

Release Notes for MAPS™ Products and Framework - version 21.2.23

This release notes lists all the enhancements and bug-fixes for each protocol and framework in general -

- [MAPS™ Framework Enhancements](#)
- [MAPS™ Product-Specific Enhancements](#)

MAPS™ Protocol-Specific Enhancements

Reason for Release / Description of Enhancement	Version
MAPS™ 3GMISimulator Enhancements: <ul style="list-style-type: none">• Package built on VS2019.• Support for Warranty License.• New Security features with software licensing.• Includes MAPS™ GUI and framework Updates.• CAMEL support for On Call SMS and Fragmented SMS.• SGs support for On Call SMS and Fragmented SMS	21.2.23
MAPS™ 2GMISimulator Enhancements: <ul style="list-style-type: none">• Package built on VS2019.• Support for Warranty License.• New Security features with software licensing.• Includes MAPS™ GUI and framework Updates.• CAMEL support for On Call SMS and Fragmented SMS.• SGs support for On Call SMS and Fragmented SMS	21.2.23
MAPS™ IuCS Enhancements: <ul style="list-style-type: none">• Package built on VS2019.• Support for Warranty License.• New Security features with software licensing.• Includes MAPS™ GUI and framework Updates.	21.2.23
MAPS™ IuH Enhancements: <ul style="list-style-type: none">• Package built on VS2019.• Support for Warranty License.• New Security features with software licensing.• Includes MAPS™ GUI and framework Updates.	21.2.23
MAPS™ GSMAoIP Enhancements: <ul style="list-style-type: none">• Package built on VS2019.• Support for Warranty License.• New Security features with software licensing.• Includes MAPS™ GUI and framework Updates.	21.2.23
MAPS™ IuCS Enhancements: <ul style="list-style-type: none">• Package built on VS2019.• Support for Warranty License.• New Security features with software licensing.	20.8.28

<ul style="list-style-type: none"> Includes MAPS™ GUI and framework Updates. RTP HD is compatible for only old Napatech firmware 2.11.0 	
MAPS™ GSMA Enhancements: <ul style="list-style-type: none"> Package built on VS2019. Support for Warranty License. New Security features with software licensing. Includes MAPS™ GUI and framework Updates. RTP HD is compatible for only old Napatech firmware 2.11.0 	20.8.28
MAPS™ BICC Enhancements: <ul style="list-style-type: none"> Package built on VS2019. Support for Warranty License. New Security features with software licensing. Includes MAPS™ GUI and framework Updates. RTP HD is compatible for only old Napatech firmware 2.11.0 	20.8.28
MAPS™ UMTS GnGp Enhancements: <ul style="list-style-type: none"> Package built on VS2019. Support for Warranty License New Security features with software licensing 	20.8.26
MAPS™ SIP and MAPS™ SIP HD Enhancements: <ul style="list-style-type: none"> Package built on VS2019. Added Attended Call Transfer feature. Application enhanced to configure MSRP message rate distribution (number of messages per second) for specified load distribution duration uniquely for every MSRP session. Includes enhancements made to test IVR servers. IVR_SpeechToText traffic type option is provided to test IVR servers using Speech To Text application. Added out of dialog UPDATE, INFO, REFER and NOTIFY transaction capability. Added Early UPDATE transaction feature for SIP calls. RTP HD load capability is improved to achieve up to 32000 endpoints per appliance (4x1 Gbps NIC) i.e. 8000 simultaneous calls with duplex traffic per port. Bug Fixes <ul style="list-style-type: none"> Fixed issues in call transfer and redirect call. Includes fixes made for TLS packet fragmentation. Parser fix for FROM and MSRP_Response headers. Record file name conflict corrected for simultaneous calls. Fixed Call hold handling when mode = inactive MSRP calls are fixed to handle error responses. Minor tweaks to configurations and scripts to handle load test issues. Includes fixes to handle 401 REFER for in dialog Refer transaction 	20.6.10
MAPS™ LTE-S1 Conformance: <ul style="list-style-type: none"> Paging success/failure Paging via IMSI success/failure UE attach success, UE detach, UE tracking area update Periodic updating Service Request E-RAB Setup procedures Setup context – Fail, Success 	20.6.9

<ul style="list-style-type: none">• UE Context Release, Modification• Handover• S1 Setup• Reset all resource, partial resource• Error Indication• Location report• Support for Warranty License• MAPS™ GUI Updates• New Security features with software licensing	
MAPS™ IuH Enhancements: <ul style="list-style-type: none">• Support for Warranty License• MAPS™ GUI Updates• New Security features with software licensing	20.5.14
MAPS™ Diameter <ul style="list-style-type: none">• MAPS™ CLI Support in Linux• Support for Warranty license• MAPS GUI Updates• New Security features with software licensing Bug Fixes <ul style="list-style-type: none">• Fixed Crash Issue in Cx interface where python not installed in system.	20.5.14
MAPS™ GSMAIP Enhancements: <ul style="list-style-type: none">• Support for Warranty License• MAPS™ CLI support in Linux• Python APIs for MAPS™ Client are included• Python scripts updated for Python3• MAPS™ GUI Updates• TestBed and Profile Parameters Updated• Send SMS on Active Call Supported.• Supplementary Calls Supported• New Security features with software licensing	20.5.14
MAPS™ LTE S1: <ul style="list-style-type: none">• Warranty license is supported• Release 15 support for few IEs• PacketLoad PCAP playback feature support	20.5.14
MAPS™ LTE eGTP: <ul style="list-style-type: none">• Warranty license is supported• PacketLoad PCAP playback feature support	20.5.14
MAPS™ LTE GnGp: <ul style="list-style-type: none">• Warranty license is supported• PacketLoad PCAP playback feature support	20.5.14
MAPS™ CAMEL-IP <ul style="list-style-type: none">• Scripts no longer available for selection which is not applicable in Call generation and reception window• Support for Warranty License	20.5.14

<ul style="list-style-type: none">• MAPS™ GUI Updates• New Security features with software licensing	
MAPS™ INAP-IP <ul style="list-style-type: none">• Scripts no longer available for selection which is not applicable in Call generation and reception window• Support for Warranty License• MAPS™ GUI Updates• New Security features with software licensing• Performance improvement for bulk calls in CLI Bug Fixes: <ul style="list-style-type: none">• Fixed crash issue in Python CLI during longer run	20.5.14
MAPS™ MAPIP <ul style="list-style-type: none">• MAP Version 1 Support for M3UA and M2PA Transports.• MS_Profile of SGSN has updated with USSD Configuration Parameters.• MAPS CLI support for Linux• Scripts no longer available for selection which is not applicable in Call generation and reception window• Support for Warranty License• MAPS™ GUI Updates• New Security features with software licensing Bug Fixes: <ul style="list-style-type: none">• MAPS™ CLI for Python Client updates Load Generation Statistics for MultiTransaction Messages	20.5.14
MAPS™ BICCIP Enhancements: <ul style="list-style-type: none">• Support for Warranty License• MAPS™ CLI support in Linux• Java and Python APIs for MAPS™ Client are included• Python scripts updated for Python3• MAPS™ GUI Updates• New Security features with software licensing• Support for Remote MAPS included	20.5.14
MAPS™ IuCS Enhancements: <ul style="list-style-type: none">• Support for Warranty License• MAPS CLI support in Linux and windows• Supplementary calls supported from profiles.• MAPS™ GUI Updates• New Security features with software licensing	20.5.14
MAPS™ ISDN-SIGTRAN Enhancements: <ul style="list-style-type: none">• Support for Warranty License• MAPS™ CLI support in Linux• Python APIs for MAPS™ Client are included• Python scripts updated for Python3• MAPS™ GUI Updates• New Security features with software licensing• Support for Remote MAPS included	20.5.14

