MAPS™ GSM Abis Interface Emulator

Scripted GSM Abis Interface Emulation Over IP and TDM

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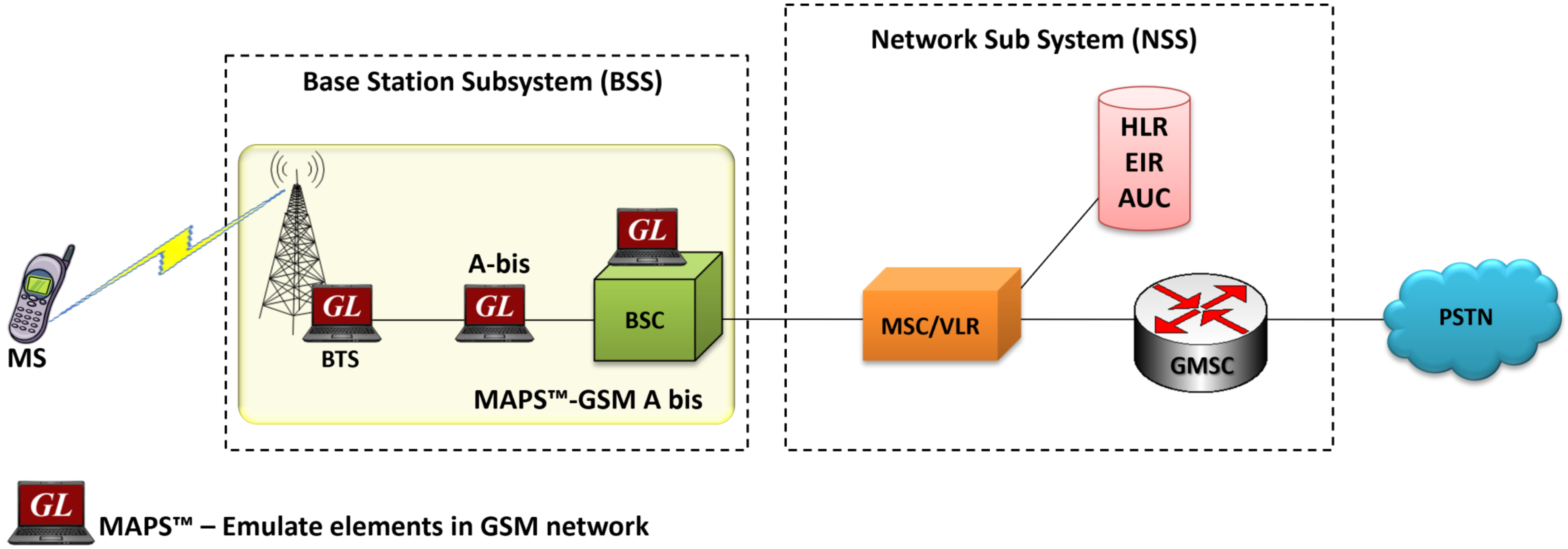
MAPS™ GSM-Abis



Network Sub System (NSS)
Base Station Subsystem (BSS)
HLR
EIR
AUC
GL
A-bis
GL
GL
BSC
MSC/VLR
GMSC
PSTN
MS
BTS
MAPS™-GSM A bis
GL
MAPS™ – Emulate elements in GSM network

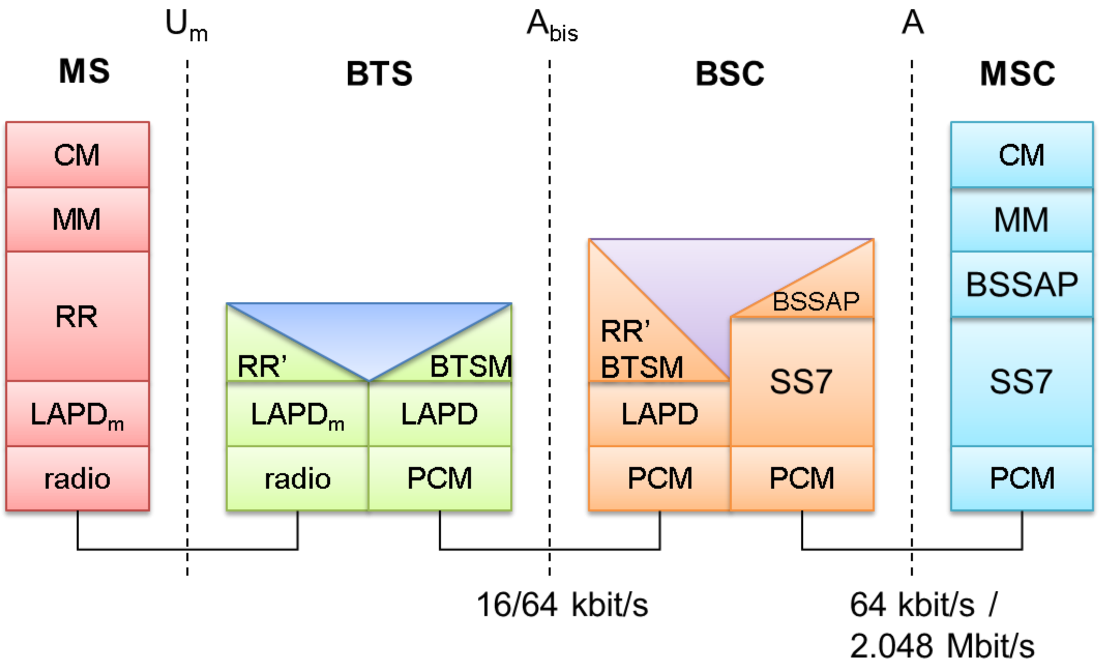
Main Features

- GSM Abis Interface emulation over IP
- Emulate BSC and BTS nodes
- Supports transmission and detection of RTP traffic – Auto Traffic digits, file, tones, fax, user-defined traffic, and IVR
- 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 TCP Layer
- Configure AGCH, ACCH, SDCCH, BCCH and other logical channels
- Supports Location Update Call, Mobile Originated Voice Call, Emergency Call, Mobile Originated SMS, Mobile Terminated Voice Call, and Mobile Terminated SMS procedures
- Access to all BTSM Message Parameters like TMSI, IMSI, CIC, MCC, LAC, and others
- User controlled access to optional parameters such as timers
- Supports Authentication, TMSI Reallocation, Encryption and other optional procedures

Applications

- Setup a virtual real-time network simulating 2G-GSM GPRS network elements using ‘MAPS™ 2G Wireless Lab Suite’
- Multi-protocol, Multi-interface Emulation
- Provides fault insertion, and erroneous call flows testing capability
- Performance testing, Load Testing, Functional testing, Regression testing and Conformance testing of network elements
- Ready scripts makes testing procedure simpler, less time consuming and hence time to market products.
- Test response of network against protocol message modification, or corruption
- Inter-operability testing of networks
- Wrap-around testing (WAT)
- SMS Testing from within the Wireless Infrastructure using MAPS™

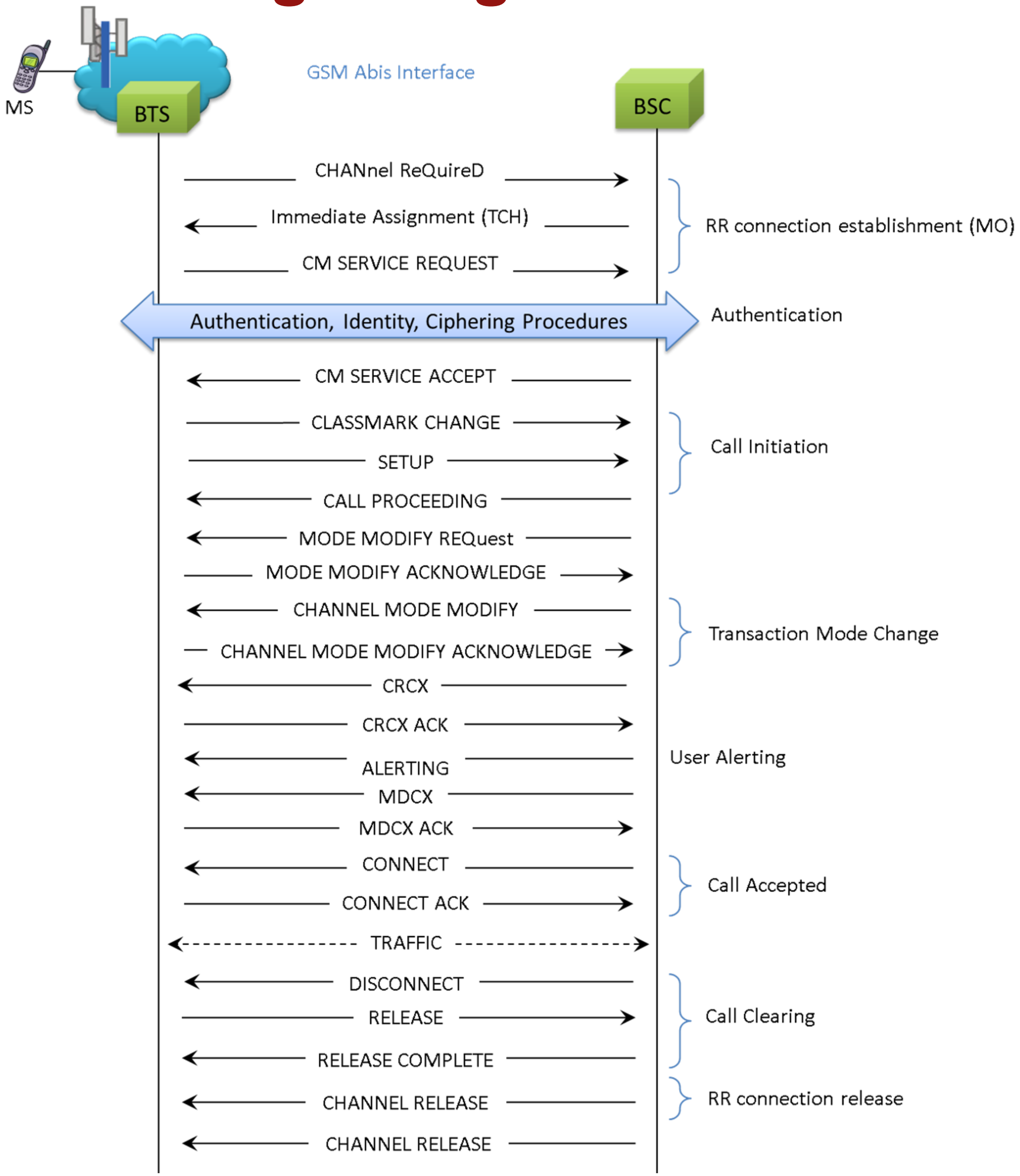
Supported Protocol Standards



U_m
A_{bis}
A
MS
BTS
BSC
MSC
CM
MM
RR
$LAPD_m$
radio
RR'
BTSM
$LAPD_m$
LAPD
radio
PCM
RR'
BTSM
BSSAP
LAPD
SS7
PCM
PCM
CM
MM
BSSAP
SS7
PCM
16/64 kbit/s
64 kbit/s / 2.048 Mbit/s

Supported Protocols	Standard / Specification Used
BTSM	3GPP TS 08.58 V8.6.0
MM	3GPP TS 04.08 V7.17.0
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 Procedure



GSM Abis Interface

MS

BTS

BSC

CHANnel ReQuireD

Immediate Assignment (TCH)

CM SERVICE REQUEST

RR connection establishment (MO)

Authentication, Identity, Ciphering Procedures

Authentication

CM SERVICE ACCEPT

CLASSMARK CHANGE

SETUP

Call Initiation

CALL PROCEEDING

MODE MODIFY REQuest

MODE MODIFY ACKNOWLEDGE

CHANNEL MODE MODIFY

CHANNEL MODE MODIFY ACKNOWLEDGE

Transaction Mode Change

CRCX

CRCX ACK

ALERTING

User Alerting

MDCX

MDCX ACK

CONNECT

CONNECT ACK

Call Accepted

TRAFFIC

DISCONNECT

RELEASE

RELEASE COMPLETE

Call Clearing

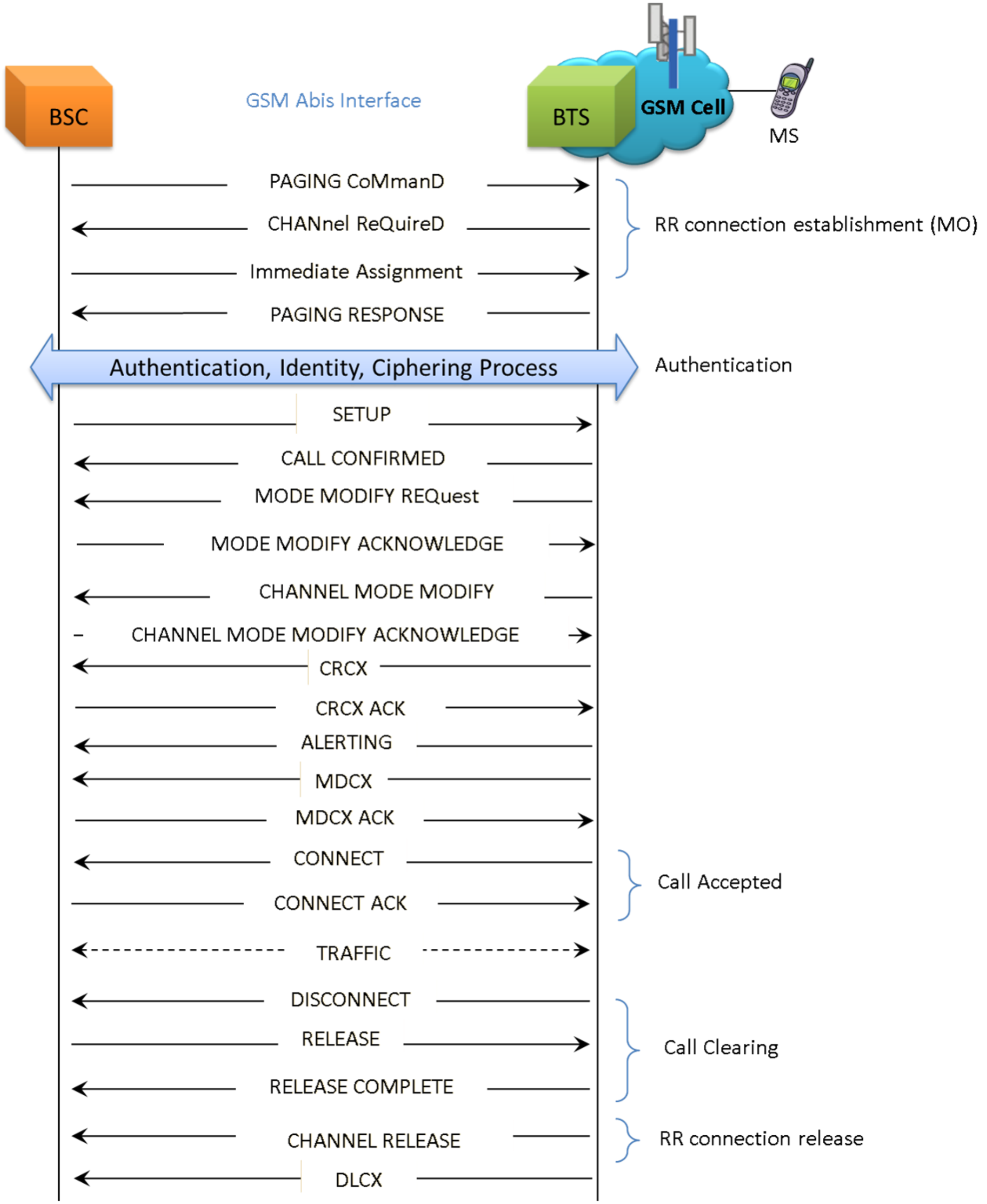
CHANNEL RELEASE

RR connection release

CHANNEL RELEASE

GL Communications

Mobile Terminating Call Procedure



BSC

GSM Abis Interface

BTS

GSM Cell

MS

PAGING CoMmanD

CHANnel ReQuireD

Immediate Assignment

PAGING RESPONSE

RR connection establishment (MO)

