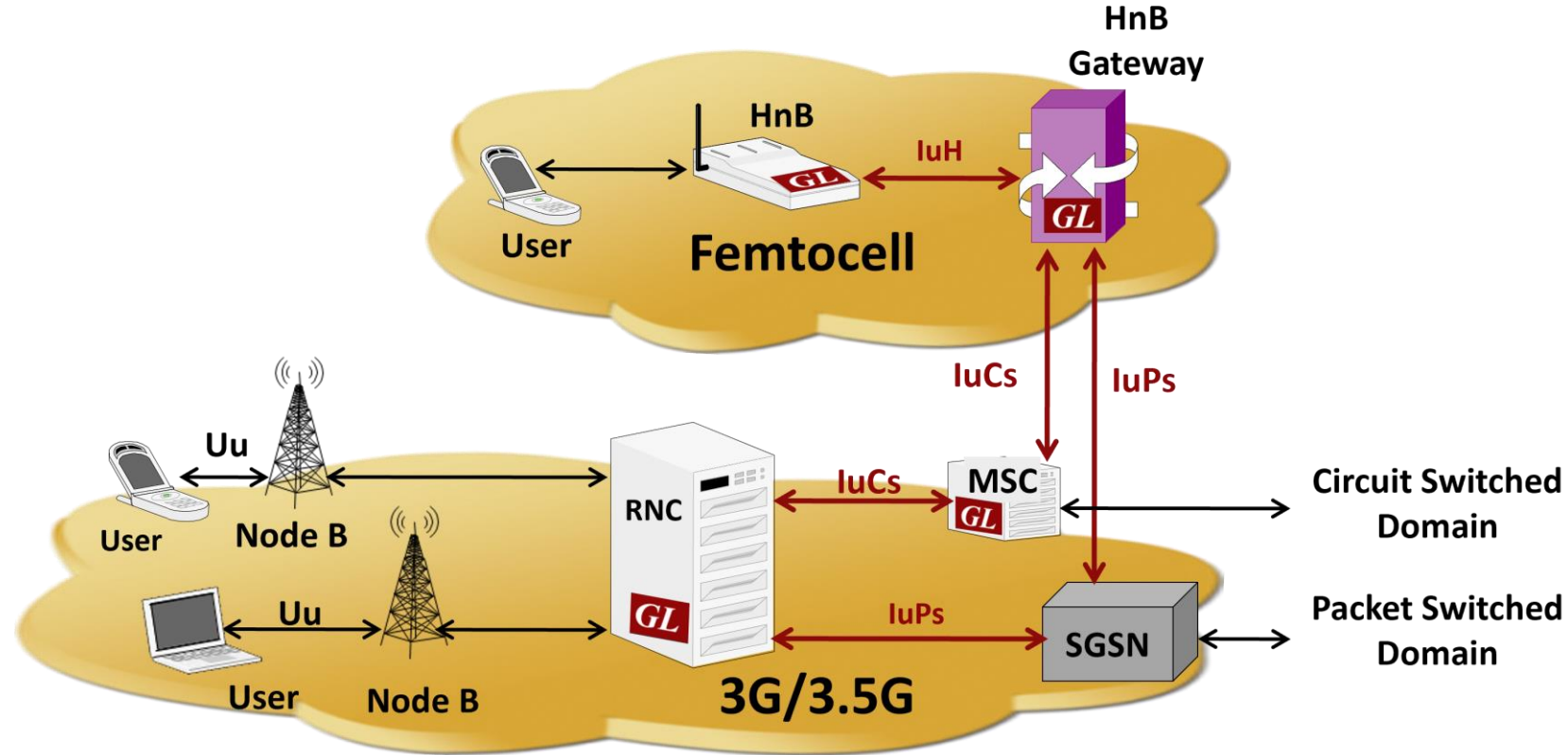

MAPS™ UMTS Emulator for IuCS and IuH Interfaces

(IuCS Emulation over IP and ATM; and IuH Emulation over IP)



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>

MAPS™ UMTS for IuCS and IuH Interfaces



MAPS™ UMTS-IuCs and IuH Emulator
(Generate up to 20,000 Subscribers
Up to 2000 Simultaneous Calls)



MAPS™ UMTS-IuCS and IuH Emulator
HD RTP Generator Hardware
(Generate up to 20,000 Subscribers
20,000 Simultaneous Calls (with RTP Traffic))

