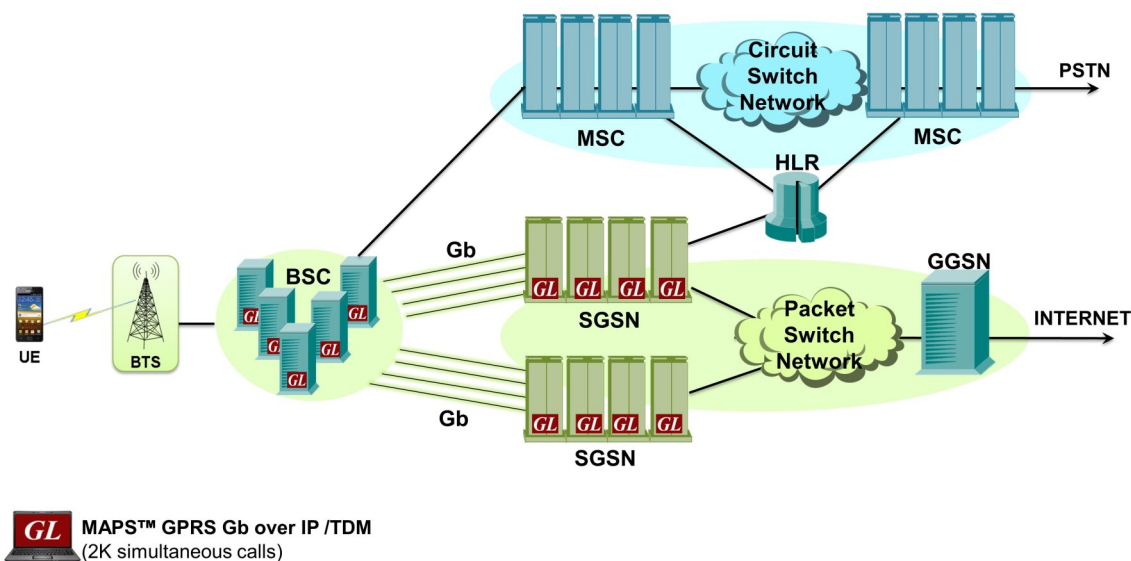


MAPS™ GPRS Gb Interface Emulation over IP/TDM



Overview

GPRS or General Packet Radio Service, was introduced (in the late 90's and early 2000's) to enhance data carrying capabilities of the basic GSM Network. Initially it used the conventional T1 E1 transport and Frame Relay protocol. As the wireless infrastructure evolved towards IP, the migration of 2G systems to IP interface provided many advantages including increased throughput, capacity and economy.

To permit our customers to emulate, test, and verify GPRS Gb over IP, GL offers **MAPS™ GPRS Gb** (Message Automation & Protocol Simulation), a multi-protocol, multi-technology platform that also supports many other protocol families including TDM, IP, ATM and Wireless.

MAPS™ GPRS Gb supports simulation of **BSS (Base Station Subsystem)** and **SGSN (Serving GPRS Support Node)** network elements over IP transmission protocol. MAPS™ GPRS Gb also supports **SGSN Pooling** feature to test and verify redundancy, load balancing, and scalability of network. SGSN pooling solution introduces a new routing mechanism which allows a BSC belonging to an SGSN Pool, connect to all SGSNs in that pool. This permits a mobile station to roam freely without a need to change the serving SGSN.

With the purchase of [ETH103 - Mobile Traffic GPRS Gb](#), MAPS™ GPRS Gb supports Mobile traffic simulation over Gb interface. Currently, this module transmits the pre-canned HTTP file (*.txt) between BSC and SGSN nodes. It multiplexes both signaling and traffic over Gb interface.

For more information, please visit [MAPS™ GPRS Gb Interfaces Emulation](#) webpage.