Authentication, Identity, Ciphering Process

Authentication

SETUP

CALL CONFIRMED

MODE MODIFY REQuest

MODE MODIFY ACKNOWLEDGE

CHANNEL MODE MODIFY

CHANNEL MODE MODIFY ACKNOWLEDGE

CRCX

CRCX ACK

ALERTING

MDCX

MDCX ACK

CONNECT

CONNECT ACK

Call Accepted

TRAFFIC

DISCONNECT

RELEASE

RELEASE COMPLETE

Call Clearing

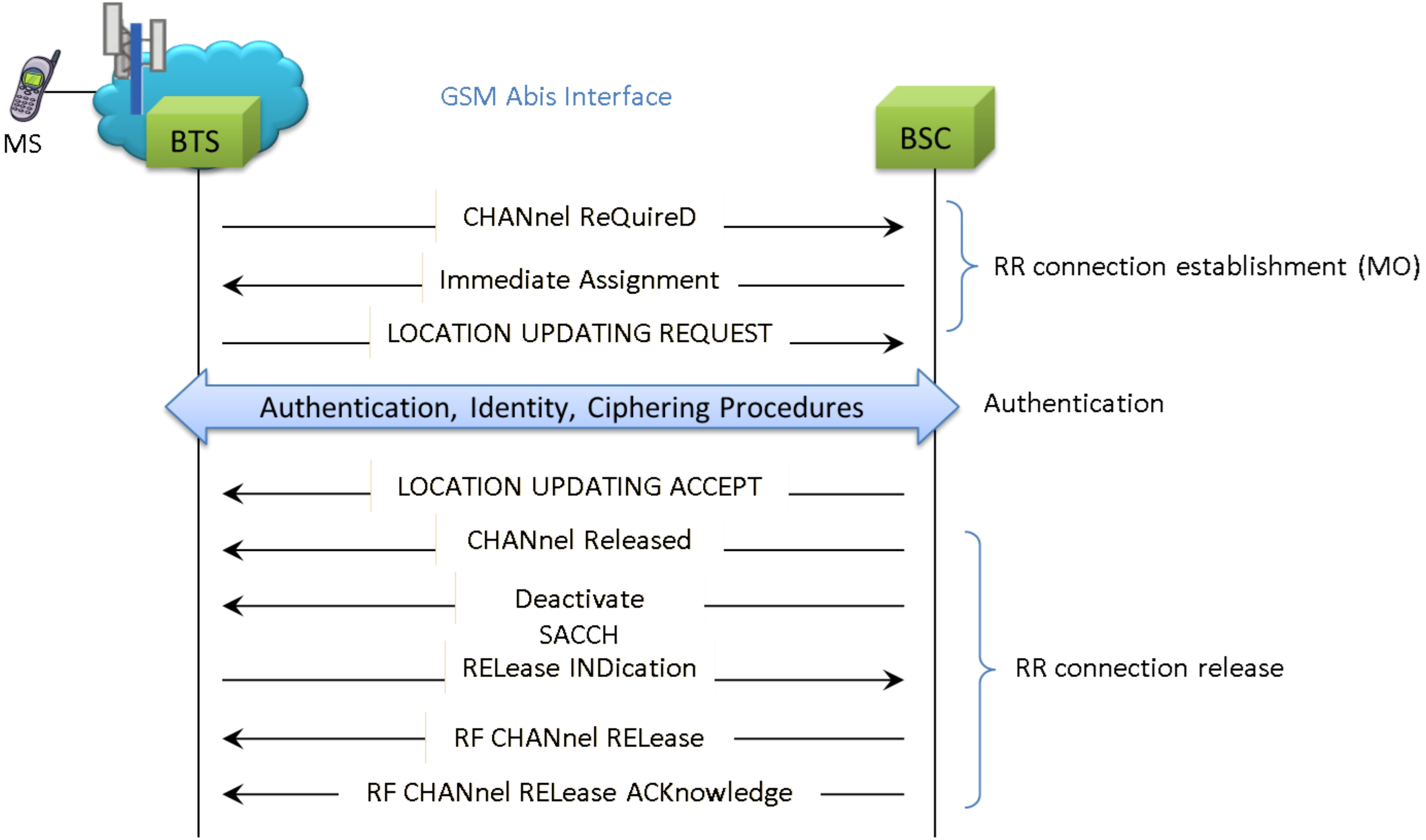
CHANNEL RELEASE

RR connection release

DLCX

GL Communications

Location Updating Call Procedure



GSM Abis Interface

CHANnel ReQuireD

Immediate Assignment

LOCATION UPDATING REQUEST

RR connection establishment (MO)

Authentication, Identity, Ciphering Procedures

Authentication

LOCATION UPDATING ACCEPT

CHANnel Released

Deactivate SACCH

RELease INDication

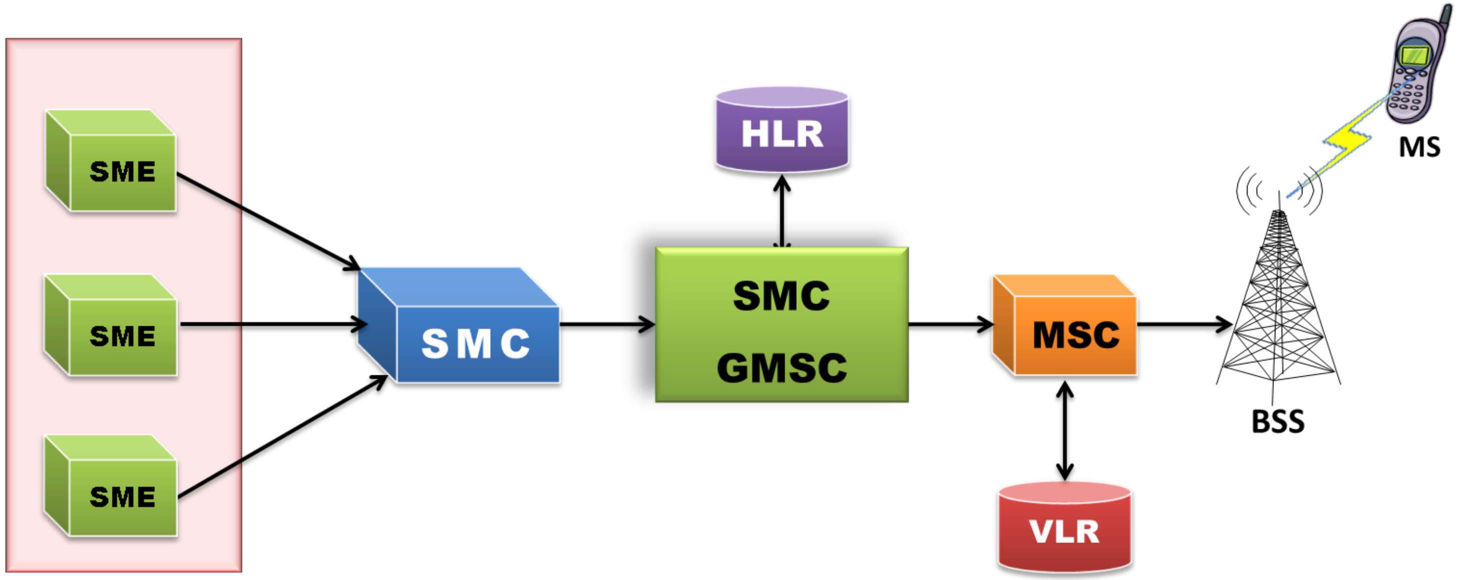
RF CHANnel RELease

RF CHANnel RELease ACKnowledge

RR connection release

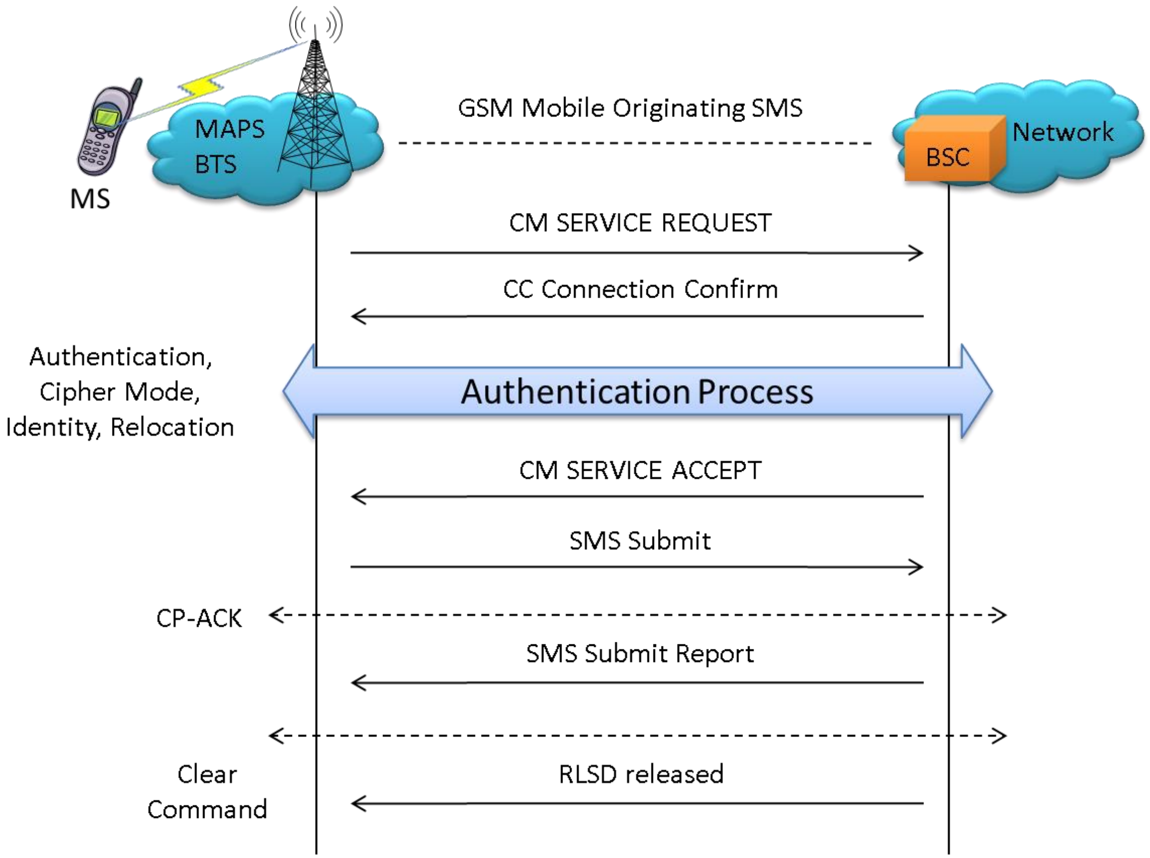
SMS Procedure

- **SMS** (Short Message Service) uses signaling channel as opposed to dedicated channels, hence these messages can be sent/received simultaneously with the voice/data/fax service over a GSM network
- SMS supports national and international roaming, meaning SMS can be sent to any other GSM mobile around the world
- Each short message can be no longer than 160 characters. These characters can be text or binary Non-Text Short messages