Bug Fixes: <ul style="list-style-type: none"> ISDN Call flow was not proper in Python CLI 	
MAPS™ ISUP-SIGTRAN Enhancements: <ul style="list-style-type: none"> Support for Warranty License MAPS CLI support in Linux Updated Java and Python APIs for MAPS™ Client are included Python scripts updated for Python3 MAPS™ GUI Updates New Security features with software licensing Bug Fixes: <ul style="list-style-type: none"> Fixed Fax calls issue over TDM 	20.5.14
MAPS™ SIP <ul style="list-style-type: none"> Supports SMS call over IMS network using MESSAGE method with binary information. Supports MSRP Heartbeat feature for MSRP calls or IM sessions. MSRP message content can be filled in run-time from a pre-defined input template. Load generation is updated to include Idle time during load distributions. In CLI mode, client can insert multiple SIP headers in run-time. Built in scripts is provided to perform iterative VQT tests and build Call Detail Records to fill into GL's NetSurveyor. Bug Fixes: <ul style="list-style-type: none"> Bug fixed for MSRP where MessageId was exceeding 32-character length. Other minor bug fixes. 	19.11.12
MAPS™ 3GMISimulator <ul style="list-style-type: none"> Warranty License included Remote-RTP HD Traffic Generation is supported Supplementary Services-USSD Request is supported Notify for Hold and Retrieve during Mobile to Mobile Call supported Fragmented SMS During Voice Call and SMS to another Subscriber Number supported Interworking Calls 3G to 2G Voice Call and SMS supported 	19.10.7
MAPS™ 2GMISimulator <ul style="list-style-type: none"> New interface Sgs is added to MSC node. SGs interface is the reference point between the MME and MSC server. Camel Procedures and BICC procedures (GMSC, MGC) supported Warranty License included Remote-RTP HD Traffic Generation is supported Supplementary Services-USSD Request is supported Notify for Hold and Retrieve during Mobile to Mobile Voice Call is supported Fragmented SMS During Voice Call and SMS to another Subscriber Number supported New xml format supported Interworking Calls 2G to 3G/4G Voice Call and SMS supported 	19.10.7
MAPS™ GSMAoIP <ul style="list-style-type: none"> Warranty License included Remote-RTP HD Traffic Generation is supported Supplementary Services-USSD and Interrogation supported New xml format supported SCTP Multi-Homing supported 	19.10.7

<ul style="list-style-type: none">• Notify for Hold and Retrieve during Mobile to Mobile Call supported• Fragmented SMS During Voice Call and SMS to another Subscriber Number supported• LCLS (Local Call-Local Switch) is now supported at MSC.• Send Command as Optional is supported.• MS REGISTRATION ENQUIRY Procedure is supported.• ReRoute Procedure brought at MSC Side• Consolidated Impairment profile (ImpairmentProfile.xml) configuration for Latency, PacketEffects and Packet Loss• Load Generation-Unique Distribution per script is supported	
MAPS™ UMTS IuCS and IuH Interfaces Emulator <ul style="list-style-type: none">• Warranty License included• Remote-RTP HD Traffic Generation is supported• Supplementary Services-USSD and Interrogation supported• SCTP Multi-Homing supported• Notify for Hold and Retrieve during Mobile to Mobile Call supported• Fragmented SMS During Voice Call and SMS to another Subscriber Number supported• Per Call Duration, Answer Delay and CC Failure Simulation supported• Send Command as Optional is supported• Consolidated Impairment profile (ImpairmentProfile.xml) configuration for Latency, PacketEffects and Packet Loss• New xml format supported• Load Generation-Unique Distribution per script is supported	19.10.7
MAPS™ LTE-eGTP <ul style="list-style-type: none">• CSV Support: CSV is an alternate to profiles where user can configure the UE related information and can be used to configure thousands of UE information.• PacketLoad Traffic module is supported for both HTTP and PCAP playback. Bug Fixes: <ul style="list-style-type: none">• Allocation of PDN IP Address (End User IP Address) based on APN Name for s11 interface.• New xml format supported.	19.8.1

MAPS™ LTES1 <ul style="list-style-type: none">• CSV Support: CSV is an alternate to profiles where user can configure the UE related information and can be used to configure thousands of UE information.• PacketLoad Traffic module is supported for both HTTP and PCAP playback. Bug Fixes: <ul style="list-style-type: none">• New xml format supported.• Auto generated user support to simulate large number of subscribers.• External gateway functionality(IP to GTP) to support third party traffic generator like iperf etc.	19.8.1
MAPS™ SIP <ul style="list-style-type: none">• In CLI Mode,<ul style="list-style-type: none">◦ Python APIs are enhanced to support both version 2 and 3.◦ Python APIs are enhanced to support MSRP sessions.◦ Python APIs are enhanced to support Load Generation and track Call Statistics.• EVS codec is enhanced to operate in AMR-WB IO mode.• Profile editor is enhanced to reduce profile memory size and optimize the profile load time when hundreds of users are configured.• New feature enhancement for MSRP sessions to insert real-time date and timestamp in transmitted message content.• Enhanced to support end user configuration profile in csv format. Bug Fixes: <ul style="list-style-type: none">• EVS codec bug fixes for CMR (Codec Mode Request) and compact format.• Bug fix for proxy authentication of in-dialog transactions.• Load performance improvement and other minor bug fixes.	19.7.4
MAPS™ Diameter <ul style="list-style-type: none">• CSV Support: CSV is an alternate to profiles where user can configure the UE related information and can be used to configure thousands of UE information• SCTP multihoming support• Profile help updated	8.12.6
MAPS™ GnGp Emulator <ul style="list-style-type: none">• CSV Support: CSV is an alternate to profiles where user can configure the UE related information and can be used to configure thousands of UE information• PacketLoad Traffic module is supported for both HTTP and PCAP playback• Bug Fixes• Allocation of PDN IP Address (End User IP Address) based on APN Name	8.11.20
MAPS™ LTE-eGTP Emulator <ul style="list-style-type: none">• CSV Support: CSV is an alternate to profiles where user can configure the UE related information and can be used to configure thousands of UE information• PacketLoad Traffic module is supported for both HTTP and PCAP playback• Bug Fixes• Allocation of PDN IP Address (End User IPAddress) based on APN Name for S11 interface	8.11.20
MAPS™ SIP Emulator <ul style="list-style-type: none">• For CLI mode, added new python API's to support modifying SDP attributes and to insert SIP headers in run-time.• Enhanced to support Late SDP negotiation call scenarios.• Modify SIP session using UPDATE method.• Call Hold Retrieve using UPDATE method• Send digit information through INFO and NOTIFY method.	8.10.15

<ul style="list-style-type: none"> Option to log per call RTP statistics to csv log file. RTP core updated with new fax library. Other minor bug fixes. 	
MAPS™ Remote-Controller <ul style="list-style-type: none"> Network key and software license support Bug fixes 	8.9.27
MAPS™ SIGTRAN Emulator <ul style="list-style-type: none"> Java and Python APIs for MAPS™ Client are included MAPS™ GUI Updates New Security features with software licensing 	8.4.27
MAPS™ LTE SLs Interface Emulator Initial release with following features: <ul style="list-style-type: none"> LCSAP and LPP protocols supported UE- based positioning method (A-GNSS) Simulation of MME, E-SMLC nodes across SLs interface User-friendly GUI for generating hundreds of UE Signaling (Load Testing) over SCTP transport 	8.4.27
MAPS™ ITU INAPIP <ul style="list-style-type: none"> Python APIs for MAPS™ Client are included MAPS™ GUI Updates New Security features with software licensing 	8.4.25
MAPS™ SIP Enhancements – <ul style="list-style-type: none"> Enhanced with MSRP protocol emulation for supporting session based instant messaging capability over SIP sessions. MAPS™ SIP JAVA and Python clients are supported over Linux platform. Bug Fixes – <ul style="list-style-type: none"> MAPS™ fixes to report OnTime and OffTime for tone detection. TCP transport handler is corrected to fix issues with bulk calls. Tested with GL Ldk License version 18.4.17 Other minor bug fixes 	8.4.20
MAPS™ ED137 Recorder Initial release with following features: <ul style="list-style-type: none"> Emulates Recorder interface at CWP, GRS and Recorder endpoints as per ED-137/4B standards Simulation using Real Time Streaming Protocol (RTSP) to establish, terminate and maintain media sessions to deliver media to recording servers Up to 200 RTSP sessions can be generated or recorded simultaneously Simulates Recorder interface for both Air-to-Ground and Ground-to-Ground calls Easy to use Event button options on Call Generation (CWP) window – such as Voting, Simultaneous SQL, Start Squelch, Call Intrusion, and Call Transfer GUI options to easily add custom call record data properties and operations and customization of each CWP/GRS profile to emulate an AG/GG call Call Record Data of each session is stored in CSV format 	8.4.16
MAPS™ ED137 Telephone <ul style="list-style-type: none"> Provides Option to define multiple traffic profiles Provides Options Ping statistics under User Defined Statistics Provides user event to send INFO message Supports writing Call Statistics to file Provides option to include customer specific profiles and scripts Supports software license feature 	8.3.19

