Anritsu envision:ensure

Signalling Tester
MD8475A

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

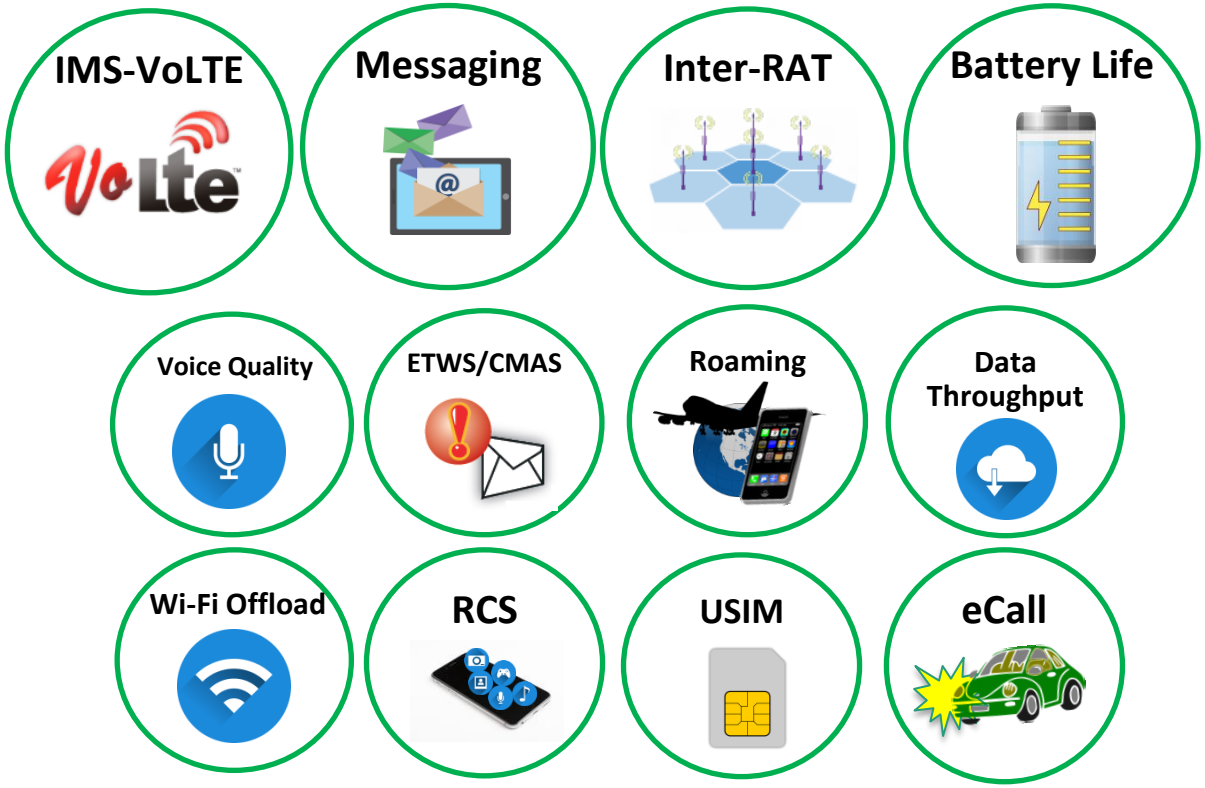
Main Applications

- 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



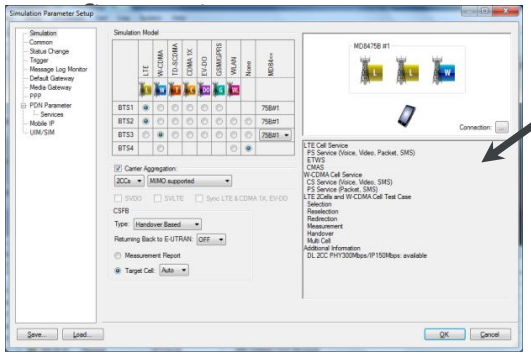
- Smartphone application test is supported strongly by simple GUI and built-in IMS server
- Support the roaming test and complicated mobility test

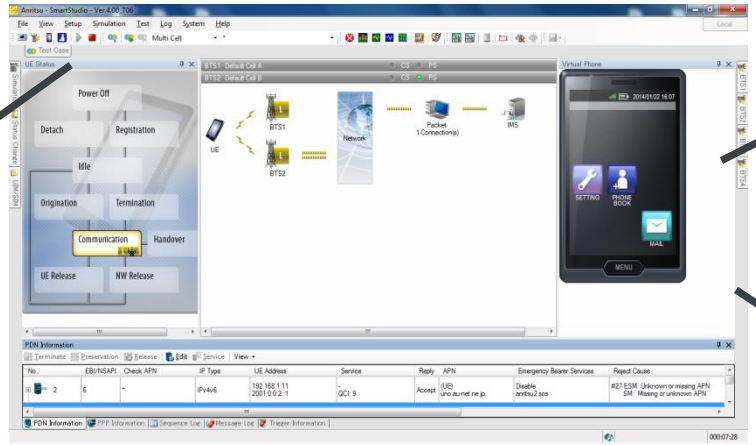
SmartStudio - Easy Operation with State-machine GUI