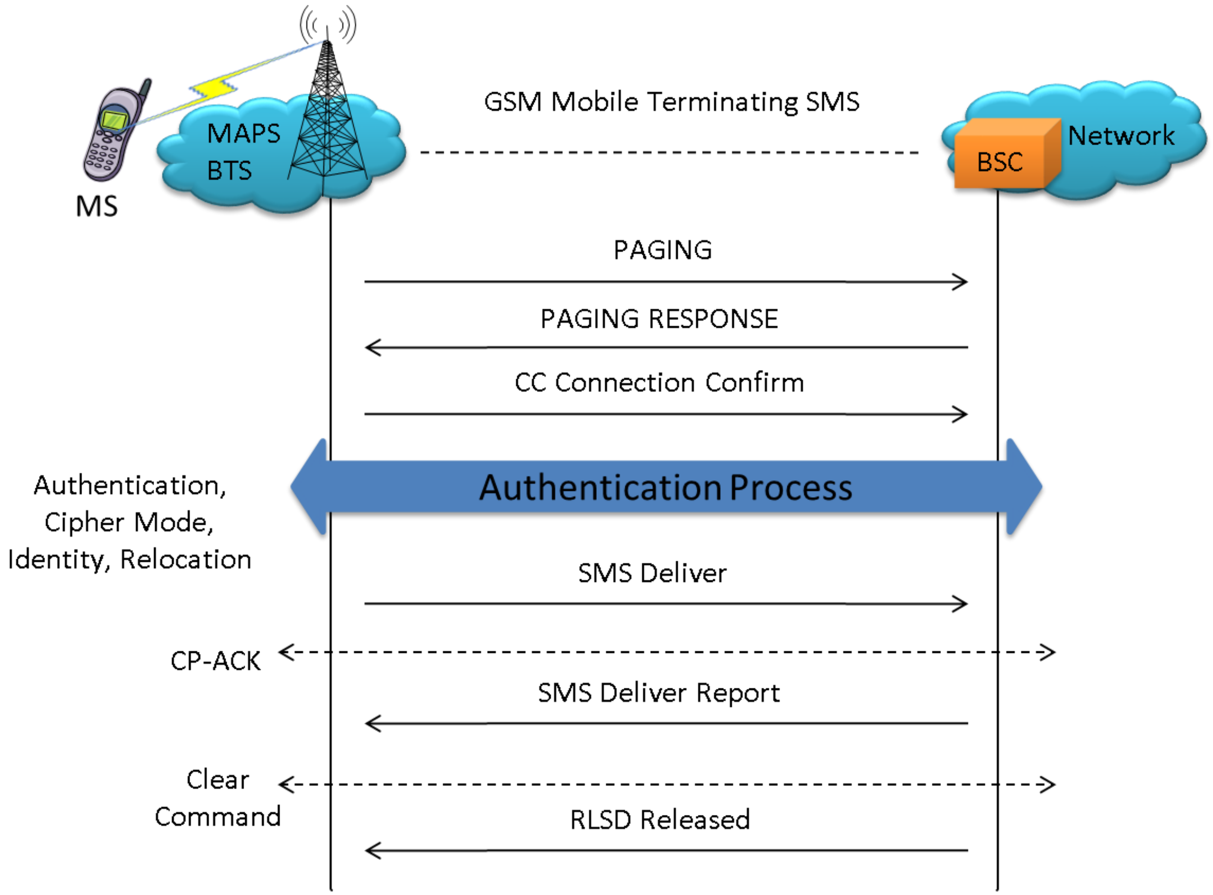


GSM-Abis IP SMS Procedure

Mobile Originating SMS Procedure

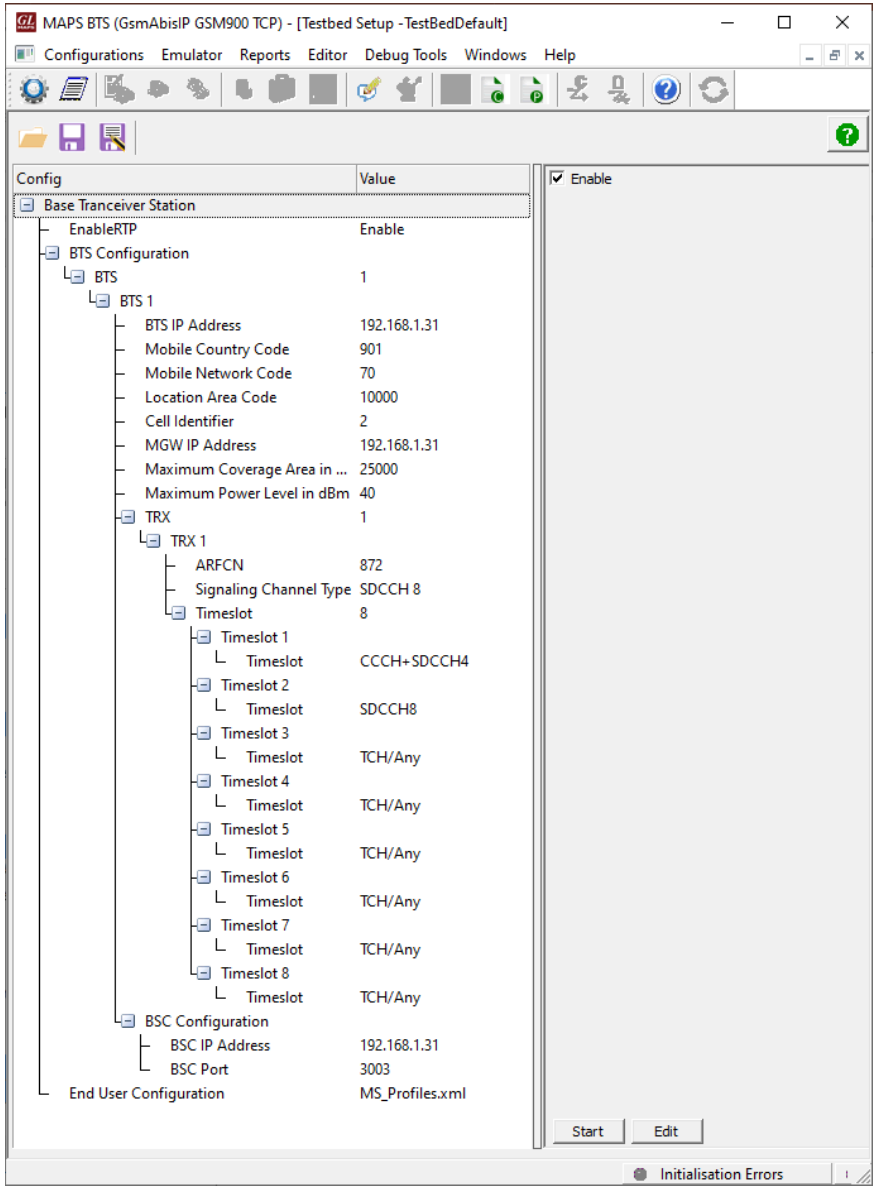

MS
MAPS BTS
BSC
Network
GSM Mobile Originating SMS
CM SERVICE REQUEST
CC Connection Confirm
Authentication, Cipher Mode, Identity, Relocation
Authentication Process
CM SERVICE ACCEPT
SMS Submit
CP-ACK
SMS Submit Report
Clear Command
RLSD released

Mobile Terminating SMS Procedure


MS
MAPS BTS
BSC
Network
GSM Mobile Terminating SMS
PAGING
PAGING RESPONSE
CC Connection Confirm
Authentication, Cipher Mode, Identity, Relocation
Authentication Process
SMS Deliver
CP-ACK
SMS Deliver Report
Clear Command
RLSD Released

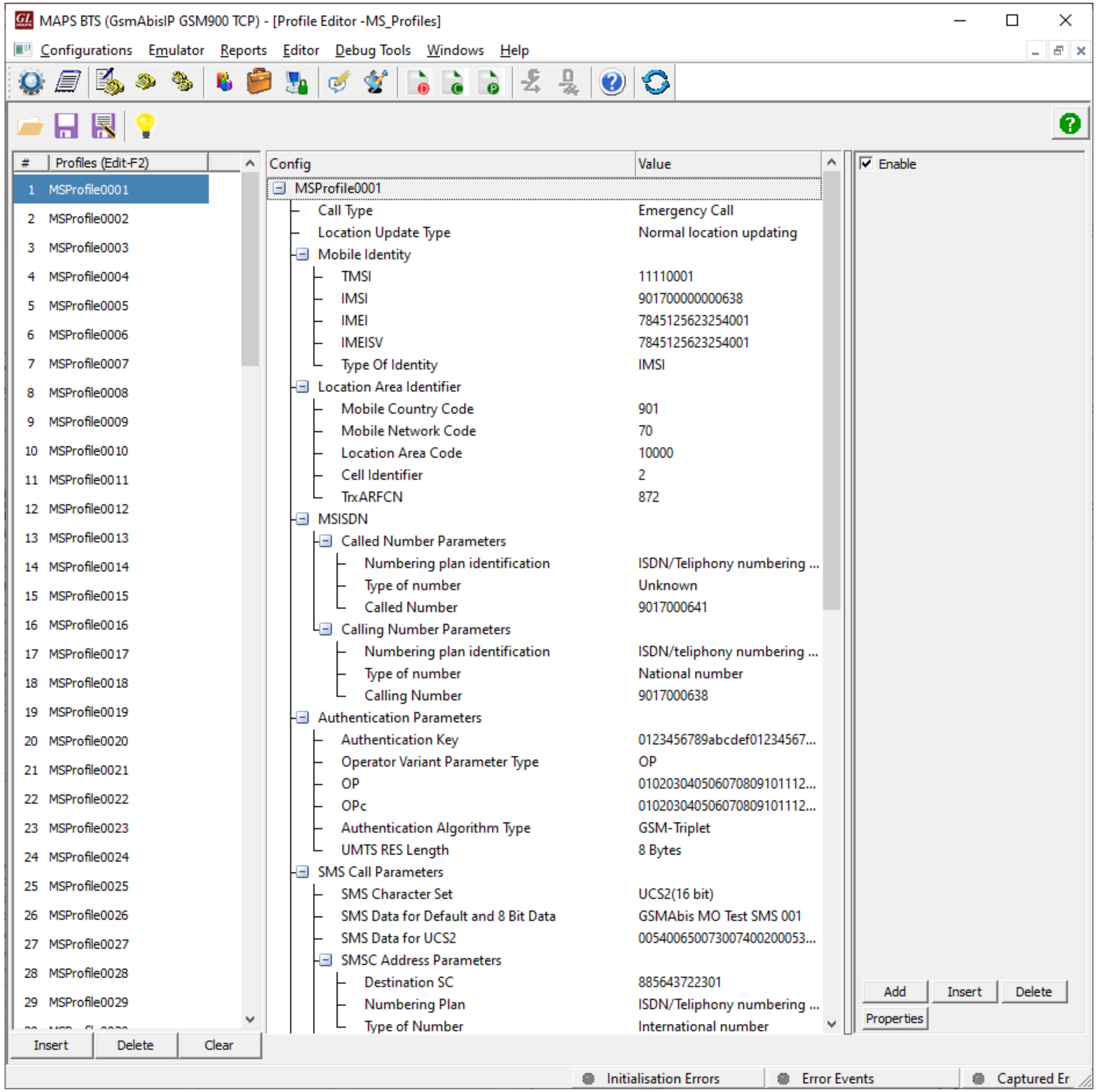
GL Communications

Testbed Configuration


MAPS BTS (GsmAbisIP GSM900 TCP) - [Testbed Setup -TestBedDefault]
Configurations
Emulator
Reports
Editor
Debug Tools
Windows
Help
☑ Enable
Start
Edit
Initialisation Errors

Config	Value
Base Tranceiver Station	
EnableRTP	Enable
BTS Configuration	
BTS	1
BTS 1	
BTS IP Address	192.168.1.31
Mobile Country Code	901
Mobile Network Code	70
Location Area Code	10000
Cell Identifier	2
MGW IP Address	192.168.1.31
Maximum Coverage Area in ...	25000
Maximum Power Level in dBm	40
TRX	1
TRX 1	
ARFCN	872
Signaling Channel Type	SDCCH 8
Timeslot	8
Timeslot 1	
Timeslot	CCCH+SDCCH4
Timeslot 2	
Timeslot	SDCCH8
Timeslot 3	
Timeslot	TCH/Any
Timeslot 4	
Timeslot	TCH/Any
Timeslot 5	
Timeslot	TCH/Any
Timeslot 6	
Timeslot	TCH/Any
Timeslot 7	
Timeslot	TCH/Any
Timeslot 8	
Timeslot	TCH/Any
BSC Configuration	
BSC IP Address	192.168.1.31
BSC Port	3003
End User Configuration	MS_Profiles.xml

Profile Editor

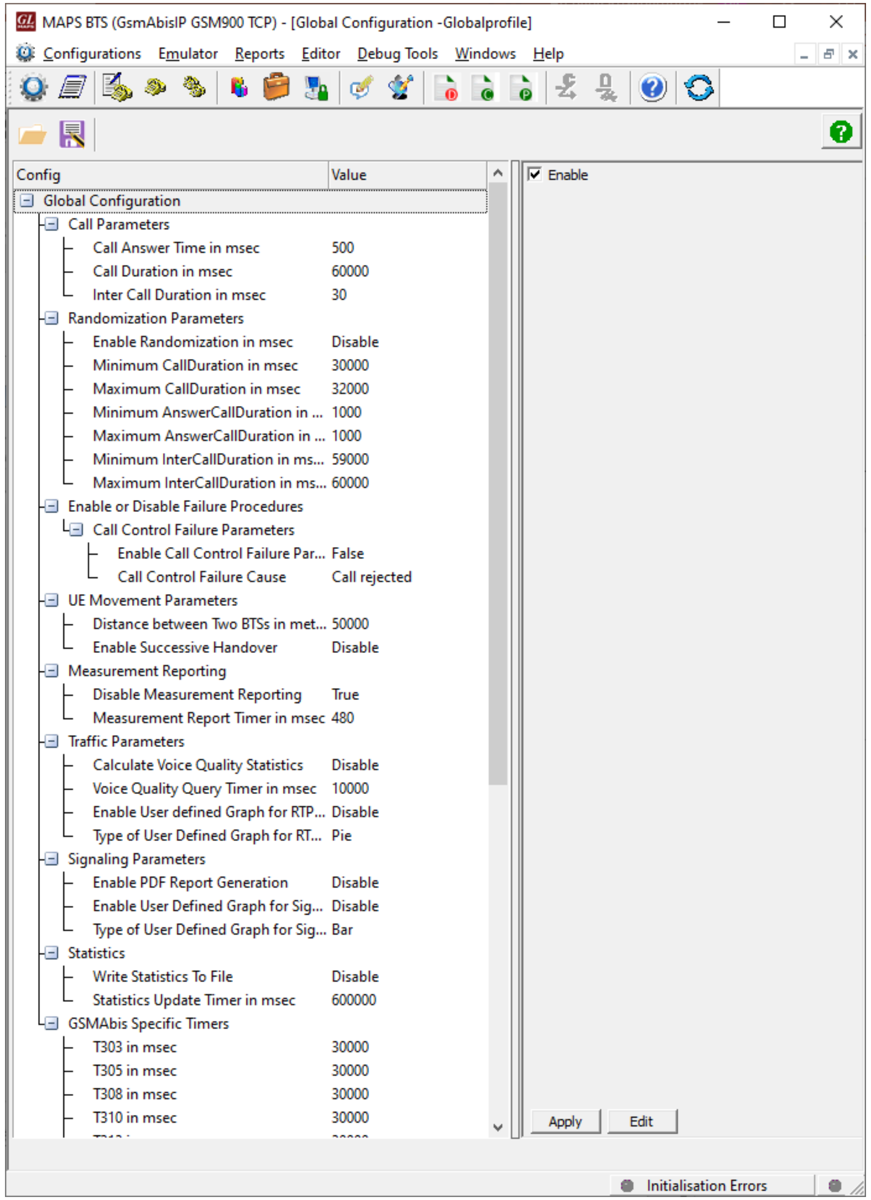


MAPS BTS (GsmAbisIP GSM900 TCP) - [Profile Editor -MS_Profiles]

#	Profiles (Edit-F2)
1	MSProfile0001
2	MSProfile0002
3	MSProfile0003
4	MSProfile0004
5	MSProfile0005
6	MSProfile0006
7	MSProfile0007
8	MSProfile0008
9	MSProfile0009
10	MSProfile0010
11	MSProfile0011
12	MSProfile0012
13	MSProfile0013
14	MSProfile0014
15	MSProfile0015
16	MSProfile0016
17	MSProfile0017
18	MSProfile0018
19	MSProfile0019
20	MSProfile0020
21	MSProfile0021
22	MSProfile0022
23	MSProfile0023
24	MSProfile0024
25	MSProfile0025
26	MSProfile0026
27	MSProfile0027
28	MSProfile0028
29	MSProfile0029

Config	Value
MSProfile0001	
Call Type	Emergency Call
Location Update Type	Normal location updating
Mobile Identity	
TMSI	11110001
IMSI	901700000000638
IMEI	7845125623254001
IMEISV	7845125623254001
Type Of Identity	IMSI
Location Area Identifier	
Mobile Country Code	901
Mobile Network Code	70
Location Area Code	10000
Cell Identifier	2
TrxARFCN	872
MSISDN	
Called Number Parameters	
Numbering plan identification	ISDN/Teliphony numbering ...
Type of number	Unknown
Called Number	9017000641
Calling Number Parameters	
Numbering plan identification	ISDN/teliphony numbering ...
Type of number	National number
Calling Number	9017000638
Authentication Parameters	
Authentication Key	0123456789abcdef01234567...
Operator Variant Parameter Type	OP
OP	0102030405060708091011112...
OPc	0102030405060708091011112...
Authentication Algorithm Type	GSM-Triplet
UMTS RES Length	8 Bytes
SMS Call Parameters	
SMS Character Set	UCS2(16 bit)
SMS Data for Default and 8 Bit Data	GSMAbis MO Test SMS 001
SMS Data for UCS2	0054006500730074002000053...
SMSC Address Parameters	
Destination SC	885643722301
Numbering Plan	ISDN/Teliphony numbering ...
Type of Number	International number

