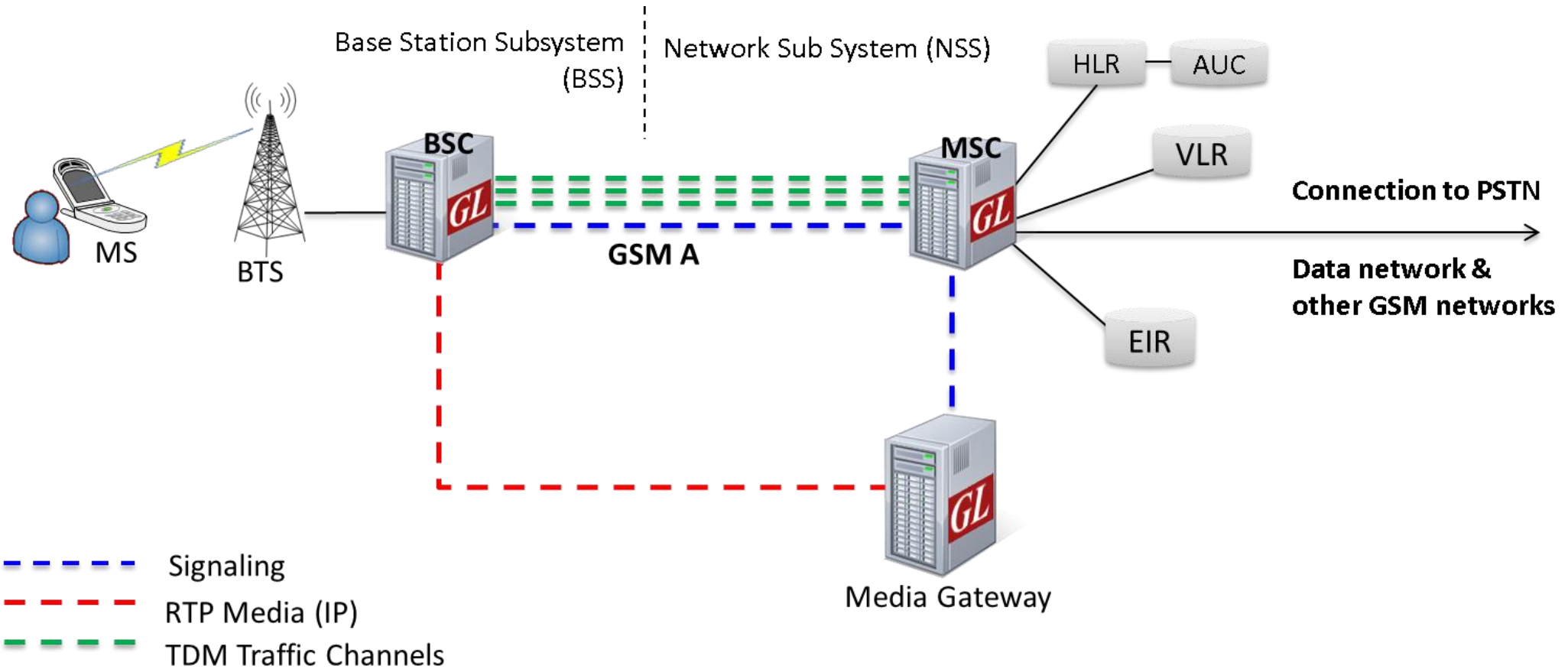

MAPS™ GSM A Interface Emulator

GSM A Interface Emulation Over IP and TDM




818 West Diamond Avenue - Third Floor, Gaithersburg, MD 20878
Phone: (301) 670-4784 Fax: (301) 670-9187 Email: info@gl.com
Website: <https://www.gl.com>

GSM A Interface Emulation



 **MAPS™ GSM A over IP /TDM**
(2K simultaneous calls per NIC card)

 **MAPS™ GSM A over IP**
HD RTP Generator Hardware
(w/ 2 x 10G cards; w/ 4 x 1G cards)

Main Features

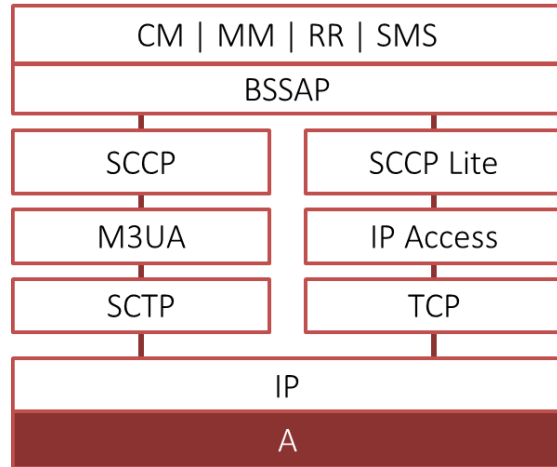
- Complete GSM A signaling emulation over IP along with RTP traffic
- Supports transmission and detection of RTP traffic – Auto digits, voice file, single /dual tones, Fax, IVR, and User defined traffic
- Access to all BSSMAP and DTAP message parameters like TMSI, IMSI, CIC, MCC, LAC, and more
- User controlled access to optional parameters such as timers
- Supports Authentication, TMSI Reallocation, Encryption, and other optional procedures
- Ready scripts for Mobile Originating, Mobile Terminating, Location Updating procedures, Mobile Originating and Terminating SMS, and Handover Management procedures
- Auto packet impairment with Latency, Packet Effects, and Packet Loss
- Supported codec types include G.711, G.729, G.726, GSM, AMR, EVRC, SMV, iLBC, SPEEX, G.722, and more.
*AMR, EVRC variants requires additional licenses
- User-friendly GUI for configuring the SCTP/TCP Layer
- HD appliance supports high density call emulation of up to 20,000 calls with traffic (5000 calls per port) – Requires additional hardware and licenses

Main Features(Contd.)

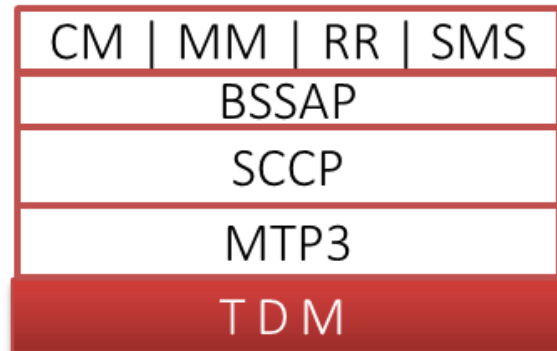
- Setup a virtual real-time GSM network emulating all the network elements using '2G and 2.5G GSM GPRS Communications Network Lab Suite '
- Supports all Call Control, Mobility Management, Radio Resource Management, SMS (Short Message Service), and Handover Management procedures
- Multiple UE related information can be accessed directly from Database, CSV files, or through regular XML Profiles for bulk call generation
- CSV or Database based profiles support massive number of UE records, and also support SMS calls ratio option to dynamically control the ratio of SMS and Voice calls to be generated
- Supports user defined graphs and statistics for monitoring performance of Signaling and RTP traffic
- Export call statistics PDF and XML file format report generation
- Customization of traffic parameters to be calculated and displayed for voice quality metrics such as Listening MOS, Conversational MOS, Packet Loss, Discarded Packets, Out of Sequence Packets, Duplicate Packets, Delay and Jitter
- Multi homing with multiple IP address configuration for single node is supported to keep the SCTP link continuously active between the connected nodes

Supported Protocol Standards

GSM A IP Interface Protocol Standards



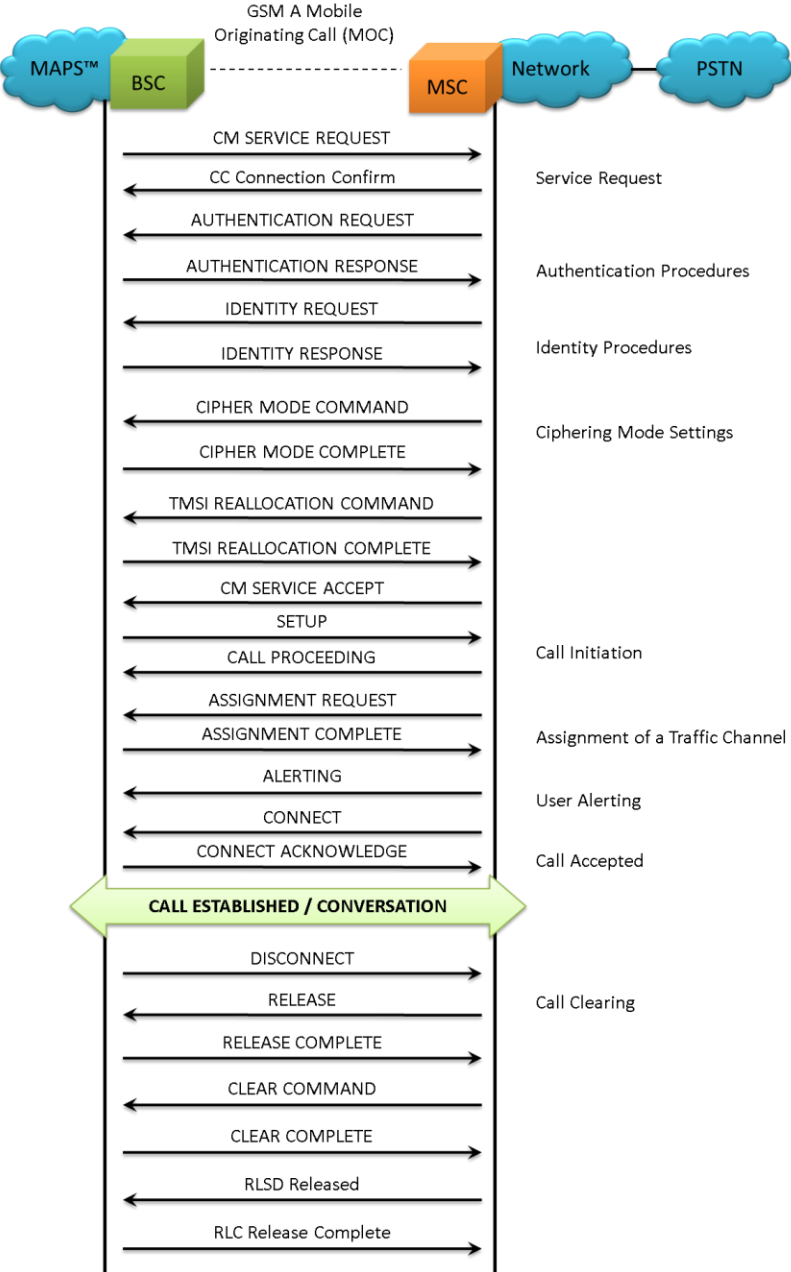
GSM A TDM Interface Protocol Standards



Supported Protocols	Standard / Specification Used
SCCP	Q.713, CCITT (ITU-T) Blue Book
SCTP	RFC 4960
TCP	RFC 793
M3UA	RFC 3332
BSSMAP / DTAP	3GPP TS 08.08 V8.9.0, 3GPP TS 48.008 V10.0.0 (2011-01)
MM/CC	3GPP TS 04.08 V7.17.0
RR	3GPP TS 04.18 V8.13.0
SMS	3GPP TS 03.40 V7.5.0 & 3GPP TS 04.11 V7.1.0 GSM 03.38 version 7.2.0 Release 1998

Supported Protocols	Standard / Specification Used
SCCP	Q.713, CCITT (ITU-T) Blue Book
M3UA	RFC 3332
BSSMAP / DTAP	3GPP TS 08.08 V8.9.0, 3GPP TS 48.008 V10.0.0 (2011-01)
MM/CC	3GPP TS 04.08 V7.17.0
RR	3GPP TS 04.18 V8.13.0
SMS	3GPP TS 03.40 V7.5.0 & 3GPP TS 04.11 V7.1.0 GSM 03.38 version 7.2.0 Release 1998

Mobile Originating Call (MOC) Procedure



MOC Call Generation and Reception

MAPS (Message Automation Protocol Simulation) BSC (GsmA GSM900) - [Call Generation - CallGenDefault]

Configurations Emulator Reports Editor Windows Help

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Event...	Result	Total Iterations	Completed Iteration
1	MO.gls	BSC01MS001	IMSI:901700000000601...	Start	SCCP Resources Released	None	...	Pass	1	1
2	MO.gls	BSC01MS002	IMSI:901700000000602...	Abort	Transmitting File	Terminate	...	Pass	1	0
3	MO.gls	BSC01MS003		Start		None	...	Unknown	1	0
4	MO.gls	BSC01MS004		Start		None	...	Unknown	1	0
5	MO.gls	BSC01MS005		Start		None	...	Unknown	1	0
6	MO.gls	BSC01MS006		Start		None	...	Unknown	1	0

Add Delete Insert Refresh Start Start All Stop Stop All Abort Abort All

Save Column Width

RLC release complete → 14:25:51.773000
CM SERVICE REQUEST → 14:25:51.774000
 ← CC connection confirm 14:25:52.352000
 ← AUTHENTICATION REQUEST 14:25:52.374000
 → AUTHENTICATION RESPONSE 14:25:52.375000
 ← CIPHER MODE COMMAND 14:25:52.936000
 → CIPHER MODE COMPLETE 14:25:52.937000
 ← TMSI REALLOCATION COMMAND 14:25:53.505000
 → TMSI REALLOCATION COMPLETE 14:25:53.506000
 ← CM SERVICE ACCEPT 14:25:54.088000

```

===== MTP3 Layer =====
0000 Service Indicator = ....0011 SCCP
0000 Priority Code = ..00.... Prior
0000 Sub-service field = 10..... Natio
0001 DPC = 2.2.2(00010010
0002 OPC = 1.1.1(01.....
0004 Signalling Link Code = 0001.... (1)
Higher Layer Data = x0100000502020
===== SCCP Layer =====
0005 Message Type = 00000001 CR co
Mandatory Fixed Parameters
Source Local Reference Parameter
Source Local Reference = 5 (x000005)
Protocol Class Parameter
Class = ....0010 Class
0009 Message Handling (Class 0 and 1 only) = 0000.... No Sp
000A Pointer to Mandatory Parameter = Param0 offset :
000B Pointer to optional parameters = x06 (6)
Mandatory Variable Length Parameters
Called Party Address = mandatory para
Parameter length = 4
Address Indicators =
  
```

Scripts Message Sequence Event Config Script Flow

Error Events Captured Errors

MAPS (Message Automation Protocol Simulation) MSC (GsmA GSM900) - [Call Reception]