- 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

SmartStudio

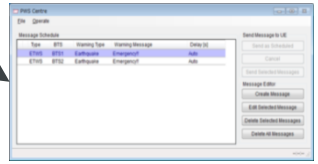
Various system





IMS Services

SMS Centre



Extensive network parameters

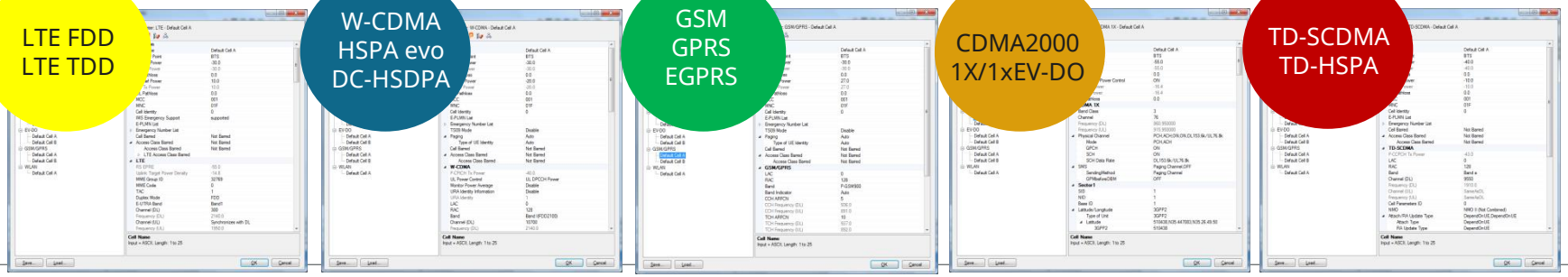
LTE FDD
LTE TDD

W-CDMA
HSPA evo
DC-HSDPA

GSM
GPRS
EGPRS

CDMA2000
1X/1xEV-DO

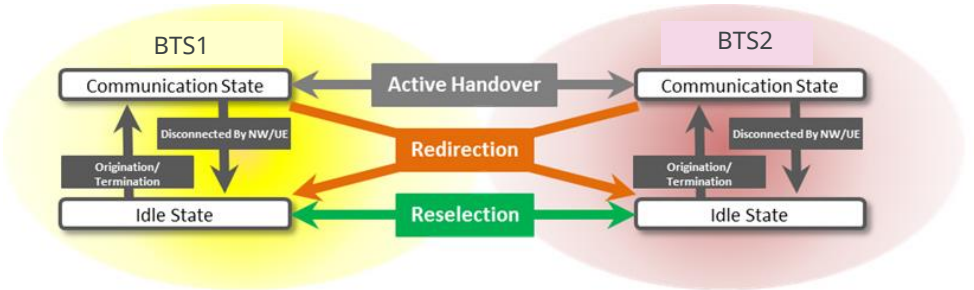
TD-SCDMA
TD-HSPA



Mobility Test – Multi system configuration

SmartStudio supports multi-system simulation without 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

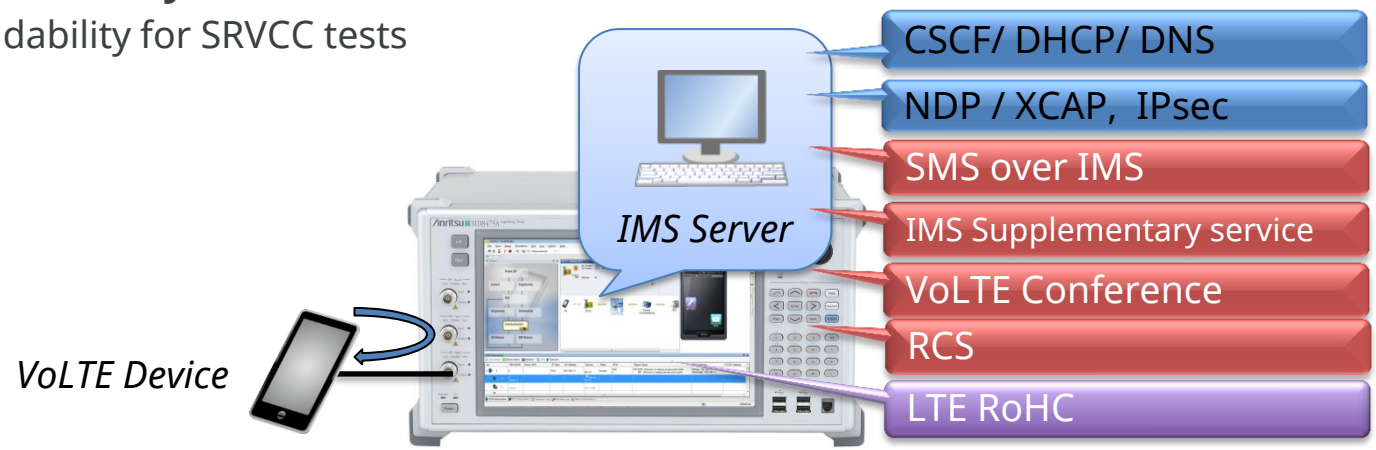
☑ **Ease of use**
- SmartStudio GUI allows users to set and configure the IMS test easy
- No complicated test scripts are required for IMS setting

☑ **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

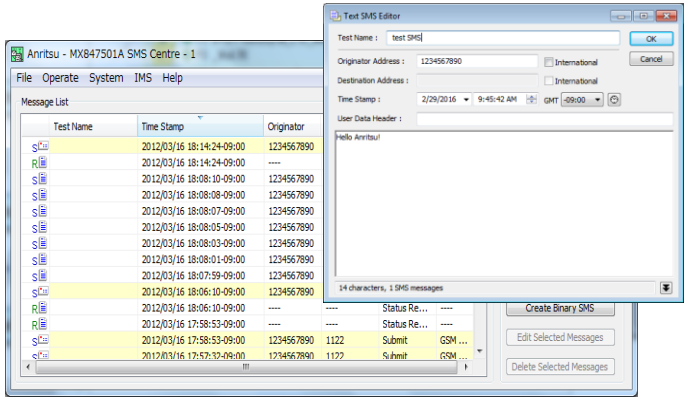
☑ **Built-in Servers**
- IMS and relevant application server can be installed within single platform
- No external server required then realize small-footprint environment