Main Features

- Simulates SGSN and BSS over GPRS Gb interface.
- Simulates control plane Gb mode.
- Supports SGSN pooling to test and verify redundancy, load balancing, and scalability of network.
- Generates hundreds of Control Signaling (Load Testing).
- Generates and processes NS (Network Service), BSSGP (Base Station Subsystem GPRS Protocol) messages.
- Supported procedures includes Network Service Control, Identity Check, Combined GPRS / IMSI Attach, and Routing Area Update
- Simulates user plane GPRS Gb traffic supporting pre-canned HTTP file transmission.
- Insertion of impairments to create invalid messages.
- Supports customization of call flows and message templates using Script and Message Editors.
- Supports scripted call generation and automated call reception.
- Supports powerful utilities like Message Editor, Script Editor, and Profile Editor which allow new scenarios to be created or existing scenarios to be modified using various protocol messages and parameters.



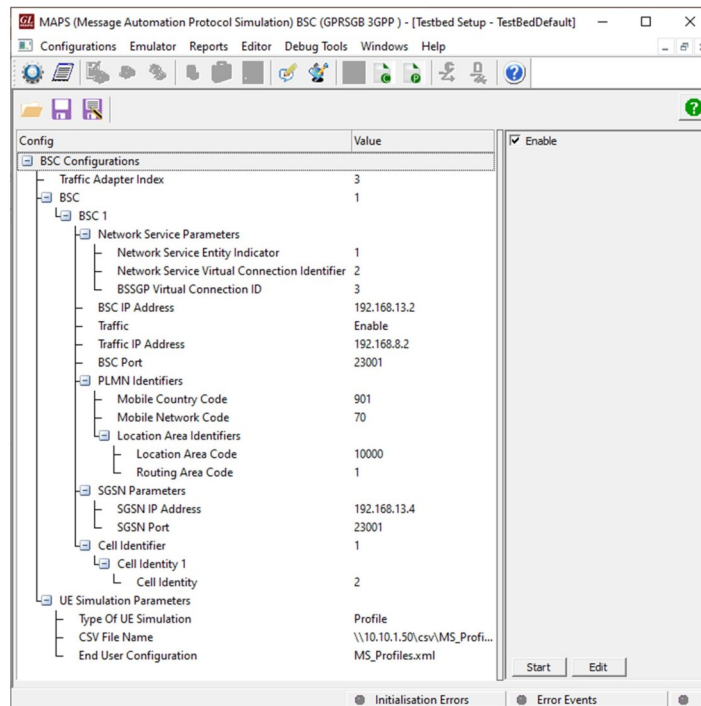
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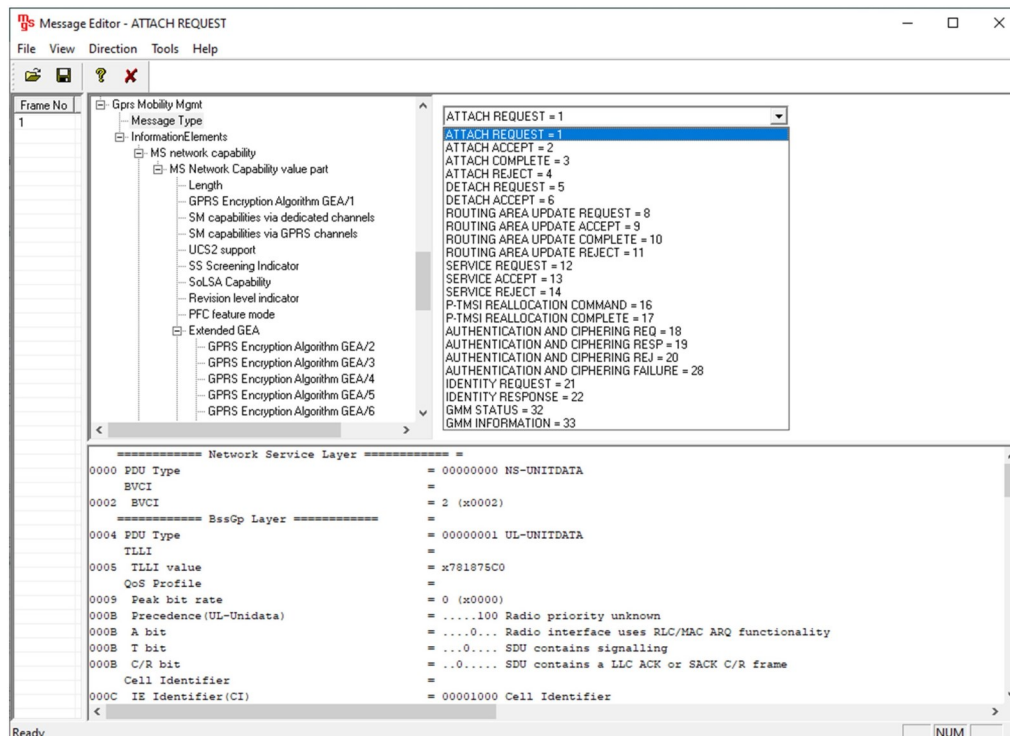
Testbed Configuration