Configurations Emulator Reports Editor Windows Help

Sr No	Script Name	Call Info	Script Execution	Status	Events	Events...	Results
1	SLTM.gls	2.2.2.1.1.1.1	Abort	MTP3 Active	Initiate SLTM		Pass
2	SCMG.gls	1	Abort	Subsystem-Allowed	Initiate SST		Pass
3	MO.gls	IMSI:901700000000601.TMSI:0...	Completed	SCCP Release Initiated	None		Pass
4	MO.gls	IMSI:901700000000601.TMSI:0...	Abort	File Sent	Terminate		Pass

Abort Abort All Show Records Auto Trash Trash

Save Column Width

DUT MAPS

← CM SERVICE REQUEST 14:24:23.131000
 → CC connection confirm 14:24:23.134000
 ← AUTHENTICATION REQUEST 14:24:23.135000
 → AUTHENTICATION RESPONSE 14:24:23.178000
 ← CIPHER MODE COMMAND 14:24:23.178000
 → CIPHER MODE COMPLETE 14:24:24.288000
 ← TMSI REALLOCATION COMMAND 14:24:24.289000
 → TMSI REALLOCATION COMPLETE 14:24:24.872000
 ← CM SERVICE ACCEPT 14:24:24.872000
 → SETUP 14:24:25.453000
 ← CALL PROCEEDING 14:24:25.454000
 → ASSIGNMENT REQUEST

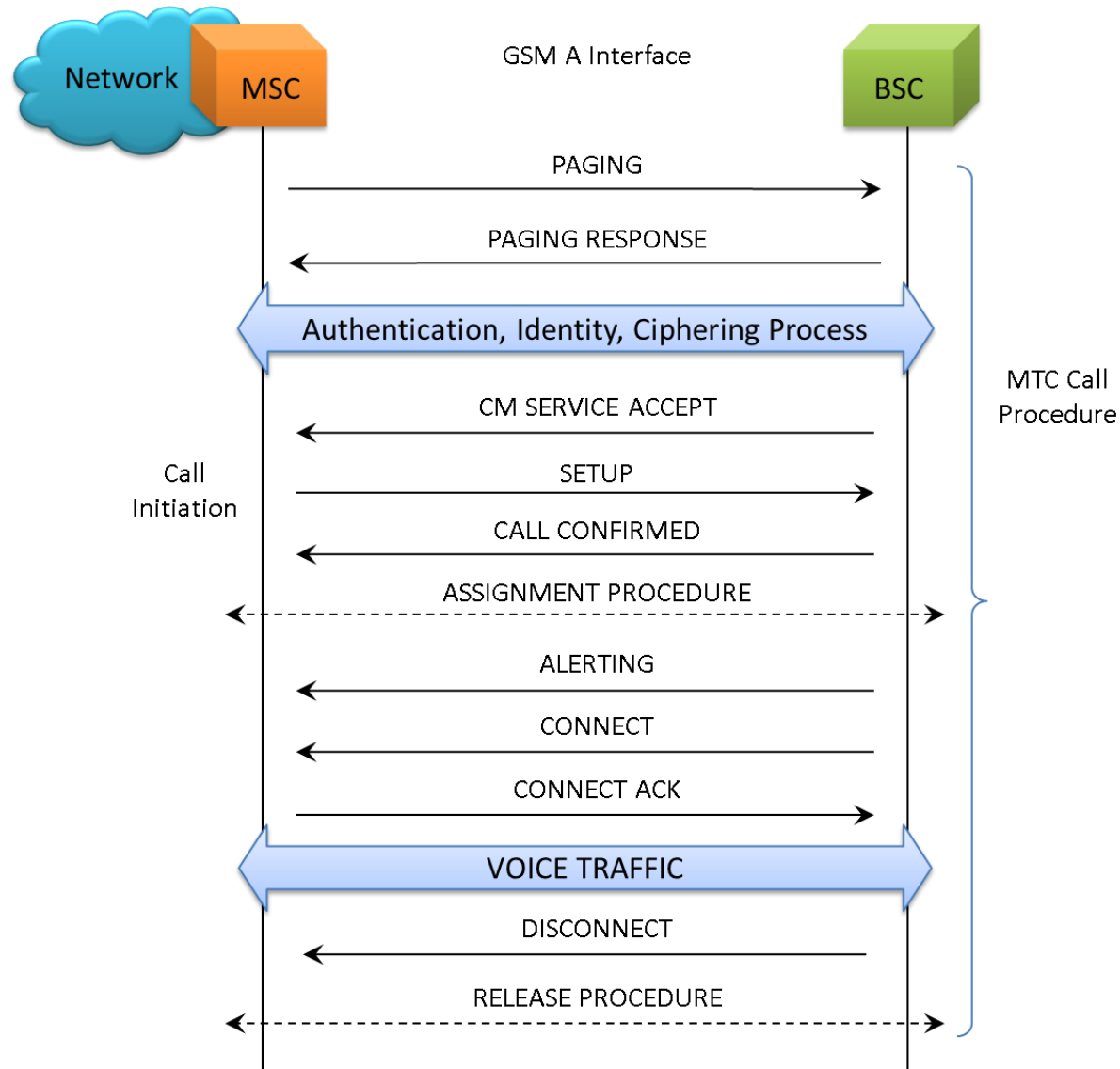
```

===== MTP3 Layer =====
0000 Service Indicator = ....0011 SCCP
0000 Priority Code = ..00.... Priority Code 0
0000 Sub-service field = 10..... National Network
0001 DPC = 2.2.2(00010010 ..010000)
0002 OPC = 1.1.1(01..... 00000010 ....0010)
0004 Signalling Link Code = 0001.... (1)
Higher Layer Data = x0100000302020604C31210FE0404C30908FE0F1C001A
===== SCCP Layer =====
0005 Message Type = 00000001 CR connection request
Mandatory Fixed Parameters
Source Local Reference Parameter
Source Local Reference = 3 (x000003)
Protocol Class Parameter
Class = ....0010 Class 2
0009 Message Handling (Class 0 and 1 only) = 0000.... No Special Options
000A Pointer to Mandatory Parameter = Param0 offset x02 (2)
000B Pointer to optional parameters = x06 (6)
Mandatory Variable Length Parameters
Called Party Address = mandatory parameter
Parameter length = 4
Address Indicators =
000D Point Code Indicators = .....1 Address contains signalling point cod
000D SSN Indicators = .....1 Address contains subsystem number
000D Global Title Indicators = ..0000.. No global title included
000D Routing Indicators = ..1..... Route on SSN
000D Natl/Intl Indicators = 1..... Address is national
  
```

Scripts Message Sequence Event Config Script Flow

Error Events Captured Errors Link Status Up=1 Down=0

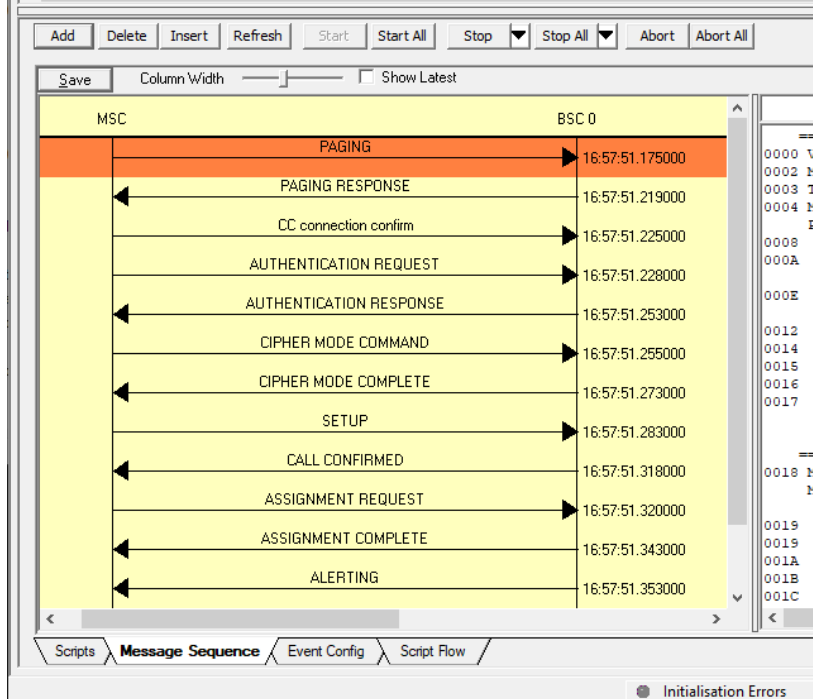
Mobile Terminating Call (MTC) Procedure



MTC Call Generation and Reception

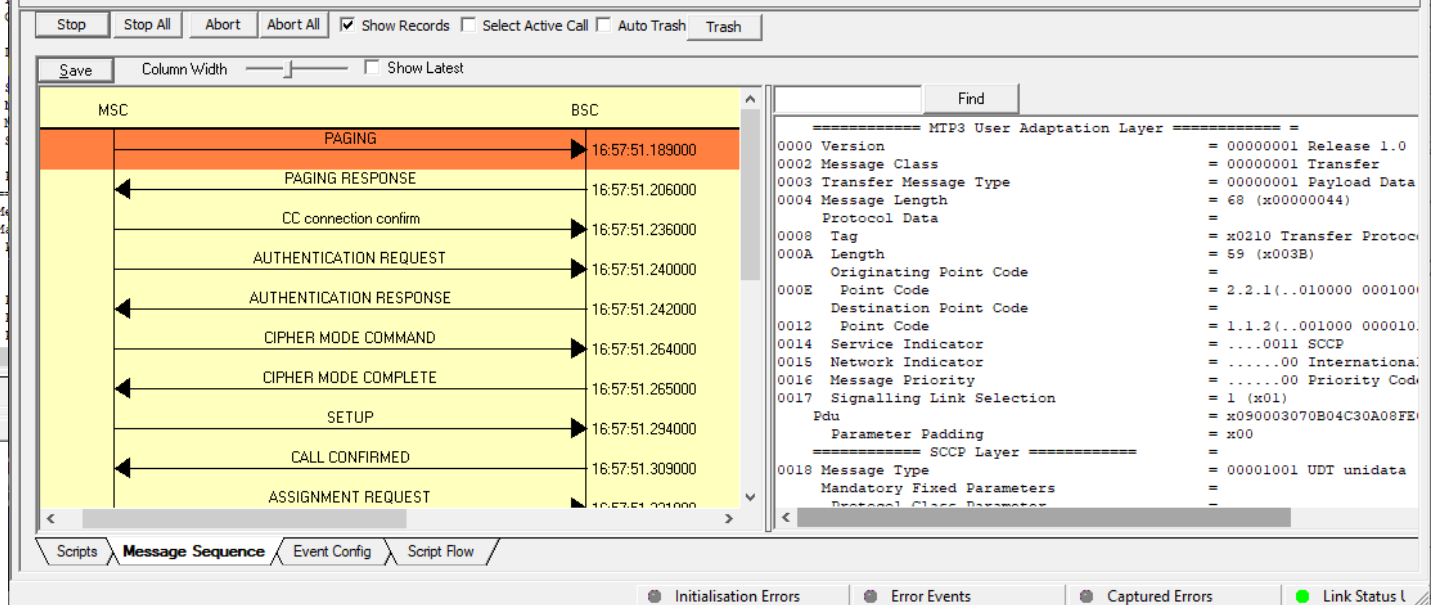
MAPS MSC (GsmAlp GSM900 M3UA) - [Call Generation -CallGenDefault]

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Result	Total Iterations	Completed Iterations
1	GSMA_MTCall.gls	MSProfile0001	IMSI:..90170000000638.Calling Number...	Stop	GSM_Send_File-Started	Terminate	Pass	1	0
2	GSMA_MTCall.gls	MSProfile0002		Start		None	Unknown	1	0
3	GSMA_MTCall.gls	MSProfile0003		Start		None	Unknown	1	0
4	GSMA_MTCall.gls	MSProfile0004		Start		None	Unknown	1	0

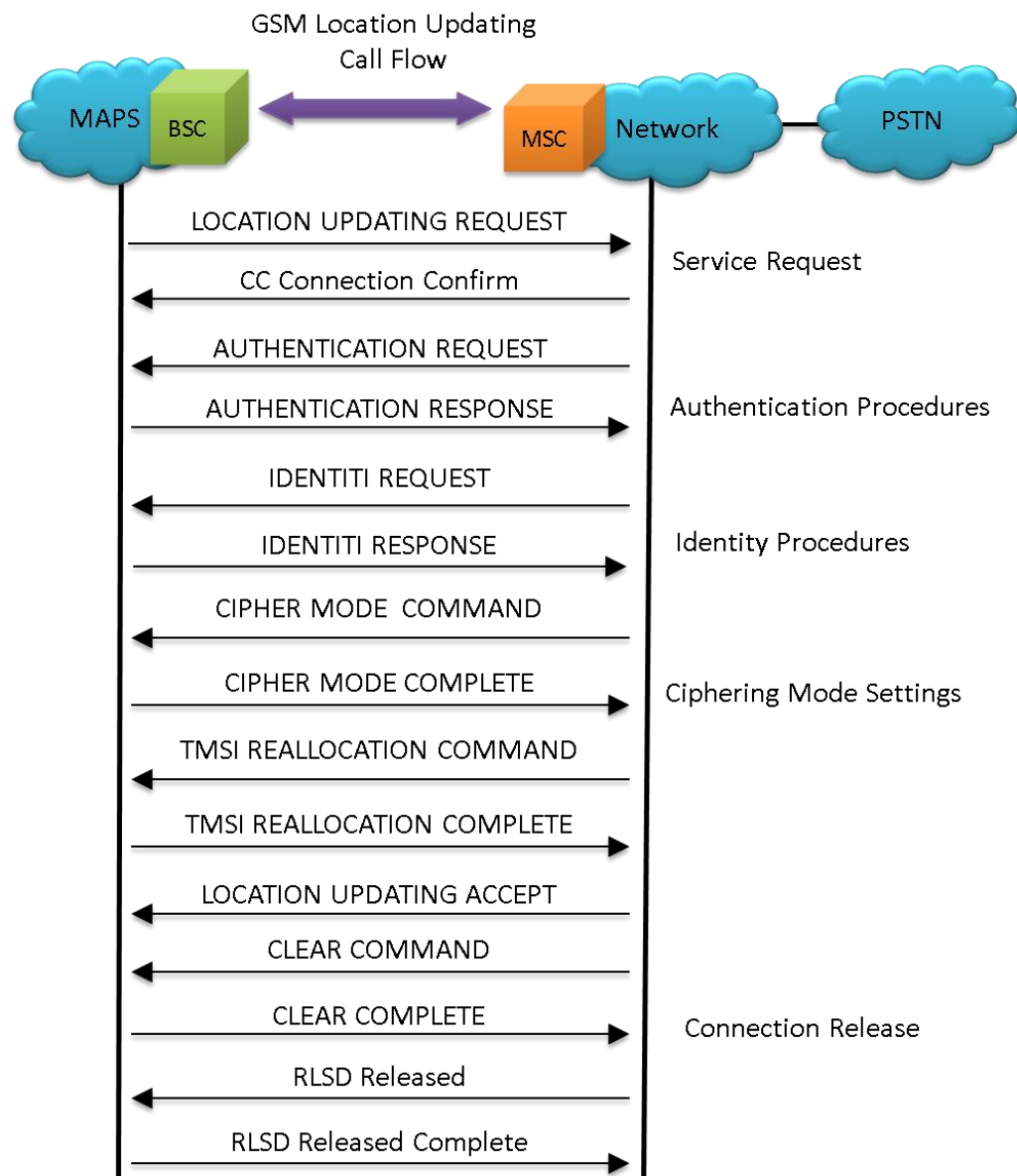


MAPS BSC (GsmAlp GSM900 M3UA) - [Call Reception]

