Overview

GL’s Message Automation & Protocol Simulation (MAPS™) is a protocol simulation/emulation and conformance test tool that supports a variety of protocols such as MGCP, SIP, MEGACO, SS7, ISDN, GSM, CAS, MC-MLPPP, MAP, LTE, UMTS, SS7 SIGTRAN, ISDN SIGTRAN, SIP I, Diameter, MAP IP, and others. This protocol emulation tool covers solutions for both protocol simulation and analysis. The product also supports RTP, TDM, TRAU GSM, and Mobile traffic simulation over various network.

The application includes various test plans and test cases to support the testing of real-time entities. Along with automation capability, the application gives users the unlimited ability to edit messages and control call scenarios (message sequences). "Call Scenarios" are generated through scripts.

MAPS™ is designed to work on TDM interfaces as well as on the Ethernet interfaces. TDM signaling protocols such as SS7, ISDN, CAS, MC-MLPPP, MAP, IUP, CAP, INAP, GSM, and FXO/FXS operate over TDM networks, whereas SIP, MEGACO, and MGCP operate over IP networks.

MAPS™ also supports 3G & 4G mobile protocol simulation such as LTE (S1, eGTP) interfaces, LTE Diameter [S6a, S6d, S13, Cx/Dx, Gs, Rx, Slg, Slh], INAP IP (ANSI, ITU), CAP IP (ANSI, ITU), GSM A over IP, SKINNY, MAP IP, BICC IP, GPRS, and UMTS (IuCS, IuPS, IuH) over IP. MAPS™ architecture supports both Binary and Text Based Protocol Simulation.

MAPS™ also supports Location Services (LCS) architecture for positioning mobile devices. Simulates Slg, Slh interfaces (GMLC, MME, HSS), Lg, Lh interfaces (GMLC, MSC, SGSN, HLR), Sls interface (MME, E-SMLC) and Lb interface (MME, SMLC) nodes and interfaces implementing positioning functionality in a cellular network.

For more details, visit www.gl.com/maps.html webpage.

### SUPPORTED PROTOCOLS

| TDM, 2G Protocols | ISDN & LAPD, SS7, GSM A, GSM Abis  
|                   | CAS, MC-MLPPP, MAP, CAP, INAP, IUP  
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<th>GSM C, GSM D, GSM H (Coming Soon)</th>
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| IP Protocols       | SIP, MEGACO, MGCP, SIP I (SIP ISUP)  
|                    | SS7 SIGTRAN (SS7 over IP), ISDN SIGTRAN (ISDN over IP), INAP IP (ANSI, ITU)  
|                    | GSM AoIP (GSM A over IP), GSM Lb, MAP IP (MAP over IP), GPRS Gb over IP, CAP IP (ANSI, ITU), Skinny T.38 (Coming Soon)  |
| 3G Protocols       | UMTS IuCS, IuH (over IP), UMTS IuPS (over IP), UMTS Gn Gp (over IP)  
|                    | UMTS IuHPS, UMTS IuB (Coming Soon)  |
| 4G Protocols       | LTE S1, LTE eGTP [S3, S4, S5, S8, S10, S11 and S16], LTE Diameter [S6a, S6d, S13, Cx/Dx, Gs, Rx, Slg, Slh], LTE X2-AP, LTE SGs, and LTE SLs.  |
Features
- **Flexible MAPS™ architecture**
  - Makes testing across any domain easy and feasible.
  - An end-to-end testing of call control and QoS from TDM -to-TDM, TDM-IP–TDM, or an All-IP network.
  - To test legacy networks (such as CAS, SS7 and ISDN), IP networks (such as SIP, MGCP, MEGACO, SIGTRAN), and the emerging technologies including UMTS, LTE better known as 3G, 4G.

- **Single Framework – Single Platform**
  - Testing across all domains easy.
  - Significantly reduces user efforts to simulate multiple protocols / interfaces.
  - PC based test solution, no bulky hardware.

- **Customize Test Scenarios using Scripts**
  - Build valid or invalid test cases.
  - Simulate a complete protocol state machine.
  - Offers ‘syntax-ready commands’ to easily build scripts.
  - Protocol Conformance Testing.

- **Customize Protocol Messages**
  - Modify any messages, message parameters, and/or information elements.
  - Add, modify or remove any optional parameter depending on specific feature of interest.
  - Perform packet level fault insertion by impairing any bit / byte of a message.