Test Bed Setup provides options to establish communication between MAPS™ and the DUT. It includes configuration parameters to be set for UDP configuration. Once the testbed is setup, messages can be transmitted and received over IP network to the DUT. Default profile used to configure MAPS™ GPRS Gb with SGSN or BSC parameters.



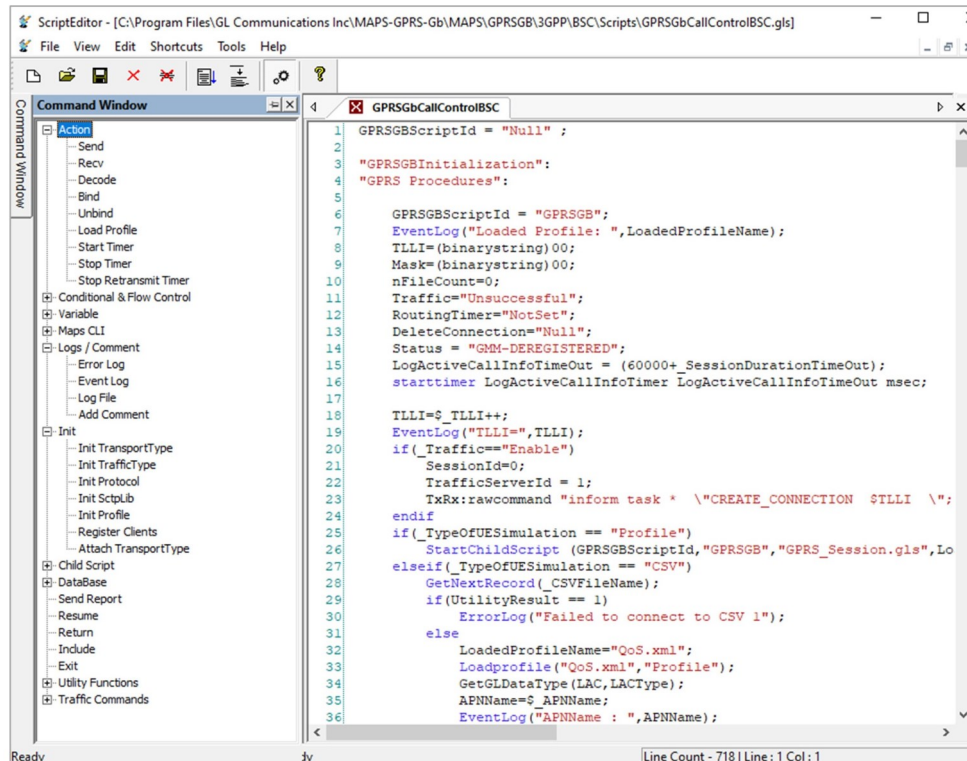
Pre-processing Tools

Message Editor - With message editor, users can build a template for each protocol message type. The value for each field may be changed in the message template prior to testing. The protocol fields comprises of mandatory fixed parameters, mandatory variable parameters, and optional variable parameters.