☑ **Multi-RAT Expandability**
- Enough expandability for SRVCC tests



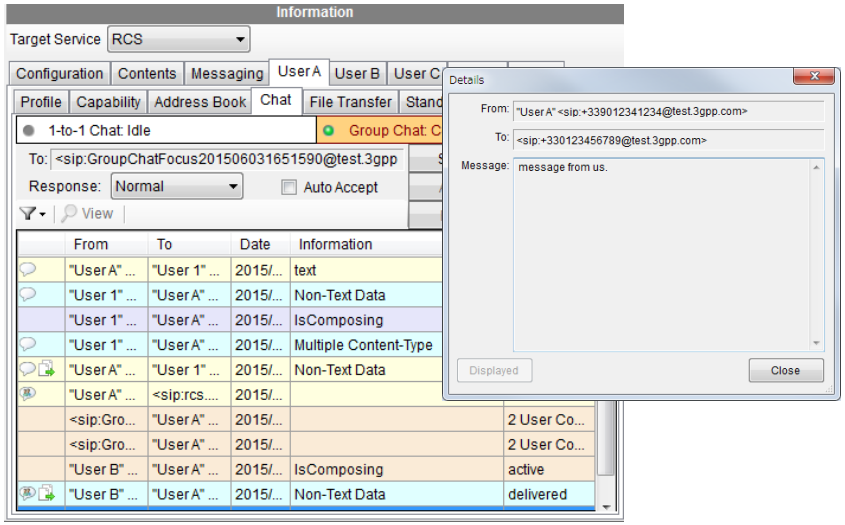
Message Service Test – SMS/RCS

- 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

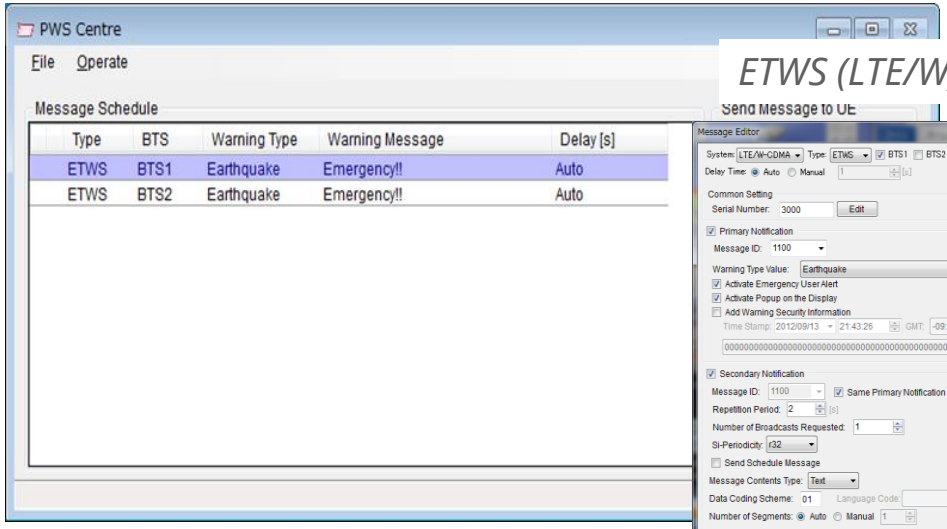


RCS Service

RCS option is required.

Message Service Test – Public Warning System

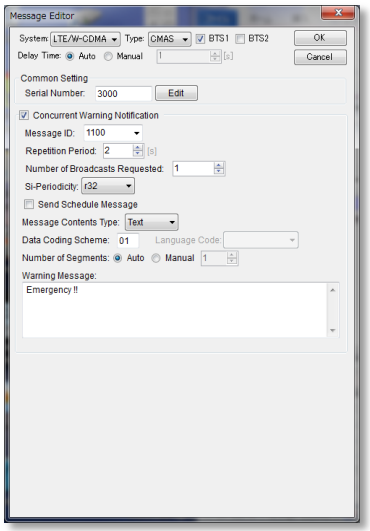
- Public Warning System (PWS) Message test
  - Earthquake Tsunami Warning System (ETWS) on LTE/WCDMA
    - Primary Notification
    - Secondary Notification
  - Commercial Mobile Alert Service (CMAS) on LTE/W-CDMA/CDMA2000/GSM



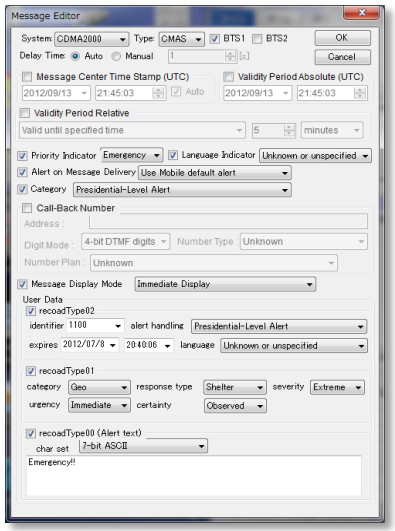
PWS Centre

ETWS (LTE/W)

CMAS (LTE/W/G)



CMAS (CDMA2000)



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

- Abnormal testing can be performed by easy setup.

  – Attach Reject

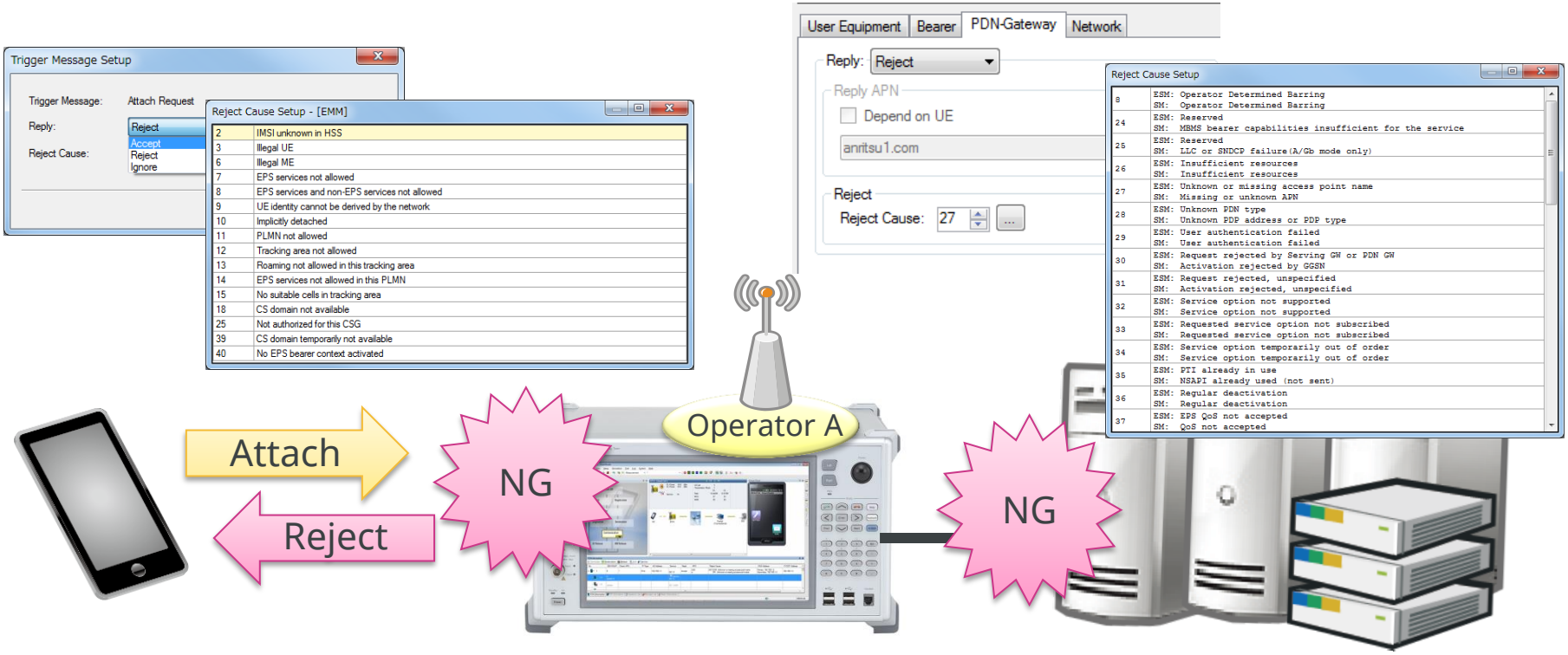
    Setting specific messages when the terminal connects to the base station can be used to reject terminal connection requests.