Highlights

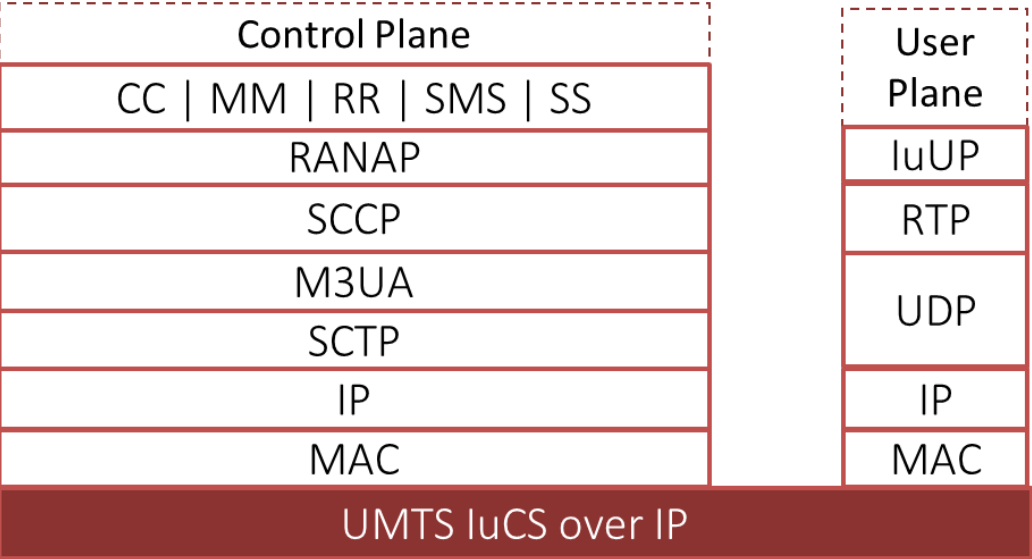
- Emulates RNC, MSC, Home NodeB (HnB) and Home NodeB Gateway (HN GW) entities
- Generates and process all Mobility Management, Session Management, RANAP, ALCAP, and DTAP messages over SSCOP
- User controlled access to RANAP, and DTAP signaling messages over SCTP
- Ready scripts for Mobile Originating, Mobile Terminating, Location Updating procedures for quick testing
- Supports RAB Assignment, Authentication, TMSI Reallocation, Encryption, and other optional procedures
- SSCOP links over which RANAP and ALCAP signaling will be carried further for making calls
- SSCOP Server (GL's WCS based server module) provides SSCOP, AAL5 and AAL2 layer services
- Supports various traffic types including Tone, Digits and File playback over AAL2
- Supports traffic over lu UP protocol layer and also over normal RTP sessions (requires additional licenses)
- All Codec supported including - G.711, G.711 App II with VAD, G.729, G.726, G.726 with VAD, GSM, AMR NB and WB, EVRC, SMV, iLBC, SPEEX NB and WB, G722, and G722.1

High Density (HD) RTP Traffic Simulation

- Rackmount network appliance with 4x1GigE NIC
- Transport over UDP and TCP, IPv4 and IPv6, and TLS for secure transport
- Easily achieve up to 20,000 endpoints per appliance (5000 per port)
- Up to 250 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



UMTS IuCS IP Protocol Stack



Supported Protocols	Specification Used
IuCS IP Interface	
SCCP	Q.713, CCITT (ITU-T) Blue Book
MTP3	Q.703, ITU-T Blue Book
RANAP	3GPP TS 25.413 V9.1.0
MM / CC	3GPP TS 24.008 V5.16.0 (2006-06)
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
Iu-UP (User Plane)	3GPP TS 25.415
SCTP	RFC4960