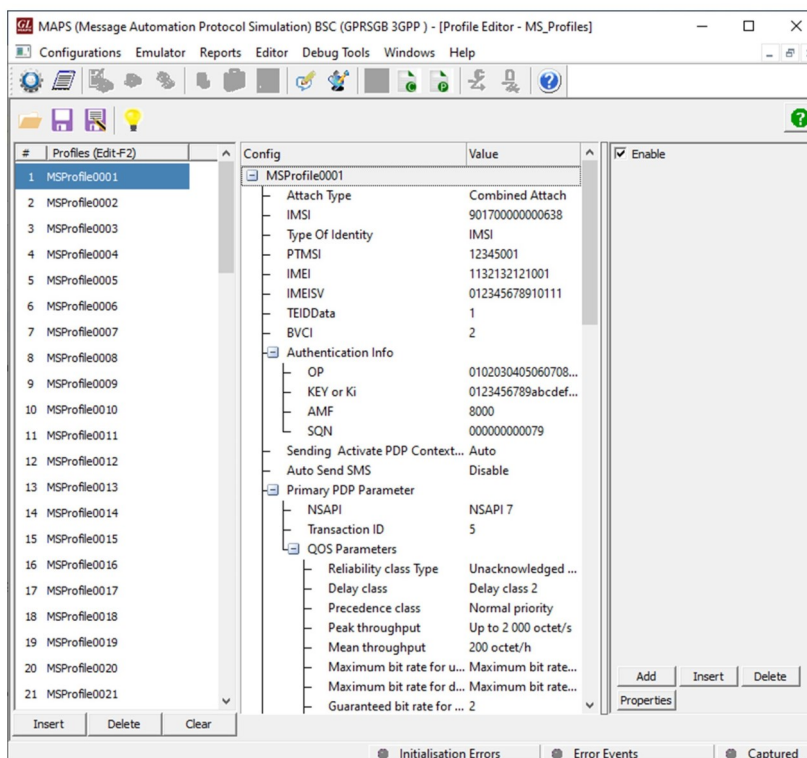


Pre-processing Tools (Contd...)

Script Editor - The script editor allows the user to create / edit scripts and access protocol fields as variables for the message template parameters. The script uses pre-defined message templates to perform send and receive actions.



Profile Editor - This feature allows loading profile to edit the values of the variables using GUI, replacing the original value of the variables in the message template. A XML file defines a set of multiple profiles with varying parameter values that allow users to configure call instances in call generation and to receive calls.



Call Generation and Call Reception

In call generation, MAPS™ is configured for the out going messages, while in call receive mode, it is configured to respond to incoming messages. Tests can be configured to run once, multiple iterations and continuously. Also, allows users to create multiple entries using quick configuration feature.

The editor allows to run the added scripts sequentially (order in which the scripts are added in the window) or randomly (any script from the list of added script as per the call flow requirements). The test scripts may be started manually or they can be automatically triggered by incoming messages.

The screenshot shows the MAPS (Message Automation Protocol Simulation) BSC (GPRSGB 3GPP) - [Call Generation - CallGenDefault] window. The window has a menu bar with options: Configurations, Emulator, Reports, Editor, Debug Tools, Windows, Help. Below the menu bar is a toolbar with icons for file operations and simulation control. The main area is divided into two panes. The left pane shows a table of scripts with columns: Sr., Script Name, Profile, Call Info, Script Execut..., Status, Events, Events Prof., Result, and Total Iterations. The right pane shows a message sequence diagram with a timeline of events and their corresponding results.

Sr.	Script Name	Profile	Call Info	Script Execut...	Status	Events	Events Prof.	Result	Total Iterations
1	GPRSGBCallControlBSC.gls	MSProfile0001	IMSI 90170000000038	Stop	GTP-U-MOBILE-TRAFFI	Stop Traffic		Unknown	1
2	GPRSGBCallControlBSC.gls	MSProfile0002		Start		None		Unknown	1
3	GPRSGBCallControlBSC.gls	MSProfile0003		Start		None		Unknown	1
4	GPRSGBCallControlBSC.gls	MSProfile0004		Start		None		Unknown	1
5	GPRSGBCallControlBSC.gls	MSProfile0005		Start		None		Unknown	1
6	GPRSGBCallControlBSC.gls	MSProfile0006		Start		None		Unknown	1
7	GPRSGBCallControlBSC.gls	MSProfile0007		Start		None		Unknown	1
8	GPRSGBCallControlBSC.gls	MSProfile0008		Start		None		Unknown	1
9	GPRSGBCallControlBSC.gls	MSProfile0009		Start		None		Unknown	1
10	GPRSGBCallControlBSC.gls	MSProfile0010		Start		None		Unknown	1