MAPS™ ED137 Radio <ul style="list-style-type: none"> Provides option to select cause for BYE and 603 messages Supports sending out of dialog NOTIFY message with active connections at GRS Supports software license feature 	8.3.19
MAPS™ Diameter <ul style="list-style-type: none"> MAPS™ Framework Updates Gy charging interface supported Python CLI support for Customer 	8.3.12
MAPS™ CAP IP <ul style="list-style-type: none"> MAPS™ Framework Updates Python CLI support for Customer 	8.3.9
MAPS™ MAP IP <ul style="list-style-type: none"> MAPS™ Framework Updates Python CLI support for Customer 	8.3.9
MAPS™ SIP <ul style="list-style-type: none"> Supports software license feature. User option to configure Jitter buffer for RTP. MAPS™CLI: Client ID is provided in CLI server response. Bug fixes: <ul style="list-style-type: none"> Fix to handle TCP connection down for an active call. Send silence failure for digits traffic action for long duration calls. 	8.2.22
MAPS™ SIP-I <ul style="list-style-type: none"> MAPS™ SIP I is upgraded and includes all new enhancements added to MAPS™ SIP (ver 7.10.17) MAPS™ framework updates. MAPS™ Bug fixes. 	7.11.10
MAPS™ LTE-SGs - New Product Release	7.11.10
MAPS™ GPRSGb <ul style="list-style-type: none"> MAPS™ Bug Fixes Updated Mobile Traffic Script Installation is changed to write the application installation path to Regedit 	7.11.10
MAPS™ MAPIP <ul style="list-style-type: none"> MAPS™ Framework Updates MAP Version 2 support supported for M2UA and M2PA Transports Authentication now supports upto 8 vectors XUDT Message decode supported 	7.11.09
MAPS™ GSMAoIP <ul style="list-style-type: none"> MAPS™ Framework Updates SMS over Voice Call implemented Profile Help updated. Consolidated Traffic profile (TrafficProfile.xml) configuration for Auto traffic file, tones, digits and user defined traffic MS_Profile includes Traffic profile name configuration Signaling Statistics supported 	7.11.09

<ul style="list-style-type: none"> • Graph for Signaling Statistics • PDF Report generation 	
MAPS™ IuCS and IuH <ul style="list-style-type: none"> • IuH – Support for HD RTP Traffic included • Test Bed Setup includes CSV profiles for bulk call generation to overcome the limitation of Profile Editor (supported only up to 1000). With CSV files, we can create more than 20K user configurations. • CSV profiles also support SMS calls ratio option to configure the ratio of SMS calls out of Total number of Calls (say, 100%), based on which MAPS™ will generate SMS calls along with MO Voice calls. For example, if the SMS call Ratio = 30% is configured in Testbed, then during bulk call simulation, MAPS™ generates 30% SMS calls and remaining 70% of total calls generated will be MO Voice calls. • Signaling Statistics supported • Graph for Signaling Statistics • PDF Report generation • Profile Help updated. • Consolidated Traffic profile (TrafficProfile.xml) configuration for Auto traffic file, tones, digits and user defined traffic • MS_Profile includes Traffic profile name configuration • Protocol Configuration Options IE is updated to latest spec - 3GPP TS 24.008 V15.0.0 (2017-09) 	7.11.09
MAPS™ UMTS IuPS <ul style="list-style-type: none"> • Includes minor bug fixes to MAPS™ framework • Mobile Traffic scripts updated 	7.11.08
MAPS™ UMTS GnGp <ul style="list-style-type: none"> • Includes minor bug fixes to MAPS™ framework • Mobile Traffic scripts updated 	7.11.08
MAPS™ Diameter <ul style="list-style-type: none"> • Includes minor bug fixes to MAPS™ framework • Installation is changed to write the application installation path to Regedit • Additional profiles added to support real Mobile SIM 	7.11.08
MAPS™ LTE eGTP <ul style="list-style-type: none"> • Allocation of PDN IP Address based on APN Name • Mobile Traffic scripts updated • Includes minor bug fixes to MAPS™ framework • Installation is changed to write the application installation path to Regedit 	7.11.08
MAPS™ LTE S1 <ul style="list-style-type: none"> • Support for multiple PDN included • Allocation of PDN IP Address based on APN Name • Service Request for Multiple PDN support • Mobile Traffic scripts updated • Includes minor bug fixes to MAPS™ framework • Installation is changed to write the application installation path to RegEdit 	7.11.08

MAPS™ SIP <ul style="list-style-type: none">• Supports silence generation when call is idle.• Supports Channel Aware mode feature for EVS codec.• Supports RTP statistics for EVS and OPUS codec.• Script bug fixes provided for<ul style="list-style-type: none">○ TCP connection down issue for persistent TCP connections○ Subscribe-Notify procedure○ Handle OPTIONS method: User can configure the OPTIONS target and OPTIONS timer○ Option to configure local call duration and call answer time per user agent.• Other Bug fixes<ul style="list-style-type: none">○ RTP Statistics fix: Transmitted packet count will be updated even when stream does not receive any packets.○ Call-Info header parser fix.○ Absolute value utility function in gls scripts.	7.10.17
MAPS™ BICCIP <ul style="list-style-type: none">• Testbed can now be setup from CSV files.• RTP<ul style="list-style-type: none">○ Scripts updated○ Profiles updated○ RTP stats added○ RTP graphs added• Serving nodes can now be configured with multiple IPs.• Multiple Clients can now be connected to single SCTP Server.• SCTP Server now accepts request from any IP.• BICC calls can be placed using Selected and Random OPC/DPCs• Default Codec options can be read and setup from Global Configurations (for call receive side)• Default traffic actions can now be Configured in Global Configurations• Added User Event buttons for Call Generation/Reception window• Restricted access to scripts in Call Gen and Incoming call handler windows• MAPS™Config.ini updated for CLI logs• MS_Profiles updated for 1200 profiles MAPS™ ISUP-SIGTRAN <ul style="list-style-type: none">• Java APIs for MAPS™ Client are included• MAPS™ GUI Updates MAPS™ ISDN-SIGTRAN <ul style="list-style-type: none">• MAPS™ GUI Updates MAPS™ INAP (ANSI & ITU) <ul style="list-style-type: none">• MAPS™ GUI Updates MAPS™ MAP IP <ul style="list-style-type: none">• MAPS™ GUI Updates MAPS™ CAMEL IP <ul style="list-style-type: none">• MAPS™ GUI Updates	7.10.6

<p>MAPS™ UMTS IuPS Emulator</p> <ul style="list-style-type: none">• Check SCTP, M3UA, and SGMG scripts are updated.• SCTP Client/Server mode selection is provided in Testbed.• M3UA termination type IPSP is handled.• Testbed is modified to handle multiple RNCs and SGSNs.• Paging Procedure is handled.• Handover(Relocation) Procedures are handled (Only Signaling).• GTP Mobile traffic scripts are updated. <p>MAPS™ UMTS GnGp Emulator</p> <ul style="list-style-type: none">• Auto Generated User support (It's an alternative method to create unique profile just by providing the initial values and these values get incremented inside script) to generate the high load• PacketLoad integration (PacketLoad is used to generate high load of User plane traffic)• User defined graphs and statistics for PacketLoad• Installation is changed to write the application installation path to RegEdit.• Message and Import file corrections• Send command is changed to accept the Destination IP and Destination Port to dynamically accepting the Destination IP. <p>MAPS™ UMTS IuCS and IuH Interface</p> <ul style="list-style-type: none">• IuH – Support for HD RTP Traffic included• Test Bed Setup includes CSV profiles for bulk call generation to overcome the limitation of Profile Editor (supported only up to 1000). With CSV files, we can create more than 20K user configurations.• CSV profiles also support SMS calls ratio option to configure the ratio of SMS calls out of Total number of Calls (say, 100%), based on which MAPS™ will generate SMS calls along with MO Voice calls. For example, if the SMS call Ratio = 30% is configured in Testbed, then during bulk call simulation, MAPS™ generates 30% SMS calls and remaining 70% of total calls generated will be MO Voice calls.• Signaling Statistics supported.• Graph for Signaling Statistics.• PDF Report generation• Profile Help updated.• Consolidated Traffic profile (TrafficProfile.xml) configuration for Auto traffic file, tones, digits and user defined traffic• MS_Profile includes Traffic profile name configuration	<p>7.10.6</p>
<p>MAPS™ ED137 Emulator</p> <p>MAPS™ ED137-C Radio:</p> <ul style="list-style-type: none">• Radio version number is updated to 'radio.02' in WG67-Version SIP header in all requests and responses.• RRCE shared and non-shared variables are reflected properly to VCS.• The event package includes the frequency id (fid) parameter in order to indicate the current frequency used. If fid is not available, it will be set to '000.000'. Whenever GRS changes its fid, SIP NOTIFY message with changed fid will be sent to all subscribed CWPs.	<p>7.8.22</p>