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Results
1	M3UA.gls		1	Stop	ASP Active	Send-ASPDown	Pass
2	SCMG.gls		1	Stop	Subsystem-Allowed	Initiate SST	Pass
3	GSMA_Call.gls	MSProfile0001	IMSI:..90170000000638.CallingNum...	Completed	SCCP Connection Released	None	Pass



Location Updating Call (LUC) Procedure



LUC Call Generation and Reception

MAPS BSC (GsmAlp GSM900 M3UA) - [Call Generation -CallGenDefault]

Sr No	Script Name	Profile	Call Info	Script Execution	Status
1	GSMA_Call.gls	MSPProfile0001	IMSI:.901700000000638	Start	SCCP C...
2	GSMA_Call.gls	MSPProfile0002		Start	
3	GSMA_Call.gls	MSPProfile0003		Start	
4	GSMA_Call.gls	MSPProfile0004		Start	
5	GSMA_Call.gls	MSPProfile0005		Start	

Save Column Width Show Latest

BSC MSC

LOCATION UPDATING REQUEST → 14:52:32.565000

← CC connection confirm 14:52:34.191000

← AUTHENTICATION REQUEST 14:52:34.202000

← AUTHENTICATION RESPONSE 14:52:34.216000

← CIPHER MODE COMMAND 14:52:34.248000

← CIPHER MODE COMPLETE 14:52:34.261000

← LOCATION UPDATING ACCEPT 14:52:34.291000

← CLEAR COMMAND 14:52:34.304000

← CLEAR COMPLETE 14:52:34.317000

← RLSD released 14:52:34.353000

← RLC release complete 14:52:34.369000

Scripts Message Sequence Event Config Script Flow

● Initialisation Errors

MAPS MSC (GsmAlp GSM900 M3UA) - [Call Reception]

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Results
1	M3UA.gls		1000	Stop	ASP Active	Send-ASPDown	Pass
2	SCMG.gls		1000	Stop	Subsystem-Allowed	Initiate SST	Pass
3	GSMA_Call.gls	MSPProfile0001	IMSI:.901700000000638	Completed	Call Released	None	Pass

Show Records
 Select Active Call
 Auto Trash

Save Column Width Show Latest

BSC 0 MSC

LOCATION UPDATING REQUEST → 14:52:34.166000

← CC connection confirm 14:52:34.181000

← AUTHENTICATION REQUEST 14:52:34.192000

← AUTHENTICATION RESPONSE 14:52:34.225000

← CIPHER MODE COMMAND 14:52:34.238000

← CIPHER MODE COMPLETE 14:52:34.272000

← LOCATION UPDATING ACCEPT 14:52:34.282000

← CLEAR COMMAND 14:52:34.293000

← CLEAR COMPLETE 14:52:34.328000

← RLSD released 14:52:34.342000

← RLC release complete 14:52:34.376000

Scripts Message Sequence Event Config Script Flow

● Initialisation Errors ● Error Events ● Captured Errors ● Link

Find

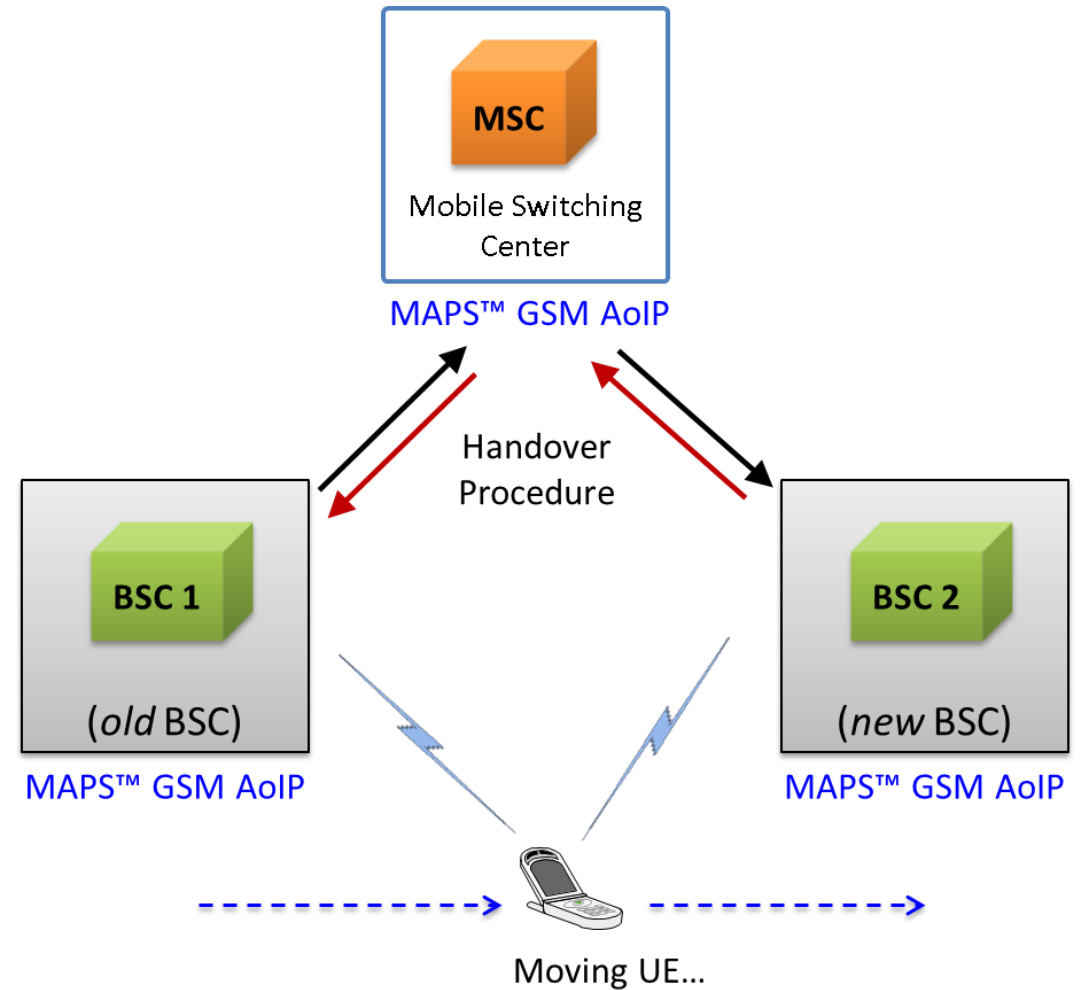
```

===== MTP3 User Adaptation Layer =====
0000 Version = 00000001 Reles
0002 Message Class = 00000001 Trans
0003 Transfer Message Type = 00000001 Paylc
0004 Message Length = 80 (x00000050)
      Protocol Data =
0008 Tag = x0210 Transfer
000A Length = 70 (x0046)
      Originating Point Code =
000E Point Code = 1.1.2(..001000
      Destination Point Code =
0012 Point Code = 2.2.1(..010000
0014 Service Indicator = .....0011 SCCP
0015 Network Indicator = .....00 Inter
0016 Message Priority = .....00 Prior
0017 Signalling Link Selection = 1 (x01)

Parameter Padding = x0000
===== SCCP Layer =====
0018 Message Type = 00000001 CR cc
      Mandatory Fixed Parameters =
      Source Local Reference Parameter =
0019 Source Local Reference = 2 (x000002)
      Protocol Class Parameter =
001C Class = ....0010 Class
    
```

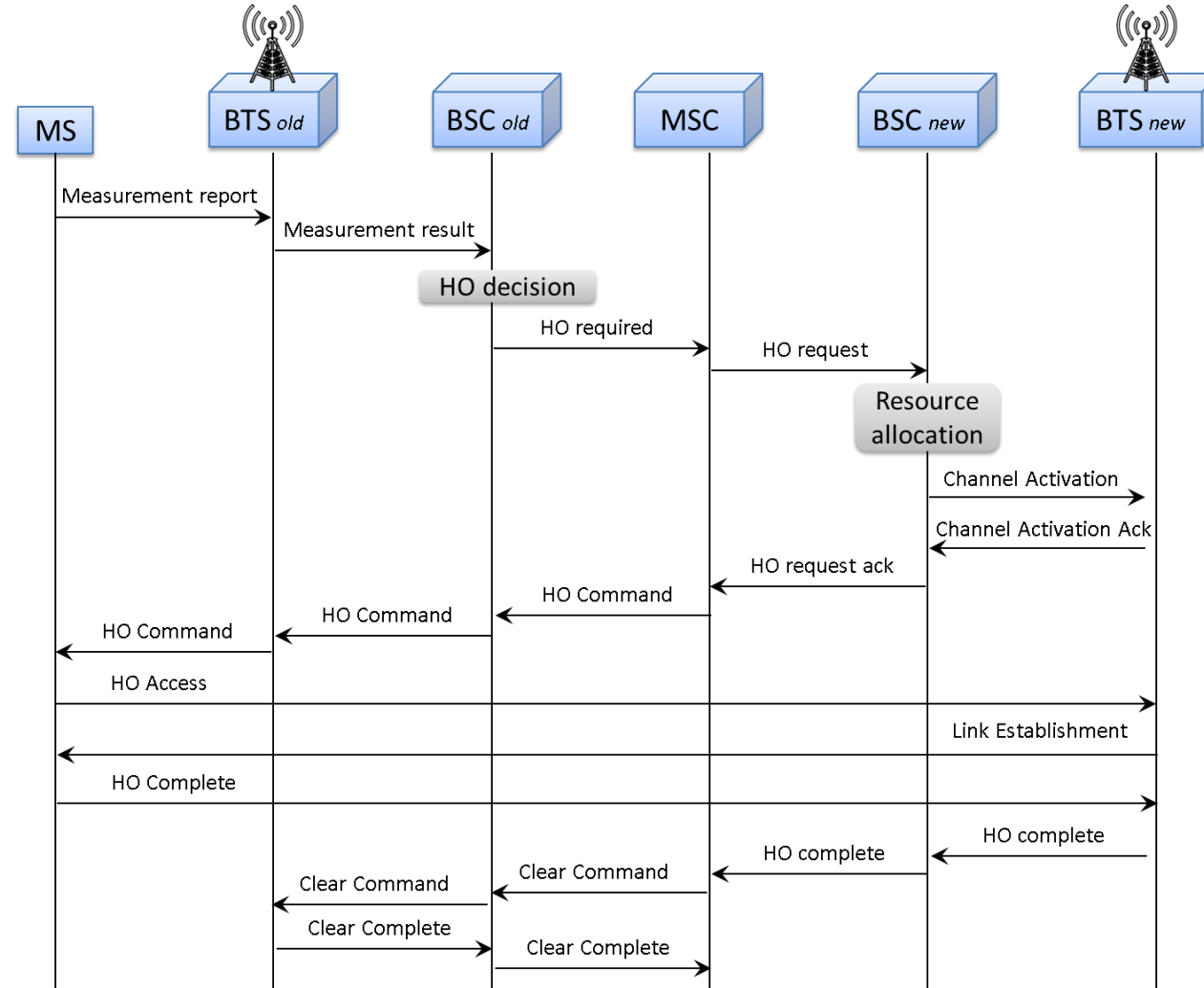
Handover Management Procedure

- When a mobile user travels across two different cell coverage areas within an active call duration, the call is transferred to the new cell's base station
- When the user is travelling across two different cell coverage areas, the Handover procedures are initiated from old BSC to new BSC via MSC. These procedures can be emulated using MAPS™ GSMA over IP Emulator



Handover Management Call Procedure

- The typical end-to-end call flow between the entities during the Handover procedure



Handover Management Procedure Emulation

- The end-to-end Handover call flow between the old BSC and new BSC via MSC emulated using MAPS™ GSMA over IP Emulator

The screenshot displays the MAPS (Message Automation Protocol Simulation) MSC (GsmAlp GSM900 M3UA) - [Call Reception] interface. The top window shows a table of script execution results:

Sr No	Script Name	Call Info	Script Execution	Status	Events	Events Profile	Results
1	Check_SCTP_Status.gls		Stop	Monitoring SCTP Status	None		Unknown
2	M3UA.gls	1003	Stop	ASP Active	None		Pass
3	SCMG.gls	1004	Stop	SubsystemAllowed	None		Pass
4	M3UA.gls	1004	Stop	ASP Active	None		Pass
5	GSMa_Call.gls	IMSI: 301700000000639.CalledNumber: 90688	Completed	SCCP Connection Released	None		Pass
6	GSMa_Call.gls	IMSI: 301700000000639.CalledNumber: 90688	Completed	SCCP Connection Released	None		Pass

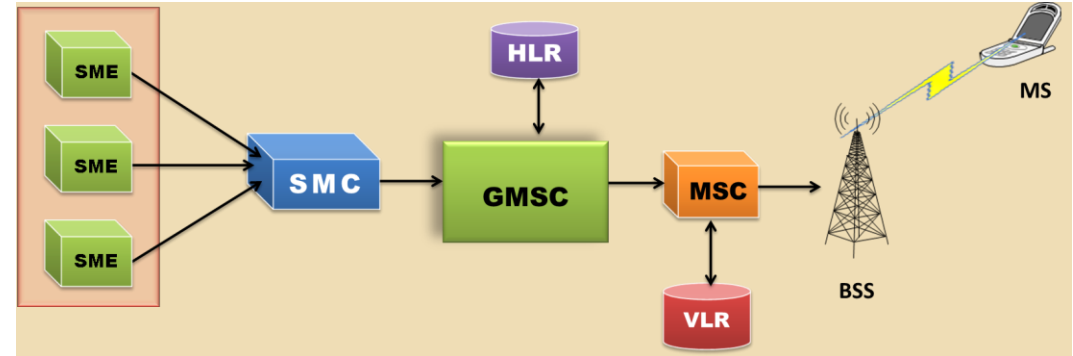
The main window shows a sequence diagram between BSC 1, MSC, and BSC 0. The flow includes:

- CM SERVICE REQUEST (BSC 1 to MSC)
- CC connection confirm (MSC to BSC 1)
- AUTHENTICATION REQUEST (BSC 1 to MSC)
- AUTHENTICATION RESPONSE (MSC to BSC 1)
- CIPHER MODE COMMAND (BSC 1 to MSC)
- CIPHER MODE COMPLETE (MSC to BSC 1)
- TMSI REALLOCATION COMMAND (BSC 1 to MSC)
- TMSI REALLOCATION COMPLETE (MSC to BSC 1)
- CM SERVICE ACCEPT (BSC 1 to MSC)
- SETUP (BSC 1 to MSC)
- CALL PROCEEDING (MSC to BSC 1)
- ASSIGNMENT REQUEST (BSC 1 to MSC)
- ASSIGNMENT COMPLETE (MSC to BSC 1)
- ALERTING (BSC 1 to MSC)
- CONNECT (BSC 1 to MSC)
- CONNECT ACKNOWLEDGE (MSC to BSC 1)
- HANDOVER REQUIRED (BSC 1 to MSC)
- HANDOVER REQUEST (MSC to BSC 0)
- CC connection confirm (BSC 0 to MSC)
- HANDOVER REQUEST ACK (BSC 0 to MSC)
- HANDOVER COMMAND (MSC to BSC 1)
- HANDOVER DETECT (BSC 0 to MSC)
- HANDOVER COMPLETE (MSC to BSC 0)
- CLEAR COMMAND (BSC 1 to MSC)
- CLEAR COMPLETE (MSC to BSC 1)
- RLSD released (BSC 1 to MSC)
- RLC release complete (MSC to BSC 1)
- DISCONNECT (BSC 0 to MSC)
- RELEASE (BSC 0 to MSC)
- RFI FAS/F CMPI FTF (MSC to BSC 0)

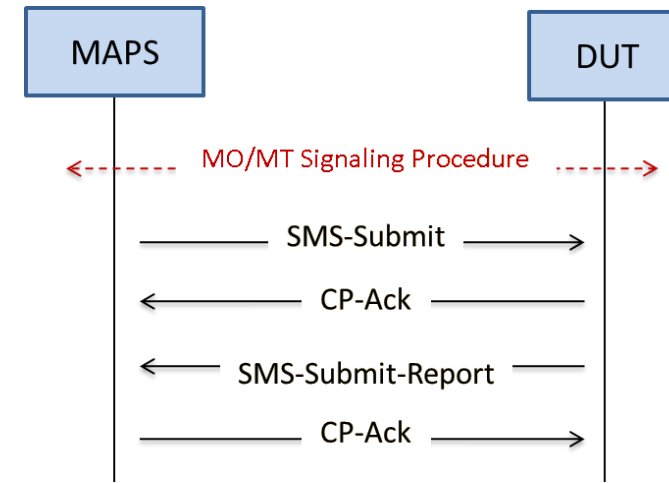
The right pane shows protocol details for the MTP3 User Adaptation Layer and SCCP Layer, including parameters like Message Class, Transfer Message Type, and various indicators.

SMS Call Procedure

- Short Message Service (SMS) is a mechanism of short messages delivery over the mobile networks
- It is a store and forward way of transmitting messages to and from mobile phones
- The messages from the sending mobile is stored in a central short message center (SMC) which then is forwarded to the destination mobile



SMS Network



SMS Call Procedure

SMS Call Generation and Reception

Mobile Originating SMS Call Generation

MAPS BSC (GsmAlp GSM900 M3UA) - [Call Generation - CallGenDefault]

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Result	Total Iterations	Completed Iterations
1	GSMA_Call.gls	MSProfile0001	MSI: 90170000000638.TMSI: 0	Start	SCCP Connection Released	None	Pass	1	1
2	GSMA_Call.gls	MSProfile0002		Start		None	Unknown	1	0
3	GSMA_Call.gls	MSProfile0003		Start		None	Unknown	1	0

Message Sequence Diagram (Message Sequence):

- 16:26:11.268000: CC connection confirm
- 16:26:11.273000: AUTHENTICATION REQUEST
- 16:26:11.276000: AUTHENTICATION RESPONSE
- 16:26:11.296000: CIPHER MODE COMMAND
- 16:26:11.298000: CIPHER MODE COMPLETE
- 16:26:11.304000: SMS-SUBMIT
- 16:26:11.326000: CP-ACK
- 16:26:11.329000: RP-ACK (SC->MS)
- 16:26:11.332000: CP-ACK
- 16:26:13.341000: CM SERVICE REQUEST

Find:

```

MTP3 User Adaptation Layer
0000 Version = 00000001 Release 1.0
0002 Message Class = 00000001 Transfer
0003 Transfer Message Type = 00000001 Payload Data
0004 Message Length = 204 (x000000CC)
Protocol Data =
0008 Tag = x0210 Transfer Protocol I
000A Length = 193 (x00C1)
000E Originating Point Code = 1.1.2 (...001000 00001010)
Destination Point Code = 2.2.1 (...010000 00010001)
0012 Point Code = 2.2.1 (...010000 00010001)
0014 Service Indicator = ....0011 SCCP
0015 Network Indicator = .....00 International n
0016 Message Priority = .....00 Priority Code 0
0017 Signalling Link Selection = 1 (x01)
Pdu = x060000030001AA0103A7190.
Parameter Padding = x000000
SCCP Layer
0018 Message Type = 00000110 DT1 data form 1
    
```

Mobile Terminating SMS Call Reception

MAPS MSC (GsmAlp GSM900 M3UA) - [Call Generation - CallGenDefault]

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Result	Total Iterations	Completed It
1	GSMA_MTCall.gls	MSProfile0001	MSI: 90170000000638.TMSI: 0x0	Start	Call Released	None	Pass	1	1
2	GSMA_MTCall.gls	MSProfile0002		Start		None	Unknown	1	0
3	GSMA_MTCall.gls	MSProfile0003		Start		None	Unknown	1	0
4	GSMA_MTCall.gls	MSProfile0004		Start		None	Unknown	1	0

Message Sequence Diagram (Message Sequence):

- 17:09:17.859000: PAGING
- 17:09:17.889000: PAGING RESPONSE
- 17:09:17.891000: CC connection confirm
- 17:09:17.894000: AUTHENTICATION REQUEST
- 17:09:17.917000: AUTHENTICATION RESPONSE
- 17:09:17.919000: CIPHER MODE COMMAND
- 17:09:17.945000: CIPHER MODE COMPLETE
- 17:09:17.958000: SMS-DELIVER
- 17:09:17.989000: CP-ACK
- 17:09:18.001000: RP-ACK (MS->SC)
- 17:09:18.003000: CP-ACK

Find:

```

MTP3 User Adaptation Layer
0000 Version = 00000001 Release 1.0
0002 Message Class = 00000001 Transfer
0003 Transfer Message Type = 00000001 Payload Data
0004 Message Length = 88 (x00000058)
Protocol Data =
0008 Tag = x0210 Transfer Protocol I
000A Length = 77 (x004D)
000E Originating Point Code = 2.2.1 (...010000 00010001)
Destination Point Code = 1.1.2 (...001000 00001010)
0012 Point Code = 1.1.2 (...001000 00001010)
0014 Service Indicator = ....0011 SCCP
0015 Network Indicator = .....00 International n
0016 Message Priority = .....00 Priority Code 0
0017 Signalling Link Selection = 1 (x01)
Parameter Padding = x000000
SCCP Layer
0018 Message Type = 00000110 DT1 data form 1
Mandatory Fixed Parameters =
Destination Local Reference Parameter =
Destination Local Reference = 2 (x0000002)
Segmenting Reassembling Parameter =
More Data Indicator = .....0 No more data
    
```


Supplementary Service Call Generation and Reception

MAPS BSC (GsmAlp GSM900 M3UA) - [Call Generation -Default]

Configurations Emulator Reports Editor Debug Tools Windows Help

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Result	Total Iterations	Completed Iterations
1	GSMA_Call.gls	MSPProfile0001	[MSI..901700000000638.TMSI..0x0111..	Start	SCCP Connection Released	None	Pass	1	1
2	GSMA_Call.gls	MSPProfile0002		Start		None	Underway	1	0
3	GSMA_Call.gls	MSPProfile0003		Start		None			
4	GSMA_Call.gls	MSPProfile0004		Start		None			

Add Delete Insert Refresh Start Start All Stop Stop All Abort Abort All

Save Column Width Show Latest

Find

11:55:05.035000 AUTHENTICATION RESPONSE

11:55:05.058000 CIPHER MODE COMMAND

11:55:05.059000 CIPHER MODE COMPLETE

11:55:05.123000 processUnstructuredSS-RequestArg

11:55:05.196000 unstructuredSS-RequestArg

11:55:05.236000 unstructuredSS-RequestRes

11:55:05.263000 unstructuredSS-RequestArg

11:55:05.264000 unstructuredSS-RequestRes

11:55:05.264000 processUnstructuredSS-RequestRes

11:55:05.343000 CLEAR COMMAND

11:55:05.349000 CLEAR COMPLETE

11:55:05.370000 RLSD released

11:55:05.371000 RLC release complete

0000 Version
0002 Message Class
0003 Transfer Message Type
0004 Message Length
0008 Tag
000A Length
000E Originating Point Code
0010 Point Code
0012 Destination Point Code
0014 Point Code
0016 Service Indicator
0018 Network Indicator
001A Message Priority
001C Signalling Link Selection
001E Parameter Padding
0020 SCCP Layer

0018 Message Type
0019 Mandatory Fixed Parameters
001A Destination Local Reference Parameter
001B Destination Local Reference Parameter
001C Segmenting Reassembling Parameter
001D More Data Indicator
001E Pointer to Mandatory Parameter
001F Mandatory Variable Length Parameter

Scripts Message Sequence Event Config Script Flow

Initialisation Errors Error Events Captured Errors

MAPS MSC (GsmAlp GSM900 M3UA) - [Call Reception]

Configurations Emulator Reports Editor Debug Tools Windows Help

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Results
1	M3UA.gls		1000	Stop	ASP Active	Send-ASPDown	Pass
2	SCMG.gls		1000	Stop	Subsystem-Allowed	Initiate SST	Pass
3	GSMA_Call.gls	MSPProfile0001	[MSI..901700000000638.TMSI..0x01110001	Completed	Call Released	None	Pass

Stop Stop All Abort Abort All Show Records Select Active Call Auto Trash Trash

Save Column Width Show Latest

Find

11:58:13.263000 AUTHENTICATION RESPONSE

11:58:13.265000 CIPHER MODE COMMAND

11:58:13.286000 CIPHER MODE COMPLETE

11:58:13.287000 processUnstructuredSS-RequestArg

11:58:13.291000 unstructuredSS-RequestArg

11:58:13.315000 unstructuredSS-RequestRes

11:58:13.318000 unstructuredSS-RequestArg

11:58:13.318000 unstructuredSS-RequestRes

11:58:13.336000 unstructuredSS-RequestRes

11:58:13.339000 processUnstructuredSS-RequestRes

11:58:13.339000 CLEAR COMMAND

11:58:13.341000 CLEAR COMPLETE

11:58:13.363000 RLSD released

11:58:13.365000 RLC release complete

0000 Version = 00000001 Release 1.0
0002 Message Class = 00000001 Transfer
0003 Transfer Message Type = 00000001 Payload Data
0004 Message Length = 172 (x000000AC)
0008 Tag =
000A Length = x0210 Transfer Protocol
000E Originating Point Code = 2.2.1(..010000 00010001)
0010 Point Code = 1.1.2(..001000 00001010)
0012 Destination Point Code = ..0011 SCCP
0014 Service Indicator =00 International n
0018 Network Indicator =00 Priority Code 0
001A Message Priority = 1 (x01)
001C Signalling Link Selection = x000000
001E Parameter Padding = x000000
0020 SCCP Layer = 00000110 DT1 data form 1
0018 Message Type =
0019 Mandatory Fixed Parameters =
001A Destination Local Reference Parameter = 4 (x00000004)
001B Destination Local Reference Parameter =
001C Segmenting Reassembling Parameter =0 No more data
001D More Data Indicator = Parm0 offset x01 (1)
001E Pointer to Mandatory Parameter =
001F Mandatory Variable Length Parameters = mandatory parameter
Data =

Scripts Message Sequence Event Config Script Flow

Initialisation Errors Error Events Captured Errors Link Status Up=1 Dc

Bulk UE Emulation with CSV based Profiles

MS_Profiles_IMSI.csv [Read-Only] - Excel

IMSI	TMSI	CallingNumber	CalledNumber	CMServiceLUT	TypeOfId	MEI	IMEISV	LAC	CI	KEY	SMSChara
binary	hex	binary	binary	int	int	binary	binary	int	int	hex	int
1013016041741	0x11110001	3016041741	3016051741	1	0	1	1.50078E+14	3.5E+15	10000	1 0x1123456789abcdef0123456789abcd00	0 G
1013016041742	0x11110002	3016041742	3016051742	1	0	1	1.50078E+14	3.5E+15	10000	1 0x1123456789abcdef0123456789abcd00	1 G
1013016041743	0x11110003	3016041743	3016051743	1	0	1	1.50078E+14	3.5E+15	10000	1 0x1123456789abcdef0123456789abcd00	2 G
1013016041744	0x11110004	3016041744	3016051744	1	0	1	1.50078E+14	3.5E+15	10000	1 0x1123456789abcdef0123456789abcd00	0 G
1013016041745	0x11110005	3016041745	3016051745	1	0	1	1.50078E+14	3.5E+15	10000	1 0x1123456789abcdef0123456789abcd00	1 G
1013016041746	0x11110006	3016041746	3016051746	1	0	1	1.50078E+14	3.5E+15	10000	1 0x1123456789abcdef0123456789abcd00	2 G
1013016041747	0x11110007	3016041747	3016051747	1	0	1	1.50078E+14	3.5E+15	10000	1 0x1123456789abcdef0123456789abcd00	0 G
1013016041748	0x11110008	3016041748	3016051748	1	0	1	1.50078E+14	3.5E+15	10000	1 0x1123456789abcdef0123456789abcd00	1 G
1013016041749	0x11110009	3016041749	3016051749	1	0	1	1.50078E+14	3.5E+15	10000	1 0x1123456789abcdef0123456789abcd00	2 G
1013016041750	0x11110010	3016041750	3016051750	1	0	1	1.50078E+14	3.5E+15	10000	1 0x1123456789abcdef0123456789abcd00	0 G
1013016041751	0x11110011	3016041751	3016051751	1	0	1	1.50078E+14	3.5E+15	10000	1 0x1123456789abcdef0123456789abcd00	1 G
1013016041752	0x11110012	3016041752	3016051752	1	0	1	1.50078E+14	3.5E+15	10000	2 0x1123456789abcdef0123456789abcd00	2 G
1013016041753	0x11110013	3016041753	3016051753	1	0	1	1.50078E+14	3.5E+15	10000	1 0x1123456789abcdef0123456789abcd00	0 G
1013016041754	0x11110014	3016041754	3016051754	1	0	1	1.50078E+14	3.5E+15	10000	1 0x1123456789abcdef0123456789abcd00	1 G
1013016041755	0x11110015	3016041755	3016051755	1	0	1	1.50078E+14	3.5E+15	10000	1 0x1123456789abcdef0123456789abcd00	2 G
1013016041756	0x11110016	3016041756	3016051756	1	0	1	1.50078E+14	3.5E+15	10000	1 0x1123456789abcdef0123456789abcd00	0 G
1013016041757	0x11110017	3016041757	3016051757	1	0	1	1.50078E+14	3.5E+15	10000	1 0x1123456789abcdef0123456789abcd00	1 G
1013016041758	0x11110018	3016041758	3016051758	1	0	1	1.50078E+14	3.5E+15	10000	1 0x1123456789abcdef0123456789abcd00	2 G
1013016041759	0x11110019	3016041759	3016051759	1	0	1	1.50078E+14	3.5E+15	10000	1 0x1123456789abcdef0123456789abcd00	0 G
1013016041760	0x11110020	3016041760	3016051760	1	0	1	1.50078E+14	3.5E+15	10000	1 0x1123456789abcdef0123456789abcd00	1 G
1013016041761	0x11110021	3016041761	3016051761	1	0	1	1.50078E+14	3.5E+15	10000	2 0x1123456789abcdef0123456789abcd00	2 G

