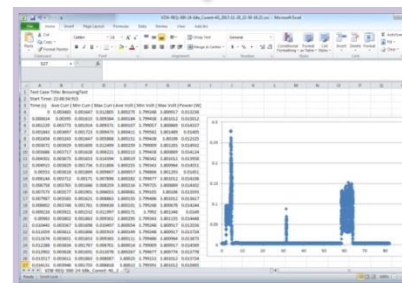


Current consumption vs time plot

Running average & latest current measurement value



Each raw sampling data is saved to the Report folder as CSV file



Basic Test for TS09

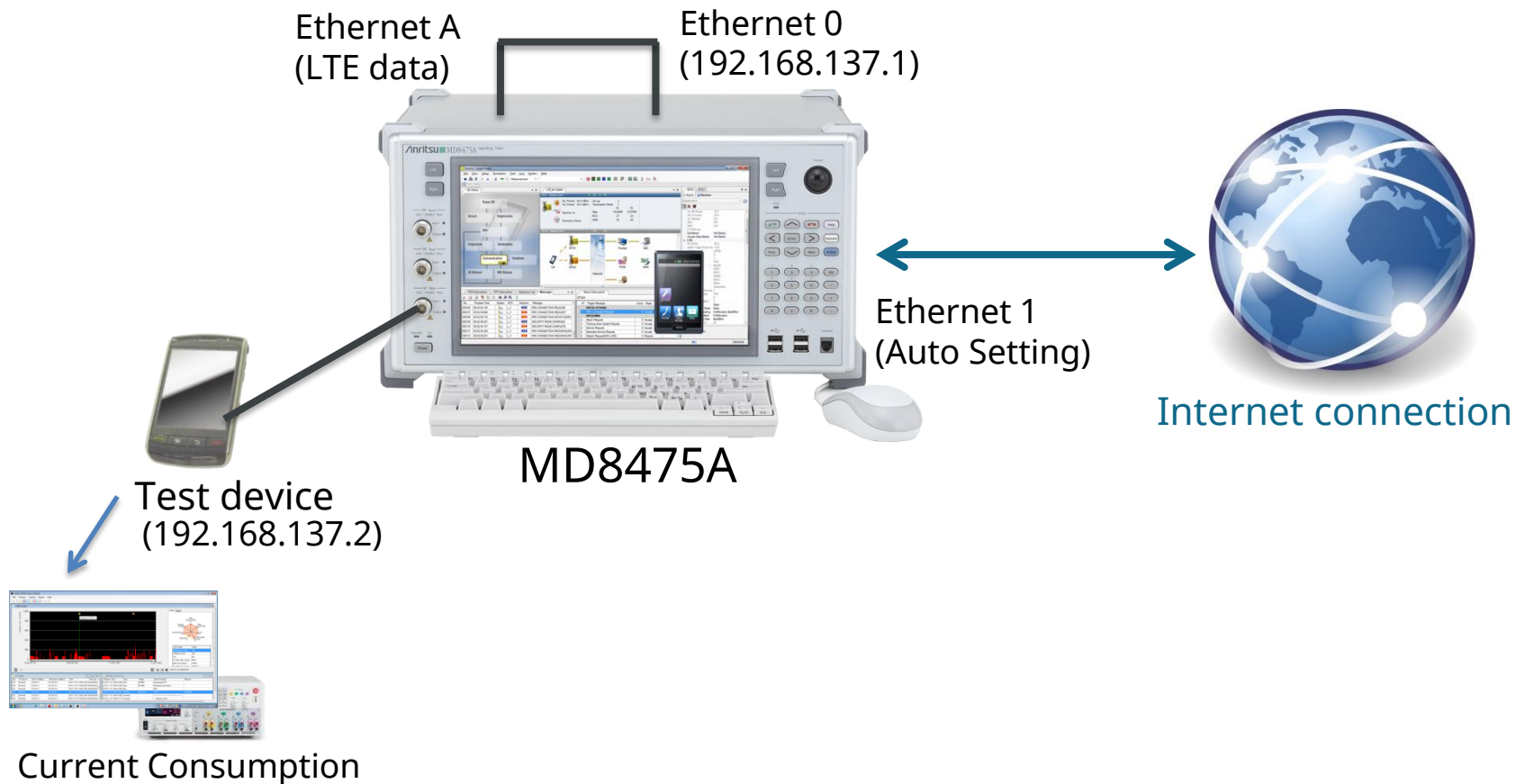
- Stand-by Test
- Talk time Test
- Packet Switch Transfer Test
- Browsing Test
- Streaming Content Test
- Video Telephony Test
- FTP Download Test