The message sequence diagram shows the following events and results:

- ATTACH REQUEST (11:09:37.110.6794) → BSC
- AUTHENTICATION AND CIPHERING REQ (11:09:37.144.4803) ← BSC
- AUTHENTICATION AND CIPHERING RESP (11:09:37.144.6413) → BSC
- ATTACH ACCEPT (11:09:37.147.1326) ← BSC
- ATTACH COMPLETE (11:09:37.147.3968) → BSC
- Activate PDP Context Request (11:09:37.147.6378) → BSC
- Activate PDP Context Accept (11:09:37.149.7800) ← BSC

The right pane shows a Find search results for the Network Service Layer and BSSOP Layer. The results are as follows:

```

===== Network Service Layer =====
0000 PDU Type = 00000000
0001 BSCI = 2 (x0002)
===== BSSOP Layer =====
0004 PDU Type = 00000001
0005 TLLI value = x00000000
0006 QoS Profile = 0 (x0000)
0007 Precedence (UL-Unidata) = .....100
0008 A bit = .....0...
0009 T bit = .....0...
000A C/R bit = .....0...
000B Cell Identifier = 00001000
000C IE Identifier (CI) = 1.....
000D Length Ext = 00010000
000E Ext of Cell Identifier = 1.....
000F MCC = 901
  
```

Call Generation

The screenshot shows the MAPS (Message Automation Protocol Simulation) SGSN (GPRSGB 3GPP) - [Call Reception] window. The window has a menu bar with options: Configurations, Emulator, Reports, Editor, Debug Tools, Windows, Help. Below the menu bar is a toolbar with icons for file operations and simulation control. The main area is divided into two panes. The left pane shows a table of scripts with columns: Sr No, Script Name, Profile, Call Info, Script Execution, Status, Events, Events Pro..., Results. The right pane shows a message sequence diagram with a timeline of events and their corresponding results.

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Events Pro...	Results
1	GbSessionInit.gls			Stop		None		Unknown
2	NS_RESET_Recv.gls			Stop		None		Pass
3	GPRSGBCallControlSGSN.gls	MSProfile0001	IMSI 90170000000006	Completed	GMM-DEREGISTERED	None		Pass

The message sequence diagram shows the following events and results:

- ATTACH REQUEST (11:09:37.143.1238) → DUT
- AUTHENTICATION AND CIPHERING REQ (11:09:37.143.3959) ← DUT
- AUTHENTICATION AND CIPHERING RESP (11:09:37.145.7982) → DUT
- ATTACH ACCEPT (11:09:37.145.9872) ← DUT
- ATTACH COMPLETE (11:09:37.148.4518) → DUT
- Activate PDP Context Request (11:09:37.148.5366) → DUT
- Activate PDP Context Accept (11:09:37.148.7416) ← DUT
- Deactivate PDP Context Request (11:10:37.157.2824) → DUT
- Deactivate PDP Context Accept (11:10:37.157.4628) ← DUT