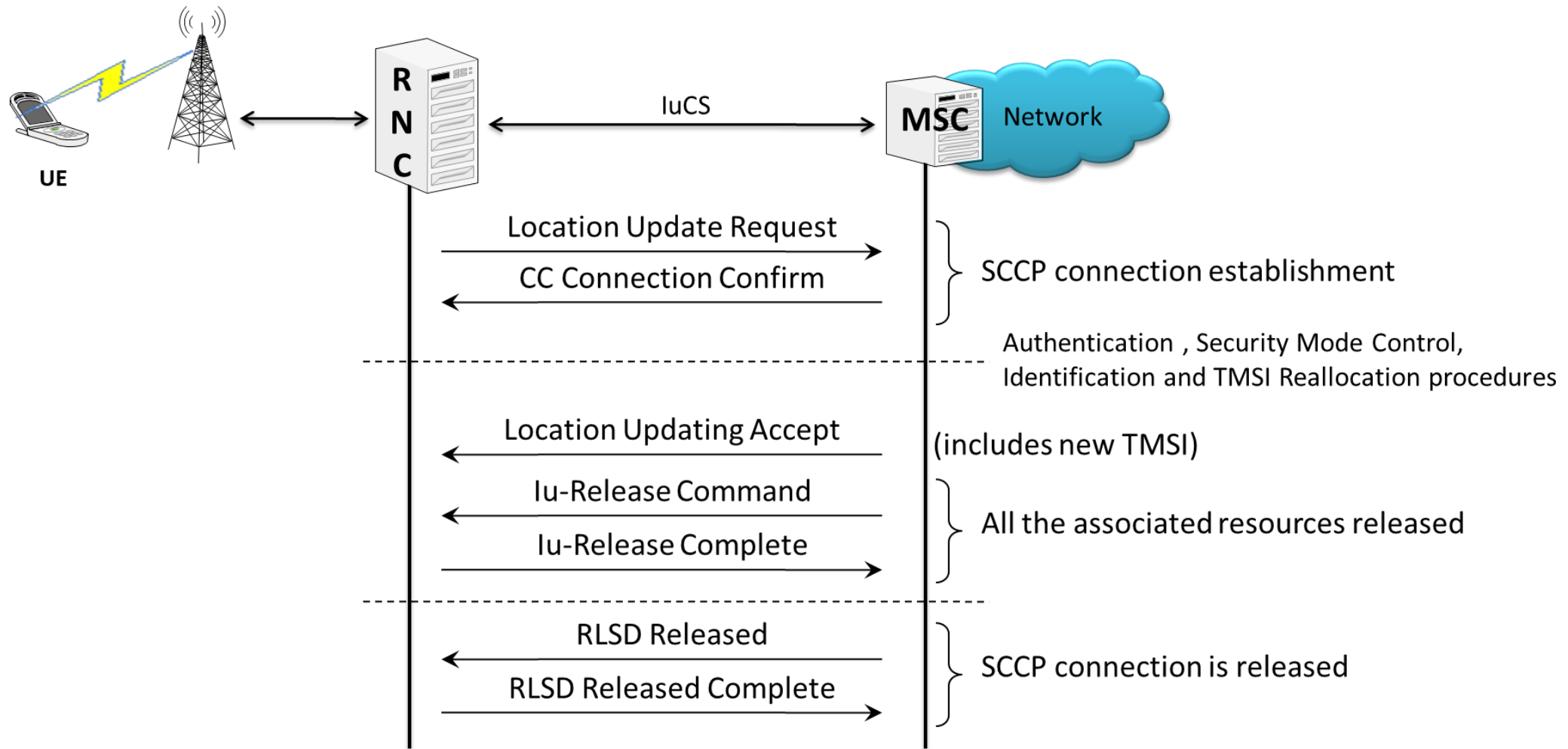
UMTS IuCS ATM Protocol Stack

CC MM RR	
ALCAP	
MTP3B	
SSCF-NNI	Codec
SSCOP	Iu UP
AAL5	AAL2
ATM	ATM
IuCS ATM	

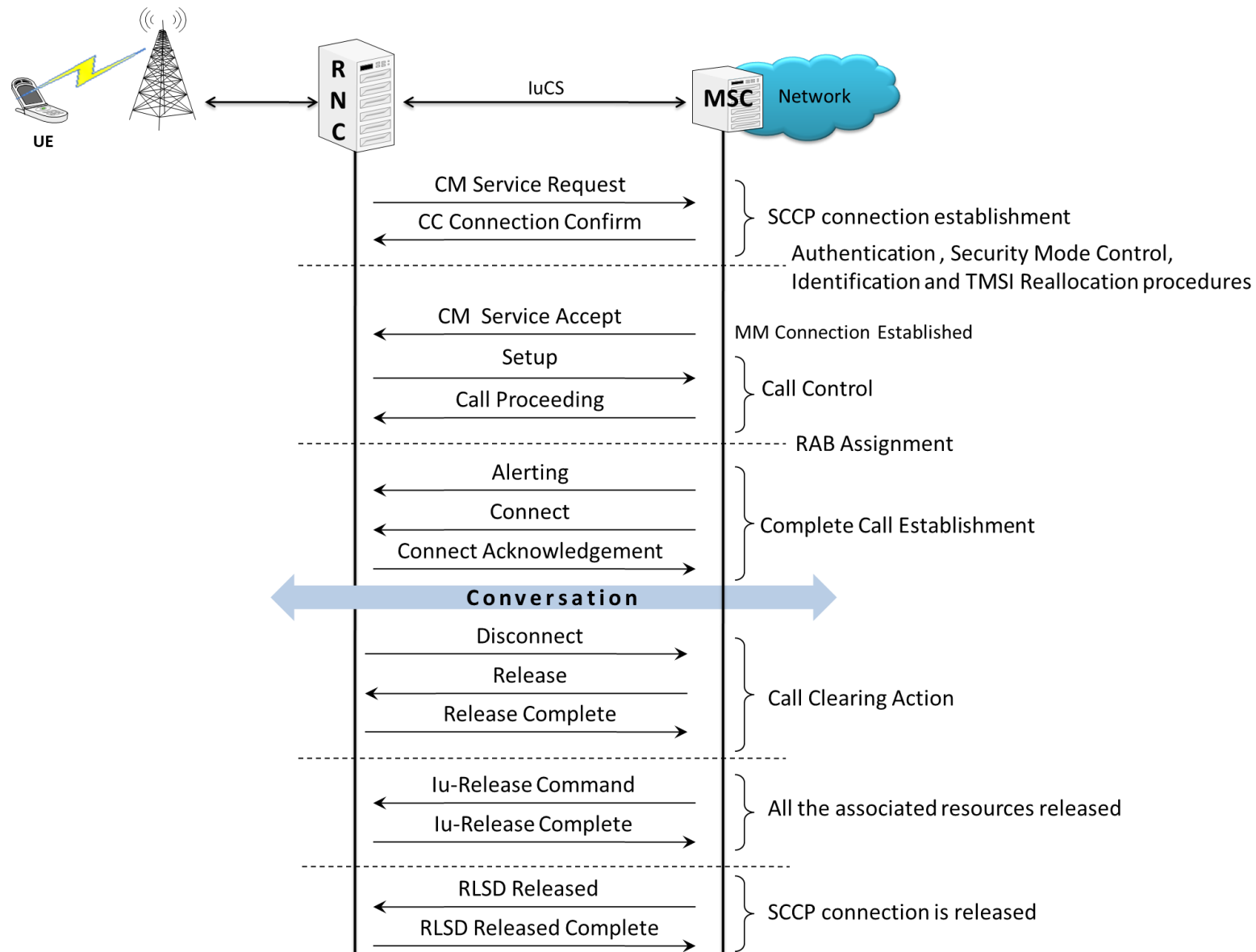
Supported Protocols	Specification Used
IuCS ATM Interface	
SSCOP	ITU-T Q.2110
MTP3b	ITU-T Recommendation Q.2210
AAL Type 2 (ALCAP)	ITU-T Recommendation Q.2630.1
RANAP	3GPP TS 25.413 V9.1.0
MM / CC	3GPP TS 24.008 V5.16.0 (2006-06)
RR	3GPP TS 04.18 V8.13.0
SMS	3GPP TS 03.40 V7.5.0 & 3GPP TS 04.11 V7.1.0 GSM 03.38 version 7.2.0 Release 1998
Iu-UP Iu User Plane Interface	3GPP TS 25.415