Appendix

Ex. Application test - Internet connection

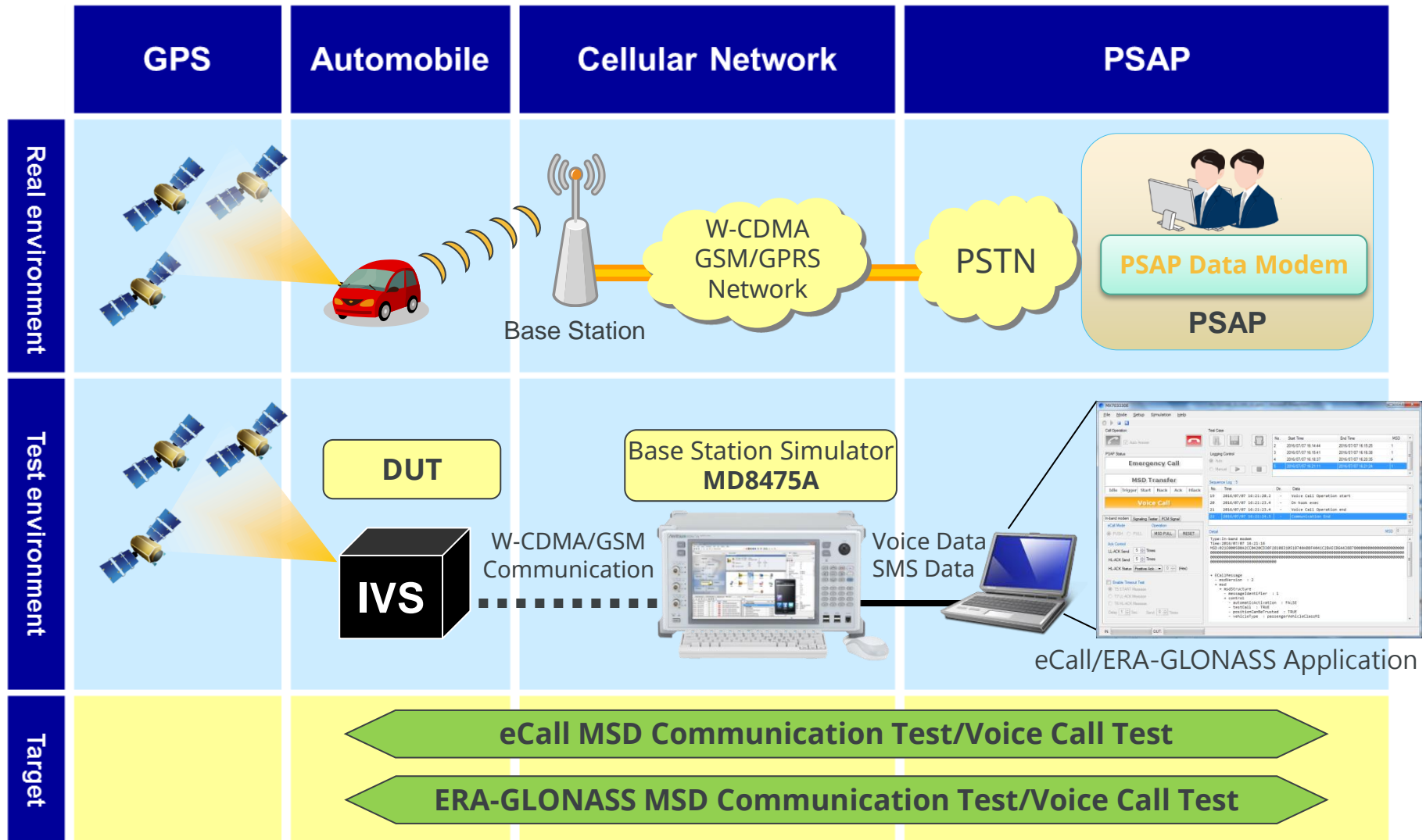
Easily simulation for complicated application

