4G (LTE) Network Test Solutions

- LTE Protocol Emulation
  - MAPSTM LTE S1
  - MAPSTM LTE eGTP
  - MAPSTM LTE X2AP
  - MAPSTM Diameter

- LTE Protocol Analysis

- LTE Network Monitoring Solutions

- End-to-End Voice and Data Quality Testing of 4G Networks

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LTE Protocol Emulation

MAPS™ LTE-S1 Emulator (S1 MME interface)

MAPS™ (Message Automation & Protocol Simulation) designed for testing LTE – S1 interface (any interface excluding Air interface) can simulate eNodeB (Evolved Node B), and MME (Mobility Management Entity).

The application gives the users the unlimited ability to edit S1-AP/NAS messages and call scenarios (message sequences). Simulate up to 500 Smartphones (UEs) powering up and down.

The product also supports Mobile traffic simulation (ETH100, ETH101, ETH102) between any two user-plane nodes in LTE network.

For more information,

MAPS™ LTE for S1 Interface Emulator - (PKS140)

MAPS™ LTE eGTP-c Emulator (S3, S4, S5, S8, S10, S11 & S16 interfaces)

MAPS™ LTE eGTP-c simulates LTE control plane entities MME, SGW, SGSN, and PDN GW. The Emulator gives the users the unlimited ability to edit S3, S4, S5, S8, S10, S11 & S16 eGTP-c (Evolved GPRS Tunneling Protocol for Control Plane (eGTP-c) messages and call scenarios (message sequences).

The product also supports Mobile traffic simulation (ETH100, ETH101, ETH102) between any two user-plane nodes in LTE network.

For more information,

MAPS™ LTE eGTP-c Interface Emulator -(PKS142)
**LTE Protocol Emulation**

**MAPS™ LTE X2-AP Emulator**

MAPS™ X2 Application Protocol (X2-AP) is used to coordinate handovers and perform load management between eNodeB (Evolved Node B) network elements - Source eNB and Target eNB. The MAPS™ X2-AP test tool is designed with specific test cases, as per LTE 3GPP mobile standards.

LTE X2-AP is responsible for Mobility Management, Load Management, Reporting of General Error Situations, Resetting /Setting the X2, and eNB Configuration Update functions.

The product also supports Mobile traffic simulation (ETH100, ETH101, ETH102) between any two user-plane nodes in LTE network.

**MAPS™ LTE Diameter Emulator**

MAPS™ Diameter is an ideal solution for emulation of various interfaces and elements in the LTE core network such as the MME, SGSN, HSS, AF, and PSCF nodes in S6a, S6d, S13, Cx/Dx, Gx, and Rx interfaces designed as per 3GPP standards.

The product supports various procedures over listed interfaces, including:

- **S6a interface** - Location Management, Subscriber Data Handling, Authentication, Fault Recovery, and Notification procedures
- **Rx interface** - AA-Request/Answer, Re-Auth-Request/Answer, Abort-Session-Request/Answer, and Session-Termination-Request/Answer procedure
- **S13 interface** - Mobile Equipment Identity Check procedure
- **Gx interface** - IPCAN Session Establishment and Modification

For more information,

- [MAPS™ LTE for X2 Interface Emulator](#) - (PKS141)
- [MAPS™ Diameter Protocol Emulator](#) - (PKS139)
LTE Protocol Analysis

For more information, refer web pages

LTE (Long Term Evolution) Protocol Analyzer - (PKV107)
PacketScan™ (SIP / H323 / Megaco / MGCP / RTP / RTCP / Video Analysis) - (PKV100)

PacketScan™ LTE analysis solution and is capable of capturing, decoding and performing various test measurements over LTE networks. The analyzer supports various interfaces including S1, S3, S4, S5 (or S8), S6a, S10, S11, S13 and X2 of the LTE network. The protocols supported for decoding across all these interfaces are NAS, S1AP, X2AP, eGTP-c, GTP-U, Diameter, SCTP, UDP, TCP, IP.

Supports both real-time and offline LTE network analysis

- Real-time LTE Analyzer
  - Displays Summary, Detail, Hex-dump, Statistics, and Call Trace Views, the contents of this view
  - Search and filtering capabilities
  - Remote monitoring capability

- Offline LTE Analyzer
  - Trace files for analysis can be loaded through simple command-line arguments.
  - Multiple trace files can be loaded simultaneously with different GUI instances for offline analysis.
For more information, PacketScanWeb™ - (PKV170)

**LTE Network Monitoring Solution**

PacketScanWeb™ is a simple, easy to use Web browser client, with which users can remotely monitor the status of entire IP network with the PacketScan™ probes or PacketProbes™ distributed within network. Whenever a monitored call completes, the probe calculates a variety of quality metrics (MOS, loss, delay, jitter, etc) and sends the metrics to the central Oracle database for storage. This data can then be accessed in real-time from anywhere in the world through PacketScanWeb™. In addition to viewing real-time data, PacketScanWeb™ can also custom filter historical data and generate various reports and graphs that summarize overall network health.

The PacketScan™ is a feature-robust Windows® based software tool that captures and monitors live IP traffic. In the VoIP world, it can monitor and measure SIP, H323, Megaco, MGCP, T.38, and video calls. In the Wireless network, it can monitor 2G, 3G, and 4G protocols such as GSM, UMTS, GPRS, SIGTRAN, and LTE over IP network.

**VQT WebViewer™ - Centralized Monitoring**

The WebViewer™ is a simple, easy to use Web browser client, with which users can remotely view status of entire network and control all VQuad™ nodes distributed within network. GL’s voice-video-data quality test solution allows connecting to any network, any service, and any interface, with a centralized control and monitoring capabilities. The test solution is network independent, all networks are supported including 3G, 4G, WiMax, LTE, and Advanced LTE. In addition all PC based internet connections are supported including WiFi, Broadband Card (3G/4G/LTE), and Wired Ethernet.

For more information, VQT WebViewer™ - (VQT040)
End-to-End LTE Network Testing

Automated Voice, Data & Video Quality Testing

VQuad™ with Dual UTA is a comprehensive hardware device is designed for complete end to end voice, data, video quality testing of LTE network. Also available is VQuad™ Probe, which is a self-contained all-in-one unit that supports all of the functionalities with an embedded PC and Dual UTA.

- Test LTE devices for Voice, Data, Video quality metrics with complete automation and centrally controlled system.
- Automated tests including TCP, UDP, HTTP, VoIP, Route, FTP, DNS, SMS, UEInfo, SIMInfo, and Phone Info.
- Automated testing of Wireless Devices including Smartphones (Android/Apple phone/Tablet).
- All PC based internet connections are supported including WiFi, Broadband Card (3G/4G/LTE), and Wired Ethernet.

For more information,

☞ Automated Data Testing over Wired & Wireless Networks - (VQT601, VQT600, VQT610)