    (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.

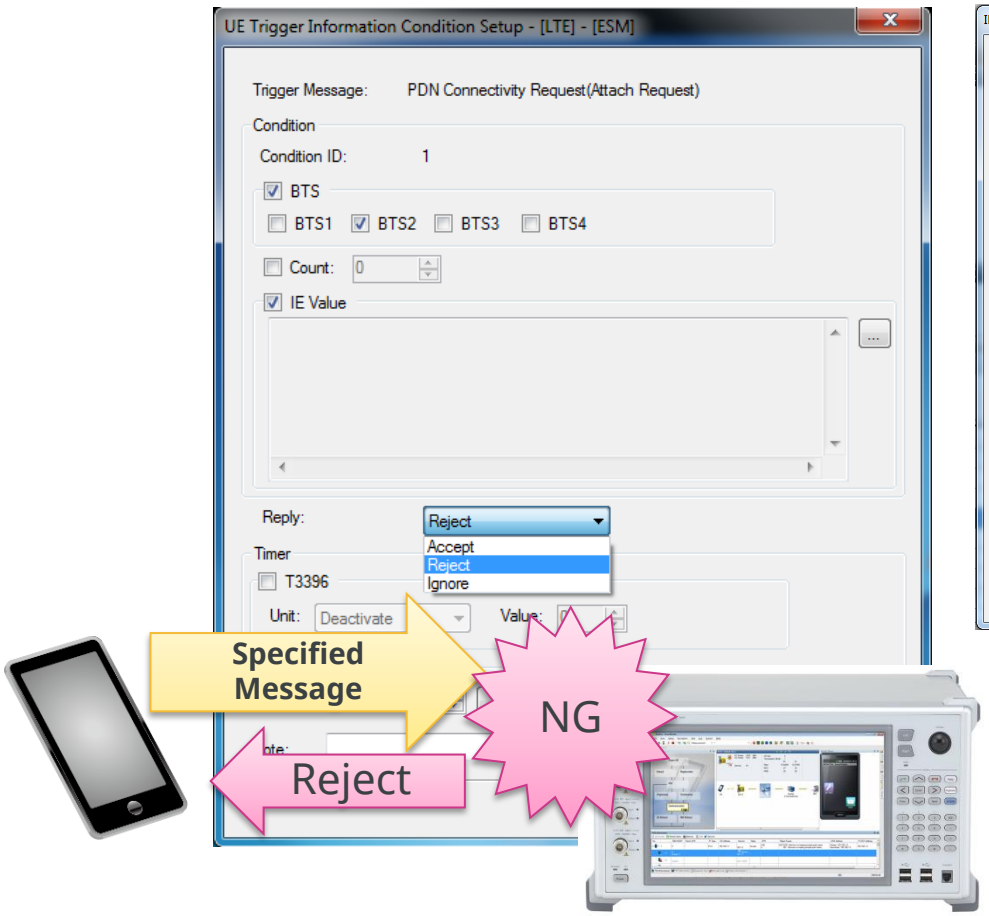
    (Support system are LTE, W-CDMA, GSM, TD-SCDMA, EVDO)

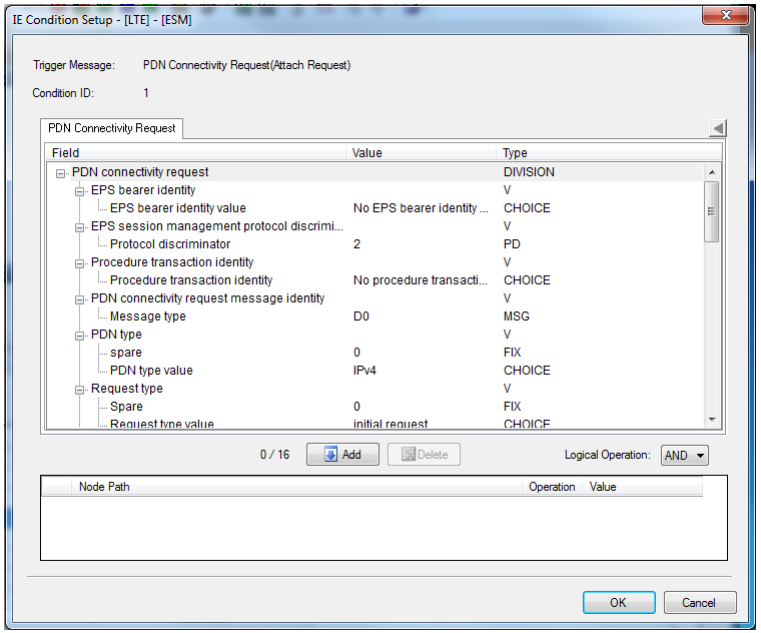


Network Failure Simulation – UE/Network Trigger (2/2)

- 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.