The right pane shows a Find search results for the Network Service Layer and BSSOP Layer. The results are as follows:

```

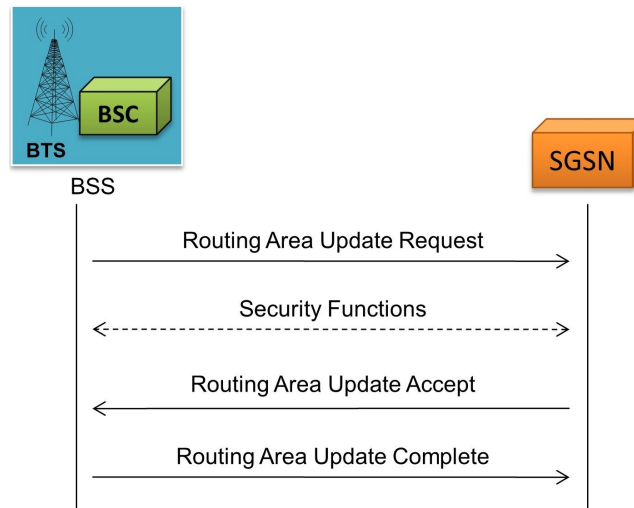
===== Network Service Layer =====
0000 NS-UN = 00000000
0001 NS-UN = 2 (x0002)
===== BSSOP Layer =====
0000 UL-UN = 00000001
0001 UL-UN = x00000003
0002 UL-UN = 0 (x0000)
0003 UL-UN = .....100 Radic
0004 UL-UN = .....0... Radic
0005 UL-UN = .....0... SDU c
0006 UL-UN = .....0... SDU c
0007 Cell Identifier = 00001000
0008 Ext of Cell Identifier = 1.....
0009 Ext of Cell Identifier = 00010000 (8)
000A Ext of Cell Identifier = 1.....
000B Ext of Cell Identifier = 901
  
```

Call Reception

MAPS™ GPRS Gb Procedures

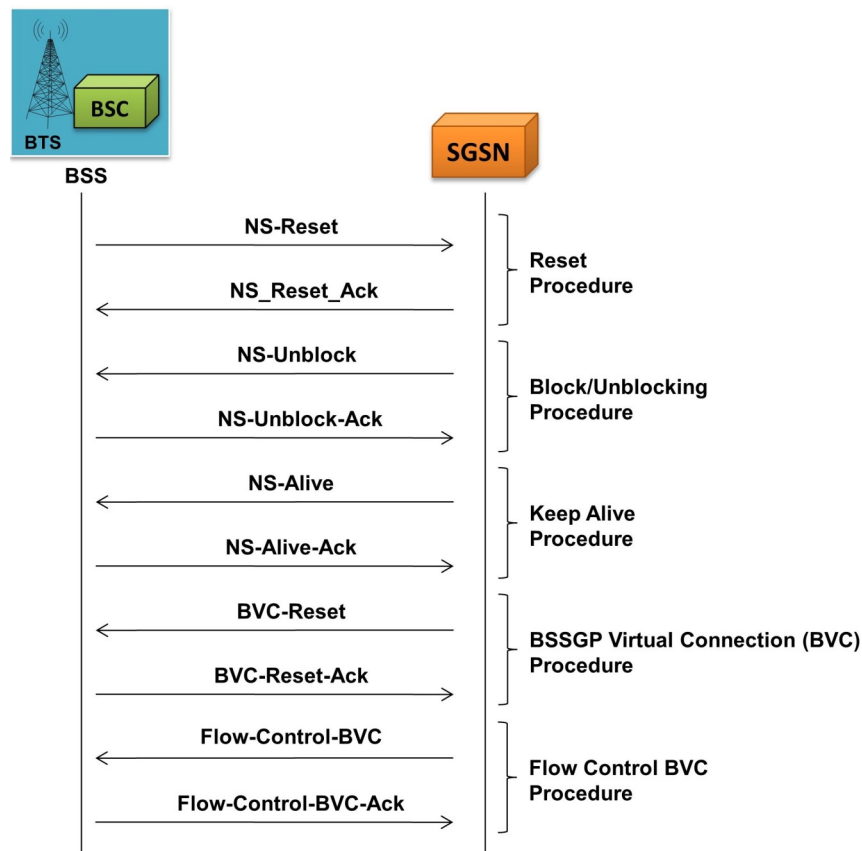
Routing Area Update Procedure

MAPS™ GPRS Gb configured as BSC sends a routing area update request when a GPRS-attached MS detects that it has entered a new RA, or when the periodic RA update timer has expired, or when the MS has to indicate new access capabilities to the network or, when a suspended MS is not resumed by the BSS