- **Ready-to-use scripts**
  - Includes ready-to-run scripts for simulating important call scenarios / procedures.
  - Syntax-ready commands in script reduces dependency on technically skilled resources.
  - Reusability, easy maintainability and reduced ‘time-to-market’.

- **Multi-Interface and Multi-Protocol Simulation**
  - Test any node in a network using respective protocols communicating with that node.
  - Simulate multiple interfaces carrying signals or data across the network.
  - **Setup a virtual real-time network simulating all the network elements using ‘MAPS™ 2G 3G 4G Wireless Lab Suite’**

- **Multiple Link & Transport Layer Simulation**
  - Supports multiple transports for IP network (TCP, UDP and SCTP).
  - Supports both IPv4 and IPv6
  - Simulates multiple SS7 (MTP) links, LAPD Links.

- **Performance, Load, Stress Testing**
  - Test to measure the capability of an entity for various traffic conditions, and protocol specific behavior.
  - Load generation defines Total Call Generation, Maximum Active Calls, and Calls per second.
  - Call rate configuration for fixed, pre-determined patterns, and for random statistical patterns.

- **Test Automation**
  - Define multiple auto-handlers to an incoming message.
  - Automate the execution of the multiple calls sequentially or randomly.
  - Handle the incoming messages.

- **Scheduler**
  - Manual / bulk call generation at scheduled time
  - Load pre-saved configuration files to automatically run the scheduled test
  - Schedule the call generation to be processed only once/ immediate execution/daily/on completion of previous execution

- **Command Line Interface for Remote Call Control**
  - Capability of accepting commands from scripting tools such as the TCL, Python, VBScript, Java, and .Net.
  - Control and operate MAPS™ remotely, also gather statistics, logs and reports.
  - Availability of MAPS™ APIs to integrate with any of the other applications.

- **Traffic Simulation**
  - Traffic generators & analyzers to perform end-to-end testing of various traffic types over Wireless, IP & TDM networks
  - Establish a voice session, monitor power level, signaling bits, or perform loopback testing real-time voice traffic
  - Transmit and receive voice files, DTMF and MF digits, Tones, FAX (Pass-through T.38), IVR, and Video (H.263 & H.264)

- **Remote MAPS**
  - Multi-node & multi-interface simulation from a single GUI
  - Suitable for testing any core network, access network, and inter-operability functions
  - Single Licensing Server controlling server and client licenses (no. of users)
  - Simultaneous traffic generation/reception at 100% on all servers
  - Admin privileges to control Testbed and access to configuration files for each remote client user. Visit [https://www.gl.com/maps-remote-controller.html](https://www.gl.com/maps-remote-controller.html) webpage.
**Additional GUI Features**

- Ladder diagram of the messages with detailed decode of each message.
- Call statistics summarizing the entire testing with a tabular and graphical view.
- Tx, Rx, & Retransmit message statistics for the respective protocol.
- Scripted call generation and automated call reception.
- Automated stress/load testing capabilities through Load Generation and Bulk Call Simulation features.
- Control the test flow by defining events. User-defined, Auto-generated, Track specific events & error logs to identify syntax errors, transport errors, decode errors, and more.
- A single Remote Client GUI to remotely control/monitor all the network interfaces and elements simulated by MAPS™ Servers; one or more MAPS™ applications can be installed in a single Sever.
- Unlimited number of remote client user can be defined at the server
- User Defined Statistics for RTP traffic parameters
- Generate Reports and Statistics for Call Status, Link Status, Message Statistics and RTP Voice Quality Metrics (LMOS, CMOS)
- GUI Options to enable or disable colour coding feature in Profile Editor and call sorting feature in Call Reception

**Command Line Interface for Remote Access**

*(requires additional licensing)*

MAPS™ can be configured as server-side application, to enable remote controlling of the application through multiple command-line based clients. Multiple MAPS™ CLI servers can also be controlled remotely from single client application.

Supported clients include TCL, Python, VBScript, Java, and .Net.

User can remotely perform all functions such as start test bed setup, load scripts and profiles, apply user events such as send digits/file/tones, detect digits/file/tones, dial, originate call, terminate call, start and stop traffic and so on. User can also generate and receive calls through commands. The client applications are distributed along with MAPS™ Server application.