<ul style="list-style-type: none"> • PTT-id values 60, 61 and 62 are reserved for non-VoIP keying sources and SHALL not be assigned to VOIP keying sources; PTT-id value 63 is reserved for the optional SELCAL feature. • Optional SDP attribute <disconnect mode> with value 'NoFreqDisconn' can be added in INVITE to request GRS not to disconnect session in case of frequency id change. • SELCAL feature: Supports sending SELCAL tones using SIP INFO message. • Supports Radio Receiver Multicast Operation. • Supports simulating Test PTT. • Simulates non-VoIP source PTT keying. • Measurement Answer Message (MAM) includes the GRS receiver delay Ts2. 	
<p>MAPS™ ED137 Emulator</p> <p>MAPS™ ED137-B Radio Enhancements:</p> <ul style="list-style-type: none"> • Simulate Dynamic Delay Compensation messages RMM and MAM. • Supports sending simultaneous squelch on all connected sessions to a Radio. • Supports sending simultaneous squelch on all connected sessions of selected multiple Radios. • Sample script provided to perform automated periodic PTT on AG calls. • Sample script provided to perform automated periodic SQU on AG calls. • Option to define multiple traffic profiles. • Support sending audio using microphone and playing audio to speaker on multiple sessions. 	7.7.14
<p>MAPS™ UMTS IuPS Interface Emulator</p> <ul style="list-style-type: none"> • Paging Procedure is handled. • Handover (Relocation) Procedures are handled (Only Signaling). • GTP Mobile traffic scripts are updated. • Check SCTP, M3UA, SCMG scripts are updated. • SCTP mode selection is provided in Testbed. • Testbed is modified to handle multiple RNC and SGSN. • M3UA termination type IPSP is handled. 	7.7.11
<p>MAPS™ SIP HD</p> <ul style="list-style-type: none"> • Supports different traffic options across simultaneous calls. • Auto Call Rejection option is enabled. • Other minor bug fixes. <p>For Internal Reference:</p> <ul style="list-style-type: none"> • Signaling scripts and profiles are integrated as per normal SIP ver 7.5.4 	7.6.29
<p>MAPS™ MEGACO HD Emulator</p> <ul style="list-style-type: none"> • MAPS™ HD is supported for TGW simulation • MAPS™ MEGACO now supports both RGW and TGW simulation. • Scripts and Configuration files are updated with TGW and RGW support. 	7.6.27
<p>MAPS™ LTE X2AP Emulator</p> <ul style="list-style-type: none"> • X2AP Decode/Encode now supports Version 14 of 3GPP TS 36.423: User can create any messages and simulate any Procedures as per TS 36.423 V.14. • All X2AP Testbed, Global Profile, Profile configurations are updated to support both Source and Target eNodeB. • All X2AP Scripts are updated to Call Control Scripts where a Single Controller script invokes X2AP Protocol script to handle and control all X2AP Procedures. • Global Procedures Parameters are moved from Profiles to Global Configurations. • Profile Parameters are now grouped systematically under proper headings. 	7.6.12

<ul style="list-style-type: none"> • Only UE Associated Procedures are allowed from Call Generation window • In Call Reception window, X2AP Setup Procedure is executed automatically once test bed setup is started and then user can initiate any other Non-UE Procedures by selecting User events button. 	
<p>MAPS™ MAP IP Emulator</p> <ul style="list-style-type: none"> • CSV support for bulk calls • TCAP and MAPIP are now shown as separate layers • Supported MAP V2 messages • TCAP and MAP Error Simulation scenarios added 	7.6.5
<p>MAPS™ Diameter Emulator</p> <ul style="list-style-type: none"> • Diameter Base Procedures handled • Provided option to Enable Transection or Session Based Scenarios • Scripts are updated with Call Control Scenario • Profiles are updated additional parameters for S6a interface 	7.6.1
<p>MAPS™ GSM A IP Emulator</p> <ul style="list-style-type: none"> • Test Bed Setup includes CSV profiles for bulk call generation to overcome the limitation of Profile Editor (supported only up to 1000). With CSV files, we can create more than 20K user configurations. • CSV profiles also support SMS calls ratio option to configure the ratio of SMS calls out of Total number of Calls (say, 100%), based on which MAPS™ will generate SMS calls along with MO Voice calls. For example, if the SMS call Ratio = 30% is configured in Testbed, then during bulk call simulation, MAPS™ generates 30% SMS calls and remaining 70% of total calls generated will be MO Voice calls. • M3UA Termination Type IPSP supported • Signaling Statistics supported. • Graph for Signaling Statistics. • Consolidated Traffic profile (TrafficProfile.xml) configuration for Auto traffic file, tones, digits and user defined traffic • MS_Profile includes Traffic profile name configuration <p>MAPS™ GSM Abis IP Emulator</p> <ul style="list-style-type: none"> • Simulation of UE movement supported, with Measurement result. • Supports half rate traffic channel for voice call to establish two different calls on the same timeslot, but different subchannels. • Consolidated Traffic profile (TrafficProfile.xml) configuration for Auto traffic file, tones, digits and user defined traffic • MS_Profile includes Traffic profile name configuration <p>MAPS™ UMTS IuCS and IuH Interfaces Emulator</p> <ul style="list-style-type: none"> • IuH – Support for HD RTP Traffic included • Test Bed Setup includes CSV profiles for bulk call generation to overcome the limitation of Profile Editor (supported only up to 1000). With CSV files, we can create more than 20K user configurations. • CSV profiles also support SMS calls ratio option to configure the ratio of SMS calls out of Total number of Calls (say, 100%), based on which MAPS™ will generate SMS calls along with MO Voice calls. For example, if the SMS call Ratio = 30% is configured in Testbed, then during bulk call simulation, MAPS™ generates 30% SMS calls and remaining 70% of total calls generated will be MO Voice calls. • Signaling Statistics supported. • Graph for Signaling Statistics. • PDF Report generation • Profile Help updated. 	<div>7.5.26</div> <div>7.5.26</div> <div>7.5.26</div>

<ul style="list-style-type: none">Consolidated Traffic profile (TrafficProfile.xml) configuration for Auto traffic file, tones, digits and user defined trafficMS_Profile includes Traffic profile name configuration MAPS™ LTE eGTP S5/S8, S11 Interfaces Emulator <ul style="list-style-type: none">MAPS™ LTE-eGTP can simulate 100000 simultaneous call using Auto Generated user configuration feature. This allows MAPS™ to internally auto-generate multiple users with unique mobile identity values. This feature is specially designed for load testing, with which it is now possible to simulate more than 100000 UEs	7.5.26
MAPS™ LTE S1 Emulator <ul style="list-style-type: none">Scripts and profiles updated to support VoLTE call simulationHandling of Multiple RAB proceduresIncludes Service Request procedureScripts and profiles updated to support Network initiated Detach procedure	7.5.23
Remote MAPS™ <ul style="list-style-type: none">Single Client GUI to control Multiple MAPS™ Server- including all TDM based and IP based protocolsOne or more MAPS™ applications can be installed on each MAPS™ Server.Multi-user support to basically have separate set of profiles used independently by each user. Each user can use MAPS™ server located remotely to run different set of call scenarios simultaneously.Remote licensing server – All purchased licenses can be installed on a remote server. Remote MAPS™ can fetch these licenses from the remote licensing server and allow normal operations from any system within the network.Support for all protocol variants and network elements with a protocol standard	7.5.5
MAPS™ SIP Emulator <ul style="list-style-type: none">Enhancement to support OPUS codec.JAVA and Python Client API's are updated to get expected and received payload information.CLI API updates to fix the bugs.Supports different traffic options across simultaneous calls.Provided an option to enable or disable DSCP.Re-Invite user event is provided to update an established session.Auto Call Rejection option is enabled.Other minor bug fixes.Installation upgraded to x64-bit	7.5.4
MAPS™ SIP Conformance <ul style="list-style-type: none">Installation upgraded to x64-bit	7.3.22