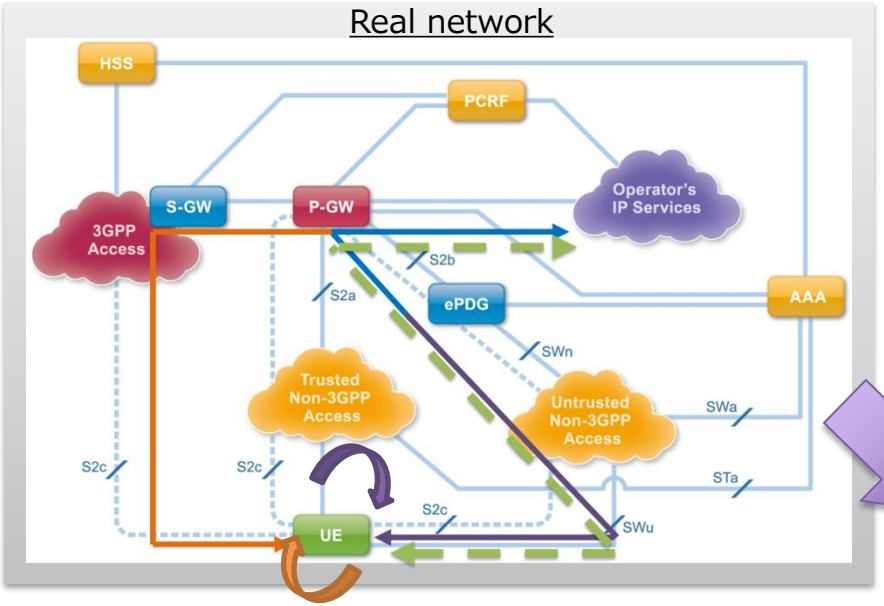


Note: UE Trigger Information Condition can specify several conditions to one UE Message and it perform Accept or Reject or Ignore according to the setting.

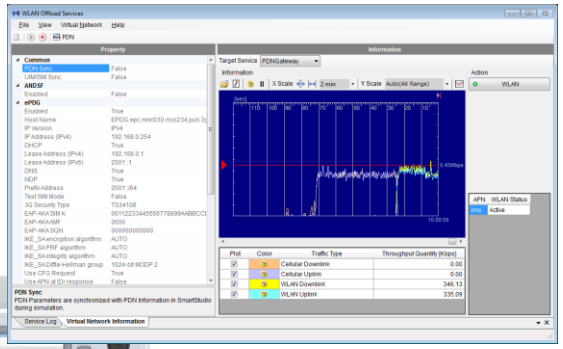
e.g. One Specified Message -> Condition A -> Reject
-> Condition B -> Ignore
-> Condition C -> Accept

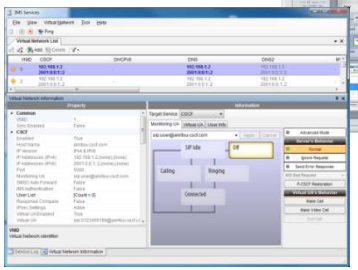
WLAN Calling

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

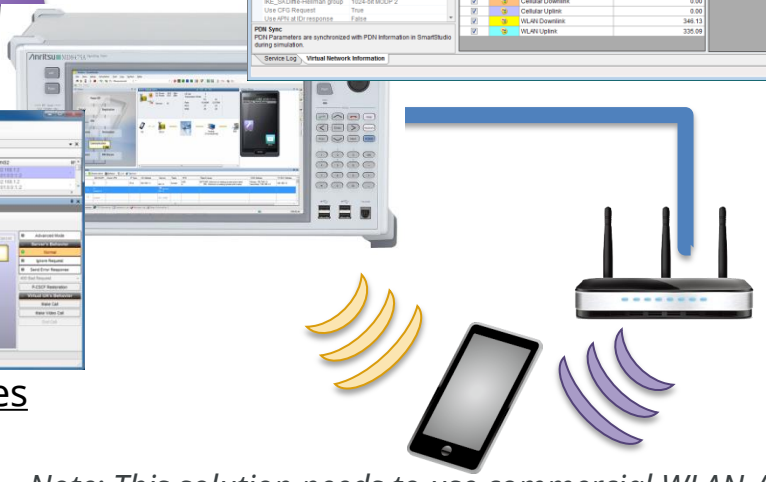


WLAN Offload services





IMS services

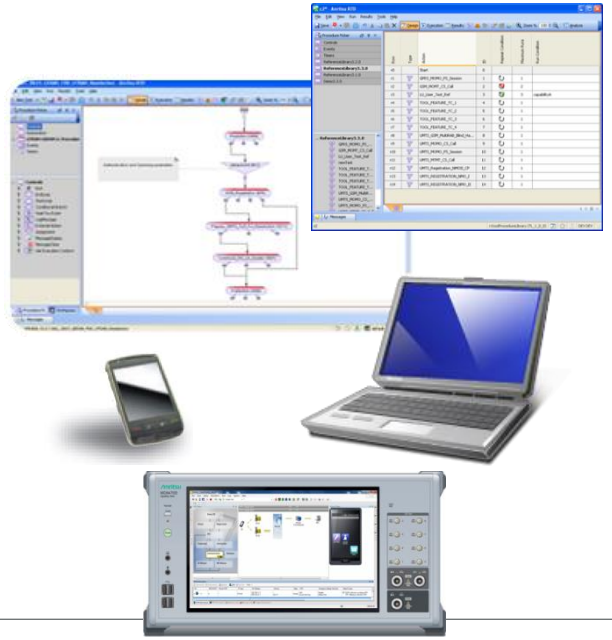


- *Note: This solution needs to use commercial WLAN-AP. (Recommended model : CISCO AIR-SAP2602E-x-K9)*