- Stable operation check and power consumption under the real application of Smartphone.



eCall/ERA-GLONASS test

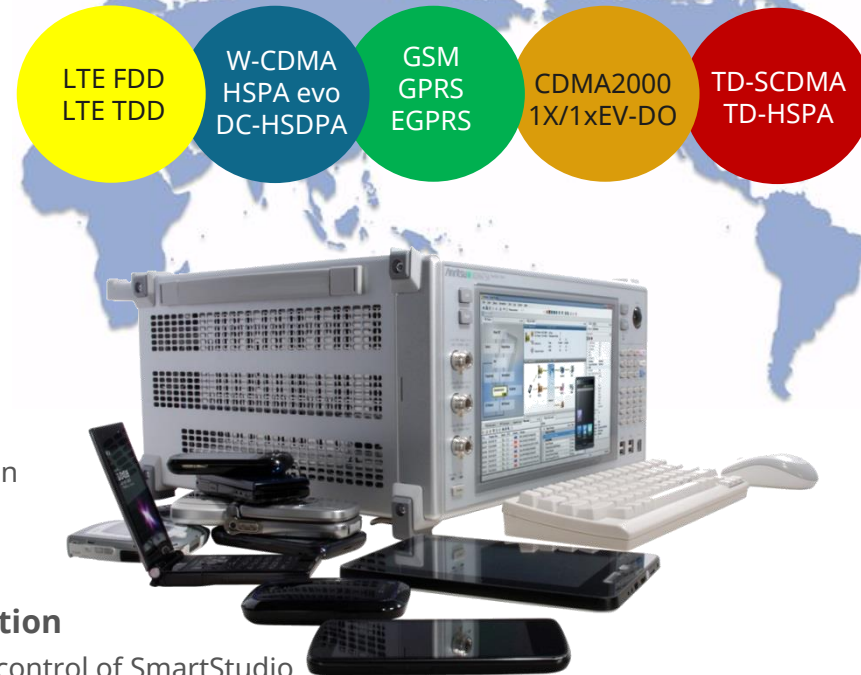
Supports to emulate eCall communications between the IVS and PSAP.



MD8475A Product Introduction

- ◆ **LTE system simulation for FDD and TDD**
- ◆ **Support 150 Mbps throughput with 2x2 MIMO and 300 Mbps for 2CCs 2x2MIMO**
- ◆ **Multi-system capable platform**
 - W-CDMA/HSPA/HSPA evo/DC-HSDPA, GSM/GPRS/EGPRS
 - CDMA2000 1X/EV-DO, TD-SCDMA/HSPA
- ◆ **Easy operation with State-machine based GUI “SmartStudio”**
- ◆ **2-cell IntraRAT / InterRAT capable platform**
 - 2-cell IntraRAT: LTE 2-cell, W-CDMA 2-cell, GSM 2-cell, TDS 2-cell
 - 2-cell InterRAT: LTE/W, LTE/G, LTE-TDD/TDS, W/G, TDS/G
 - LTE-cdma2000 (Hybrid mode) 2-box Interworking, Optimized HO
 - LTE-cdma2000 single-box Interworking with 2RF
- ◆ **Built-in IMS service function**
 - CSCF/DHCP/DNS Server functions
 - NDP/XCAP/GBA/Early Media function
 - IMS Supplementary Service
 - RCS (Rich Communication Suite)
 - Script-based I/F for advanced test
- ◆ **Built-in SMS center**
- ◆ **Built-in PWS center**
 - ETWS (LTE/W-CDMA/GSM)
 - CMAS (LTE/W-CDMA/GSM/cdma2000)
- ◆ **Built-in PHY/IP layer throughput monitor**
- ◆ **Built-in UE/Network Trigger function**
 - Sub-normal condition(LTE/W-CDMA/GSM/TD-SCDMA))
- ◆ **UL RF power measurement (LTE/W-CDMA/GSM)**
- ◆ **WLAN Offloading**
 - EAP authentication
 - ePDG access
 - ANDSF policy distribution
- ◆ **Automation**
 - Remote control of SmartStudio
 - Script-based automation engine
 - Included more than sample 160 TCs