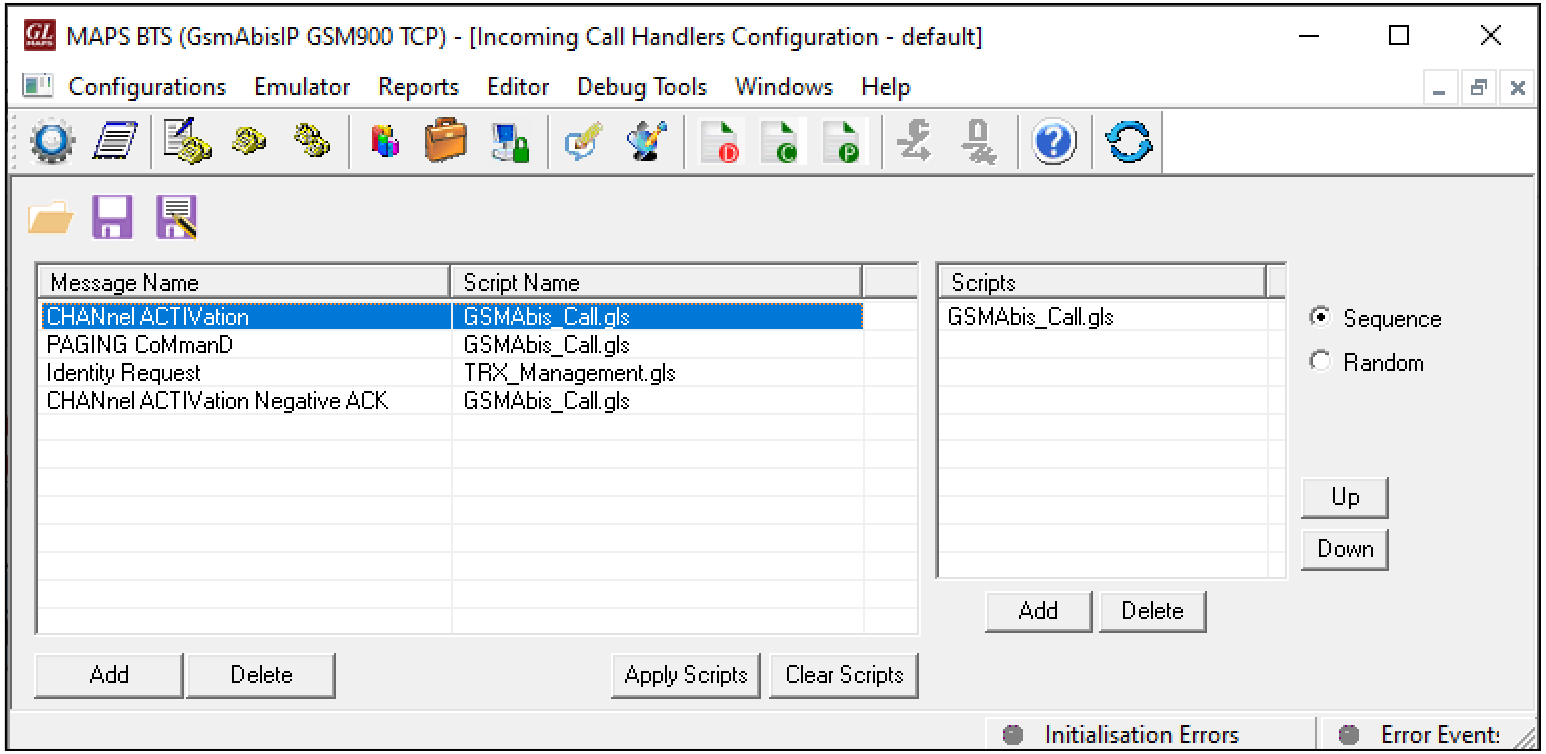
Global Configuration


MAPS BTS (GsmAbisIP GSM900 TCP) - [Global Configuration -Globalprofile]
Configurations
Emulator
Reports
Editor
Debug Tools
Windows
Help
Apply
Edit
Initialisation Errors

☑ Enable

Config	Value
Global Configuration	
Call Parameters	
Call Answer Time in msec	500
Call Duration in msec	60000
Inter Call Duration in msec	30
Randomization Parameters	
Enable Randomization in msec	Disable
Minimum CallDuration in msec	30000
Maximum CallDuration in msec	32000
Minimum AnswerCallDuration in ...	1000
Maximum AnswerCallDuration in ...	1000
Minimum InterCallDuration in ms...	59000
Maximum InterCallDuration in ms...	60000
Enable or Disable Failure Procedures	
Call Control Failure Parameters	
Enable Call Control Failure Par...	False
Call Control Failure Cause	Call rejected
UE Movement Parameters	
Distance between Two BTSs in met...	50000
Enable Successive Handover	Disable
Measurement Reporting	
Disable Measurement Reporting	True
Measurement Report Timer in msec	480
Traffic Parameters	
Calculate Voice Quality Statistics	Disable
Voice Quality Query Timer in msec	10000
Enable User defined Graph for RTP...	Disable
Type of User Defined Graph for RT...	Pie
Signaling Parameters	
Enable PDF Report Generation	Disable
Enable User Defined Graph for Sig...	Disable
Type of User Defined Graph for Sig...	Bar
Statistics	
Write Statistics To File	Disable
Statistics Update Timer in msec	600000
GSMAbis Specific Timers	
T303 in msec	30000
T305 in msec	30000
T308 in msec	30000
T310 in msec	30000

GSM-Abis IP Incoming Call Handler Configuration

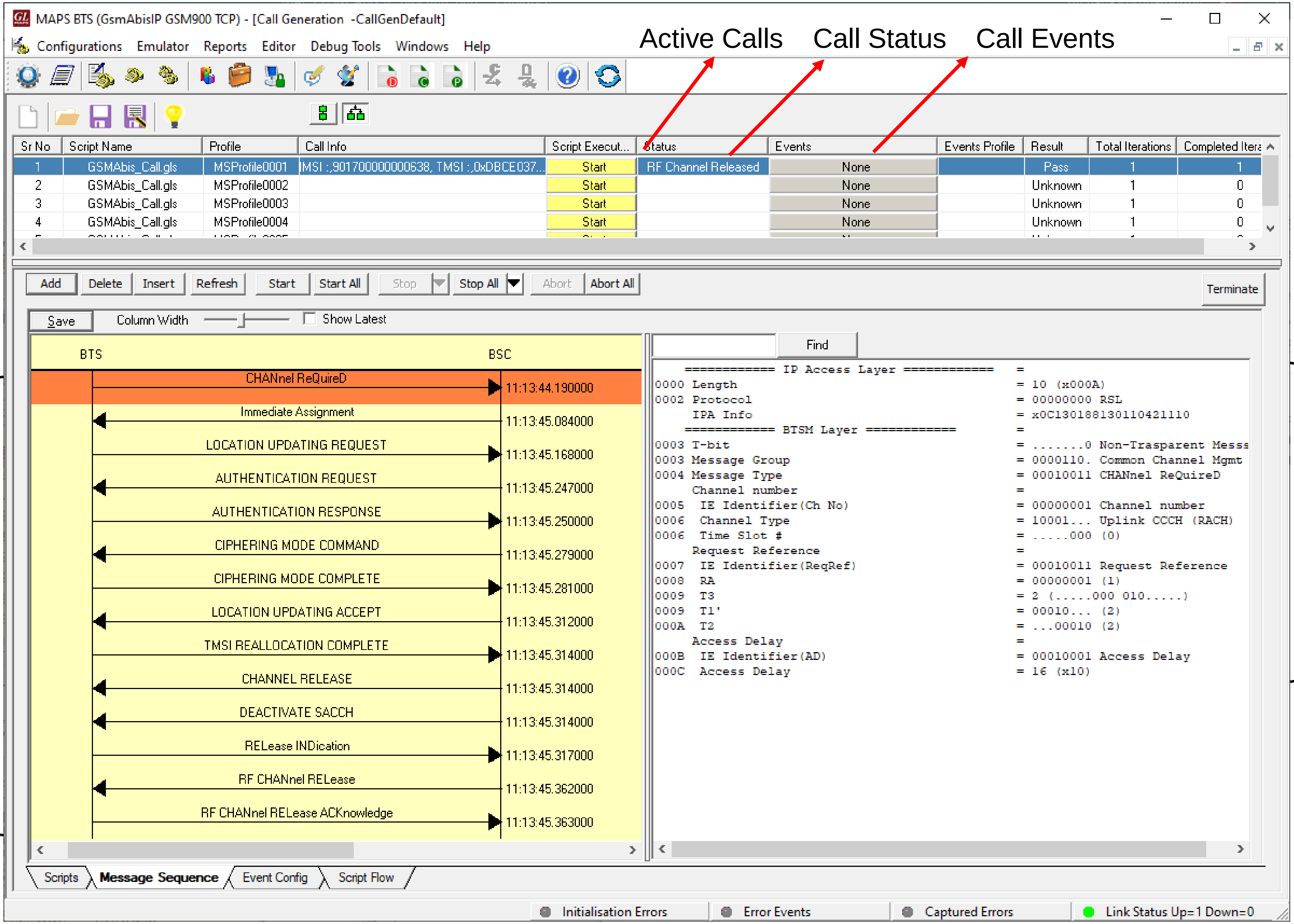

MAPS BTS (GsmAbisIP GSM900 TCP) - [Incoming Call Handlers Configuration - default]
Configurations
Emulator
Reports
Editor
Debug Tools
Windows
Help
Up
Down
Add
Delete
Apply Scripts
Clear Scripts
Initialisation Errors
Error Event:

Message Name	Script Name
CHANnel ACTIVation	GSMAbis_Call.gls
PAGING CoMmanD	GSMAbis_Call.gls
Identity Request	TRX_Management.gls
CHANnel ACTIVation Negative ACK	GSMAbis_Call.gls

Scripts
GSMAbis_Call.gls

● Sequence
○ Random

GSM-Abis IP Call Generation


MAPS BTS (GsmAbisIP GSM900 TCP) - [Call Generation -CallGenDefault]
Configurations
Emulator
Reports
Editor
Debug Tools
Windows
Help
Add
Delete
Insert
Refresh
Start
Start All
Stop
Stop All
Abort
Abort All
Terminate
Save
Column Width
☐ Show Latest
Find
Scripts
Message Sequence
Event Config
Script Flow
Initialisation Errors
Error Events
Captured Errors
Link Status Up=1 Down=0

Active Calls

Call Status

Call Events

Loading Scripts and Profiles

Sr No	Script Name	Profile	Call Info	Script Execut...	Status	Events	Events Profile	Result	Total Iterations	Completed Itera
1	GSMAbis_Call.gls	MSProfile0001	IMSI :,901700000000638, TMSI :,0xDBCE037...	Start	RF Channel Released	None		Pass	1	1
2	GSMAbis_Call.gls	MSProfile0002		Start		None		Unknown	1	0
3	GSMAbis_Call.gls	MSProfile0003		Start		None		Unknown	1	0
4	GSMAbis_Call.gls	MSProfile0004		Start		None		Unknown	1	0

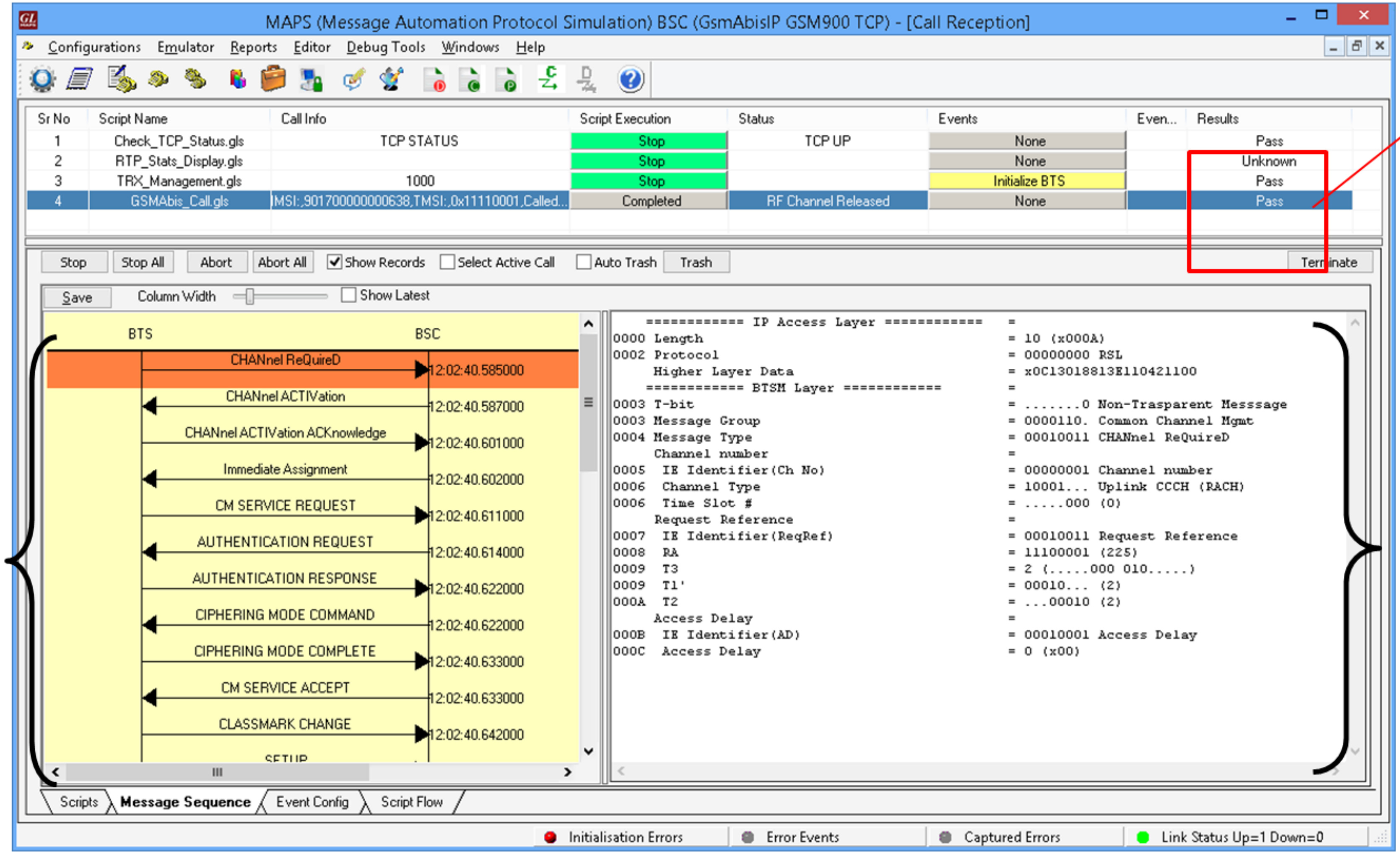
Message Sequence

BTS	BSC	
CHANnel ReQuireD →		11:13:44.190000
← Immediate Assignment		11:13:45.084000
LOCATION UPDATING REQUEST →		11:13:45.168000
← AUTHENTICATION REQUEST		11:13:45.247000
AUTHENTICATION RESPONSE →		11:13:45.250000
← CIPHERING MODE COMMAND		11:13:45.279000
CIPHERING MODE COMPLETE →		11:13:45.281000
← LOCATION UPDATING ACCEPT		11:13:45.312000
TMSI REALLOCATION COMPLETE →		11:13:45.314000
← CHANNEL RELEASE		11:13:45.314000
← DEACTIVATE SACCH		11:13:45.314000
RELease INDication →		11:13:45.317000
← RF CHANnel RELease		11:13:45.362000
RF CHANnel RELease ACKnowledge →		11:13:45.363000