Call Emulation Procedures over IP

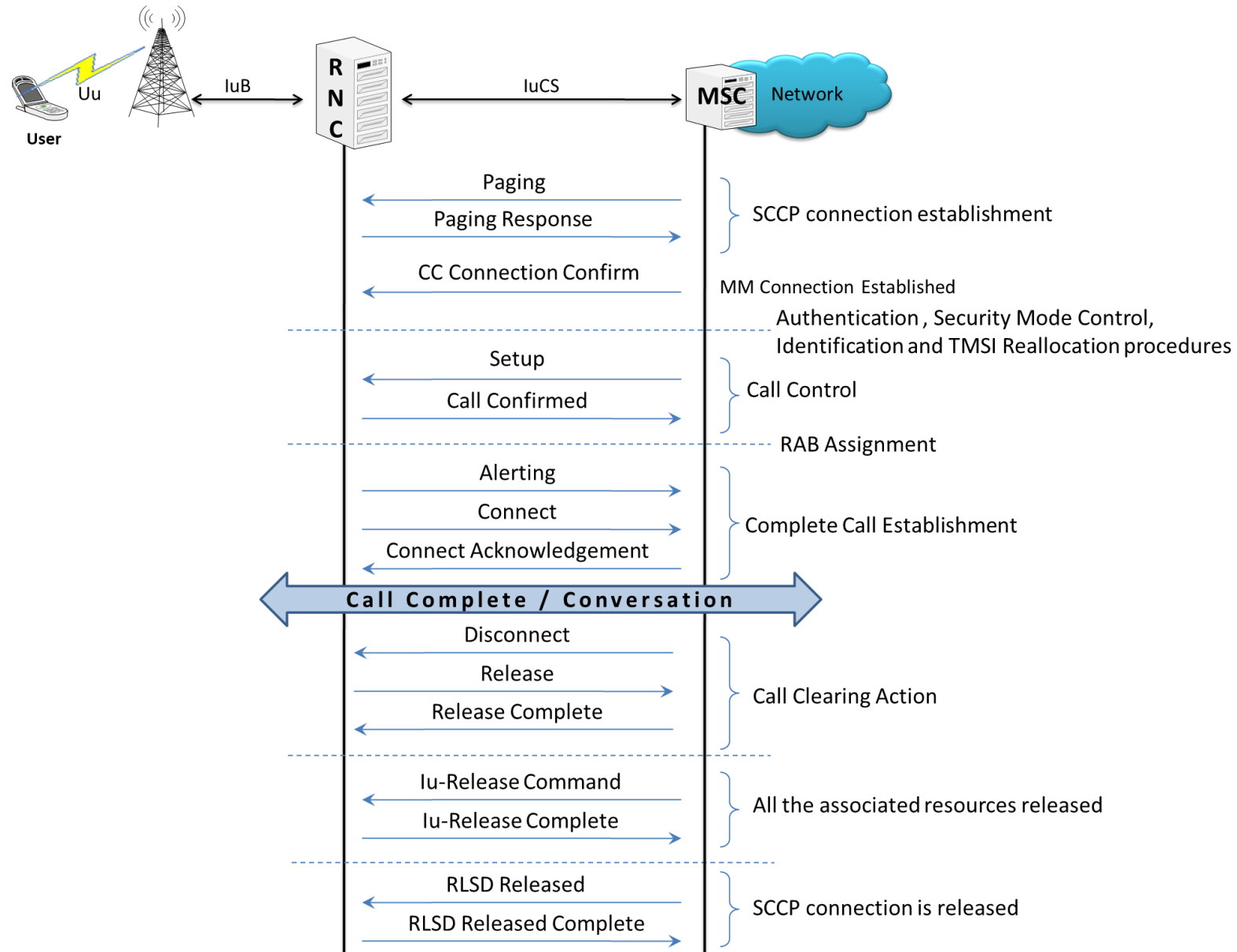
Location Updating (LU) Call Flow