SmartStudio



Test Automation Framework - ACTS

The Android Open Source Project (AOSP) provides a Python-based test suite using the MD8475A for some tests.

The AOSP provides the Android Connectivity Testing Suite (ACTS) to verify Bluetooth, Wi-Fi, and cellular radios. The MD8475A is used to perform the ACTS cellular tests.

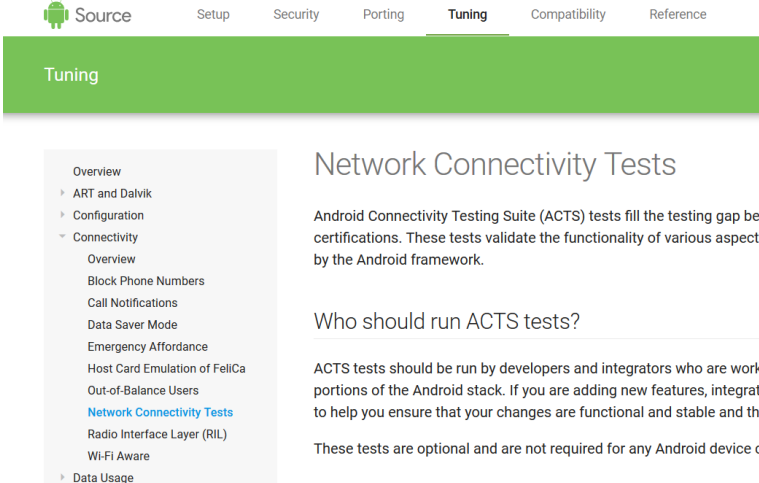
https://source.android.com/devices/tech/connect/connect_tests

ACTS is the AOSP deliverable. To use ACTS, read the license page.

<https://source.android.com/setup/licenses>

The Android Comms Test Suite includes more than 170 cellular tests in acts/tests/google/tel/lab.

- CMAS
- ETWS
- Emergency Call
- Data Roaming On/Off
- Throughput
- Power Consumption
- Handover
- Neighbour Cell
- SMS
- UE Identity
- VoLTE



The screenshot shows the 'Tuning' page on the Android Source website. The navigation bar includes 'Source', 'Setup', 'Security', 'Porting', 'Tuning', 'Compatibility', and 'Reference'. The 'Tuning' section is highlighted in green. Below the navigation bar, there is a sidebar menu with the following items: Overview, ART and Dalvik, Configuration, Connectivity, Overview, Block Phone Numbers, Call Notifications, Data Saver Mode, Emergency Affordance, Host Card Emulation of FeliCa, Out-of-Balance Users, Network Connectivity Tests (highlighted in blue), Radio Interface Layer (RIL), Wi-Fi Aware, and Data Usage. The main content area is titled 'Network Connectivity Tests' and contains the following text: 'Android Connectivity Testing Suite (ACTS) tests fill the testing gap between certifications. These tests validate the functionality of various aspects of the Android framework.' Below this, there is a section titled 'Who should run ACTS tests?' with the text: 'ACTS tests should be run by developers and integrators who are working on portions of the Android stack. If you are adding new features, integrate them to help you ensure that your changes are functional and stable and that they are tested. These tests are optional and are not required for any Android device configuration.'