**Summary of Supported Traffic Types**

- **RTP Traffic Simulation** *(PKS102, PKS108, PKS200, PKS106)*
  over UMTS IuCS & IuH, IuPS, SIP, SIP-I, MGCP, MEGACO, GSM A, & GSM Abis over IP interfaces

- **TDM Traffic Simulation** *(xx610, xx620, xxFT0)*
  over ISDN, SS7, CAS, GSM A interfaces

- **TRAU GSM Traffic** *(xx646)*
  over GSM A-bis interfaces

- **Mobile Traffic Simulation** *(ETH100, ETH101, ETH102, ETH103)*
  over LTE S1, eGTP and UMTS GnGp, IuPS, IuH, GPRS Gb interfaces
Protocols Supported & Standards

**MAPS™ for Protocol Simulation in TDM, 2G**

- **ISUP (Integrated Services Digital Network User Part)**
  MAPS™ SS7 can simulate Service Switching Point (SSP), where ISUP signaling is defined by the ITU-T and ANSI standards. MAPS™ SS7 functionality covers the ITU and ANSI variant of SS7 implementing MTP2, MTP3, and ISUP protocols. MAPS™ SS7 also supports scripting through CLI such as the Python, and TCL, using MAPS™ client-server functionality with additional license. For more information, visit [http://www.gl.com/maps-isup.html](http://www.gl.com/maps-isup.html).

- **ISDN (Integrated Services Digital Network)**
  MAPS™ ISDN is designed to simulate complete ISDN & LAPD over TDM (T1/E1) connection (Switch to Subscriber), where ISDN signaling is defined by the ITU-T standards. MAPS™ ISDN also supports TDM traffic simulation. MAPS™ ISDN also supports ISDN and LAPD Conformance Test Suite. For more information, visit [http://www.gl.com/maps-isdn.html](http://www.gl.com/maps-isdn.html).

- **GSM A Interface**
  MAPS™ GSM A can simulate BSC and MSC entities over A Interface by generating and receiving BSSMAP and DTAP messages. The signaling conforms ITU-T and 3GPP standards. MAPS™ GSM A also supports TDM traffic simulation. For more information, visit [http://www.gl.com/maps-gsm-a.html](http://www.gl.com/maps-gsm-a.html).

- **GSM Abis Interface**
  MAPS™ GSM Abis can simulate BTS and BSC entities over Abis Interface by generating and receiving BSSM messages. The signaling conforms 3GPP standards. MAPS™ GSM Abis also supports TDM traffic simulation. For more information, visit [http://www.gl.com/maps-gsm-abis.html](http://www.gl.com/maps-gsm-abis.html).

- **MAP (Mobile Application Part)**
  MAPS™ MAP Emulator can simulate various MAP signaling interfaces (C, D, E, F, H, and & Packet-switched interfaces such as Gc, Gr, Gf, Gd) in GSM/UMTS networks as defined by 3GPP standards. For more information, visit [http://www.gl.com/map-protocol-emulation-over-ip-tdm-using-maps.html](http://www.gl.com/map-protocol-emulation-over-ip-tdm-using-maps.html).

- **CAS (Channel Associated Signaling)**
  MAPS™ CAS Emulator can simulate any CAS based protocol (CAS signaling types include Loopstart, Groundstart, Feature Group D (FGD), Winkstart, MFC-R2) in telephone networks. For more information, visit [http://www.gl.com/maps-cas-emulator.html](http://www.gl.com/maps-cas-emulator.html).

- **MC-MLPPP (Multi-Class Multi-Link Point-to-Point)**
  MAPS™ MLPPP is an advanced tool for MLPPP simulation over TDM (T1 E1) that can simulate peer end-points (Router or a Switch). The MLPPP signaling specification conforms to IETF standards. For more information, visit [http://www.gl.com/maps-mlppp-emulator.html](http://www.gl.com/maps-mlppp-emulator.html).

**MAPS™ for Protocol Simulation in TDM, 2G (contd...)**

- **CAP (CAMEL Application Part)**
  MAPS™ CAMEL (Customized Applications for Mobile networks Enhanced Logic) Application Part (CAP) Protocol emulator can simulate functional entities such as Service Control Function (gsmSCF) and Service Switching Function (gsmSSF). For more information, visit [http://www.gl.com/cap-protocol-emulation-over-ip-tdm-using-maps.html](http://www.gl.com/cap-protocol-emulation-over-ip-tdm-using-maps.html).

- **INAP (Intelligent Network Application Part)**
  MAPS™ INAP Protocol Emulator is an advanced protocol simulator/tester for INAP (Intelligent Network Application Part) that can simulate INAP messages and signaling as per ITU, ANSI specifications. INAP information flow is defined between functional entities such as SCF and SSF distributed across SS7 network. For more information, visit [http://www.gl.com/inap-protocol-emulation-over-ip-tdm-using-maps.html](http://www.gl.com/inap-protocol-emulation-over-ip-tdm-using-maps.html).