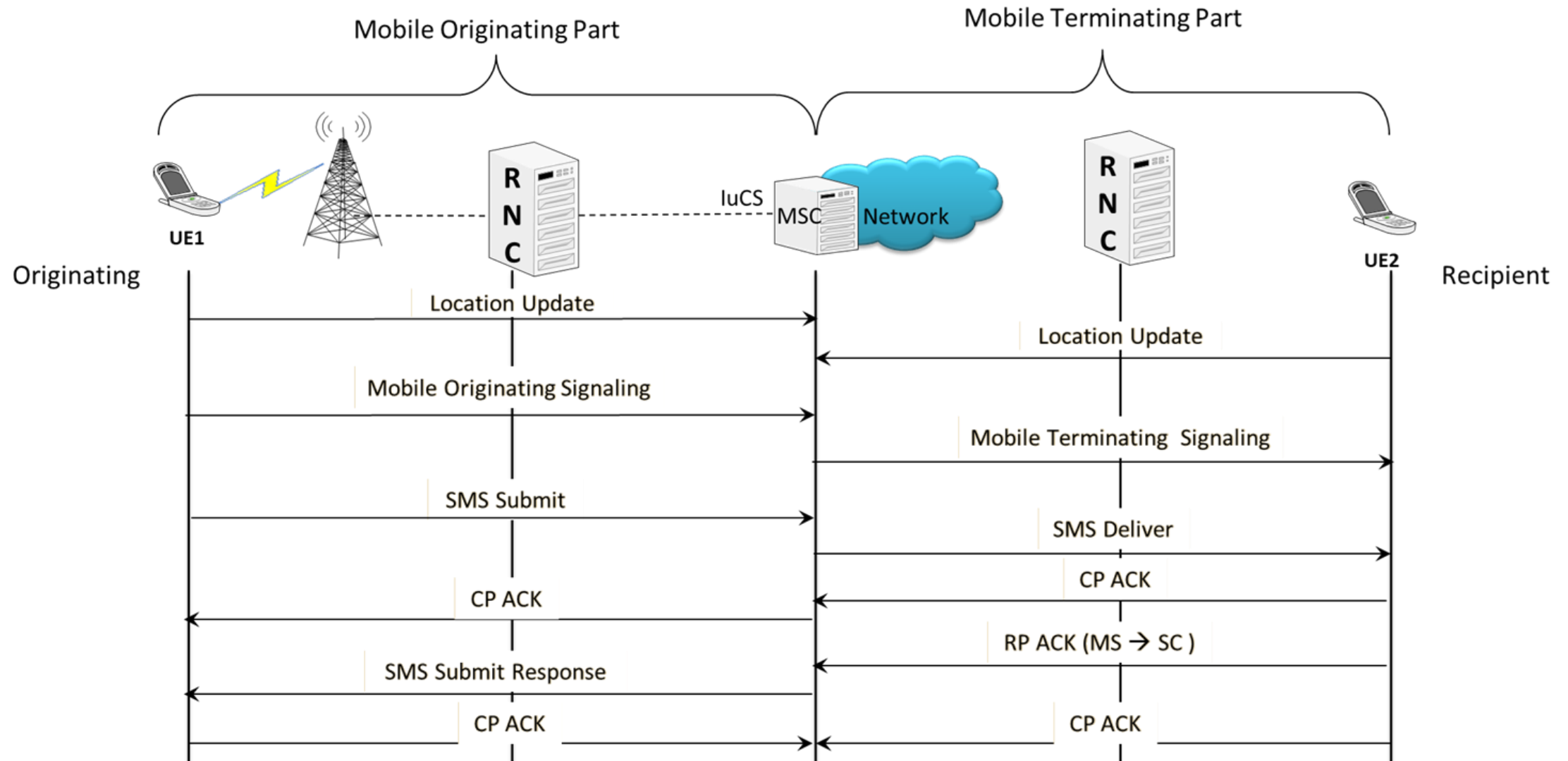
Mobile Originating Call Procedure



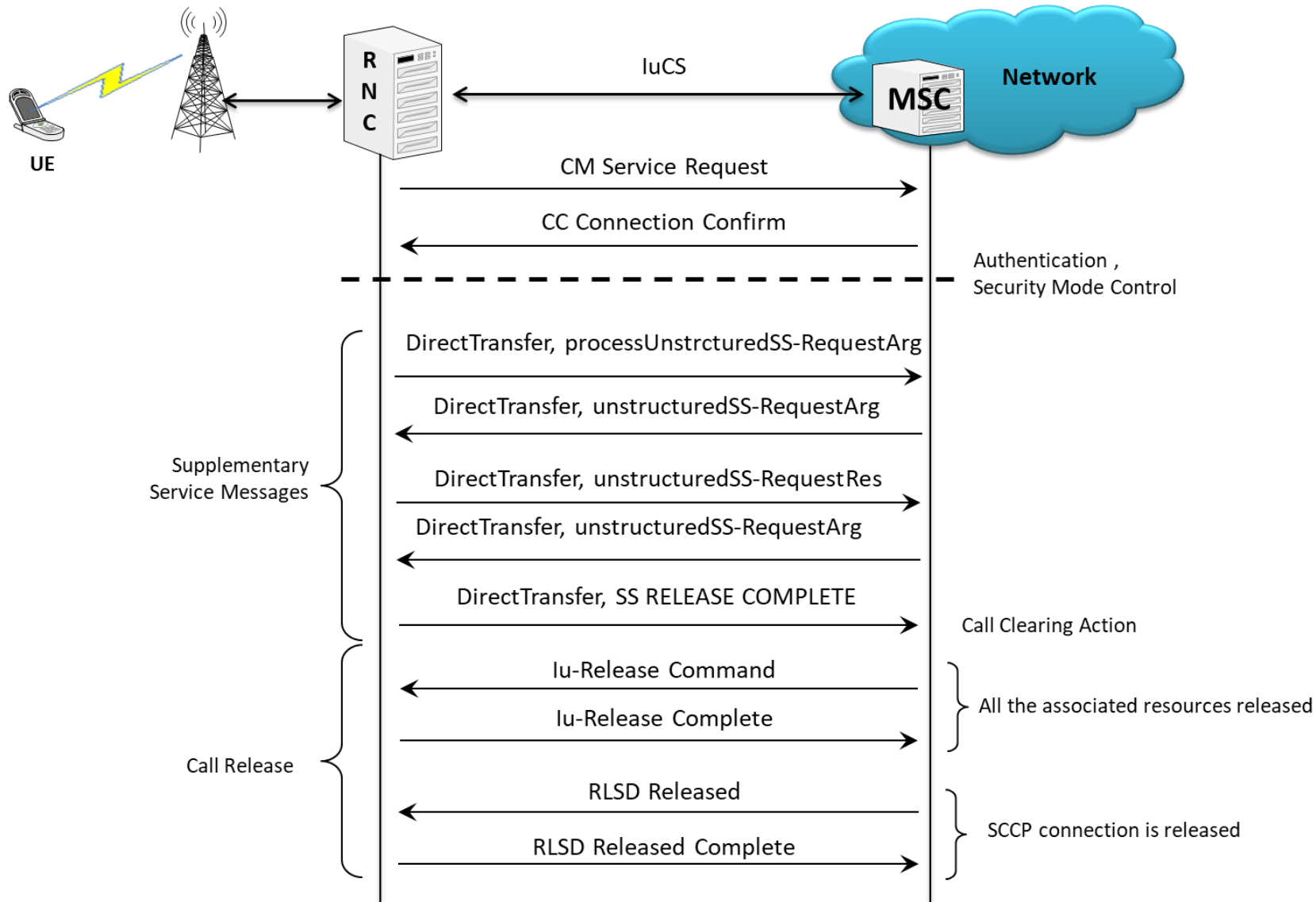