Network Service Control Procedure

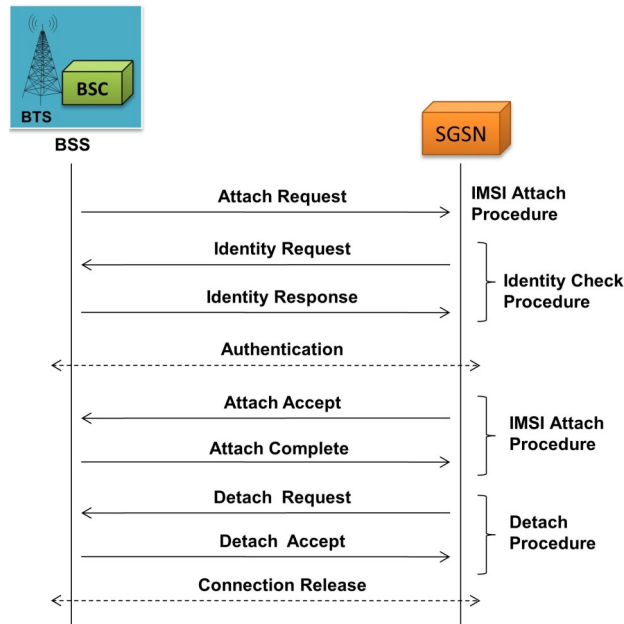
MAPS™ GPRS Gb configured as BSS uses this Network Service Control test procedure to check end-to-end communication with its peer entity (SGSN) on NS-VC.



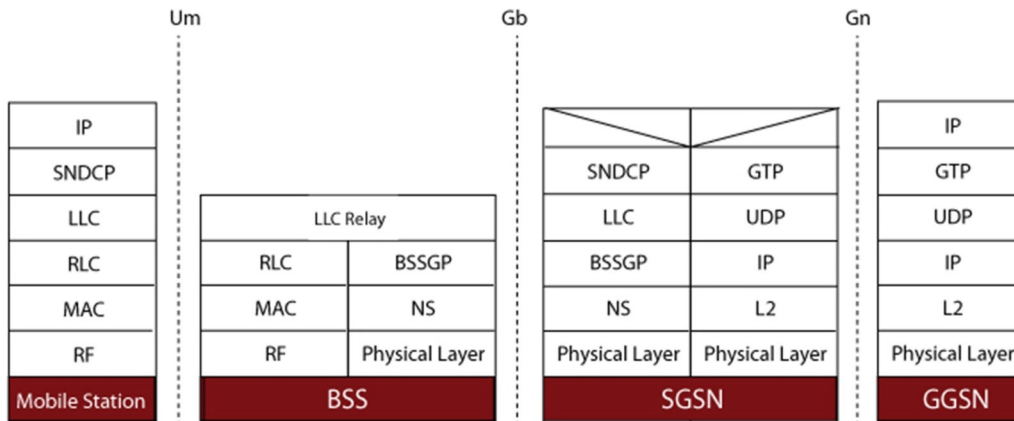
MAPS™ GPRS Gb Procedures (contd..)

IMSI Attach/Detach Procedure

MAPS™ GPRS Gb configured as BSC allows a GPRS attach request to be made to the SGSN. The SGSN sends Identity Request (Identity Type) to the MS. The MS responds with Identity Response (Mobile Identity).



Supported Protocols and Specifications



Supported Protocols	Standard / Specification Used
BSSGP	3GPP TS 08.18 V8.10.0 (2002-05)
LLC	3GPP TS 04.64 V8.7.0 (2001-12)
NS (Network Service)	GSM 8.16 (ETSI TS 101 299 V8.0.0)
GMM	3GPP 24.008
SMG (GPRS Session Mgmt)	3GPP TS 24.008 V5.16.0 (2006-06) (Release 5)
SNDCP	3GPP TS 04.64 V8.7.0 (2001-12)

Buyer's Guide

Item No	Product Description
PKS131	MAPS™ Gb Emulator over IP
ETH100	Mobile Traffic - PacketCheck™
ETH101	MobileTrafficCore - GTP
ETH102	MobileTrafficCore - Gateway
ETH103	MobileTrafficCore - Gb
PKV100	PacketScan™ - All IP Protocol Analyzer

Note: PCs which include GL hardware/software require Intel or AMD processors for compliance.

For more information, please visit [MAPS™ GPRS Gb Interfaces Emulation](#) webpage.



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