- **IUP (BT SS7 Interconnect User Part Protocol)**
  MAPS™ IUP is an advanced protocol simulator used to simulate UK specific SS7 IUP in British Telecom (BT) networks. It is designed to simulate interconnect route between Incoming and Outgoing Networks as defined by the PNO-ISC/INFO/004(IUP) and TGS/Spec/006 specifications. For more information, visit [http://www.gl.com/bt-iup-interconnect-user-part-protocol-emulation-maps.html](http://www.gl.com/bt-iup-interconnect-user-part-protocol-emulation-maps.html).

**MAPS™ for Protocol Simulation in IP Network**

- **SIP (Session Initiation Protocol)**
  MAPS™ SIP supports simulating SIP proxy servers, Redirect servers, Registrars, Registrants, and User Agents such as SIP phones. MAPS™ SIP also supports bulk audio and video call simulation capabilities. The MAPS™ SIP Conformance Suite performs protocol conformance testing as per ETSI standard. For more information, visit [http://www.gl.com/mapssip.html](http://www.gl.com/mapssip.html).

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Protocols Supported & Standards

- **MEGACO (Media Gateway Control)**
  MAPS™ Megaco emulator can simulate MGC and Media Gateways with various types of calls. It can also control scenario involved in Media conversion. The MAPS™ Megaco Conformance Suite performs protocol conformance testing as per ETSI TS 102 374-2 standards. MAPS™ Megaco also supports RTP traffic simulation. For more information, visit [http://www.gl.com/maps-megaco.html](http://www.gl.com/maps-megaco.html).

- **MGCP (Media Gateway Controller Protocol)**
  MAPS™ MGCP can simulate MGC and Media Gateways with various types of calls. It can also control scenario involved in Media conversion. The MAPS™ MGCP Conformance Suite is designed to perform protocol conformance testing as per RFC 3435. MAPS™ MGCP also supports RTP traffic simulation. For more information, visit [http://www.gl.com/maps-mgcp.html](http://www.gl.com/maps-mgcp.html).

- **SIP I (SIP ISUP)**
  MAPS™ SIP I can simulate Signaling Gateway, Softswitch entities as UAC, UAS in the network, where SIP ISUP signaling is specified by the ITU and IETF standards. MAPS™ SIP I also supports RTP traffic simulation. For more information, visit [http://www.gl.com/maps-sip-i-emulator.html](http://www.gl.com/maps-sip-i-emulator.html).

- **SCCP (Skinny Call Control Protocol)**

- **SS7 SIGTRAN (SS7 over IP)**
  MAPS™ SS7 SIGTRAN can simulate Signaling Gateway and Softswitch, where ISUP signaling over IP specification is defined by ITU-T Q.761-764 and Q.784 standards. MAPS™ SS7 SIGTRAN functionality covers the ITU and ANSI variants of SS7 implementing M3UA and ISUP protocols. With additional licenses, MAPS™ SIGTRAN can also support SS7 conformance testing over IP. For more information, visit [http://www.gl.com/maps-sigtran.html](http://www.gl.com/maps-sigtran.html).

- **MAP IP (Mobile Application Part over IP)**
  MAPS™ MAP IP simulates various MAP signaling interfaces transported using SIGTRAN in UMTS/GSM network as defined by 3GPP standards. MAPS™ MAP IP functionality covers the ITU and ANSI variants of SS7 implementing M3UA, M2PA, and MTP3 protocols. It also supports LCS procedures over Lg, Lh interface. For more information, visit [http://www.gl.com/map-protocol-emulation-over-ip-tdm-using-maps.html](http://www.gl.com/map-protocol-emulation-over-ip-tdm-using-maps.html).

- **ISDN-SIGTRAN (ISDN over IP)**
  MAPS™ ISDN SIGTRAN simulates a complete ISDN connection between SG (Signaling Gateway) to MGC (Media Gateway Controller), where ISDN signaling are as defined by the ITU-T Q.921 / Q.931 standards. For more information, visit [http://www.gl.com/maps-isdn-sigtran.html](http://www.gl.com/maps-isdn-sigtran.html).