Mobile Terminating Call Procedure



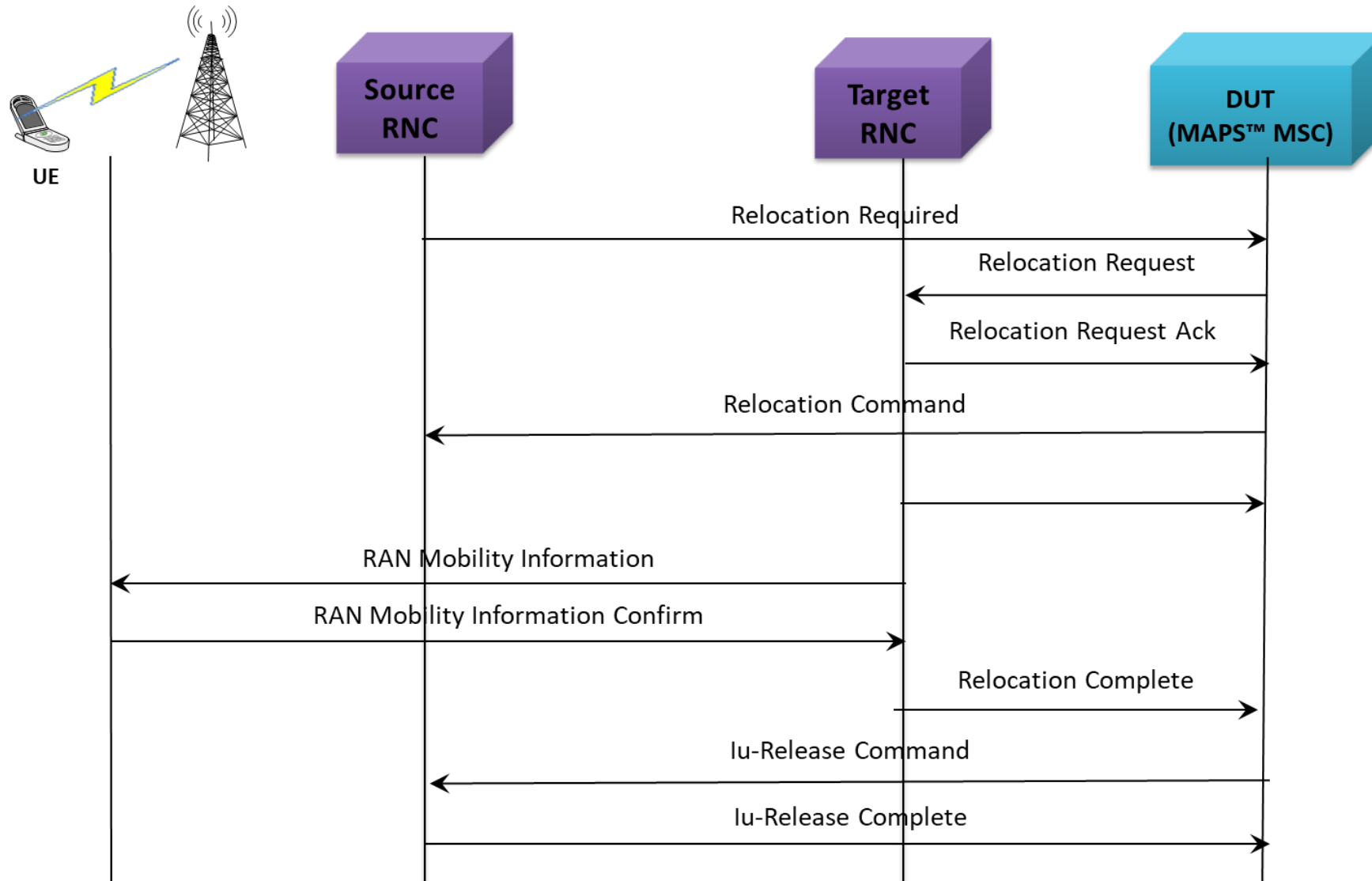