Decode Message

```
    ============ IP Access Layer ============   =
0000 Length                                     = 10 (x000A)
0002 Protocol                                   = 00000000 RSL
     IPA Info                                   = x0C130188130110421110
    ============ BTSM Layer ============        =
0003 T-bit                                      = .......0 Non-Trasparent Mess
0003 Message Group                              = 0000110. Common Channel Mgmt
0004 Message Type                               = 00010011 CHANnel ReQuireD
     Channel number                             =
0005  IE Identifier(Ch No)                      = 00000001 Channel number
0006  Channel Type                              = 10001... Uplink CCCH (RACH)
0006  Time Slot #                               = .....000 (0)
     Request Reference                          =
0007  IE Identifier(ReqRef)                     = 00010011 Request Reference
0008  RA                                        = 00000001 (1)
0009  T3                                        = 2 (.....000 010.....)
0009  T1'                                       = 00010... (2)
000A  T2                                        = ...00010 (2)
     Access Delay                               =
000B  IE Identifier(AD)                         = 00010001 Access Delay
000C  Access Delay                              = 16 (x10)
```

GSM-Abis IP Call Reception


MAPS (Message Automation Protocol Simulation) BSC (GsmAbisIP GSM900 TCP) - [Call Reception]
Configurations
Emulator
Reports
Editor
Debug Tools
Windows
Help
Stop
Stop All
Abort
Abort All
☑ Show Records
☐ Select Active Call
☐ Auto Trash
Trash
Terminate
Save
Column Width
☐ Show Latest
Scripts
Message Sequence
Event Config
Script Flow
Initialisation Errors
Error Events
Captured Errors
Link Status Up=1 Down=0

Sr No	Script Name	Call Info	Script Execution	Status	Events	Even...	Results
1	Check_TCP_Status.gls	TCP STATUS	Stop	TCP UP	None		Pass
2	RTP_Stats_Display.gls		Stop		None		Unknown
3	TRX_Management.gls	1000	Stop		Initialize BTS		Pass
4	GSMAbis_Call.gls	IMSI:,901700000000638,TMSI:,0x11110001,Called...	Completed	RF Channel Released	None		Pass

```
BTS                                   BSC
CHANnel ReQuireD                      12:02:40.585000
CHANnel ACTIVation                    12:02:40.587000
CHANnel ACTIVation ACKnowledge        12:02:40.601000
Immediate Assignment                  12:02:40.602000
CM SERVICE REQUEST                    12:02:40.611000
AUTHENTICATION REQUEST                12:02:40.614000
AUTHENTICATION RESPONSE               12:02:40.622000
CIPHERING MODE COMMAND                12:02:40.622000
CIPHERING MODE COMPLETE               12:02:40.633000
CM SERVICE ACCEPT                     12:02:40.633000
CLASSMARK CHANGE                      12:02:40.642000
SETUP
```

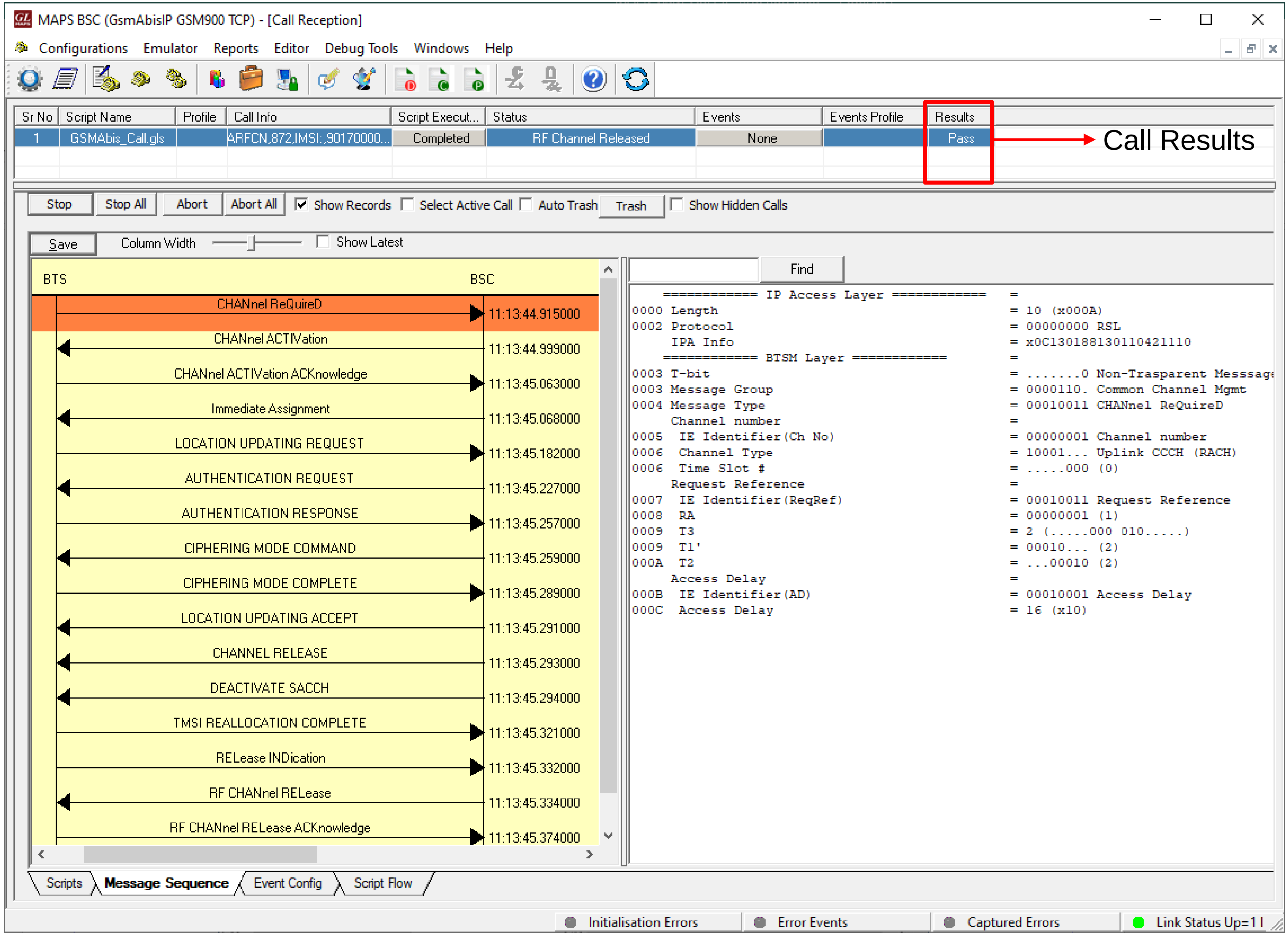
```
    ============ IP Access Layer ============         =
0000 Length                                          = 10 (x000A)
0002 Protocol                                        = 00000000 RSL
     Higher Layer Data                               = x0C13018813E110421100
    ============ BTSM Layer ============              =
0003 T-bit                                           = .......0 Non-Trasparent Messsage
0003 Message Group                                   = 0000110. Common Channel Mgmt
0004 Message Type                                    = 00010011 CHANnel ReQuireD
     Channel number                                  =
0005  IE Identifier(Ch No)                           = 00000001 Channel number
0006  Channel Type                                   = 10001... Uplink CCCH (RACH)
0006  Time Slot #                                    = .....000 (0)
     Request Reference                               =
0007  IE Identifier(ReqRef)                          = 00010011 Request Reference
0008  RA                                             = 11100001 (225)
0009  T3                                             = 2 (.....000 010.....)
0009  T1'                                            = 00010... (2)
000A  T2                                             = ...00010 (2)
     Access Delay                                    =
000B  IE Identifier(AD)                              = 00010001 Access Delay
000C  Access Delay                                   = 0 (x00)
```

Call Results

Message Sequence

Decode Message

GSM-Abis IP Call Reception



MAPS BSC (GsmAbisIP GSM900 TCP) - [Call Reception]
Configurations Emulator Reports Editor Debug Tools Windows Help
Stop
Stop All
Abort
Abort All
Trash
Save
Column Width
Find
Scripts
Message Sequence
Event Config
Script Flow

Sr No	Script Name	Profile	Call Info	Script Execut...	Status	Events	Events Profile	Results
1	GSMAbis_Call.gls		ARFCN,872,IMSI:,90170000...	Completed	RF Channel Released	None		Pass

☑ Show Records ☐ Select Active Call ☐ Auto Trash ☐ Show Hidden Calls

☐ Show Latest

```
BTS                                              BSC
CHANnel ReQuireD                                 11:13:44.915000
CHANnel ACTIVation                               11:13:44.999000
CHANnel ACTIVation ACKnowledge                   11:13:45.063000
Immediate Assignment                             11:13:45.068000
LOCATION UPDATING REQUEST                        11:13:45.182000
AUTHENTICATION REQUEST                           11:13:45.227000
AUTHENTICATION RESPONSE                          11:13:45.257000
CIPHERING MODE COMMAND                           11:13:45.259000
CIPHERING MODE COMPLETE                          11:13:45.289000
LOCATION UPDATING ACCEPT                         11:13:45.291000
CHANNEL RELEASE                                  11:13:45.293000
DEACTIVATE SACCH                                 11:13:45.294000
TMSI REALLOCATION COMPLETE                       11:13:45.321000
RELease INDication                               11:13:45.332000
RF CHANnel RELease                               11:13:45.334000
RF CHANnel RELease ACKnowledge                   11:13:45.374000
```

```
    ============ IP Access Layer ============    =
0000 Length                                      = 10 (x000A)
0002 Protocol                                    = 00000000 RSL
     IPA Info                                    = x0C13018813011042111O
    ============ BTSM Layer ============         =
0003 T-bit                                       = .......0 Non-Trasparent Messsage
0003 Message Group                               = 0000110. Common Channel Mgmt
0004 Message Type                                = 00010011 CHANnel ReQuireD
     Channel number                              =
0005  IE Identifier(Ch No)                       = 00000001 Channel number
0006  Channel Type                               = 10001... Uplink CCCH (RACH)
0006  Time Slot #                                = .....000 (0)
     Request Reference                           =
0007  IE Identifier(ReqRef)                      = 00010011 Request Reference
0008  RA                                         = 00000001 (1)
0009  T3                                         = 2 (.....000 010.....)
0009  T1'                                        = 00010... (2)
000A  T2                                         = ...00010 (2)
     Access Delay                                =
000B  IE Identifier(AD)                          = 00010001 Access Delay
000C  Access Delay                               = 16 (x10)
```

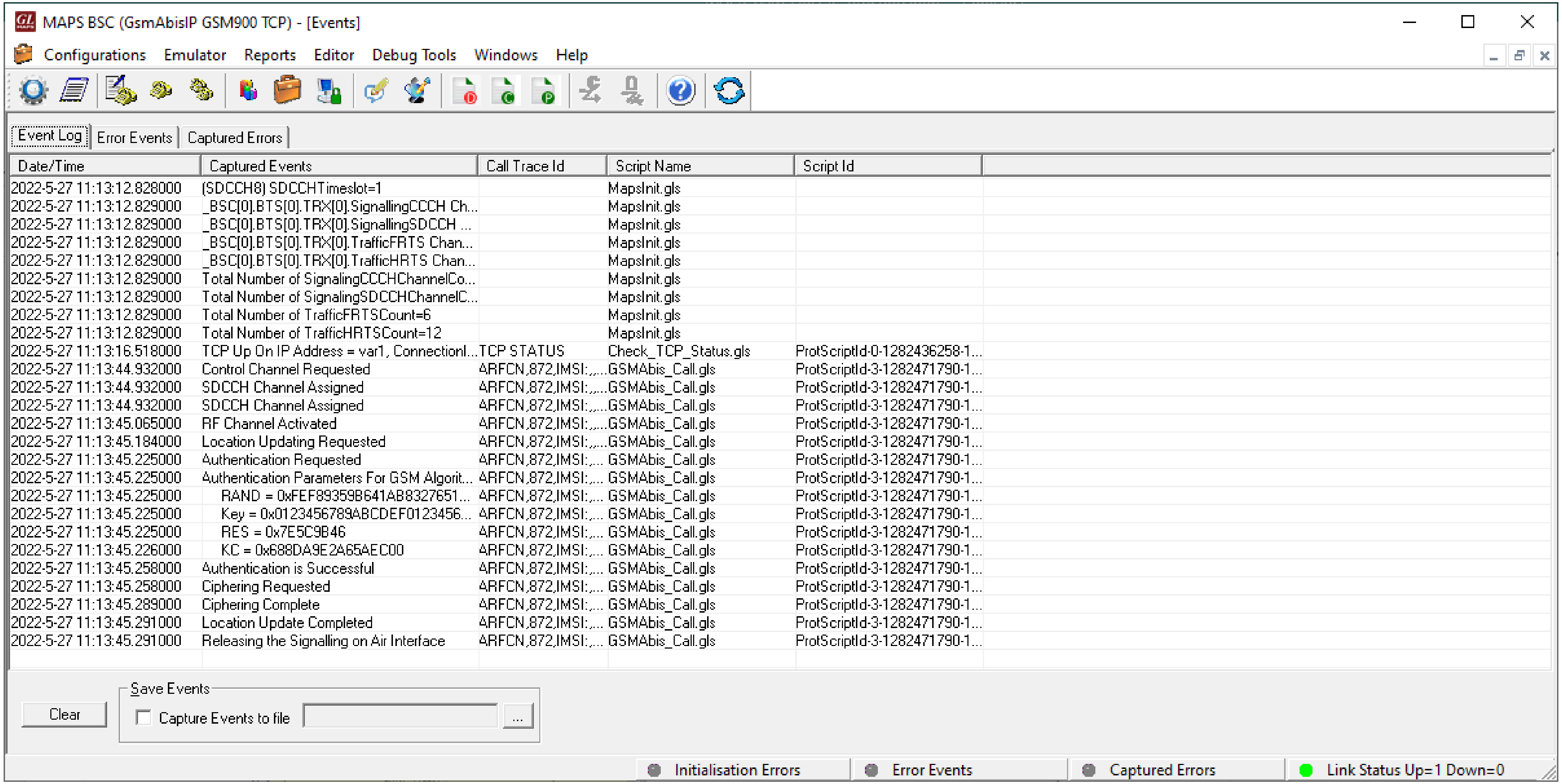
● Initialisation Errors ● Error Events ● Captured Errors ● Link Status Up=1 I