MAPS (Message Automation Protocol Simulation) BSC (GsmAlp GSM900 M3UA) - [Call Generation - Default]

Configurations Emulator Reports Editor Debug Tools Windows Help

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Result
1	GSMA_Call.gls	MSProfile0001	IMSI:1013016041751,TMSI:0x11110011,CalledNumber:301...	Start	SCCP Connection Rel...	None	Pass
2	GSMA_Call.gls	MSProfile0002	IMSI:1013016041752,TMSI:0x11110012,CalledNumber:301...	Start	SCCP Connection Rel...	None	Pass
3	GSMA_Call.gls	MSProfile0003	IMSI:1013016041753,TMSI:0x11110013,CalledNumber:301...	Start	SCCP Connection Rel...	None	Pass
4	GSMA_Call.gls	MSProfile0004	IMSI:1013016041754,TMSI:0x11110014,CalledNumber:301...	Start	SCCP Connection Rel...	None	Pass
5	GSMA_Call.gls	MSProfile0005	IMSI:1013016041755,TMSI:0x11110015,CalledNumber:301...	Start	SCCP Connection Rel...	None	Pass
6	GSMA_Call.gls	MSProfile0006	IMSI:1013016041756,TMSI:0x11110016,CalledNumber:301...	Start	SCCP Connection Rel...	None	Pass
7	GSMA_Call.gls	MSProfile0007	IMSI:1013016041757,TMSI:0x11110017,CalledNumber:301...	Stop	Send_File-Started	Hold	Pass
8	GSMA_Call.gls	MSProfile0008	IMSI:1013016041758,TMSI:0x11110018,CalledNumber:301...	Stop	Send_File-Started	Hold	Pass
9	GSMA_Call.gls	MSProfile0009	IMSI:1013016041759,TMSI:0x11110019,CalledNumber:301...	Stop	Send_File-Started	Hold	Pass
10	GSMA_Call.gls	MSProfile0010	IMSI:1013016041760,TMSI:0x11110020,CalledNumber:301...	Stop	Send_File-Started	Hold	Pass

Add Delete Insert Refresh Start Start All Stop Stop All Abort Abort All

Save Column Width Show Latest Find

BSC MSC

```

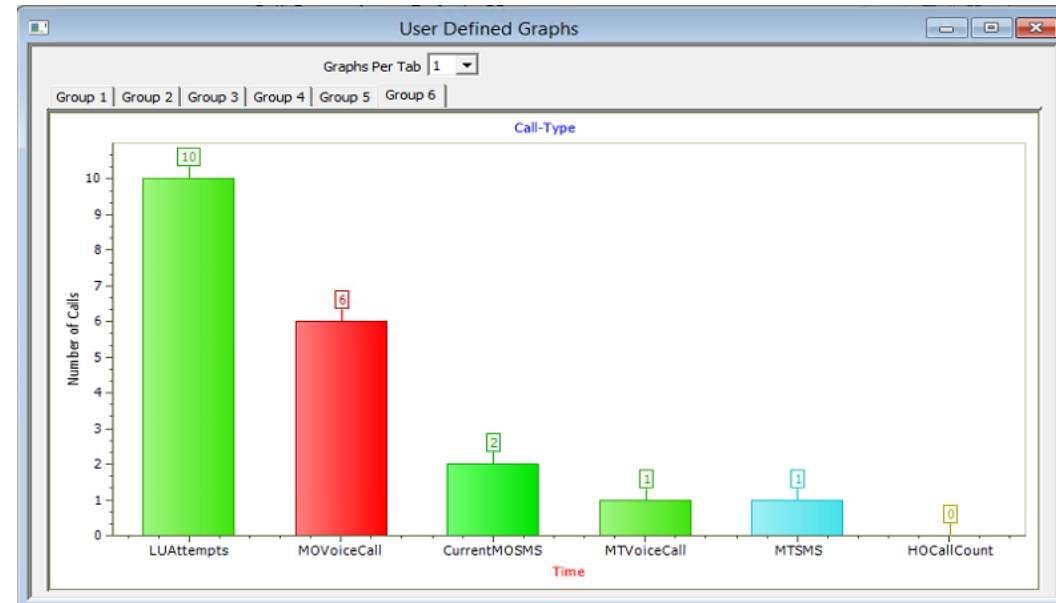
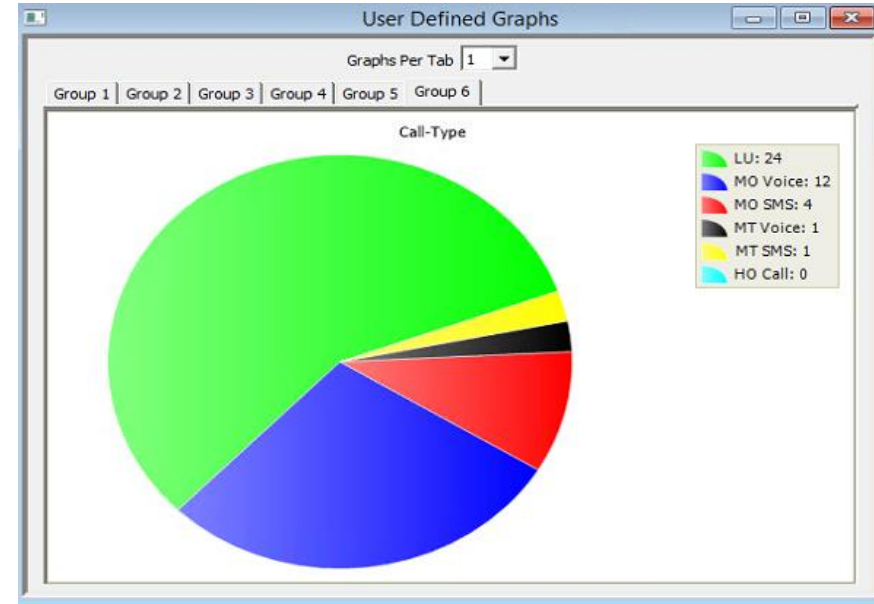
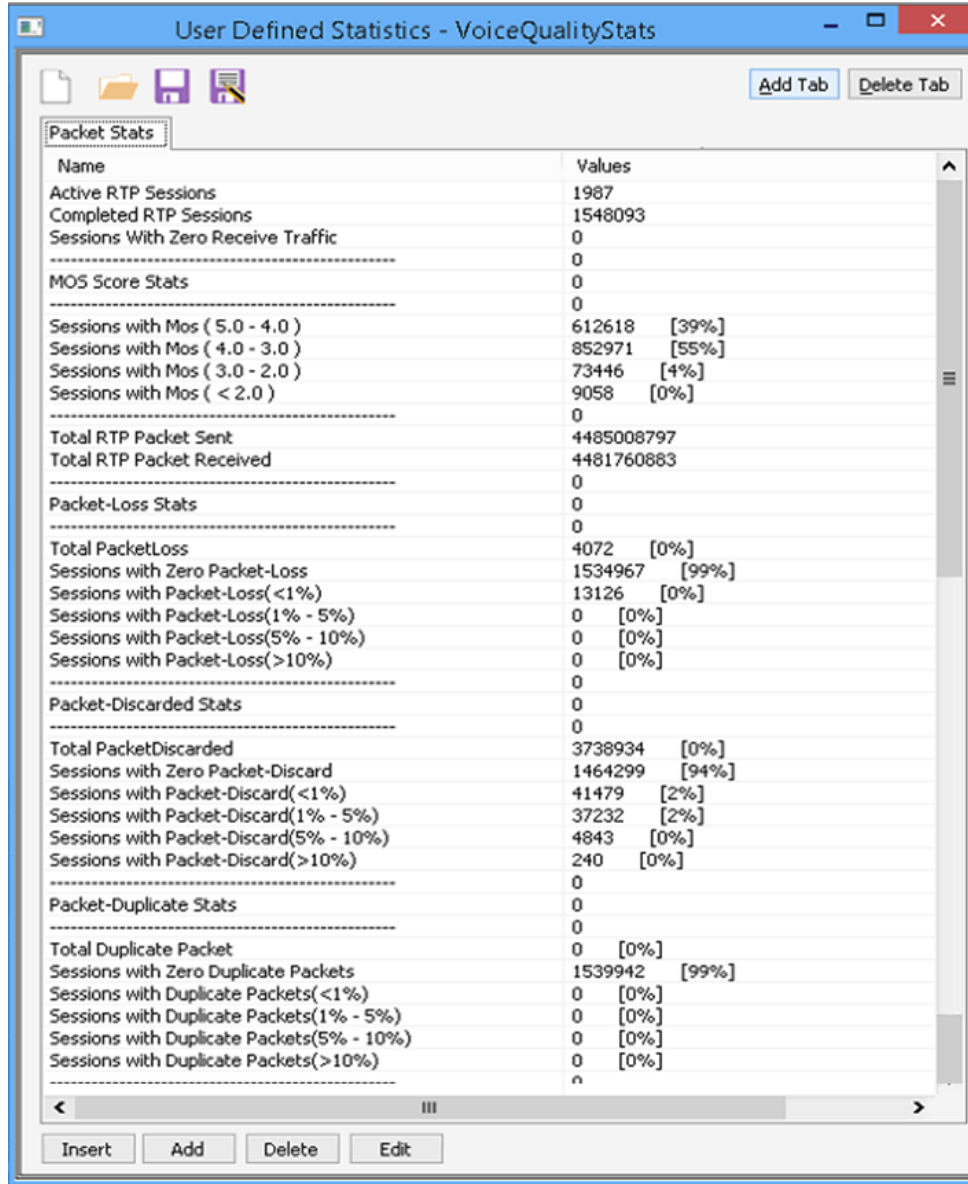
===== MTP3 User Adaptation Layer =====
0000 Version = 00000001 Release 1.0
0002 Message Class = 00000001 Transfer
0003 Transfer Message Type = 00000001 Payload Data
0004 Message Length = 76 (x0000004C)
    Protocol Data
0008 Tag = x0210 Transfer Protocol Da
000A Length = 67 (x0043)
    Originating Point Code =
    Point Code = 1.1.2(.001000 00001010)
    Destination Point Code =
    Point Code = 2.2.1(.010000 00010001)
0014 Service Indicator = ...0011 SCCP
0015 Network Indicator = .....00 International net
0016 Message Priority = .....00 Priority Code 0
0017 Signalling Link Selection = 1 (x01)

Parameter Padding = x00
===== SCCP Layer =====
0018 Message Type =
Mandatory Fixed Parameters =
Source Local Reference Parameter =
0019 Source Local Reference = 22 (x000016)
Protocol Class Parameter =
001C Class = ...0010 Class 2
    
```

Scripts Message Sequence Event Config Script Flow

Initialisation Errors Error Events Captured Errors Link Status U

User Defined Graphs and Statistics



Testbed Configuration

The screenshot shows the MAPS MSC configuration interface. The main window displays a tree view of configurations under 'MSC Configurations'. The 'MSC 1' folder is expanded, showing various parameters and their values. The 'Enable' checkbox is checked. At the bottom, there are 'Start' and 'Edit' buttons, and a status bar with 'Initialisation Errors' and 'Error Events' indicators.