MAPS™ ED137-Telephone Specific Enhancements: <ul style="list-style-type: none">• Button options in Call Generation and Reception window to apply Events on an ongoing call<ul style="list-style-type: none">➢ "Receive Traffic" user button to provide an option to receive traffic (i.e. record to file, detect digits/tones) for every active call.➢ "ReInvite" user button is provided to send a Re-Invite to update an active SIP session.➢ "Transfer" user button to transfer the call to another user agent➢ "On Hold" user button to put the active call On Hold• Supports IP Spoofing• Supports RTP Statistics Calculation	7.3.3
MAPS™ LTE SLs Interface Emulator <ul style="list-style-type: none">• First release for MAPS™ SLs interface emulation• Supported LTE SLs interface procedures:<ul style="list-style-type: none">➢ Location service request procedure➢ Location information exchange procedure➢ Location Abort Procedure• Loading Location information parameters from Profiles as well as CSV files	7.2.9
MAPS™ ED137-Radio Specific Enhancements: <ul style="list-style-type: none">• Supports Multiple Radio Simulation:<ul style="list-style-type: none">➢ MAPS™ ED137 Radio has been enhanced to simulate multiple radios within a single instance.➢ IP addresses specified in the Radio profile will be created as virtual IP addresses on the system NIC interface. Profile Editor also includes Color coding option to create different profiles.➢ Sorting and color codes are used to group all calls associated to individual radios in Call Reception window.• Enhanced to handle Linked Session Management:<ul style="list-style-type: none">➢ The Linked Session functionality provides to the GRS endpoint the opportunity to detect SIP sessions which are coming from the same user but from different equipment (i.e. different IP Address) to guarantee higher service availability.➢ So, GRS can identify the calls coming with same User part in From Address but with different IP/host address and with 'ls-pl' SDP parameter included. It will treat the linked sessions and treat them as one single logical session to radio.➢ The linked session functionality enables the GRS endpoint to support handling of redundant connections between VCS endpoint and GRS endpoint for all types of connections.➢ User has the option to enable or disable linked session management for each radio.• Button options in Call Generation and Reception window to apply Events on an ongoing call<ul style="list-style-type: none">➢ "Receive Traffic" user button to provide an option to receive traffic (i.e. record to file, detect digits/tones) for every active call.➢ ReInvite user button is provided to send a Re-Invite from CWP to update an active SIP session.➢ Enhanced to update Signal Quality Information (SQI) in run-time for an active call.➢ Radio handles the incoming PTT and prioritize accordingly	7.2.3

MAPS™ Protocol Specific Enhancements: <ul style="list-style-type: none">• MAPS™ SIP<ul style="list-style-type: none">➤ Enhanced with 64bit RTP➤ T38 Fax simulation is supported.➤ TLS and SRTP is supported.➤ EVS Codec is supported (Only Primary Mode).➤ Java and Python CLI API's are included.	6.12.21
MAPS™ Protocol Specific Enhancements: <ul style="list-style-type: none">• MAPS™ CAP IP<ul style="list-style-type: none">➤ Handled Dynamic SCCP Routing➤ Updated low balance call flow➤ Added IPSP with M3UA and M2PA signaling procedures➤ Updated Scripts - Camel_VoiceCall_Service_SSF.gls script for Prepaid Call, Toll free, Low balance procedures, Camel_SMS_Service_SSF.gls script for Camel SMS Procedure, GPRSCamel_GPRS_Service_SSF.gls script for Voice call in GPRS Procedure, and Camel_ICA_Service_SSF.gls for Initiate Call Attempt (ICA) services.➤ Help files updated• MAPS™ ITU INAP IP<ul style="list-style-type: none">➤ Handled dynamic SCCP Routing➤ Updated low balance call flow➤ IPSP with M3UA and M2PA signaling procedures➤ Updated Scripts - INAP_VoiceCall_Service_SSF.gls script is used, to simulate Prepaid, Low balance, Initial Call Attempt Service and toll free services➤ Help files updated	6.7.19
MAPS™ Protocol Specific Enhancements: <ul style="list-style-type: none">• MAPS™ UMTS IuCS<ul style="list-style-type: none">➤ Supports both Normal RTP and HD RTP Traffic Generation➤ HD Configurations in Test Bed setup are simplified: The system automatically detects the IP address of the RTP cores, user need not provide IP Address for RTP Cores.➤ Detailed RTP Statistics are available now under User-defined Statistics: RTP Stats Display script is included which will query RTP Core for QueryStatsTimer and reports in User-defined Statistics window➤ Only Scripts Relevant to Call Generation window are displayed and supporting sub scripts are now hidden	6.4.22
<ul style="list-style-type: none">• MAPS™ BICC<ul style="list-style-type: none">➤ Supports both Normal RTP and HD RTP Traffic Generation➤ HD Configurations in Test Bed setup are simplified: The system automatically detects the IP address of the RTP cores, user need not provide IP Address for RTP Cores.➤ Detailed RTP Statistics are available now under User-defined Statistics: RTP Stats Display script is included which will query RTP Core for QueryStatsTimer and reports in User-defined Statistics window➤ Only Scripts Relevant to Call Generation window are displayed and supporting sub scripts are now hidden	6.4.22
<ul style="list-style-type: none">• MAPS™ GSMAoIP<ul style="list-style-type: none">➤ Supports both Normal RTP and HD RTP Traffic Generation➤ HD Configurations in Test Bed setup are simplified: The system automatically detects the IP address of the RTP cores, user need not provide IP Address for RTP Cores.➤ Detailed RTP Statistics are available now under User defined Statistics: RTP Stats Display script is included which will query RTP Core for QueryStatsTimer and reports in User-defined Statistics window	6.4.22

<ul style="list-style-type: none">➤ Only Scripts relevant to Call Generation window are displayed and supporting sub scripts are now hidden➤ User defined button "Terminate" is enabled on Call Generation window so that user need not right-click to select user event "Terminate" to disconnect call➤ IT Inactivity Timers are handled properly for each Messages sent and Received after SCCP connection is established➤ Call Release Procedure are handled properly from MSC node	
<ul style="list-style-type: none">• MAPS™ SIP-HD<ul style="list-style-type: none">➤ Supports both Normal RTP and HD RTP Traffic Generation➤ HD Configurations in Test Bed setup are simplified: The system automatically detects the IP address of the RTP cores, user need not provide IP Address for RTP Cores.➤ Detailed RTP Statistics are available now under User Defined Statistics: RTP Stats Display script is included which will query RTP Core for QueryStatsTimer and reports in User-defined Statistics window	6.4.22
<ul style="list-style-type: none">• MAPS™ MGCP<ul style="list-style-type: none">➤ Supports both Normal RTP and HD RTP Traffic Generation➤ HD Configurations in Test Bed setup are simplified: The system automatically detects the IP address of the RTP cores, user need not provide IP Address for RTP Cores.➤ Detailed RTP Statistics are available now under User Defined Statistics: RTP Stats Display script is included which will query RTP Core for QueryStatsTimer and reports in User-defined Statistics window➤ Profile Help included➤ Only Scripts relevant to Call Generation window are displayed and supporting sub scripts are now hidden	6.4.22
<ul style="list-style-type: none">• MAPS™ Megaco<ul style="list-style-type: none">➤ Supports both Normal RTP and HD RTP Traffic Generation➤ HD Configurations in Test Bed setup are simplified: The system automatically detects the IP address of the RTP cores, user need not provide IP Address for RTP Cores.➤ Detailed RTP Statistics are available now under User Defined Statistics: RTP Stats Display script is included which will query RTP Core for QueryStatsTimer and reports in User-defined Statistics window➤ Profile Help included➤ Only Scripts relevant to Call Generation window are displayed and supporting sub scripts are now hidden	6.4.22
<ul style="list-style-type: none">• MAPS™ GSM Abis<ul style="list-style-type: none">➤ Supports only Normal RTP Traffic Generation (* GSM Abis does not support HD RTP. It supports only 100 Simultaneous calls)➤ Detailed RTP Statistics are available now under User Defined Statistics: RTP Stats Display script is included which will query RTP Core for QueryStatsTimer and reports in User-defined Statistics window➤ Only Scripts relevant to Call Generation window are displayed and supporting sub scripts are now hidden	6.4.22