Call Results

Message Sequence

Decode Message

GSM-Abis IP Call Event Log

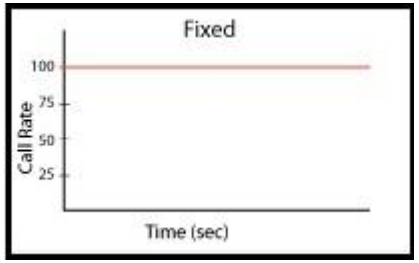


Date/Time	Captured Events	Call Trace Id	Script Name	Script Id
2022-5-27 11:13:12.828000	(SDCCH8) SDCCHTimeslot=1		MapsInit.gls	
2022-5-27 11:13:12.829000	_BSC[0].BTS[0].TRX[0].SignallingCCCH Ch...		MapsInit.gls	
2022-5-27 11:13:12.829000	_BSC[0].BTS[0].TRX[0].SignallingSDCCH ...		MapsInit.gls	
2022-5-27 11:13:12.829000	_BSC[0].BTS[0].TRX[0].TrafficFRTS Chan...		MapsInit.gls	
2022-5-27 11:13:12.829000	_BSC[0].BTS[0].TRX[0].TrafficHRTS Chan...		MapsInit.gls	
2022-5-27 11:13:12.829000	Total Number of SignalingCCCHChannelCo...		MapsInit.gls	
2022-5-27 11:13:12.829000	Total Number of SignalingSDCCHChannelC...		MapsInit.gls	
2022-5-27 11:13:12.829000	Total Number of TrafficFRTSCount=6		MapsInit.gls	
2022-5-27 11:13:12.829000	Total Number of TrafficHRTSCount=12		MapsInit.gls	
2022-5-27 11:13:16.518000	TCP Up On IP Address = var1, ConnectionI...	TCP STATUS	Check_TCP_Status.gls	ProtScriptId-0-1282436258-1...
2022-5-27 11:13:44.932000	Control Channel Requested	ARFCN,872,IMSI:,...	GSMAbis_Call.gls	ProtScriptId-3-1282471790-1...
2022-5-27 11:13:44.932000	SDCCH Channel Assigned	ARFCN,872,IMSI:,...	GSMAbis_Call.gls	ProtScriptId-3-1282471790-1...
2022-5-27 11:13:44.932000	SDCCH Channel Assigned	ARFCN,872,IMSI:,...	GSMAbis_Call.gls	ProtScriptId-3-1282471790-1...
2022-5-27 11:13:45.065000	RF Channel Activated	ARFCN,872,IMSI:,...	GSMAbis_Call.gls	ProtScriptId-3-1282471790-1...
2022-5-27 11:13:45.184000	Location Updating Requested	ARFCN,872,IMSI:,...	GSMAbis_Call.gls	ProtScriptId-3-1282471790-1...
2022-5-27 11:13:45.225000	Authentication Requested	ARFCN,872,IMSI:...	GSMAbis_Call.gls	ProtScriptId-3-1282471790-1...
2022-5-27 11:13:45.225000	Authentication Parameters For GSM Algorit...	ARFCN,872,IMSI:...	GSMAbis_Call.gls	ProtScriptId-3-1282471790-1...
2022-5-27 11:13:45.225000	RAND = 0xFEF89359B641AB8327651...	ARFCN,872,IMSI:...	GSMAbis_Call.gls	ProtScriptId-3-1282471790-1...
2022-5-27 11:13:45.225000	Key = 0x0123456789ABCDEF0123456...	ARFCN,872,IMSI:...	GSMAbis_Call.gls	ProtScriptId-3-1282471790-1...
2022-5-27 11:13:45.225000	RES = 0x7E5C9B46	ARFCN,872,IMSI:...	GSMAbis_Call.gls	ProtScriptId-3-1282471790-1...
2022-5-27 11:13:45.226000	KC = 0x688DA9E2A65AEC00	ARFCN,872,IMSI:...	GSMAbis_Call.gls	ProtScriptId-3-1282471790-1...
2022-5-27 11:13:45.258000	Authentication is Successful	ARFCN,872,IMSI:...	GSMAbis_Call.gls	ProtScriptId-3-1282471790-1...
2022-5-27 11:13:45.258000	Ciphering Requested	ARFCN,872,IMSI:...	GSMAbis_Call.gls	ProtScriptId-3-1282471790-1...
2022-5-27 11:13:45.289000	Ciphering Complete	ARFCN,872,IMSI:...	GSMAbis_Call.gls	ProtScriptId-3-1282471790-1...
2022-5-27 11:13:45.291000	Location Update Completed	ARFCN,872,IMSI:...	GSMAbis_Call.gls	ProtScriptId-3-1282471790-1...
2022-5-27 11:13:45.291000	Releasing the Signalling on Air Interface	ARFCN,872,IMSI:...	GSMAbis_Call.gls	ProtScriptId-3-1282471790-1...

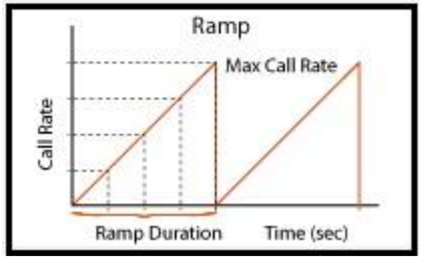
Load Generation

- 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.

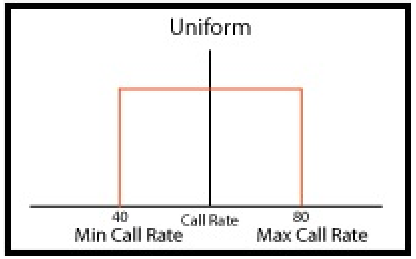
Fixed



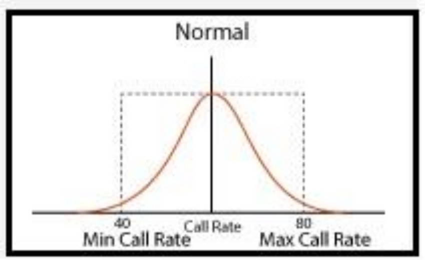
Ramp



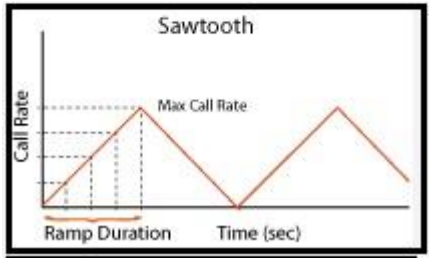
Uniform



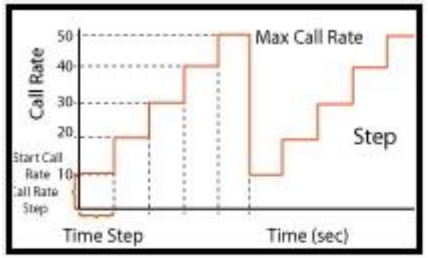
Normal

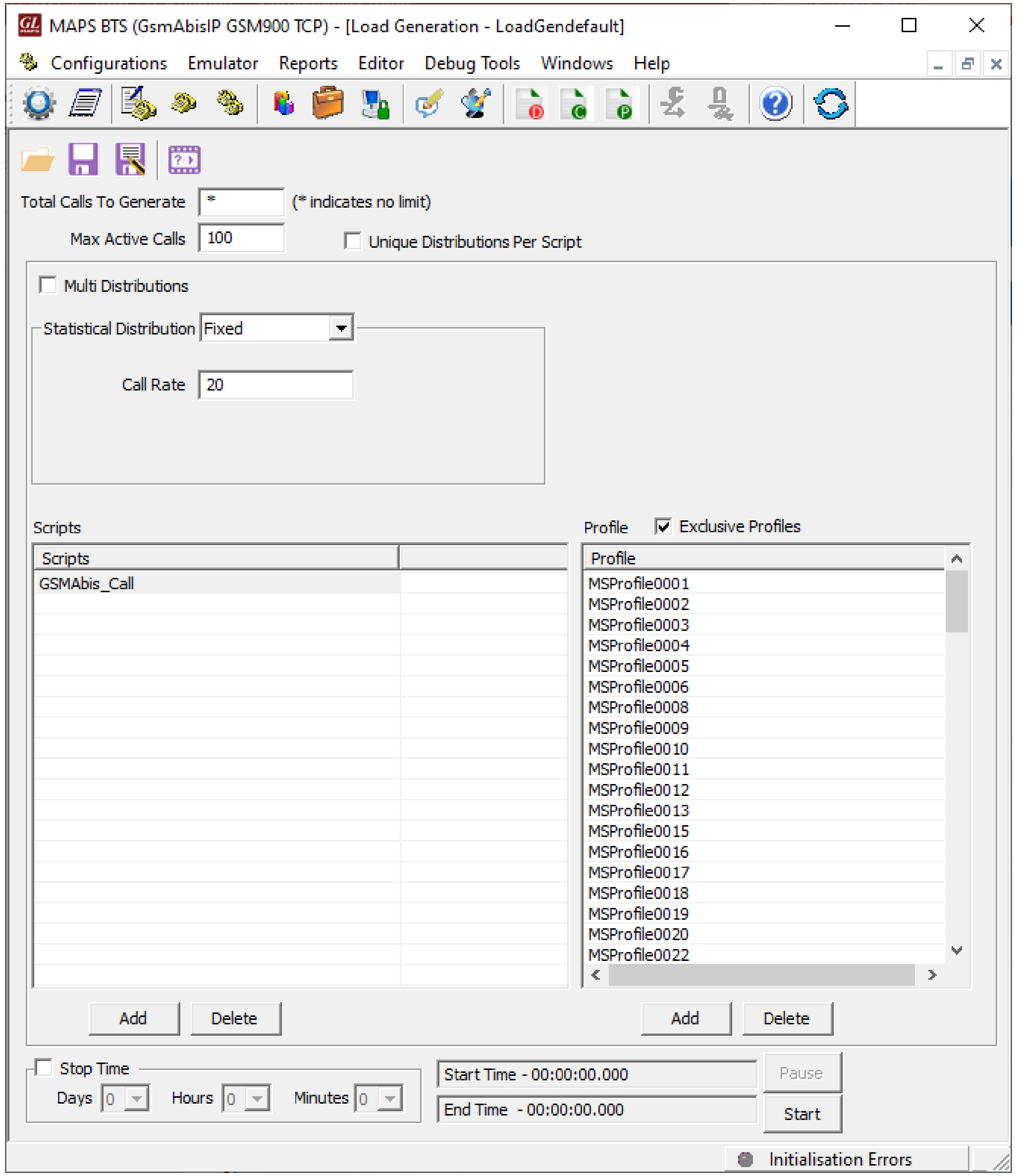


Saw-tooth



Step




MAPS BTS (GsmAbisIP GSM900 TCP) - [Load Generation - LoadGendefault]
Configurations
Emulator
Reports
Editor
Debug Tools
Windows
Help
Scripts
Profile
Add
Delete
Add
Delete
Pause
Start
Initialisation Errors

Total Calls To Generate * (* indicates no limit)

Max Active Calls 100

☐ Unique Distributions Per Script

☐ Multi Distributions

Statistical Distribution Fixed

Call Rate 20

Profile ☑ Exclusive Profiles

Scripts	
GSMAbis_Call	

Profile
MSProfile0001
MSProfile0002
MSProfile0003
MSProfile0004
MSProfile0005
MSProfile0006
MSProfile0008
MSProfile0009
MSProfile0010
MSProfile0011
MSProfile0012
MSProfile0013
MSProfile0015
MSProfile0016
MSProfile0017
MSProfile0018
MSProfile0019
MSProfile0020
MSProfile0022