Config	Value	Enable
MSC Configurations		<input checked="" type="checkbox"/>
M3UA Termination Type	IPSP	
Enable RTP Simulation	Enable	
RTP Hardware Interface Type	PC NIC	
MSC	1	
MSC 1		
MSC IP Address	192.168.13.3	
MGW IP Address	192.168.13.3	
PLMN Identifiers		
Mobile Country Code	901	
Mobile Network Code	70	
MTP Parameters		
MSC Point Code	2.2.1	
Signaling Link Selection	1	
Network Indicator	International	
MSC Address Indicator	National	
BSC Parameters		
Supported BSCs	1	
Supported BSCs 1		
BSC IP Address	192.168.13.9	
BSC Port	2905	
BSC Point Code	1.1.2	
BSC Address Indicator	National	
MSC Port	2905	
LAIs	1	
LAIs 1		
Location Area Code	10000	
Cell Identity	3	
M3UA Parameters		
Routing Context Indicator	Absent	
Routing Context	1	
Network Appearance Indicator	Absent	
Network Appearance	12	
HD RTP Media Configuration		
End User Configuration	MS_Profiles.xml	
CSV File Name for Key IMSI	MS_Profiles_IMSI.CSV	
CSV File Name for Key Calling Number	MS_Profiles_CallingNumber....	
Enable SMS Ratio for CSV	False	
Ratio of SMS Calls	30 %	

Profile Configuration

MAPS MSC (GsmAlp GSM900 M3UA) - [Profile Editor -MS_Profiles]

Configurations Emulator Reports Editor Debug Tools Windows Help

#	Profiles (Edit-F2)	Config	Value	Enable
1	MSPProfile001	MSPProfile001		<input checked="" type="checkbox"/>
2	MSPProfile002	Type Of Call	Terminate MO Call	
3	MSPProfile003	Service Type For MT Call	SMS Call	
4	MSPProfile004	SS Type	USSD Notify	
5	MSPProfile005	Mobile ID		
6	MSPProfile006	IMEI	350077523237001	
7	MSPProfile007	TMSI	01110001	
8	MSPProfile008	MSISDN	901700000000638	
9	MSPProfile009	Calling Number Parameters		
10	MSPProfile010	Numbering plan identification	ISDN/Telphony numbering plan(REC E.1...	
11	MSPProfile011	Type of number	Unknown	
12	MSPProfile012	Calling Number or MSISDN	9017000638	
13	MSPProfile013	Called Number Parameters		
14	MSPProfile014	Numbering Plan Identification	ISDN/Telphony numbering plan(REC E.1...	
15	MSPProfile015	Type of Number	Unknown	
16	MSPProfile016	Called Number	9017000688	
17	MSPProfile017	Location Area Identifiers for Paging		
18	MSPProfile018	LAC	10000	
19	MSPProfile019	Cell Identity	3	
20	MSPProfile020	Authentication Parameters		
21	MSPProfile021	Key	0123456789abcdef0123456789abcd00	
22	MSPProfile022	Operator Variant Parameter Type	OP	
23	MSPProfile023	OP	01020304050607080910111213141516	
24	MSPProfile024	OPc	01020304050607080910111213141516	
25	MSPProfile025	Authentication Algorithm Type	GSM-Triplet	
26	MSPProfile026	AMF	8000	
27	MSPProfile027	SQN	000000000079	
28	MSPProfile028	USSD Parameters		
29	MSPProfile029	USSD Notify String	Last Call charge is Rs 2.45. Your Current b...	
30	MSPProfile030	SMS Call Parameters		
31	MSPProfile031	SMS Character Set	Default	
32	MSPProfile032	SMS Data for Default and 8 Bit Data	GSMA MT Test SMS 001	
33	MSPProfile033	SMS Data for UCS2	00540065007300740073006D00730030003...	
34	MSPProfile034	Originating SME	995643722311	
		SMSC Address Parameters		
		Originating SC	885643722311	
		Numbering Plan	ISDN/Telphony numbering plan(REC E.1...	
		Type of Number	International number	
		LCLS Parameters		
		Codec Negotiation		
		Codec Options and Traffic Configuration		
		Custom Simulation		

Properties

Initialisation Errors
 Error Events
 Captured Errors

Incoming Call Handler Configuration

The screenshot displays the 'Incoming Call Handlers Configuration' window in the MAPS MSC software. The window title is 'MAPS MSC (GsmAlp GSM900 M3UA) - [Incoming Call Handlers Configuration - default]'. The interface includes a menu bar (Configurations, Emulator, Reports, Editor, Debug Tools, Windows, Help) and a toolbar with various icons. The main area is divided into three sections:

- Message Name / Script Name Table:** A table listing various messages and their associated scripts.
- Scripts List:** A list of scripts currently assigned to the selected message, with 'GSMA_Call.gls' listed.
- Control Elements:** Radio buttons for 'Sequence' (selected) and 'Random', and buttons for 'Up', 'Down', 'Add', and 'Delete'.

At the bottom of the window, there are buttons for 'Add', 'Delete', 'Apply Scripts', and 'Clear Scripts'. The status bar at the bottom right shows 'Initialisation Errors' and 'Error'.

Message Name	Script Name
LOCATION UPDATING REQUEST	GSMA_Call.gls
CM SERVICE REQUEST	GSMA_Call.gls
PAGING RESPONSE	GSMA_Call.gls
ASP Up	M3UA.gls
ASP Down	M3UA.gls
ASP Active	M3UA.gls
ASP Inactive	M3UA.gls
SSA subsystem-allowed	SCMG.gls
SSP subsystem-prohibited	SCMG.gls
SOR subsystem-out-of-service-request	SCMG.gls
SST subsystem-status-test	SCMG.gls
HANDOVER REQUEST	GSMA_Call.gls
RESET	Rx_Reset.gls
IMSI DETACH INDICATION	GSMA_Call.gls
MM NULL	GSMA_Call.gls
RESET IP RESOURCE	Rx_IP_Resource.gls
MS REGISTRATION ENQUIRY	Rx_MS_Registration.gls

Scripts
GSMA_Call.gls

GSM A Call Generation

Active Calls Call Status Call Events

Loading Scripts and Profiles

The screenshot displays the MAPS BSC software interface. At the top, a table lists call generation results with columns for Sr No, Script Name, Profile, Call Info, Script Execution, Status, Events, Events Profile, Result, Total Iterations, and Completed Iterations. Below this, a Message Sequence diagram shows a sequence of messages between BSC and MSC, including CM SERVICE REQUEST, CC connection confirm, AUTHENTICATION REQUEST, AUTHENTICATION RESPONSE, CIPHER MODE COMMAND, CIPHER MODE COMPLETE, SETUP, CALL PROCEEDING, ASSIGNMENT REQUEST, ASSIGNMENT COMPLETE, ALERTING, and CONNECT. To the right, a Decode Message window shows the decoded parameters for the MTP3 User Adaptation Layer and SCCP Layer.

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Events Profile	Result	Total Iterations	Completed Iterations
1	GSMA_Call.gls	MSPProfile0001	IMSI: 901700000000638.TMSI:...	Stop	GSM Send_File-Started	Hold		Pass	1	0
2	GSMA_Call.gls	MSPProfile0002	IMSI: 901700000000639.TMSI:...	Stop	GSM Send_File-Started	Hold		Pass	1	0
3	GSMA_Call.gls	MSPProfile0003	IMSI: 901700000000640.TMSI:...	Stop	GSM Send_File-Started	Hold		Pass	1	0
4	GSMA_Call.gls	MSPProfile0004	IMSI: 901700000000641.TMSI:...	Stop	GSM Send_File-Started	Hold		Pass	1	0
5	GSMA_Call.gls	MSPProfile0005	IMSI: 901700000000642.TMSI:...	Stop	GSM Send_File-Started	Hold		Pass	1	0

Message Sequence

Decode Message

GSM A Call Reception

The screenshot displays the MAPS MSC (GsmAlp GSM900 M3UA) - [Call Reception] interface. The top section is a table with columns: Sr No, Script Name, Profile, Call Info, Script Execution, Status, Events, and Results. A red box highlights the Events and Results columns for rows 3 through 10. Below the table is a control bar with buttons like Stop, Stop All, Abort, Abort All, Show Records, Select Active Call, Auto Trash, Trash, and Terminate. The bottom section is split into two panes: 'Message Sequence' on the left and 'Decode Message' on the right. The Message Sequence pane shows a sequence of messages between BSC 0 and MSC, including CM SERVICE REQUEST, CC connection confirm, AUTHENTICATION REQUEST, AUTHENTICATION RESPONSE, CIPHER MODE COMMAND, CIPHER MODE COMPLETE, SETUP, CALL PROCEEDING, ASSIGNMENT REQUEST, ASSIGNMENT COMPLETE, ALERTING, and CONNECT. The Decode Message pane shows the decoded content of the selected message, including MTP3 User Adaptation Layer and SSCP Layer details.

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Results
1	M3UA_gls		1000	Stop	ASP Active	Send-ASPDown	Pass
2	SCMG_gls		1000	Stop	Subsystem-Allowed	Initiate SST	Pass
3	GSMA_Call_gls	MSPProfile0001	IMSI;.901700000000638,CalledNumber;.9017000688	Completed	Call Released	None	Pass
4	GSMA_Call_gls	MSPProfile0002	IMSI;.901700000000639	Completed	Call Released	None	Pass
5	GSMA_Call_gls	MSPProfile0002	IMSI;.901700000000639,CalledNumber;.9017000689	Completed	Call Released	None	Pass
6	GSMA_Call_gls	MSPProfile0003	IMSI;.901700000000640	Completed	Call Released	None	Pass
7	GSMA_Call_gls	MSPProfile0003	IMSI;.901700000000640,CalledNumber;.9017000690	Completed	Call Released	None	Pass
8	GSMA_Call_gls	MSPProfile0004	IMSI;.901700000000641	Completed	Call Released	None	Pass
9	GSMA_Call_gls	MSPProfile0004	IMSI;.901700000000641,CalledNumber;.9017000691	Completed	Call Released	None	Pass
10	GSMA_Call_gls	MSPProfile0005	IMSI;.901700000000642	Completed	Call Released	None	Pass

Message Sequence

Decode Message

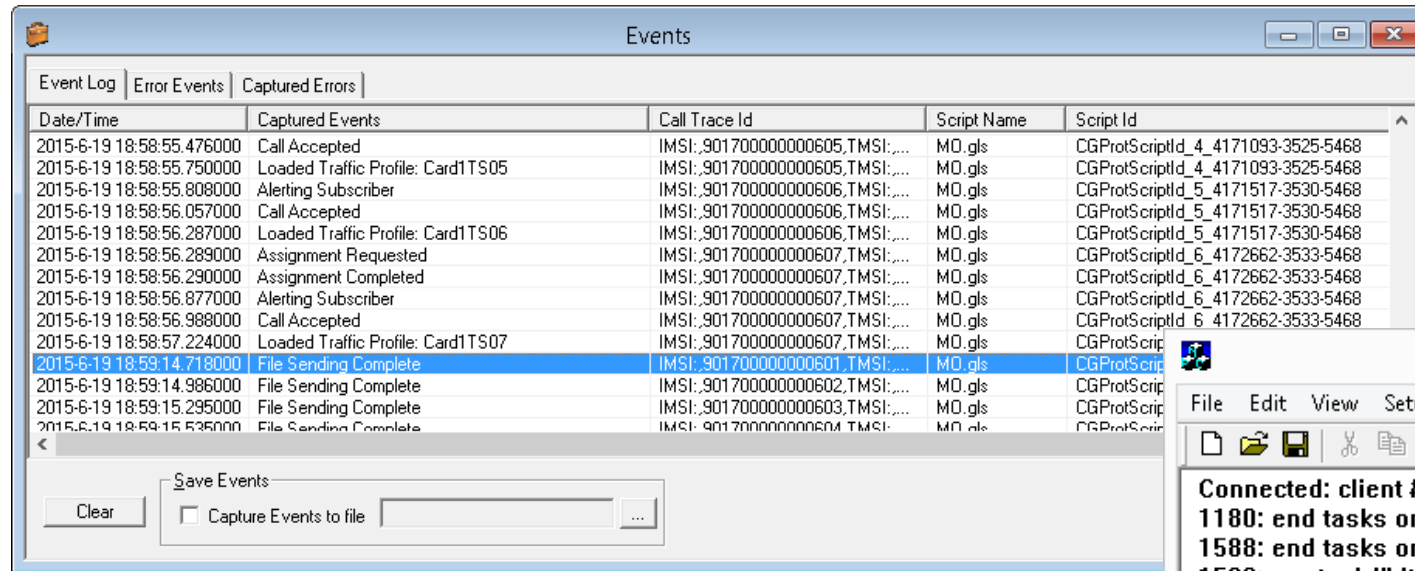
Call Results

Message Sequence

Decode Message

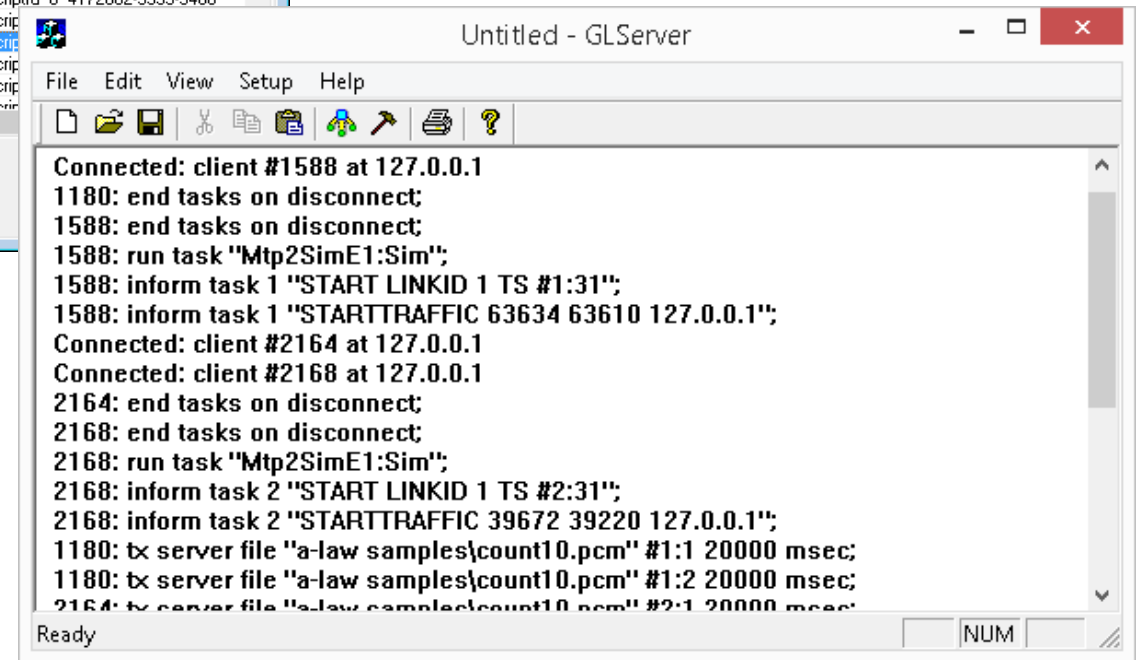
GSM A Call and Server Log

Event Log



Date/Time	Captured Events	Call Trace Id	Script Name	Script Id
2015-6-19 18:58:55.476000	Call Accepted	IMSI:,901700000000605,TMSI:...	MO_gls	CGProtScriptId_4_4171093-3525-5468
2015-6-19 18:58:55.750000	Loaded Traffic Profile: Card1TS05	IMSI:,901700000000605,TMSI:...	MO_gls	CGProtScriptId_4_4171093-3525-5468
2015-6-19 18:58:55.808000	Alerting Subscriber	IMSI:,901700000000606,TMSI:...	MO_gls	CGProtScriptId_5_4171517-3530-5468
2015-6-19 18:58:56.057000	Call Accepted	IMSI:,901700000000606,TMSI:...	MO_gls	CGProtScriptId_5_4171517-3530-5468
2015-6-19 18:58:56.287000	Loaded Traffic Profile: Card1TS06	IMSI:,901700000000606,TMSI:...	MO_gls	CGProtScriptId_5_4171517-3530-5468
2015-6-19 18:58:56.289000	Assignment Requested	IMSI:,901700000000607,TMSI:...	MO_gls	CGProtScriptId_6_4172662-3533-5468
2015-6-19 18:58:56.290000	Assignment Completed	IMSI:,901700000000607,TMSI:...	MO_gls	CGProtScriptId_6_4172662-3533-5468
2015-6-19 18:58:56.877000	Alerting Subscriber	IMSI:,901700000000607,TMSI:...	MO_gls	CGProtScriptId_6_4172662-3533-5468
2015-6-19 18:58:56.988000	Call Accepted	IMSI:,901700000000607,TMSI:...	MO_gls	CGProtScriptId_6_4172662-3533-5468
2015-6-19 18:58:57.224000	Loaded Traffic Profile: Card1TS07	IMSI:,901700000000607,TMSI:...	MO_gls	CGProtScriptId_6_4172662-3533-5468
2015-6-19 18:59:14.718000	File Sending Complete	IMSI:,901700000000601,TMSI:...	MO_gls	CGProtScriptId_6_4172662-3533-5468
2015-6-19 18:59:14.986000	File Sending Complete	IMSI:,901700000000602,TMSI:...	MO_gls	CGProtScriptId_6_4172662-3533-5468
2015-6-19 18:59:15.295000	File Sending Complete	IMSI:,901700000000603,TMSI:...	MO_gls	CGProtScriptId_6_4172662-3533-5468
2015-6-19 18:59:15.535000	File Sending Complete	IMSI:,901700000000604,TMSI:...	MO_gls	CGProtScriptId_6_4172662-3533-5468