<ul style="list-style-type: none">• MAPS™ ISUP Sigtran<ul style="list-style-type: none">➤ Updated M3UTermination Type with IPSP option➤ Only Scripts relevant to Call Generation window are displayed and supporting sub scripts are now hidden	6.4.22
<ul style="list-style-type: none">• MAPS™ Diameter<ul style="list-style-type: none">➤ Includes Cx-Dx, Rx and Gx Interface➤ S6, Rx, Gx, Cx-Dx, S13 and S13' released with TCP transport Multiple Client connections are handled➤ S13 released with modified scripts and created 100 profiles➤ S13' release with modified scripts and created 100 profiles➤ Updated Profile Help➤ Modified the Scripts according to specifications and handled the procedures	6.4.22
<ul style="list-style-type: none">• MAPS™ Skinny<ul style="list-style-type: none">➤ Profile Help included➤ Only Scripts relevant to Call Generation window are displayed and supporting sub scripts are now hidden	6.4.22

MAPS™ Framework Enhancements	
<p>May 06, 2020</p> <ul style="list-style-type: none"> • Implementation of Utility functions like logarithm, pow and File operations. • Modification of stop Traffic actions base on action type in the parser. • License Error showing ProductId(PKSxxx) instead of FeatureId by including WarLiDsc library. • Enabled License checking through Maps Launcher for all TDM protocols. • TLS Partial Message Handling support. • Invoking Python Script from Maps crash bug Is fixed. • Remote Maps script Editor and Message Editor Invocation issue in multi-interface issue fixed. • 5G Bug Fixes to reported internally. • Vs2019 Project Files Update. 	20.5.06
<p>April 07, 2020</p> <ul style="list-style-type: none"> • Support for ANSIINAP in TDM. • Internal Bug Fixes in Maps, MapsCLI and Remote Maps. <p>Decode Changes</p> <ul style="list-style-type: none"> • Customer needed Restoration INDicator IE in Restoredata message in MAP • ActivityTestRes is displayed as InitialDPRes in INAP ATM • Supported SLTM and Network Management in SS7ATM MAPS application • SLTM and Net.Management messages supported SS7ATM Uk • Decode modifications to Packet Expert header. • Error messages were not displaying in Sequence Diagram for Camel, ANSI INAP • 16-bit reference number concatenated Short message support in MAP protocol • Fixed decode error in AIN response message. 	20.4.07
<p>March 12, 2020</p> <ul style="list-style-type: none"> • Support for Structure, typedef and reference • Added structure type in Profile Handler. • Vs2019 support for Maps, Mapscli, RemoteMaps and dependent Projects. • Support for Executing Python Script from GIs script. • Support for GPRSGBTDM • IDLE LoadDistribution support in LoadGen. • Fixes for TCP Connection Issue. • SIP and MSRP Header Parser Fixes • Support SSCOP Statistics and Modification for multiple Tasks. • Support for ReportEventQ in Mapscli • Support for HTTP2 protocol • Internal Bug Fixes in Maps, MapsCLI and Remote Maps <p>Decode Changes</p> <ul style="list-style-type: none"> • Supported RRC messages in S1AP protocol • Few messages in MAP & eGTP protocol is updated to Release15 • TCAP layers over ATM stack is supported in MAPS • Corrections to MapMessage class • In CNAM & INAP encode file, TCAP and its components are separated 	20.3.12

- Corrections to per Enumerated class
- AIN, CAMEL, MAP, Ansi Tcap, CNAM protocols are supported over ATM layer in MAPS™
- SCCPANSI.h - SSN values can be read from ini file & tcap branching will takes place accordingly in SS7ATM stack
- Supplementary services are supported in GprsGb Stack
- Corrections/changes in following decodes.
 - DiameterDCCA
 - DiameterRf
 - DiameterSh
 - DiameterSLg
 - DiameterSLh
 - NAS

October 22,2019**MAPS™ Framework Enhancements**

- Support for 5G authentication
- Support for user defined tab in call generation & call reception per call.
- Support to draw used defined graph per call in Call generation and Call reception.
- Instruction to decode ISUP content in SIP.
- Websocket client and server Support
- HTTP Interface support to 5G protocols
- Utility Functions DisplayProfileName, Get UTCTime
- Support of Variables in MSRP Message Template
- ABORT Support in SCTP Transport.
- Encode, Decode, Import and Export Utility functions for 5G
- MAPIP changes for CallId
- Sipl Bug Fix in SIPImessage.cpp in GetMessage.
- Bug Fixes in Scheduler, Allocating unique id
- Internal Bug Fixes in Maps, MapsCLI and Remote Maps.

Decode Changes

- New encode file GsmNokiaOM.h to decode NokiaOML layer
- Decode correction in few files
- S1AP.h encode is changed so that decimal value can be given as input to bitstring UEIdentityIndexValue
- Corrections to usage of prgma pack.
- Commented codes are removed from few decodes

SIMGSMOIPPROT

- Supported NokiaOML layer
- Changes are made tp IpAccessLayer decode file to accomodate NokiaOML on SCTP

SIMSS7Prot

- Stack change to separating TCAP layer from CAMEL and INAP
- Separating each component and creating a new INAP message. Otherwise if a single incoming message has 3 components then script will get only one message to handle.

19.10.22

May 21,2019 MAPS™ Framework Enhancements <ul style="list-style-type: none">• Support of NAF, AUSF, SMF, EIR, UDM, NRF Nodes in 5G• Security Update for 5G• RestAPI framework changes are included for 5G and Multiple Instruction for scripting• Profile Loading based on the combination of Multiple keys• Support of CustomDBQuery Instruction,• Support for HTTP Protocol over GL TCPLIB.• Included SIP Header Parser and SDP Parser Changes• Partial Message Handling for SIP-I protocol.• Enabled LoadGeneration for MAPSCLI.• Modified Multihoming feature in SCTPLIB Decode Changes <ul style="list-style-type: none">• Updating PFCP protocol to 3GPP TS 29.244 V15.4.0• Update eGTP protocol to Rel 15• Updation of NAS 5G to 3GPP TS 24.501 V15.2.1 (2019-01)• Integrating S1AP and NAS Rel 15 encode files in MAPS• Supporting Zh interface in MAPS• Supporting one extra MM layer in GsmAIP for ReRoute Command• Decode corrections in INAP Ericsson• Adding callingMsisdn and callingVlrAddress IEs in MAP-OPEN Info in TCAP layer• Segmentation of Tcap Components. In INAP/CAMEL single TCAP message can have multiple Components. MAP Decode Correction.• Supporting 2 NAS PDUs in NgAP single message• Correction to call binding in MAPS-Ng• Correction to BTSM layer encode• Updation of NgAP in 5G to 3GPP TS 38.413 V15.2.0 (2018-12)• NAS 5G - Decode correction to SUCI format in 5GS mobile identity IE• Corrections to PER decode class	19.5.21
December 07, 2018 <ul style="list-style-type: none">• RestAPI Server FrameWork Support in MAPSCLI• Save Detail Export feature has been added to Message Editor• Handling multiple VLAN layers in UMTS & LTE.• Corrections done for processing for received GTP packets in mobileIPCore (corrections in flag)• CustomNode support in MultiInterface.• Supporting Data Import feature of VQT in MAPS• SCTP MultiHoming Support• Support for the Dedicated bearer in GTP gateway• Supported ipv6 IP address for Serving gateway & GTP gateway• Hiding specific messages in message sequence dialog• Controlling Max active calls per script in LoadGeneration• New Profile Editor Changes• Remote Rtpcore Support• New scriptEditor enhancements, supported all the Utility Funcitons.	8.12.7