☐ Stop Time

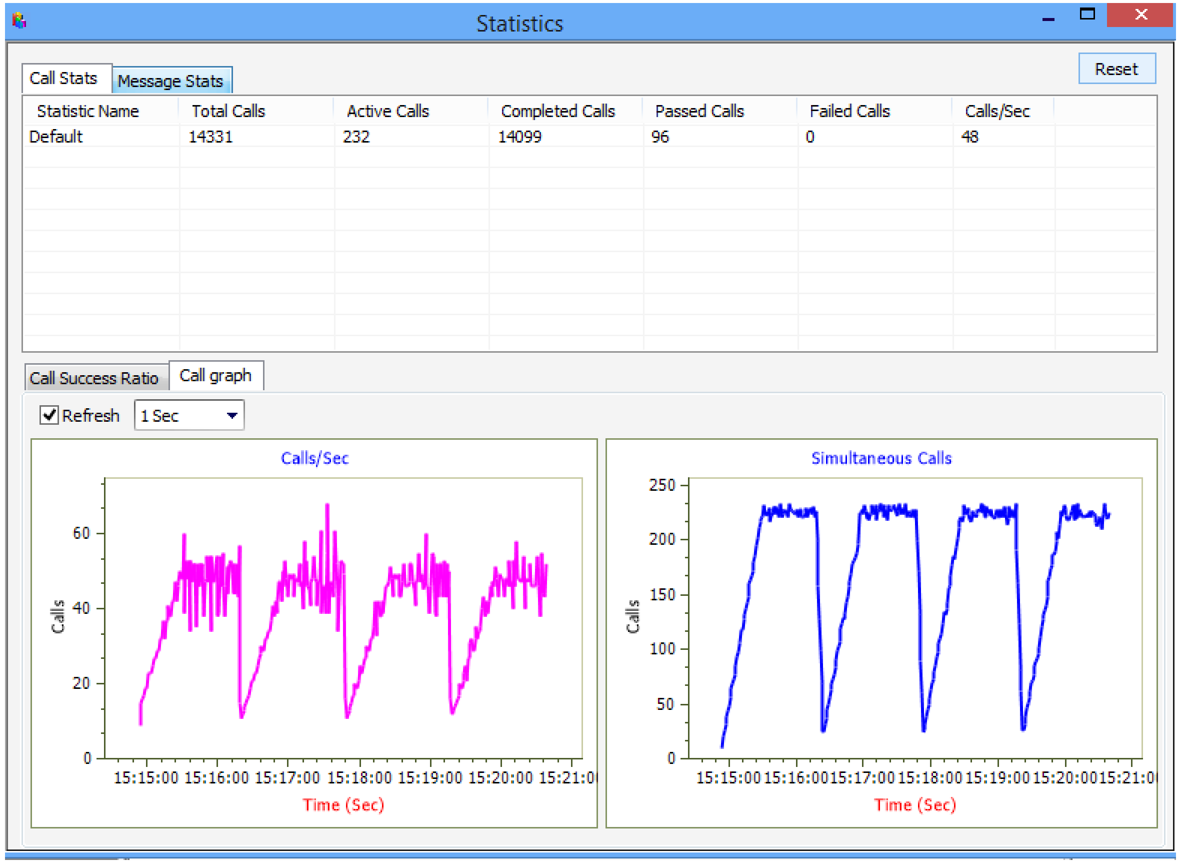
Days 0 Hours 0 Minutes 0

Start Time - 00:00:00.000

End Time - 00:00:00.000

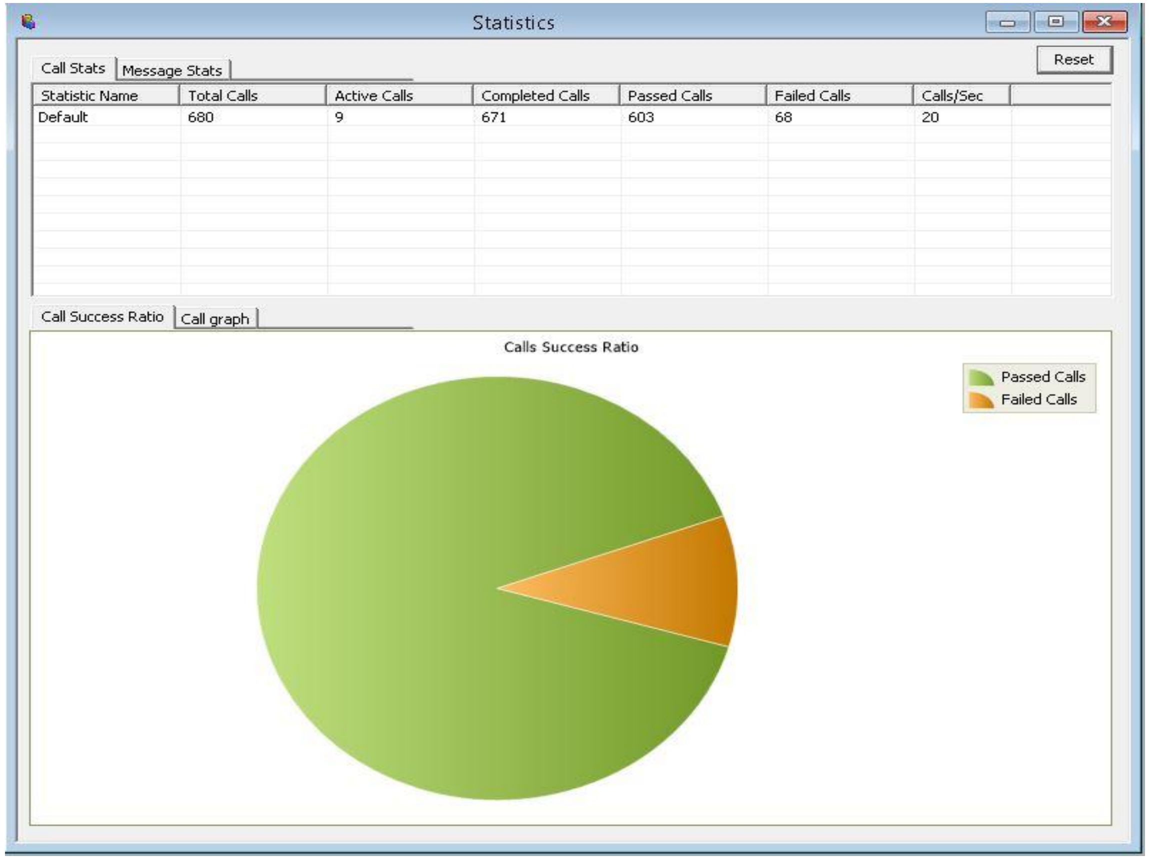
Call Ratio Statistics

Call Graph


Statistics
Call Stats
Message Stats
Reset
Call Success Ratio
Call graph
☑ Refresh
1 Sec
Calls/Sec
Calls
0
20
40
60
15:15:00 15:16:00 15:17:00 15:18:00 15:19:00 15:20:00 15:21:0
Time (Sec)
Simultaneous Calls
Calls
0
50
100
150
200
250
15:15:00 15:16:00 15:17:00 15:18:00 15:19:00 15:20:00 15:21:0
Time (Sec)

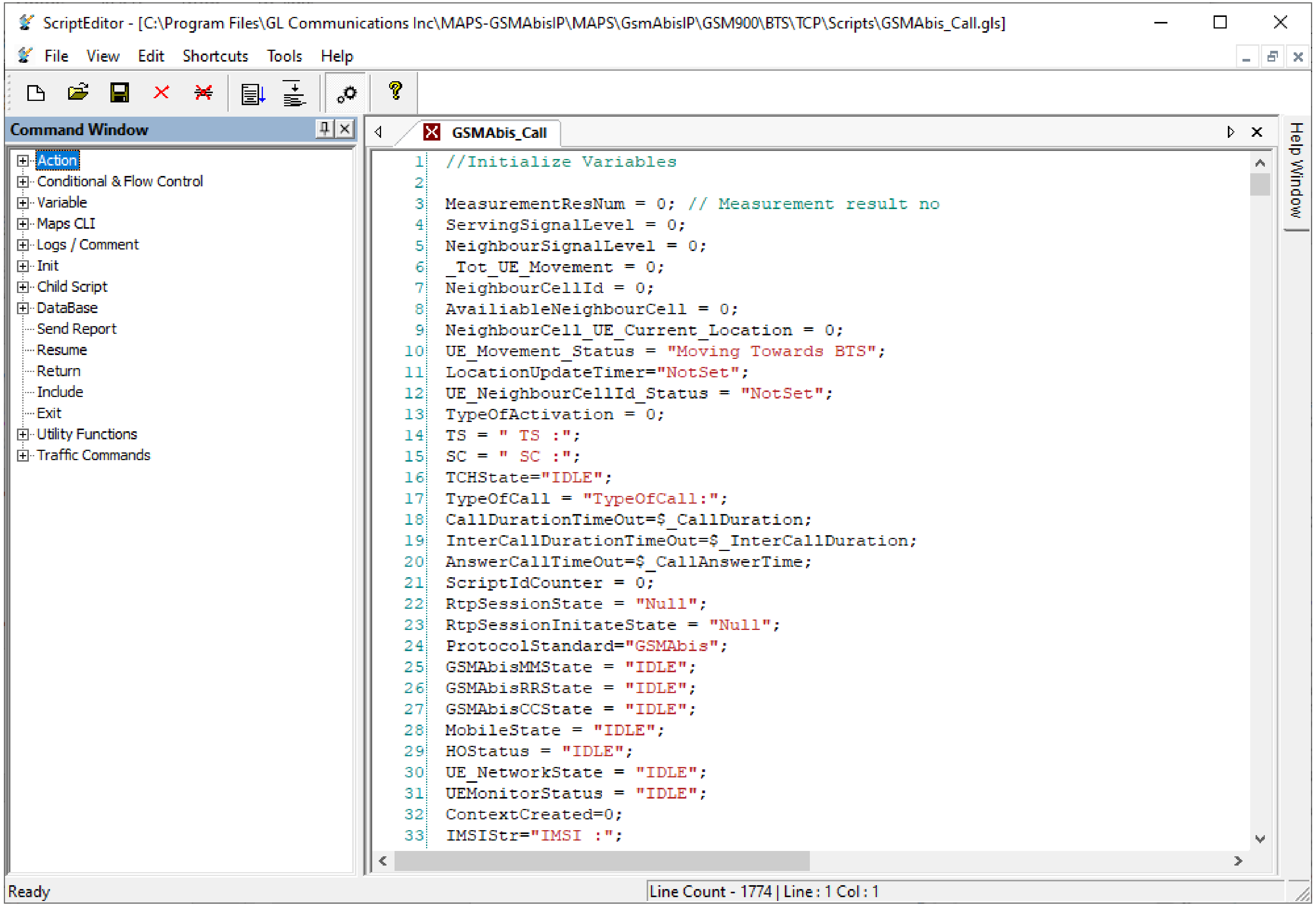
Statistic Name	Total Calls	Active Calls	Completed Calls	Passed Calls	Failed Calls	Calls/Sec
Default	14331	232	14099	96	0	48

Call Statistics


Statistics
Call Stats
Message Stats
Reset
Call Success Ratio
Call graph
Calls Success Ratio
Passed Calls
Failed Calls

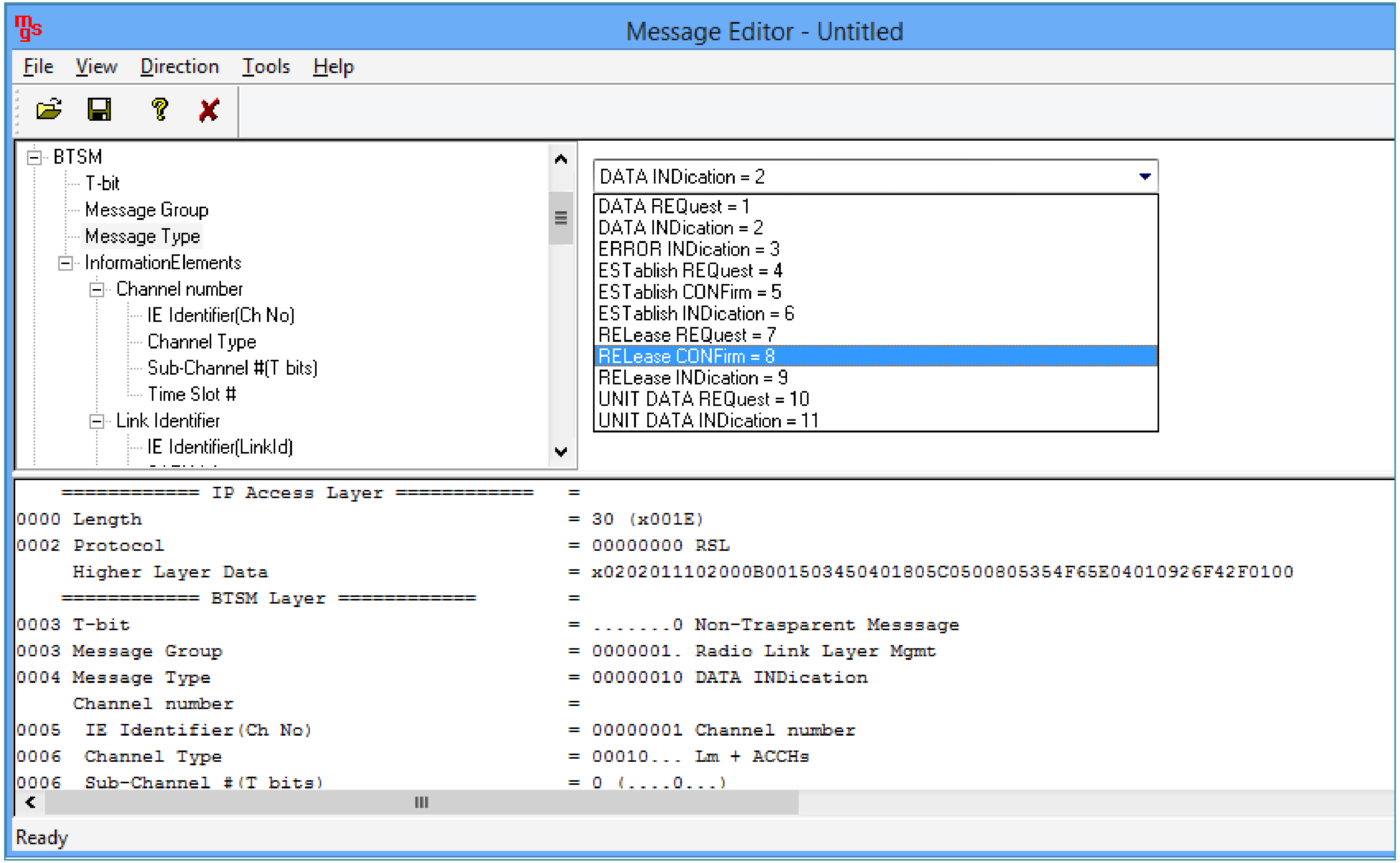
Statistic Name	Total Calls	Active Calls	Completed Calls	Passed Calls	Failed Calls	Calls/Sec
Default	680	9	671	603	68	20

Customizations - Call Flow (Scripts)


ScriptEditor - [C:\Program Files\GL Communications Inc\MAPS-GSMAbisIP\MAPS\GsmAbisIP\GSM900\BTS\TCP\Scripts\GSMAbis_Call.gls]
File
View
Edit
Shortcuts
Tools
Help
Command Window
Action
Conditional & Flow Control
Variable
Maps CLI
Logs / Comment
Init
Child Script
DataBase
Send Report
Resume
Return
Include
Exit
Utility Functions
Traffic Commands
GSMAbis_Call
Help Window
Ready
Line Count - 1774 | Line : 1 Col : 1

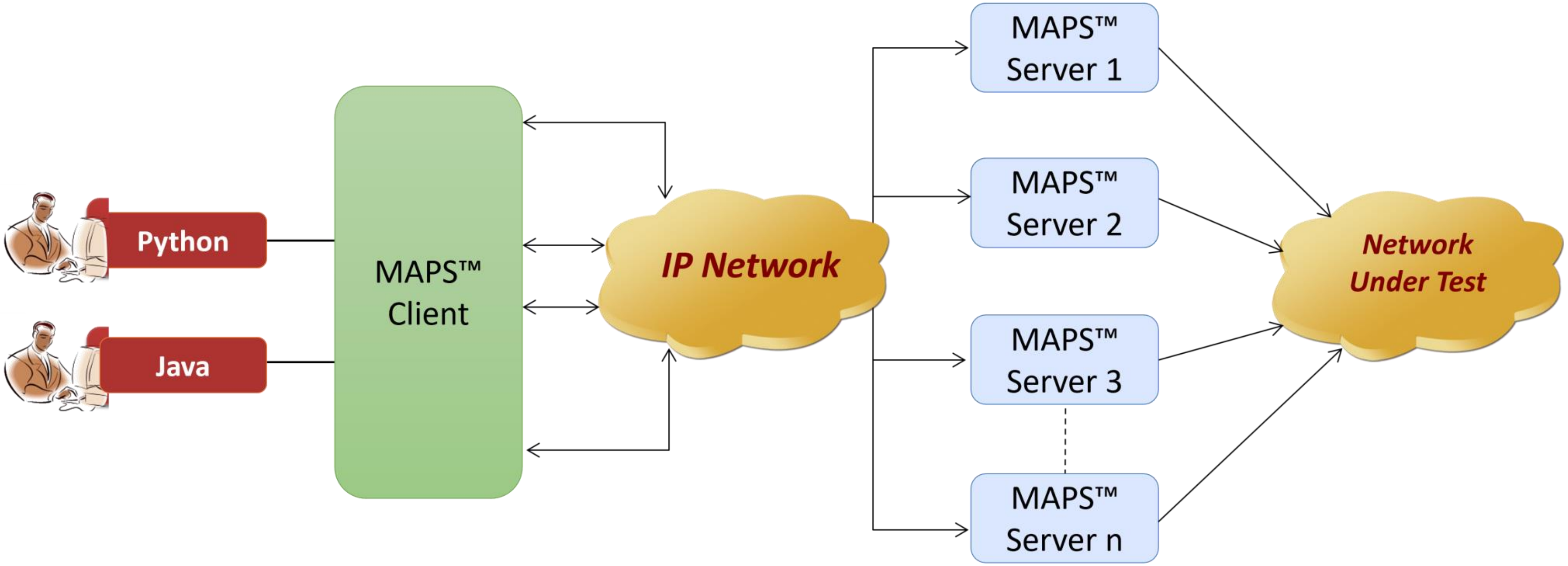
```
//Initialize Variables

MeasurementResNum = 0; // Measurement result no
ServingSignalLevel = 0;
NeighbourSignalLevel = 0;
_Tot_UE_Movement = 0;
NeighbourCellId = 0;
AvailiableNeighbourCell = 0;
NeighbourCell_UE_Current_Location = 0;
UE_Movement_Status = "Moving Towards BTS";
LocationUpdateTimer="NotSet";
UE_NeighbourCellId_Status = "NotSet";
TypeOfActivation = 0;
TS = " TS :";
SC = " SC :";
TCHState="IDLE";
TypeOfCall = "TypeOfCall:";
CallDurationTimeOut=$_CallDuration;
InterCallDurationTimeOut=$_InterCallDuration;
AnswerCallTimeOut=$_CallAnswerTime;
ScriptIdCounter = 0;
RtpSessionState = "Null";
RtpSessionInitateState = "Null";
ProtocolStandard="GSMAbis";
GSMAbisMMState = "IDLE";
GSMAbisRRState = "IDLE";
GSMAbisCCState = "IDLE";
MobileState = "IDLE";
HOStatus = "IDLE";
UE_NetworkState = "IDLE";
UEMonitorStatus = "IDLE";
ContextCreated=0;
IMSIStr="IMSI :";
```