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

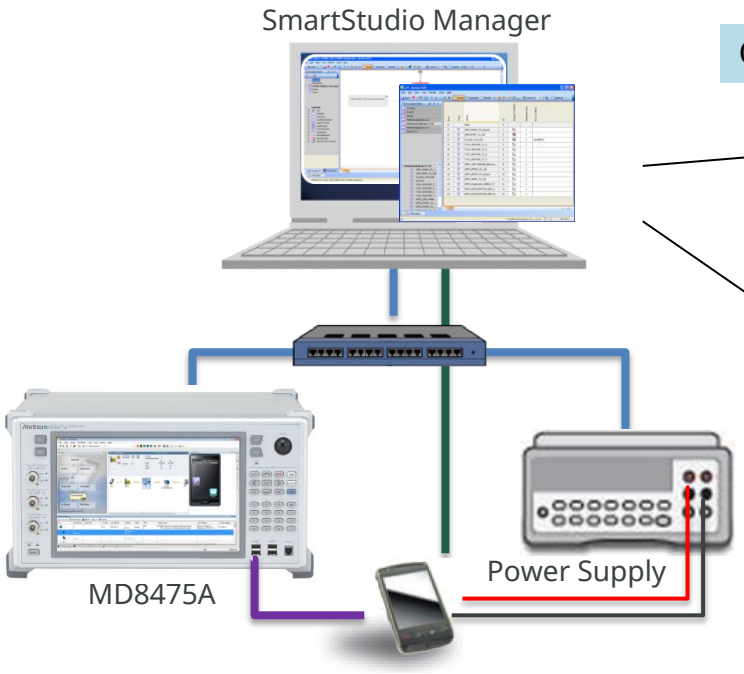
- ✓ Ease of use, without requiring in depth knowledge of 3GPP protocols
  - Intuitive graphical user interface to expedite creation and execution of test cases
- ✓ Evaluates application behavior under different network conditions
  - Simulate different QoS, data throughput and mobility scenarios
- ✓ 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_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_G_SMSoverSGs_MT	Mobility_TG_SelResel	Service_LL_CA_MIMO_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_WW_Voice_Packet_Hard_Handover		TS09_GSM_TalkTime_MO_MR
	Service_T_Emergency	Mobility_LW_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_MR
Service_W_Voice	Service_L2W_CSFB_Emergency	Mobility_LT_SelResel	Mobility_WW_Video_Soft_Handover	IMS_L_SMSoverIMS_MT	TS09_W_TalkTime_MT_NR
Service_GSM_Voice	Service_L2G_CSFB_Emergency	Mobility_LD_SelResel	Mobility_WW_Voice_Packet_Soft_Handover	IMS_L_TIR_MOMR	TS09_L_PacketSwitchedTransfer
Service_T_Voice	Service_L2T_CSFB_Emergency	Mobility_LL_Redirection	Mobility_WW_Video_Packet_Soft_Handover	IMS_L_TIR_MTNR	TS09_L_PacketSwitchedTransfer_FileDownload
Service_C_Voice	Service_L2C_CSFB_Emergency	Mobility_LW_Redirection	Mobility_WW_Video_Packet_Soft_Hanc	IMS_L_Video_MOMR	TS09_L_PacketSwitchedTransfer_FileUpload
		Mobility_LG_Redirection	Mobility_GG_Voice_Handover	IMS_L_Video_MTNR	TS09_L_PacketSwitchedTransfer_ParallelFileDlUl
Packet Call	ETWS	Mobility_LT_Redirection	Mobility_GG_Video_Handover	IMS_L_CFU_MOMR	TS09_L_StreamingContent_Video
Service_W_Packet	Service_L_ETWS_Primary	Mobility_LD_Redirection	Mobility_TT_Voice_Hard_Handover	IMS_L_CFU_MTNR	TS09_W_HTMLBrowsing
Service_GPRS_Packet	Service_L_ETWS_Secondary	Mobility_LL_Handover	Mobility_TT_Video_Hard_Handover	IMS_L_TIP_MOMR	TS09_W_HTMLBrowsing_Full
Service_T_Packet	Service_L_ETWS_PrimarySecondary	Mobility_LW_Handover	Mobility_TT_Packet_Hard_Handover	IMS_L_TIR_MOMR	TS09_L_StreamingContent_Video
Service_D_Packet	Service_W_ETWS_Primary	Mobility_LG_CellChange	Mobility_TT_Voice_Packet_Hard_Handover	IMS_L_CFU_MOMR	TS09_L_StreamingContent_Audio
	Service_W_ETWS_Secondary	Mobility_LW_Handover	Mobility_TT_Video_Packet_Hard_Handover	IMS_L_CFU_MTNR	TS09_W_VideoStreaming
CSFB	Service_W_ETWS_PrimarySecondary	Mobility_LD_Handover	Mobility_WG_CellChange	IMS_L_Attach_Script	TS09_W_VideoStreaming_HD
Service_L2W_CSFB_MOMR	Service_G_ETWS_Primary	Mobility_LWL_Voice_Handover	Mobility_WG_CellChange	IMS_L_Attach_Script	TS09_GPRS_FTPDownload
Service_L2G_CSFB_MOMR	Service_G_ETWS_Secondary	Mobility_LL_Voice_Handover	Mobility_TG_Voice_Handover	IMS_L_GBA_Authentication	
Service_L2T_CSFB_MOMR	Service_G_ETWS_PrimarySecondary	Mobility_LD_SystemLost	Mobility_TG_CellChange	IMS_L_Early_Media	
Service_L2C_CSFB_MOMR		Mobility_LW_SRVCC_MOMR			
Service_L2W_CSFB_MTNR	CMAS	Mobility_LG_SRVCC_MOMR	Stress test	RCS	
Service_L2G_CSFB_MTNR	Service_L_CMAS_Concurrent	Mobility_LW_SRVCC_MTNR	Service_W_Voice_Stress	RCS_L_Registration	
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_MOMR	Service_T_Voice_Stress	WLAN Offload	
	Service_C_CMAS	Mobility_LW_vSRVCC_MTNR	Service_C_Voice_Stress	WLAN_LWL_Untrusted_Access	
Access Control		Mobility_LL_TAU	Mobility_LL_Handover_Stress	WLAN_LWL_Trusted_Access	
Service_LL_CellBarred	SMS	Mobility_WW_RAULAU	Mobility_LW_Handover_Stress		
Service_WW_CellBarred	SMS_L_SMSoverSGs_MO	Mobility_GG_RAULAU	Mobility_LT_Handover_Stress	DSDS	
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_LLL_CA_SCell_AddDel	Mobility_LD_Handover_Stress		
Service_L_AccessClassBarred	SMS_T_SMSoverSGs_MO	Mobility_WW_SelResel			