<p>Remote Maps</p> <ul style="list-style-type: none"> • Support for Master configuration at client side • Support for User defined graph. • Implementing MultiUser Licensing in RemoteMaps • Supported New Script editor. <p>Decode Changes</p> <ul style="list-style-type: none"> • BcdTimeStampField (SIMPROTSPEC) - Used to decode timestamp in CAMEL protocol • IPAddress - Generic class to take IPAddress in string format. It supports both Ip4 and Ipv6 address. • PerDegreesLongitude, PerUncertaintyAltitude - To decode Longitude and Altitude when defined in PER notation • PerBitStrIfcToProtObj - New interface class PerBitStrIfcToProtObj derived from PerBitString to decode Bit String using conventional classes. • PerLayerIfc - Use PerLayerIfc class if the higher layer protocol is unaligned. • ProtOptPerBitFieldGroupList - This class is similar to ProtOptFieldGroupList but frame pointer will not be moved • BerAsnObject - Correction made in ParseData to avoid crash in MsgEditor • ProtAsnObjects - Application was crashing due to un-initialized variables. • AtomField - BitNumArrayItemField should get the start offset from PER classes and is provided by an interface Field List class. To support this added new function in Base Class. • BitNumArrayItemField - Data type changed from unsigned long to __int64 • IPV6Filed - Re-written the class.It had issues as it was not used earlier. • Per classes - Made changes in few classes to support Unaligned per protocols. • Per Boolean - m_bValue in PerBoolean should have either 0 or 1, not the integer value represented by the bit • BErLayerIfc - Correction to support indefinite length fields. • GsmLastFieldListSeptet - Added carriage return at the end of the string when last byte contains few bits instead of complete byte. Otherwise Buffer will have value 0x00 & it is GSM default value for symbol @ <p>Bug fixes:</p> <ul style="list-style-type: none"> • 7531,5625,6726,7082,6934,6630,7433,7302,7142,7421,6868,6644,6595,7318,7360,6027,7299 	
<p>March 15, 2018</p> <ul style="list-style-type: none"> • New ScriptEditor enhancements • Encode class changes in ProtExtBitArrayFieldList • Supported Camel Response messages in MAPS-Camellp • AddiotnalInfoParams parameter is added to get details view of message for MAPSCLI • Added "EnableAbsName" to Import instruction • Handled ExpiryInfo for LDK License in Maps, RemoteMaps and MapsCLI • Software License support • Bug fixes: 7232, 6221, 7125, 7156, 6927, 6027, 6836,7305,7299,6937,7092,7302,7132, 7080,6421,6447, 5894,5880 	8.3.15
<p>MAPS™ Framework Enhancements:</p> <ul style="list-style-type: none"> • Improved memory usage per call • Support for MAPS™ to MAPS™ Communication using UDP • EvsChannelAwareMode support for EVS Codec • SDP Parser Support 	8.3.12

<ul style="list-style-type: none"> • Added WCSGetSigToneMon Instruction • Displays LDKVersion in MAPS™ Help->About MAPS™ • Added Functionality to enable and disable Remote Licensing Configuration through MAPS™_GUI_Config.ini • Statistics now gets updated for hidden scripts • Added microsecond precision to Timestamp in Message Sequence • MAPS™ CLI - moved logging of capturedErrors, EventLogs and ErrorLogs to Logs folder in the Installation • New Script Editor enhancements • Handles ExpiryInfo for LDK License in MAPS™, RemoteMAPS™ and MAPS™CLI • "EnableAbsName" added to Import instruction • AdditonalInfoParams parameter is added to get details view of message for MAPS™-CLI • Support for Software Licensing included 	
<p>MAPS™ Framework Enhancements:</p> <ul style="list-style-type: none"> • Testbed progress bar indicates the status of start and stop of MAPS™ application. • Added customized Signaling and RTP Statistics for all MAPS™ IP products supporting RTP • Call Statistics can now be periodically logged to csv file. • Default custom specific scripts and profiles are included. This helps customers to edit and maintain their own custom (*.gls) scripts and profile changes separately. • Consolidated Traffic profile (TrafficProfile.xml) configuration for Auto traffic file, tones, digits and user defined traffic • Easy to use options in Call Generation and Call Reception window • Profile Color Code and Sort Received Calls The Profile Editor tool within MAPS™ now includes color code feature to indicate the sub-profiles with different colors. This enhanced feature allows MAPS™ to support bulk calls from multiple terminals. Profiles are the XML configuration file that includes a set of multiple sub-profiles, which allows to configure multiple end terminals of same capabilities with unique set of parameters for each profile. The multiple sub-profiles created based on key identifier parameters: Contact Address, Address of Record and RTP IP Address that are required to handle both signaling and media. Color codes are used to sort and group all received calls related to individual end-terminal displayed in Call Reception window to make it more informative. The following Call Reception window below depicts grouped calls specific to each end-terminal. • Performance Options: Call Generation and Reception Logs MAPS™ Performance Options feature now includes the following additional options used to auto log call events: <ul style="list-style-type: none"> ➤ Enable/disable the global options such as Event Log, Captured Errors, Error Events, and Message Sequences during performance / load and stress testing to minimize the load on CPU usage or memory usage ➤ When enabled script log for Call Generation and Reception, user can view script specific logs such as Event Log, Error Events, and Captured Errors in respective windows ➤ Auto log passed and failed call information to a text file. It can be enabled to log message sequence, script flow and captured errors events to a log file with a specified file naming convention 	<p>7.10.6</p>

- **Changes to Configuration Files**

MAPS™ includes configuration files which can be configured to have a fine control over MAPS™ application features and to control logging of performance, received calls, memory usage and other important log during call simulation process. The following configuration files are used -

- **MAPS™Config.ini** configuration file – This file includes various parameter configurations essential for controlling call simulation process such as remote license checking feature for CLI, show/hide script flow log in Call Generation or Reception window, control auto log of Events, Errors and Captured Error events to csv or txt file, controlling pre-process script engine to answer bulk calls and thus improving the response time, and control performance and memory usage log.

LogFileSize configuration option provided in MAPS™Config.ini to increase message sequence buffer to avoid purging of call flow in ladder diagram.

Passed / Failed call info can now be logged into txt file. It includes message sequence, script flow and captured errors.

- **MAPS™_GUI_Config.ini** configuration file – This file parameter configurations allow controlling certain features within MAPS™ GUI like default script and profile pre-set in call generation window and set the scripts list to be available for selection within Call Generation and Incoming Call Handler window.
 It also includes configurations to enable hide scripts option in Incoming Call Handler window and enables show hidden scripts option in Call Reception window.

MAPS™ Framework Enhancements:

- **Call Generation and Reception**

- Button options in Call Generation and Reception
- Sorting and color codes are used to group all calls in Call Reception for ED137
- Displaying Profile name in call reception window

- **Traffic Handling**

- Enhanced support for Packet load
- Adds support for EVS, OPUS Codec
- Modification to Codec Negotiation in compareSDP Support in SIP
- SMS over IMS Support.

- **Licensing Enhancements**

- License modifications as per New License library
- License Support based on Card for TDM Protocols
- Added License Checking to MAPS™ Listener based on componentId

- **Profiles**

- Color coding option to create different profiles.

- **Scripting**

- Sub message Folder support in send Instruction
- Support for Report Event instruction to communicate to other MAPS™ Script
- Addition of following new Utility Functions
 GetGLDataType

7.5.23

IsMaxValueReachedOnIncr
ClearAdditionalMessageInfo
ImportNRI2TMSI
ExportNRIFromTMSI
GetSizeOfSTLs
SetTrasportType
InitIpSec
CreateSA
SetSaAtribsAndRemoteSpi
OpenSA
CloseSA
CloseIpSec
SetProperties
SetOperations
GenerateCRD
ExtractProperties
ExtractOperations
InitIpSpoofing
CreateVirtualIp
DeleteVirtualIp
GetAdaptorIndexFromIp

- **Others**

- Enhancement for IMS Nodes
- Support for Remote MAPS™- MAPS™core, MAPS™client e.t.c
- SIP Parser modifications for Contact, From, To, Via, RecordRoute, SecurityClient, SecurityServer, SecurityVerify, ReferTo, Request, Supported and Proxy-authenticate headers.
- Support for SDP Parser
- Support for handling MAP IP multiple versions in Message Editor & MAPS™.