WCS Server Log

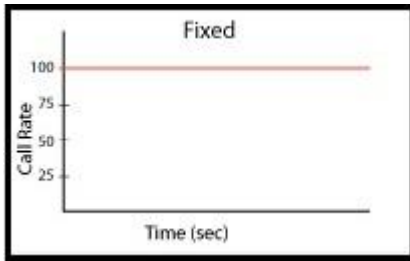


```
Connected: client #1588 at 127.0.0.1
1180: end tasks on disconnect;
1588: end tasks on disconnect;
1588: run task "Mtp2SimE1:Sim";
1588: inform task 1 "START LINKID 1 TS #1:31";
1588: inform task 1 "STARTTRAFFIC 63634 63610 127.0.0.1";
Connected: client #2164 at 127.0.0.1
Connected: client #2168 at 127.0.0.1
2164: end tasks on disconnect;
2168: end tasks on disconnect;
2168: run task "Mtp2SimE1:Sim";
2168: inform task 2 "START LINKID 1 TS #2:31";
2168: inform task 2 "STARTTRAFFIC 39672 39220 127.0.0.1";
1180: tx server file "a-law samples\count10.pcm" #1:1 20000 msec;
1180: tx server file "a-law samples\count10.pcm" #1:2 20000 msec;
2164: tx server file "a-law samples\count10.pcm" #2:1 20000 msec;
```

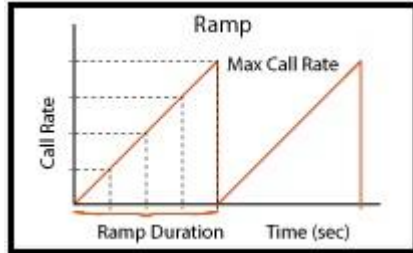
Load Generation

- Stability/Stress and Performance testing using Load Generation
- Different types of Load patterns to distribute load
- User can load multiple patterns for selected script
- User configurable Test Duration, CPS, Maximum and Minimum Call Rate etc.

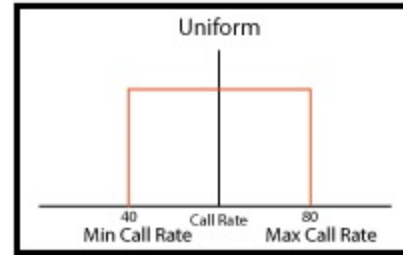
Fixed



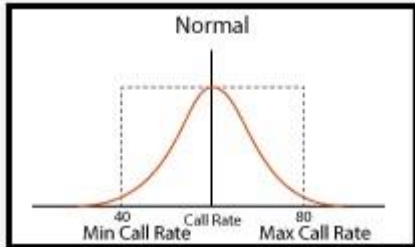
Ramp



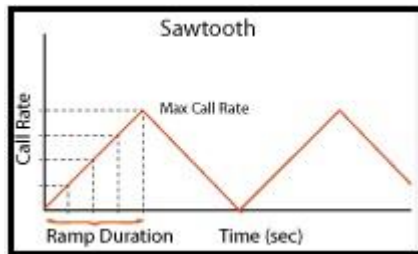
Uniform



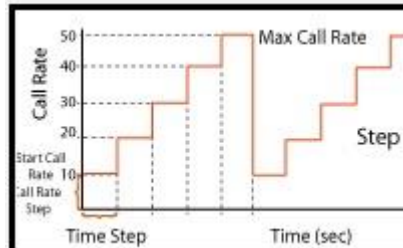
Normal



Saw-tooth



Step



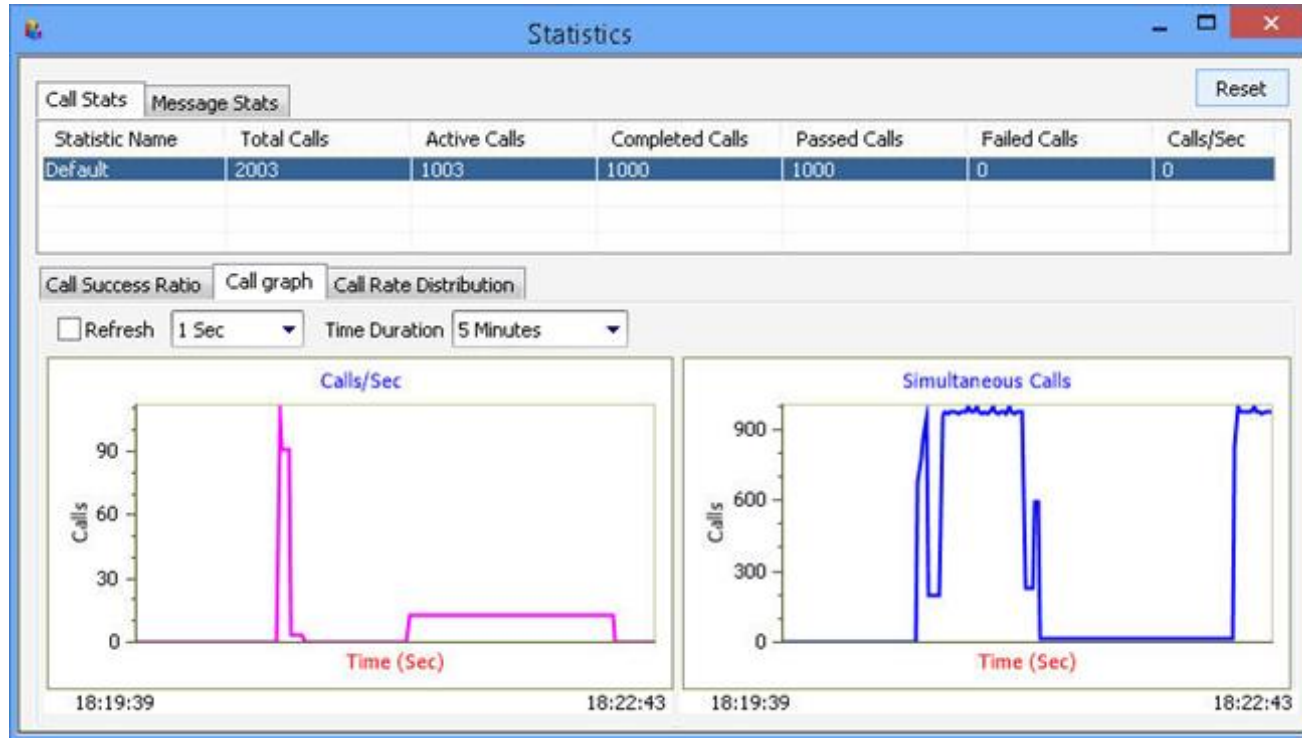
The screenshot shows the 'Load Generation - LoadGendefault' window. It includes fields for 'Total Calls To Generate' (set to '*'), 'Max Active Calls' (set to 2000), and a checkbox for 'Unique Distributions Per Script'. There is a table for 'Multi Distributions' with columns for 'Distributions' and 'Description'. Below this is a 'Scripts' section with a list of scripts, including 'GSMA_Call', and a 'Profile' section with a list of profiles from 'MSProfile0001' to 'MSProfile0013'. At the bottom, there are 'Add' and 'Delete' buttons for both scripts and profiles, and a 'Stop Time' section with 'Start Time' and 'End Time' fields set to '00:00:00.000'.

GSM A Bulk Call Generation

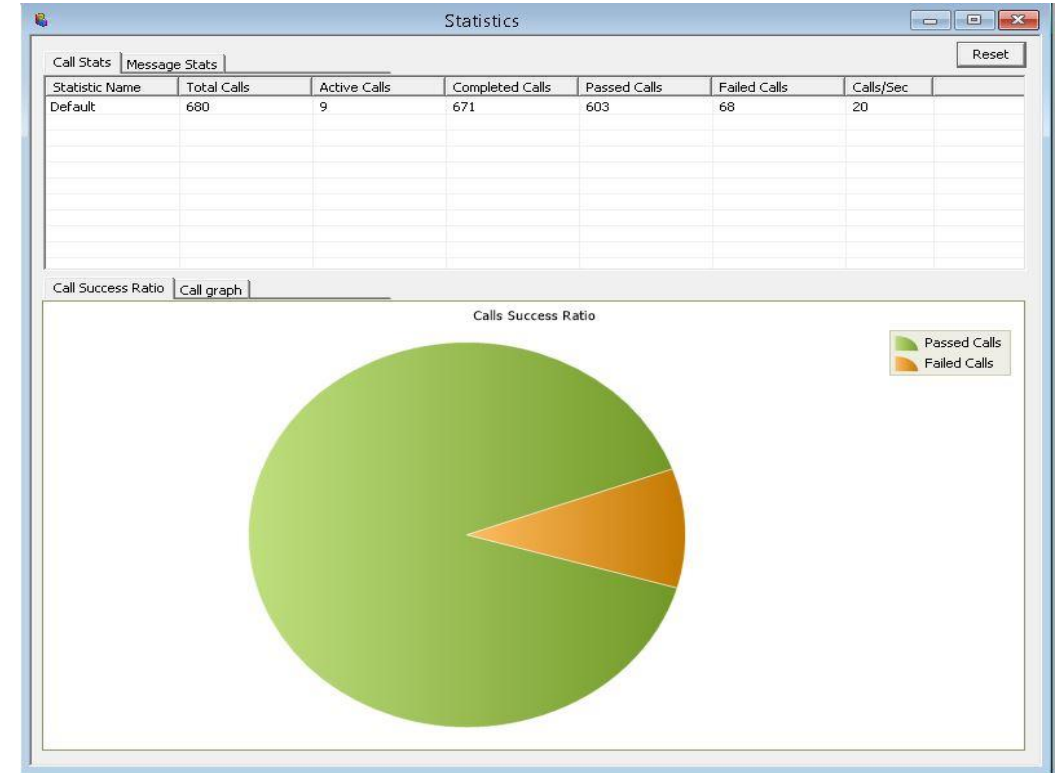
At the bottom of the window, there are tabs for 'Scripts', 'Message Sequence', 'Event Config', and 'Script Flow'. The status bar at the very bottom shows indicators for 'Initialisation Errors', 'Error Events', 'Captured Errors', and 'Link Status'.

GSM A Call Ratio Statistics

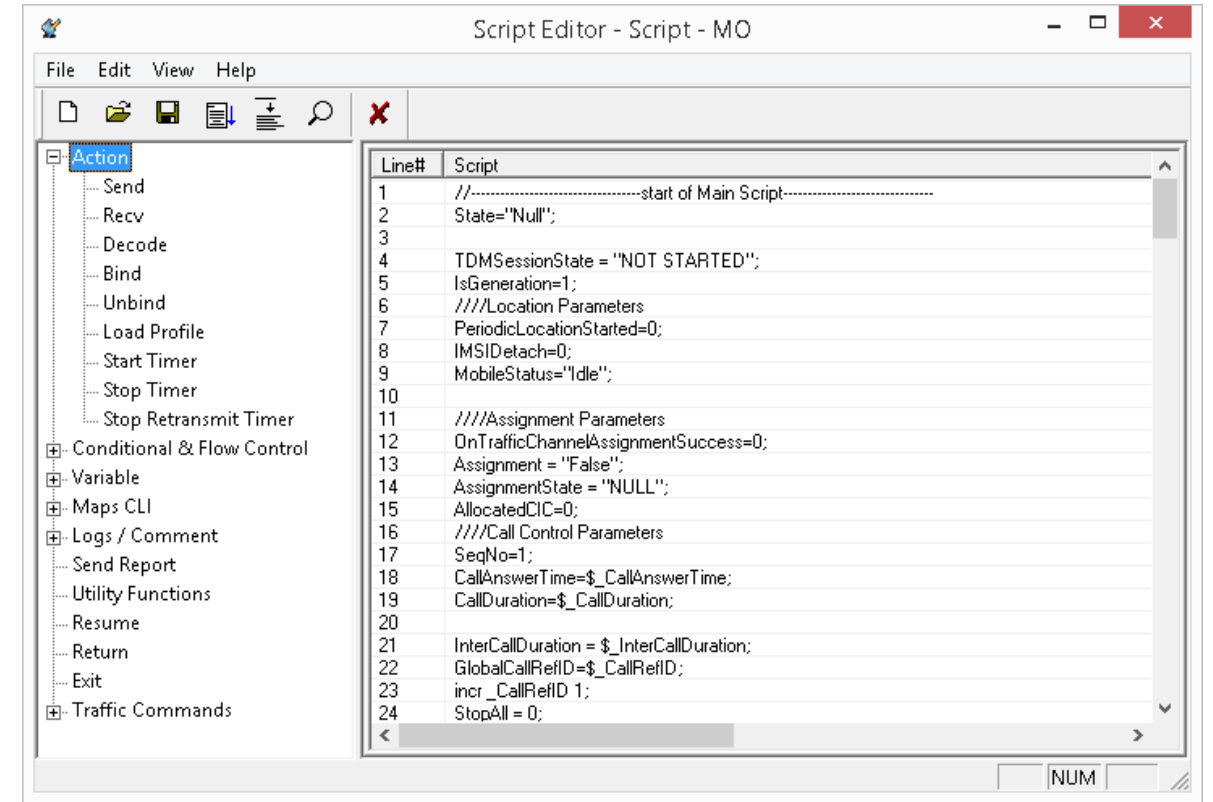
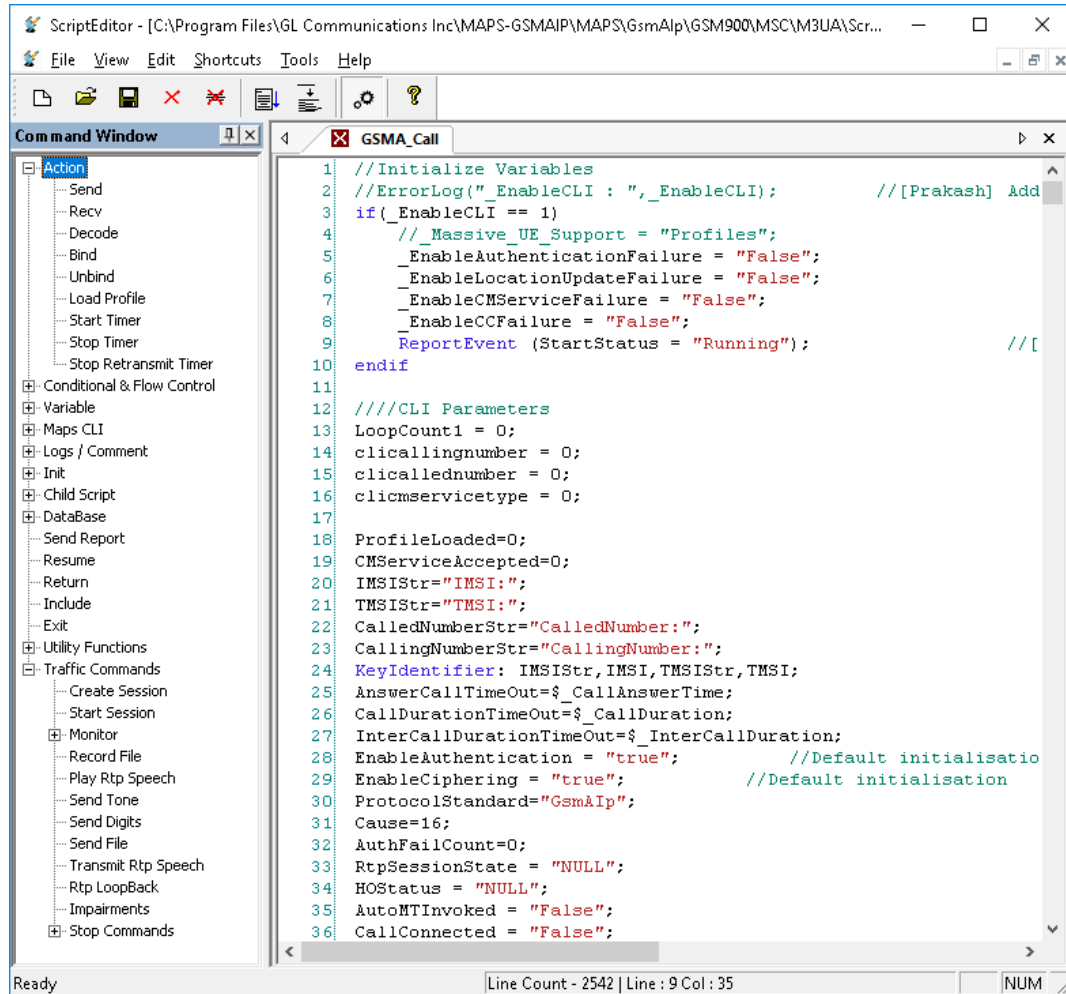
Call Graph