**MAPS™ for Protocol Simulation in 3G, 4G Network**

- **LTE (Long Term Evolution) S1**
  MAPS™ LTE S1 is designed to simulate network elements such as eNodeB (Evolved Node B), and MME (Mobility Management Entity) in S1 interface as per 3GPP 36.413 9.0.0 and 3GPP TS 24.301 V9.0.0 standards. The application gives the users the unlimited ability to edit S1-AP/NAS messages and control scenarios (message sequences). For more information on MAPS™ LTE S1 interface, visit [http://www.gl.com/maps-lte-s1.html](http://www.gl.com/maps-lte-s1.html).

- **LTE (Long Term Evolution) S3, S4, S5, S8, S10, S11 & S16**
  MAPS™ LTE eGTP-c (Evolved GPRS Tunneling Protocol for Control Plane) is designed to simulate MME (Mobility Management Entity), SGW (Serving Gateway) and PGW (PDN Gateway) in S11, S5/S8 interfaces as per 3GPP TS 29.274 standards. The application gives the users the unlimited ability to edit eGTP-c messages and control scenarios (message sequences). For more information on MAPS™ LTE eGTP (S3, S4, S5, S8, S10, S11 and S16 interfaces), visit [http://www.gl.com/maps-lte-egtp.html](http://www.gl.com/maps-lte-egtp.html).

- **LTE X2-AP**
  MAPS™ X2 Application Protocol (X2AP) is used to coordinate handovers and perform load management between eNodeB (Evolved Node B) network elements - Source eNB and Target eNB. The MAPS™ X2AP test tool is designed with specific test cases, as per LTE 3GPP mobile standards. For more information on MAPS™ X2, visit [http://www.gl.com/maps.html](http://www.gl.com/maps.html).

For detail information on the supported protocols and standards, please download the MAPS™ Brochure from [www.gl.com/brochures.html](http://www.gl.com/brochures.html) website, or refer to [http://www.gl.com/maps.html](http://www.gl.com/maps.html) webpage.
MAPS™ for 3G, 4G Networks (contd.)

- **LTE SLs**
  MAPS™ supports simulation of Location Services Application Protocol (LCS-AP) messages applicable to LTE SLs interface between E-SMLC (Enhanced Serving Mobile Location Center) and MME (Mobile Management Entity) network elements as per 3GPP TS 29.171 V14.0.0 (2016-12) specifications. For MAPS™ LTE SLs, visit http://www.gl.com/test-location-based-services-lte-sl-interface.html

- **MAPS™ GSM Lb**
  MAPS™ supports simulation of Base Station System Application Part LCS Extension (BSSAP-LE) message exchange between BSS (Base Station Centre) and SMLC (Serving Mobile Location Center) entities as per 3GPP TS 49.031 specifications over GSM Lb interface in LCS network. For MAPS™ GSM Lb, visit http://www.gl.com/test-location-based-services-gsm-lb-interface.html

- **UMTS IuPS (over IP)**
  MAPS™ UMTS IuPS designed to simulate RNC (Radio Network Controller), and 3G SGSN (3G Serving GPRS Support Node) network elements in IuPS interface as per 3GPP and ITU-T standards. For MAPS™ UMTS IuPS, visit http://www.gl.com/maps-umts-iups-emulator.html

- **GPRS Gb over IP**
  MAPS™ is designed to simulate GPRS Gb interface messages and signaling specification as defined by 3GPP standards between the BSS (Base Station Subsystem) and the SGSN (Serving GPRS Support Node) over IP transmission protocol. For MAPS™ GPRS Gb, visit http://www.gl.com/gprs-gb-over-ip-emulator-maps.html

- **UMTS IuCS and IuH (over IP)**
  MAPS™ UMTS IuCS simulates RNC (Radio Network Controller), and 3G MSC (3G Mobile Switching Centre) by generating RANAP messages and signaling specification as defined by ITU-T and 3GPP standards. MAPS™ also supports RTP traffic simulation over these interfaces. MAPS™ UMTS IuH simulates Femto Home Node B (HNB), and a Femto Home Node Gateway (HNB-GW) as per 3GPP standards (TS 25468, TS 25.413, TS 04.08, TS 04.18, TS 03.40/03.38/04.11). MAPS™ IuH also supports RTP traffic simulation over UMTS IuH interface. With additional licensing Mobile and Gateway GTP traffic is supported. For MAPS™ UMTS IuCS and IuH, visit http://www.gl.com/maps-umts-iucs-iuh-emulator.html