- **Transport Handlers**

- Addition of subchannel selection for MTP2 Simulation
- IP Spoofing enhancement
- Support for IP-security
- Multiple IP support for Serving Gateway
- Megaco Binary Support for Trunking and Residential Gateway.
- TPKT (TCP)and SCTP support for Megaco

MAPS™ Framework Enhancements:

- **Profile Editor**

- IP spoofing - IP addresses specified in the subscriber profile automatically creates virtual IP addresses on the system NIC interface.
- Profile Editor also includes Color coding option to create different profiles. Sorting and color codes are used to group all calls associated to individual nodes in Call Reception window.

- **Configurations**

- GUI Options to enable or disable colour coding feature in Profile Editor and call sorting feature in Call Reception

- **Transport Handlers**

- Support for Secured RTP (SRTP), and TLS included

- **Traffic Handling**

- Support for additional FAX information.
- GTP Gateway enhanced to use different IP Addresses on both side

7.2.3

<ul style="list-style-type: none">➤ Improved IP Transport Handler performance by ignoring loopback packets➤ Added Statistics & log• Utility functions added<ul style="list-style-type: none">➤ To resolve DNS➤ To Read & Write ini file• Others<ul style="list-style-type: none">➤ Support for MAP Phase 2 & Phase 3➤ Support for Megaco Binary encoding➤ Support for SS7 over ATM➤ Implemented Path Management procedure➤ Support for Media Gateway Controller in Multi-interface	
<p>MAPS™ Framework Enhancements:</p> <ul style="list-style-type: none">• Added New Emulation MAPS™APS• Call Generation and Reception<ul style="list-style-type: none">➤ Enabled certain GUI features control through MAPS™_GUI_Config.ini configuration file<ul style="list-style-type: none">▪ On adding new instance in call generation, a default script and profile are pre-set.▪ Only a set of allowed scripts can be available for selection in Call Generation and Incoming Call Handler window.▪ Enable and disable Call Generation, Call Reception, and Load Generation window▪ Provide customized command button control for user-defined events in call generation window. <p>All these options are defined in MAPS™_GUI_Config.ini configuration file</p> <ul style="list-style-type: none">➤ Variable Assignment command has been updated to allow end user to change colour of the script execution status (Pass = Green, Fail = Red)➤ Important User defined events earlier available on right-click under Events column, can now be selectively made available as individual command button on the call generation and reception windows➤ Abort and Stop functionality has been changed. Stop option gracefully stops the execution of the selected scripts from the point of execution by executing the set of commands under the OnStop section within the script. This command stops only the current instance and allows the next set of iterations of script execution to continue. Abort option stops the execution of the selected scripts from the point of execution abruptly. It dismisses all the further iterations of script execution➤ Option provided in call reception window to auto select the Active Call➤ Message Sequence can now be exported into text file format using the save option. This option saves the ladder diagram and decodes into a notepad file. Message Sequence also includes select/deselect 'View Latest Message' option. Ability to change colours from Add Message Sequence Command for specific messages <ul style="list-style-type: none">• Events (Captured Errors, Error Events, Events Log)<ul style="list-style-type: none">➤ The Events captured can be saved to a file, in either TXT, CSV, or Apache log4net™ (.Log4Net) file format for purposes of debugging and troubleshooting➤ Responses from T1 E1 WCS server is now received by MAPS™ and can be verified in Events Log during script execution to detect any failures during communication with servers	6.4.22

- **Utility Functions**
 - **Connect to Database** - Provides option to connect to central database such as Oracle, and send Test Reports, Signalling and Traffic Events to allow centralized and remote monitoring of tests status.
 - Added function to get System time in GMT Format.
- **Initial Configurations**
 - Initialization errors window displays all the errors relating to optional and required licenses for the corresponding application.
 - Master configuration can now be loaded from Initial Configuration menu only (before starting Testbed Setup). Once This cannot be loaded or edited from any other windows once loaded
 - MAPS™ TDM products are now tied to hardware license and can be invoked though CLI by giving Hardware info (does not require Dongle license)
 - Enable/Disable Options per Node in Profile
- **Script Editor**
 - MAPS™ includes a new interface for Script Editor that provides a user friendly, and quicker way to find not only all commands, but also easily find existing variables, import/export files, message templates, labels, and globally defined timers.
 - **Script Debugging** – This provides a debugging environment for all MAPS™ scripts with Watch, Breakpoints, Step through and Step over options to troubleshoot scripting errors and understand the script flow.
 - **Script Profiling** – Used for GL internal purposes only. Script Profiling is a process of analyzing script's runtime behaviour to determine how to optimize performance. The data used for this analysis is collected while the script is being executed. Script profiling helps the optimization of the application.
 - **Script Coverage** – Used for GL internal purposes only. Script coverage is a measure used to describe the degree to which the code of a script is tested by particular test cases. Script coverage testing determines how much code is being tested. The data used for this analysis is collected while the script is being executed. A script with high script coverage has been more thoroughly tested and has a lower chance of containing bugs than a script with low coverage.
 - **Import/Export** – Supports Conditional import and multiple file support
- **Statistics**
 - User Defined Graph and Statistics – Customized statistics and graph can be leveraged by defining appropriate variables to the output of test results. Example of such include RTP packet statistics, and VQT measurements.
 - Option to write output of call statistics to CSV file or PDF file using Report Generation command CSV/PDF)
 - Graph Refresh time can be set in seconds and up to 5 hrs of graph time can be displayed
 - Added new Call rate distribution graph feature to show the frequency of Max CPS times that was achieved
 - Call Graph X-axis changed to display time
- **Transport Layer**
 - Support for SCTP Multi-homing
 - Bugs fixes provided for GTP Transport issues
 - An SCTP server can now accept multiple clients based on source ports and register all clients
 - SCTP Destination Port information is now posted to SCTP Connection UP Event.

<ul style="list-style-type: none">• Traffic Options<ul style="list-style-type: none">➤ Multiple RTP Core can be initialized per NIC port with a single RTP Core License➤ Support for R2S Keep Alive➤ Support for Secured RTP (SRTP), TLS transport – Coming Soon➤ Support for Google VP8 Video Codec for Video Call Simulation➤ Support for traffic impairments➤ RTP Create Session command changed to support IuUP and DSCP➤ RTP Start Session command changed to provide PTT Support➤ RTP Impairment command changed➤ TDM Send file command changed to support # BytesToBeSent➤ Support for specifying Inter Digit Time and Intra Digit Time - If difference between the Digits is very less, but needs to be identified as separate Digits, then we define Inter Digit time appropriately. The Intra Digits is used to identify series of digits as 2 or more sets of digits➤ Bug Fixes provided for IPV6 issues➤ Voice Activity Detection implemented as per TCS requirement➤ Multiparty Conference call supported along with remove last participant from the conference➤ Monitor Power now detects -Inf value	
<p>MAPS™ Framework Enhancement:</p> <ul style="list-style-type: none">• MAPS™ Core<ul style="list-style-type: none">➤ Load Generation with Multi Distributions which allows to add different load pattern for a particular script.➤ Unique Distributions per script which allows to add different load pattern for different scripts.➤ Write Statistics to file parameter option in Global Configuration, to export the Statistics to CSV file.➤ Save and Save As options across all the GUIs (Global Configuration, Incoming Call Handler, Profile Editor, Message Editor, Call Generation & Reception) <p>Bug Fixes:</p> <ul style="list-style-type: none">• In Statistics window, Time axis of Call graph is not displayed accurately for long duration test run. There will be few minutes' difference between Time axis and system time.• Load Generation using scheduler gives the below parsing error. "Failed to Initiate Call: Parsing Error:", "Unable to open the ScriptFile:", for Parsing Or ScriptNotFound.• Load Generation limits call rate to less than 500 for step distribution.	5.8.12