Call Stats



Script Editor



Message Editor

Message Editor - CMServiceRequest

File View Direction Tools Help

MM

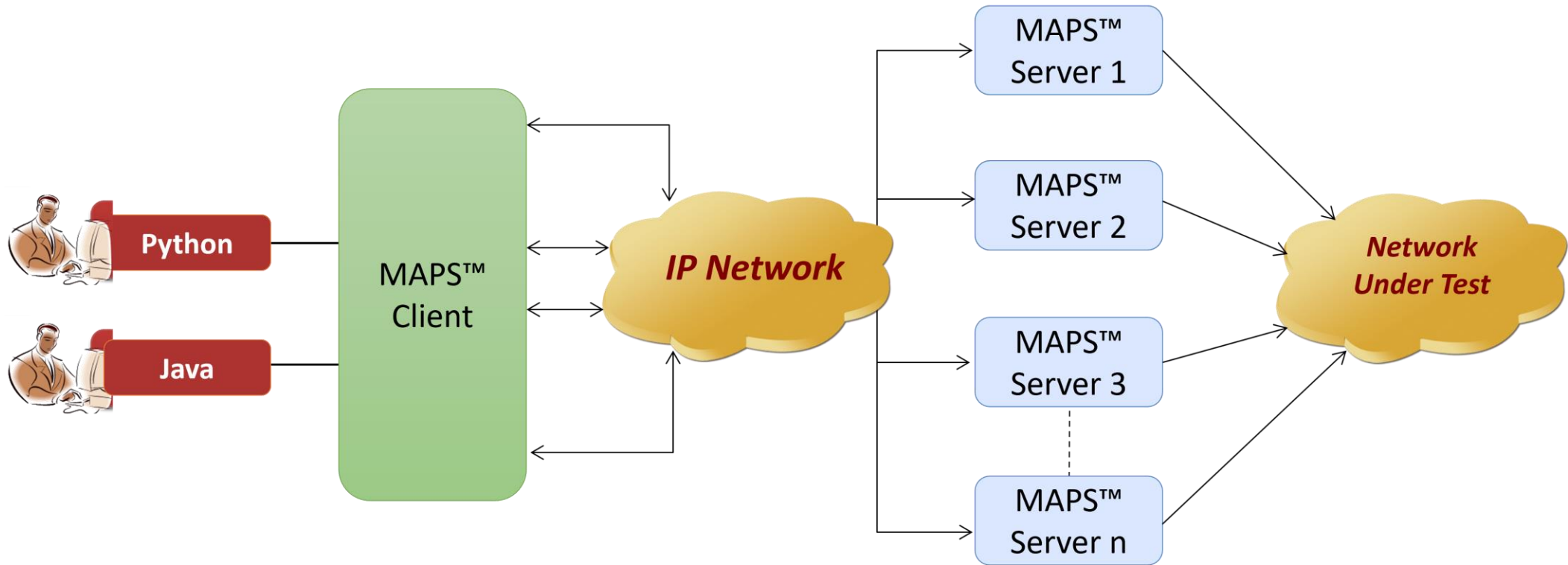
- Message Type
- Sequence Number
- InformationElements
 - CM service type / Ciphering key
 - key sequence(ms->nw)
 - CM Service Type
 - Mobile StationClassMark2
 - Length Of Mobile Station Classmark2
 - RF powercapability
 - A5/1
 - ES IND

CM SERVICE REQUEST = 36
AUTHENTICATION FAILURE = 28
IDENTITY REQUEST = 24
IDENTITY RESPONSE = 25
TMSI REALLOCATION COMMAND = 26
TMSI REALLOCATION COMPLETE = 27
CM SERVICE ACCEPT = 33
CM SERVICE REJECT = 34
CM SERVICE ABORT = 35
CM SERVICE REQUEST = 36
CM SERVICE PROMPT = 37

```
===== MTP3 User Adaptation Layer ===== =  
0000 Version = 00000001 Release 1.0  
0002 Message Class = 00000001 Transfer  
0003 Transfer Message Type = 00000001 Payload Data  
0004 Message Length = 76 (x0000004C)  
Protocol Data =  
0008 Tag = x0210 Transfer Protocol Data  
000A Length = 65 (x0041)  
Originating Point Code =  
000E Point Code = 1.1.2(..001000 00001010)  
Destination Point Code =  
0012 Point Code = 2.2.1(..010000 00010001)  
0014 Service Indicator = ....0011 SCCP  
0015 Network Indicator = .....10 National Network  
0016 Message Priority = .....00 Priority Code 0  
0017 Signalling Link Selection = 0 (x00)  
  
Pdu = x0109FBF1220206044  
Parameter Padding = x000000  
===== SCCP Layer =====  
0018 Message Type = 00000001 CR connection request  
Mandatory Fixed Parameters =  
Source Local Reference Parameter =  
0019 Source Local Reference = 654321 (x09FBF1)  
Protocol Class Parameter =  
001A Source Local Reference = 00000000  
001B Source Local Reference = 00000000
```

Ready NUM

MAPS™ API Architecture



- API wraps our proprietary scripting language in standard languages familiar to the user:
 - Python
 - Java
- Clients and Servers support a “Many-to-Many” relationship, making it very easy for users to develop complex test cases involving multiple signaling protocols

CLI/API Support

```
CLI MapsCLI BSC (GsmAlp GSM900 M3UA)
File Edit View
View Latest Command
2 :: 2020-3-17 10:27:24.549000 : StartScript 1 "GSMMA_Call.gls" "MSProfile0001" 1 # "CMServiceType"=1,"CalledNumber"="(binarystring)9017000688,"SMDData"="Welcome to CLI","TrafficType"="UserDefinedTraffic","EnableCLI"=1;
2 :: 2020-3-17 10:27:34.616000 : UserEvent 1 "IsTransportUp";
2 :: 2020-3-17 10:27:35.706000 : UserEvent 1 "InitiateNewCall";
2 :: 2020-3-17 10:27:36.799000 : UserEvent 1 "GetCallStatus";
2 :: 2020-3-17 10:27:37.896000 : UserEvent 1 "GetCallStatus";
2 :: 2020-3-17 10:27:38.004000 : UserEvent 1 "SendFile" # "TxFileName"="voicefiles\Send\G711\ULAW\Wijay.glw", "TxFileDuration"=10;
2 :: 2020-3-17 10:28:18.141000 : UserEvent 1 "GetCallStatus";
2 :: 2020-3-17 10:28:18.252000 : UserEvent 1 "Terminate";
2 :: 2020-3-17 10:28:21.317000 : UserEvent 1 "GetMessageCount";
2 :: 2020-3-17 10:28:21.422000 : UserEvent 1 "GetMessageInfo" # "Index"=0;
2 :: 2020-3-17 10:28:21.533000 : UserEvent 1 "GetMessageInfo" # "Index"=1;
2 :: 2020-3-17 10:28:21.641000 : UserEvent 1 "GetMessageInfo" # "Index"=2;
2 :: 2020-3-17 10:28:21.752000 : UserEvent 1 "GetMessageInfo" # "Index"=3;
2 :: 2020-3-17 10:28:21.860000 : UserEvent 1 "GetMessageInfo" # "Index"=4;
2 :: 2020-3-17 10:28:21.969000 : UserEvent 1 "GetMessageInfo" # "Index"=5;
2 :: 2020-3-17 10:28:22.078000 : UserEvent 1 "GetMessageInfo" # "Index"=6;
2 :: 2020-3-17 10:28:22.187000 : UserEvent 1 "GetMessageInfo" # "Index"=7;
2 :: 2020-3-17 10:28:22.299000 : UserEvent 1 "GetMessageInfo" # "Index"=8;
2 :: 2020-3-17 10:28:22.408000 : UserEvent 1 "GetMessageInfo" # "Index"=9;
2 :: 2020-3-17 10:28:22.521000 : UserEvent 1 "GetMessageInfo" # "Index"=10;
2 :: 2020-3-17 10:28:22.626000 : UserEvent 1 "GetMessageInfo" # "Index"=11;
2 :: 2020-3-17 10:28:22.734000 : UserEvent 1 "GetMessageInfo" # "Index"=12;
2 :: 2020-3-17 10:28:22.847000 : UserEvent 1 "GetMessageInfo" # "Index"=13;
2 :: 2020-3-17 10:28:22.954000 : UserEvent 1 "GetMessageInfo" # "Index"=14;
2 :: 2020-3-17 10:28:23.063000 : UserEvent 1 "GetMessageInfo" # "Index"=15;
2 :: 2020-3-17 10:28:23.176000 : UserEvent 1 "GetMessageInfo" # "Index"=16;
2 :: 2020-3-17 10:28:23.284000 : UserEvent 1 "GetMessageInfo" # "Index"=17;
2 :: 2020-3-17 10:28:23.391000 : UserEvent 1 "GetMessageInfo" # "Index"=18;
2 :: 2020-3-17 10:28:23.504000 : UserEvent 1 "GetMessageInfo" # "Index"=19;
2 :: 2020-3-17 10:28:24.594000 : StopScript 1;
ServerLogerrCode = 0, errString = connection has been gracefully closed for ClientId =2
```

```
Python 3.7.5 Shell
File Edit Shell Debug Options Window Help
Python 3.7.5 (tags/v3.7.5:5c02a39a0b, Oct 15 2019, 00:11:34) [MSC v.1916 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:\Program Files\GL Communications Inc\MAPS-GSMAIP\MAPSCLI\PythonClient\examples\MSC\GSMMA_BindCall.py
GSMAIP Server Connection... True
GSMAIP Testbed Starting... True
GSMAIP Loading Profile... True
Starting Script... True
Wait event - StartScript... True
GSMAIP Incoming Transaction Binding... True
GSMAIP Transaction bound to Binding User Id : (binarystring) 901700000000638
Waiting for Call Request ... Location Update Procedure
Total Signalling Messages: 14
GSMAIP Call's LastMSGRCV.....
Time Stamp      Route      Message
12:58:14.294    <-        CM SERVICE REQUEST

***** GSMA-IP Call Message Flow *****
CLI (MSC)      <-->      DUT (BSC)

Time Stamp      Route      Message
12:58:14.209    <-        LOCATION UPDATING REQUEST
12:58:14.211    ->        CC connection confirm
12:58:14.211    ->        COMMONID
12:58:14.212    ->        AUTHENTICATION REQUEST
12:58:14.227    <-        AUTHENTICATION RESPONSE
12:58:14.228    ->        CIPHER MODE COMMAND
12:58:14.245    <-        CIPHER MODE COMPLETE
12:58:14.247    ->        CLEAR COMMAND
12:58:14.266    <-        CLEAR COMPLETE
12:58:14.269    ->        RLSD released
12:58:14.286    <-        RLC release complete
12:58:14.294    <-        CM SERVICE REQUEST
12:58:14.301    ->        CC connection confirm
12:58:14.303    ->        COMMONID
GSMAIP Script Stopping... True
GSMAIP Server Disconnecting... True
>>>
```

Ln: 38 Col: 4

High Density (HD) RTP Traffic Emulation

- MAPS™ GSMA High Density supports generation of high volume of calls with traffic for load testing network using MAPS™ RTP HD network appliance, specialized 1U rack mounted designed to easily achieve up to 20,000 endpoints per appliance (5000 simultaneous calls with duplex traffic per port)
- Rackmount network appliance with 4x1GigE NIC
- Transport over UDP and TCP, IPv4 and IPv6, and TLS for secure transport
- Up to 350 calls per second (with RTP traffic)
- Scales to around 100,000 to 200,000 endpoints with use of Master Controller for single point of control
- Manage 10+ MAPS™ systems with single point of control from Master Controller



Thank You