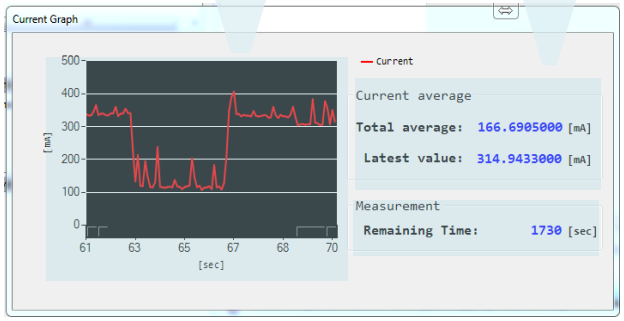
More than 180 various sample test cases available for fully automated Regression Test and Stress Test

Battery Consumption Test - SmartStudio Manager

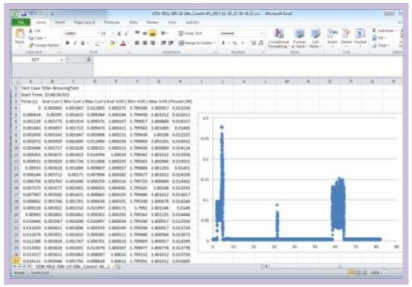


Current consumption vs time plot

Running average & latest current measurement value



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



Basic Test for TS09

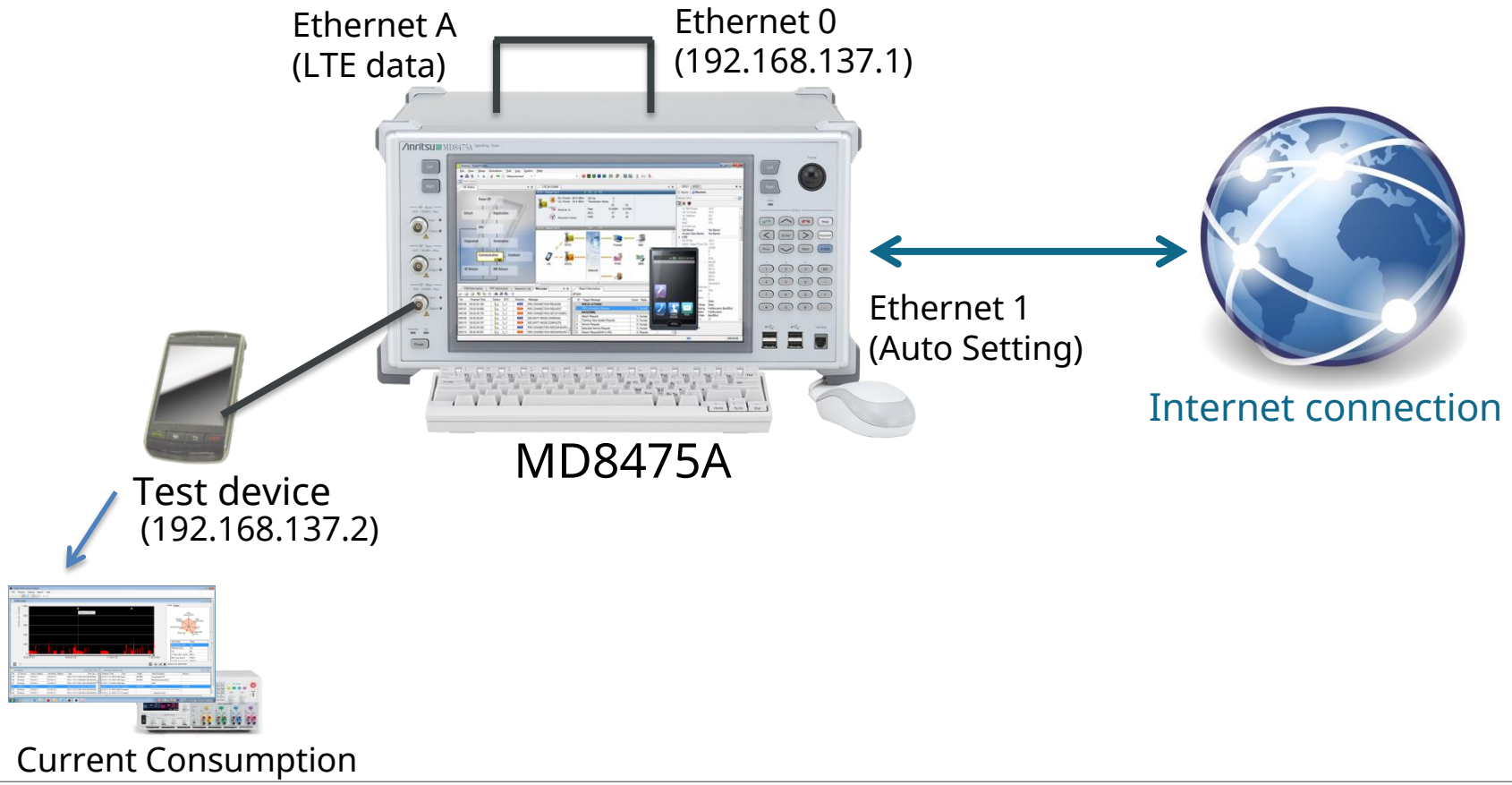
- Stand-by Test
- Talk time Test
- Packet Switch Transfer Test
- Browsing Test
- Streaming Content Test
- Video Telephony Test
- FTP Download Test