- **Diameter [S6a, S6d, S13, Cx/Dx, Gx, Rx, SLg, SLh]**
  MAPS™ Diameter is an ideal solution for simulation of various interfaces and elements in the LTE core network such as the MME, SGSN, HSS, AF, PCRF, PCEF, PDN-GW, GMLC, and EIR nodes in S6a, S6d, S13, Cx/Dx, Gx, Rx, SLg, and SLh interfaces as per 3GPP standards (3GPP TS 29.272 V10.3.0, and 3GPP TS 29.214-b10). For MAPS™ Diameter application, visit http://www.gl.com/maps-diameter-protocol-emulator.html

- **INAP IP (ANSI, ITU)**
  MAPS™ INAP IP (ANSI, ITU) Emulator is an advanced protocol simulator/tester for INAP (Intelligent Network Application Part) that can simulate ANSI INAP messages and signaling as per ITU –T Q.121x & Q.122x specifications. INAP information flow is defined between functional entities such as Service Control Function (SCF) and Service Switching Function (SSF) distributed across SS7 network. For MAPS™ INAP IP application, visit http://www.gl.com/inap-protocol-emulation-over-ip-tdm-using-maps.html

- **CAP IP (CAMEL Application Part)**

- **LTE SGs Fallback Interface**
  MAPS™ SGs Emulator is designed to realize the CS fallback function for Voice and SMS delivery via the Circuit Switched (CS) core network using SGs interface between the Mobility Management Entity (MME) and Visitor Location Register (VLR), as defined in 3GPP TS 29.118 specifications (SGsAP). For MAPS™ LTE SGs, visit http://www.gl.com/test-sms-csfallback-over-sgs-interface.html

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Buyer's Guide

**XX648** – MAPS™ ISDN & LAPD Emulator

**XX642** – MAPS™ ISDN & LAPD Conformance Emulator

**XX682** - MAPS™ IUP Emulator

**XX649** – MAPS™ SS7

**XX647** – MAPS™ SS7 Conformance Scripts

**XX651** - MAPS™ CAS

**XX652** - MAPS™ MC-MLPPP

**XX656** - MAPS™ INAP

**XX692** – MAPS™ GSM A

**XX693** – MAPS™ GSM Abis

**XX624** - MAPS™ FXO FXS Emulator

**XX694** - MAPS™ MAP (B, C, D, E, F, G, and H interfaces)

**XX696** - MAPS™ CAP (CAMEL Application Part)

**PKS111** – MAPS™ Remote Controller

**PKS120** - MAPS™ SIP

**PKS121** - MAPS™ SIP Conformance Scripts

**PKS122** – MAPS™ MEGACO

**PKS123** – MAPS™ MEGACO Conformance Scripts

**PKS124** - MAPS™ MGCP and Conformance Scripts

**PKS126** - MAPS™ SIP I

**PKS127** - MAPS™ IMS Emulator

**PKS130** – MAPS™ SS7 SIGTRAN (SS7 over IP)

**PKS131** – MAPS™ Gb Emulator over IP

**PKS132** - MAPS™ MAP over IP

**PKS135** - MAPS™ ISDN SIGTRAN (ISDN over IP)

**PKS136** - MAPS™ INAP IP (ANSI, ITU)

**PKS139** - MAPS™ Diameter

**PKS140** - MAPS™ LTE-S1

**PKS141** - MAPS™ LTE X2-AP

**PKS142** - MAPS™ LTE-eGTP-c (S3, S4, S5, S8, S10, S11 and S16)

**PKS143** - MAPS™ IuCP Interface Emulator

**PKS146** - MAPS™ LTE SGs Interface Emulator

**PKS147** - MAPS™ GSM Lb Interface Emulator

**PKS148** - MAPS™ LTE SLs Interface Emulator

**PKS151** - MAPS™ CAP IP Protocol Emulator

**PKS160** - MAPS™ UMTS IuCS and IuH

**PKS164** - MAPS™ UMTS IuPS Protocol Emulator

**PKS166** - MAPS™ UMTS GnGp Interface Emulator

**ETH100** - Mobile Traffic - PacketCheck™

**ETH101** - MobileTrafficCore - GTP

**ETH102** - MobileTrafficCore - Gateway

**ETH103** - MobileTrafficCore - Gb

**PKS101** - SIP Core

**PKS102** - RTP Soft Core for RTP Traffic Generation

**PKS103** - RTP IuUP Soft Core

**PKS106** - RTP Video Traffic Generation

**PKS107** - RTP EUROCAE ED137

**PKS108** - RTP Voice Quality Measurements

**PKS200** - RTP Pass Through Fax Emulation