Customizations - Protocol Messages


Message Editor - Untitled
File
View
Direction
Tools
Help
BTSM
T-bit
Message Group
Message Type
InformationElements
Channel number
IE Identifier(Ch No)
Channel Type
Sub-Channel #(T bits)
Time Slot #
Link Identifier
IE Identifier(LinkId)
DATA INDication = 2
DATA REQuest = 1
DATA INDication = 2
ERROR INDication = 3
ESTablish REQuest = 4
ESTablish CONFirm = 5
ESTablish INDication = 6
RELease REQuest = 7
RELease CONFirm = 8
RELease INDication = 9
UNIT DATA REQuest = 10
UNIT DATA INDication = 11
Ready

```
    ============ IP Access Layer ============    =
0000 Length                                      = 30 (x001E)
0002 Protocol                                    = 00000000 RSL
     Higher Layer Data                           = x0202011102000B001503450401805C0500805354F65E04010926F42F0100
    ============ BTSM Layer ============         =
0003 T-bit                                       = .......0 Non-Trasparent Messsage
0003 Message Group                               = 0000001. Radio Link Layer Mgmt
0004 Message Type                                = 00000010 DATA INDication
     Channel number                              =
0005  IE Identifier(Ch No)                       = 00000001 Channel number
0006  Channel Type                               = 00010... Lm + ACCHs
0006  Sub-Channel #(T bits)                      = 0 (....0...)
```

MAPS™ API Architecture

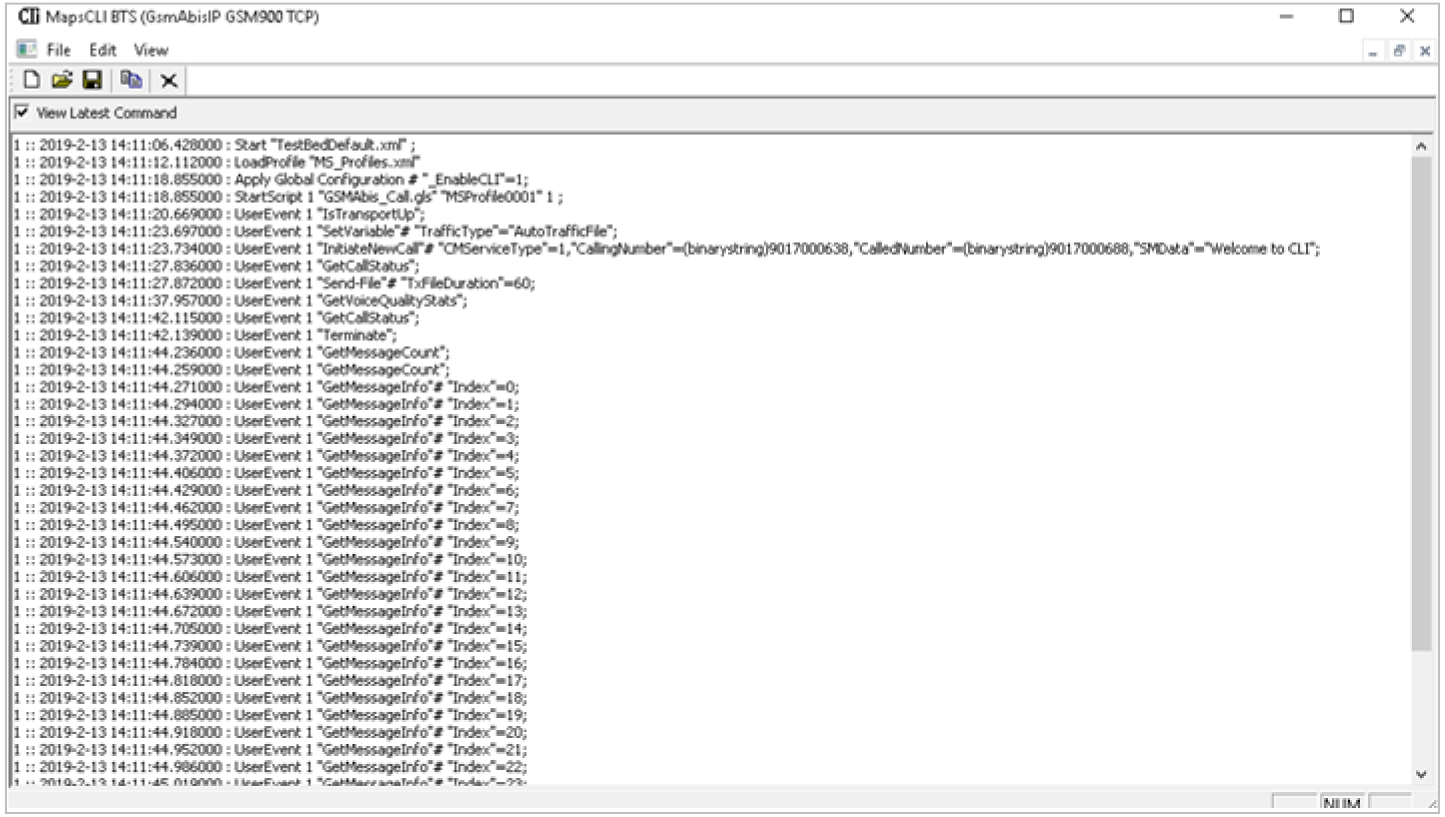

Python
Java
MAPS™ Client
IP Network
MAPS™ Server 1
MAPS™ Server 2
MAPS™ Server 3
MAPS™ Server n
Network Under Test

- 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

GL Communications

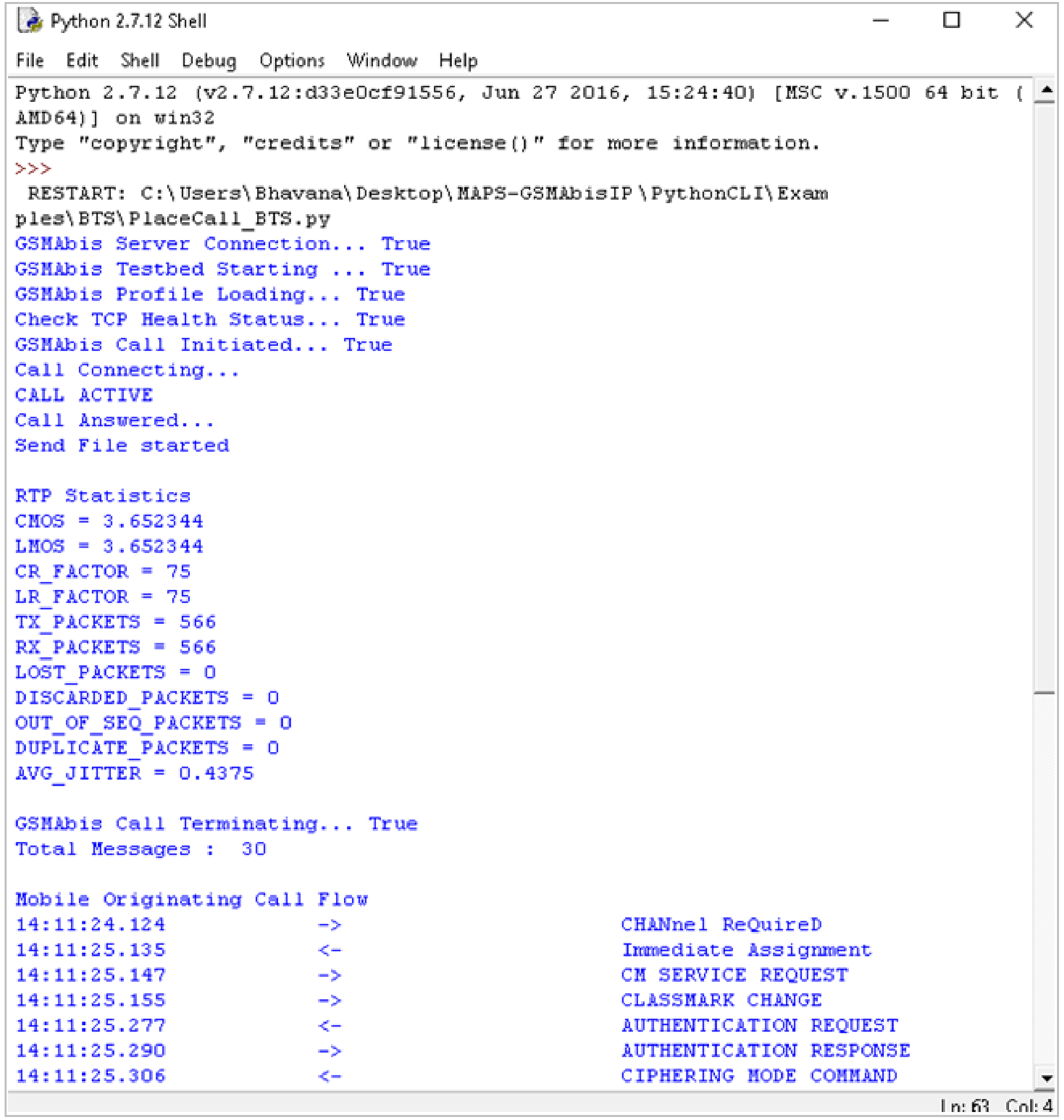
CLI Support

MAPS CLI Server



```
1 :: 2019-2-13 14:11:06.428000 : Start "TestBedDefault.xml" ;
1 :: 2019-2-13 14:11:12.112000 : LoadProfile "MS_Profiles.xml"
1 :: 2019-2-13 14:11:18.855000 : Apply Global Configuration # "_EnableCLI"=1;
1 :: 2019-2-13 14:11:18.855000 : StartScript 1 "GSMAbis_Call.gls" "MSProfile0001" 1 ;
1 :: 2019-2-13 14:11:20.669000 : UserEvent 1 "IsTransportUp";
1 :: 2019-2-13 14:11:23.697000 : UserEvent 1 "SetVariable"# "TrafficType"="AutoTrafficFile";
1 :: 2019-2-13 14:11:23.734000 : UserEvent 1 "InitiateNewCall"# "CMServiceType"=1,"CallingNumber"=(binarystring)9017000638,"CalledNumber"=(binarystring)9017000688,"SMData"="Welcome to CLI";
1 :: 2019-2-13 14:11:27.836000 : UserEvent 1 "GetCallStatus";
1 :: 2019-2-13 14:11:27.872000 : UserEvent 1 "Send-File"# "TxFileDuration"=60;
1 :: 2019-2-13 14:11:37.957000 : UserEvent 1 "GetVoiceQualityStats";
1 :: 2019-2-13 14:11:42.115000 : UserEvent 1 "GetCallStatus";
1 :: 2019-2-13 14:11:42.139000 : UserEvent 1 "Terminate";
1 :: 2019-2-13 14:11:44.236000 : UserEvent 1 "GetMessageCount";
1 :: 2019-2-13 14:11:44.259000 : UserEvent 1 "GetMessageCount";
1 :: 2019-2-13 14:11:44.271000 : UserEvent 1 "GetMessageInfo"# "Index"=0;
1 :: 2019-2-13 14:11:44.294000 : UserEvent 1 "GetMessageInfo"# "Index"=1;
1 :: 2019-2-13 14:11:44.327000 : UserEvent 1 "GetMessageInfo"# "Index"=2;
1 :: 2019-2-13 14:11:44.349000 : UserEvent 1 "GetMessageInfo"# "Index"=3;
1 :: 2019-2-13 14:11:44.372000 : UserEvent 1 "GetMessageInfo"# "Index"=4;
1 :: 2019-2-13 14:11:44.406000 : UserEvent 1 "GetMessageInfo"# "Index"=5;
1 :: 2019-2-13 14:11:44.429000 : UserEvent 1 "GetMessageInfo"# "Index"=6;
1 :: 2019-2-13 14:11:44.462000 : UserEvent 1 "GetMessageInfo"# "Index"=7;
1 :: 2019-2-13 14:11:44.495000 : UserEvent 1 "GetMessageInfo"# "Index"=8;
1 :: 2019-2-13 14:11:44.540000 : UserEvent 1 "GetMessageInfo"# "Index"=9;
1 :: 2019-2-13 14:11:44.573000 : UserEvent 1 "GetMessageInfo"# "Index"=10;
1 :: 2019-2-13 14:11:44.606000 : UserEvent 1 "GetMessageInfo"# "Index"=11;
1 :: 2019-2-13 14:11:44.639000 : UserEvent 1 "GetMessageInfo"# "Index"=12;
1 :: 2019-2-13 14:11:44.672000 : UserEvent 1 "GetMessageInfo"# "Index"=13;
1 :: 2019-2-13 14:11:44.705000 : UserEvent 1 "GetMessageInfo"# "Index"=14;
1 :: 2019-2-13 14:11:44.739000 : UserEvent 1 "GetMessageInfo"# "Index"=15;
1 :: 2019-2-13 14:11:44.784000 : UserEvent 1 "GetMessageInfo"# "Index"=16;
1 :: 2019-2-13 14:11:44.818000 : UserEvent 1 "GetMessageInfo"# "Index"=17;
1 :: 2019-2-13 14:11:44.852000 : UserEvent 1 "GetMessageInfo"# "Index"=18;
1 :: 2019-2-13 14:11:44.885000 : UserEvent 1 "GetMessageInfo"# "Index"=19;
1 :: 2019-2-13 14:11:44.918000 : UserEvent 1 "GetMessageInfo"# "Index"=20;
1 :: 2019-2-13 14:11:44.952000 : UserEvent 1 "GetMessageInfo"# "Index"=21;
1 :: 2019-2-13 14:11:44.986000 : UserEvent 1 "GetMessageInfo"# "Index"=22;
1 :: 2019-2-13 14:11:45.019000 : UserEvent 1 "GetMessageInfo"# "Index"=23;
```

Python Client Sample Script



```
Python 2.7.12 (v2.7.12:d33e0cf91556, Jun 27 2016, 15:24:40) [MSC v.1500 64 bit (
AMD64)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
 RESTART: C:\Users\Bhavana\Desktop\MAPS-GSMAbisIP\PythonCLI\Exam
ples\BTS\PlaceCall_BTS.py
GSMAbis Server Connection... True
GSMAbis Testbed Starting ... True
GSMAbis Profile Loading... True
Check TCP Health Status... True
GSMAbis Call Initiated... True
Call Connecting...
CALL ACTIVE
Call Answered...
Send File started

RTP Statistics
CMOS = 3.652344
LMOS = 3.652344
CR_FACTOR = 75
LR_FACTOR = 75
TX_PACKETS = 566
RX_PACKETS = 566
LOST_PACKETS = 0
DISCARDED_PACKETS = 0
OUT_OF_SEQ_PACKETS = 0
DUPLICATE_PACKETS = 0
AVG_JITTER = 0.4375

GSMAbis Call Terminating... True
Total Messages :  30

Mobile Originating Call Flow
14:11:24.124            ->                    CHANnel ReQuireD
14:11:25.135            <-                    Immediate Assignment
14:11:25.147            ->                    CM SERVICE REQUEST
14:11:25.155            ->                    CLASSMARK CHANGE
14:11:25.277            <-                    AUTHENTICATION REQUEST
14:11:25.290            ->                    AUTHENTICATION RESPONSE
14:11:25.306            <-                    CIPHERING MODE COMMAND
```

Thank You