Appendix

Ex. Application test – Internet connection

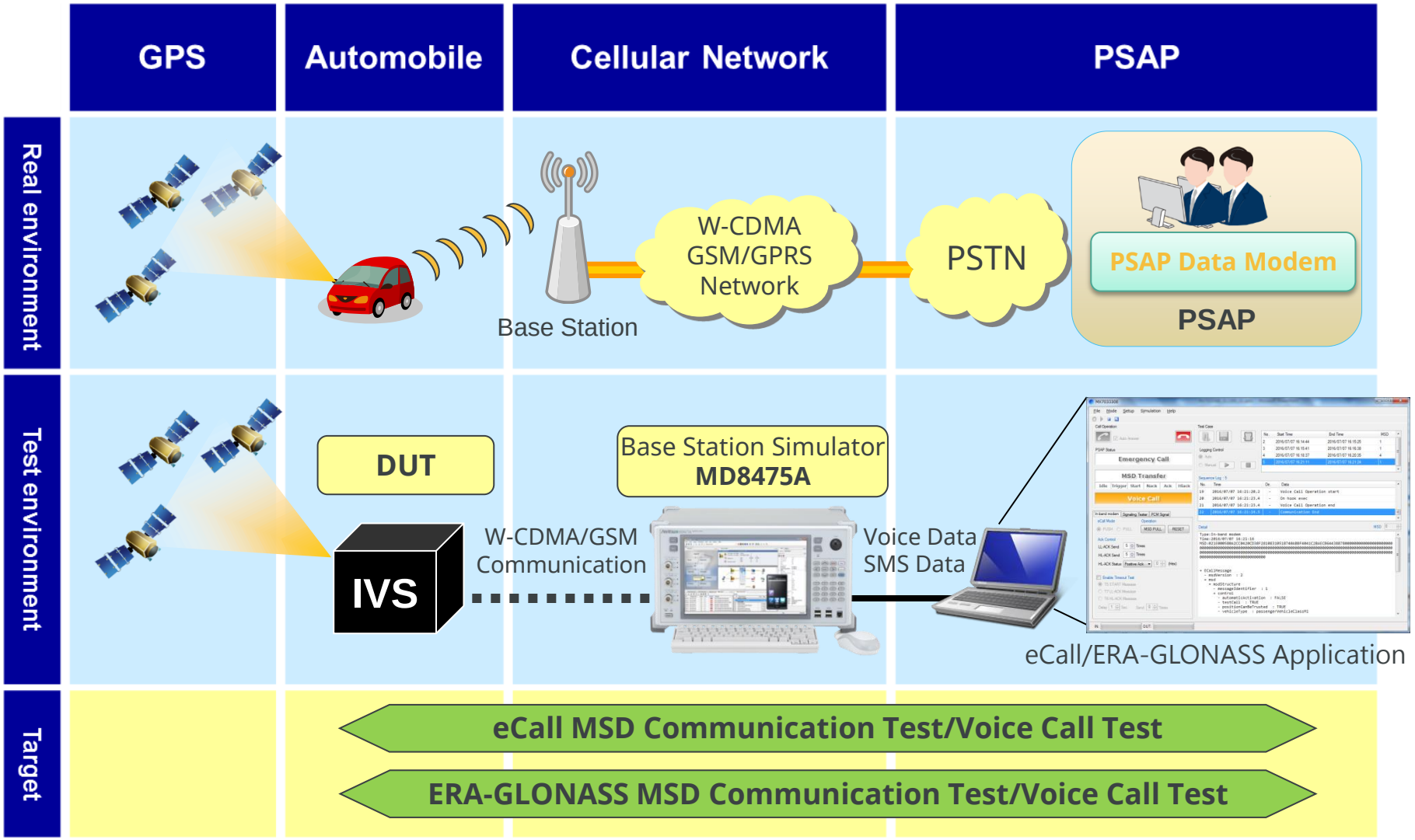
Easily simulation for complicated application

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



eCall/ERA-GLONASS test

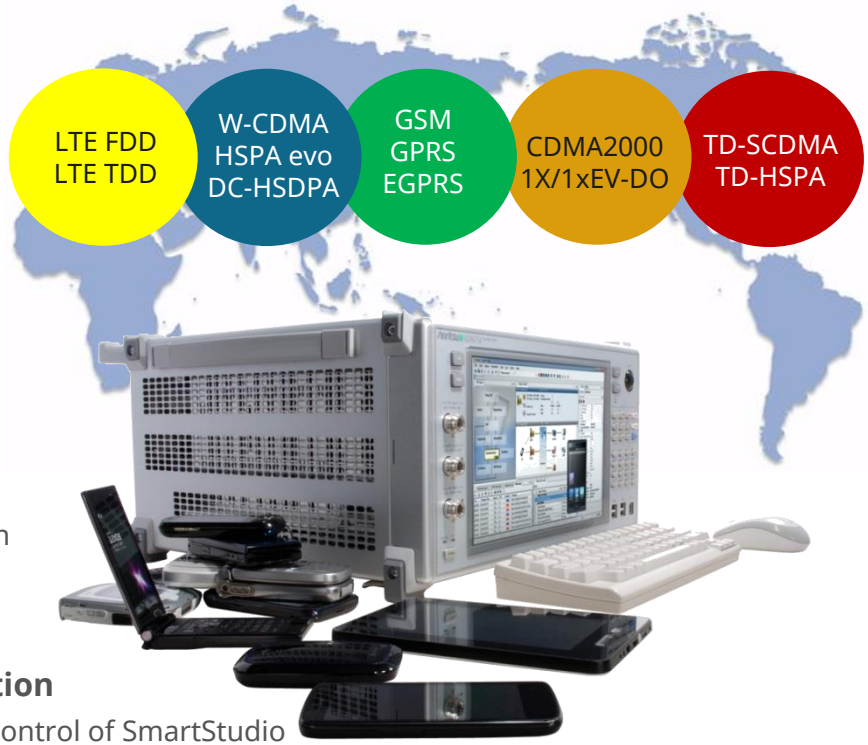
Supports to emulate eCall communications between the IVS and PSAP.



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.

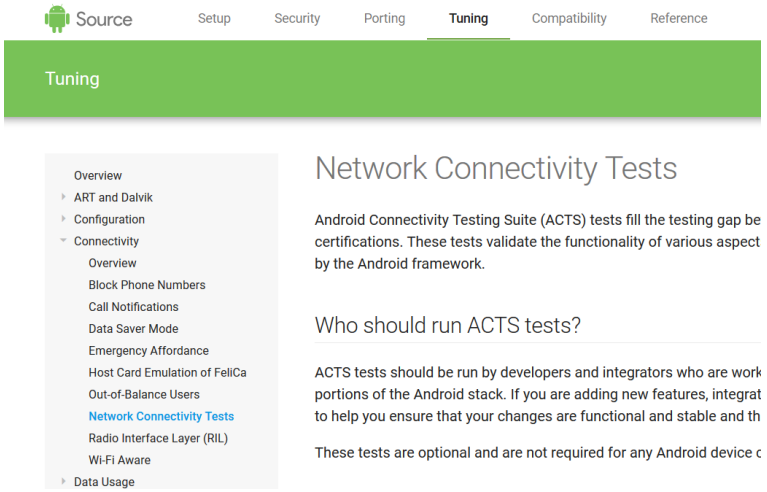
https://source.android.com/devices/tech/connect/connect_tests

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



Anritsu

envision : ensure

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