Mobile to Mobile SMS Call Procedure



Supplementary Service Call Flow

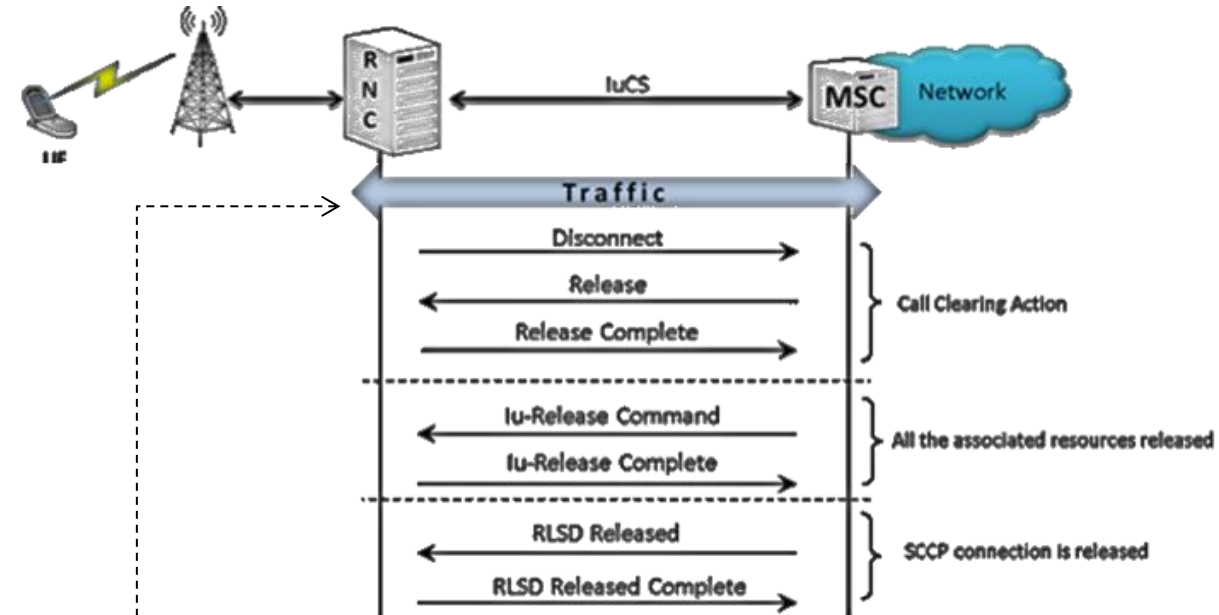
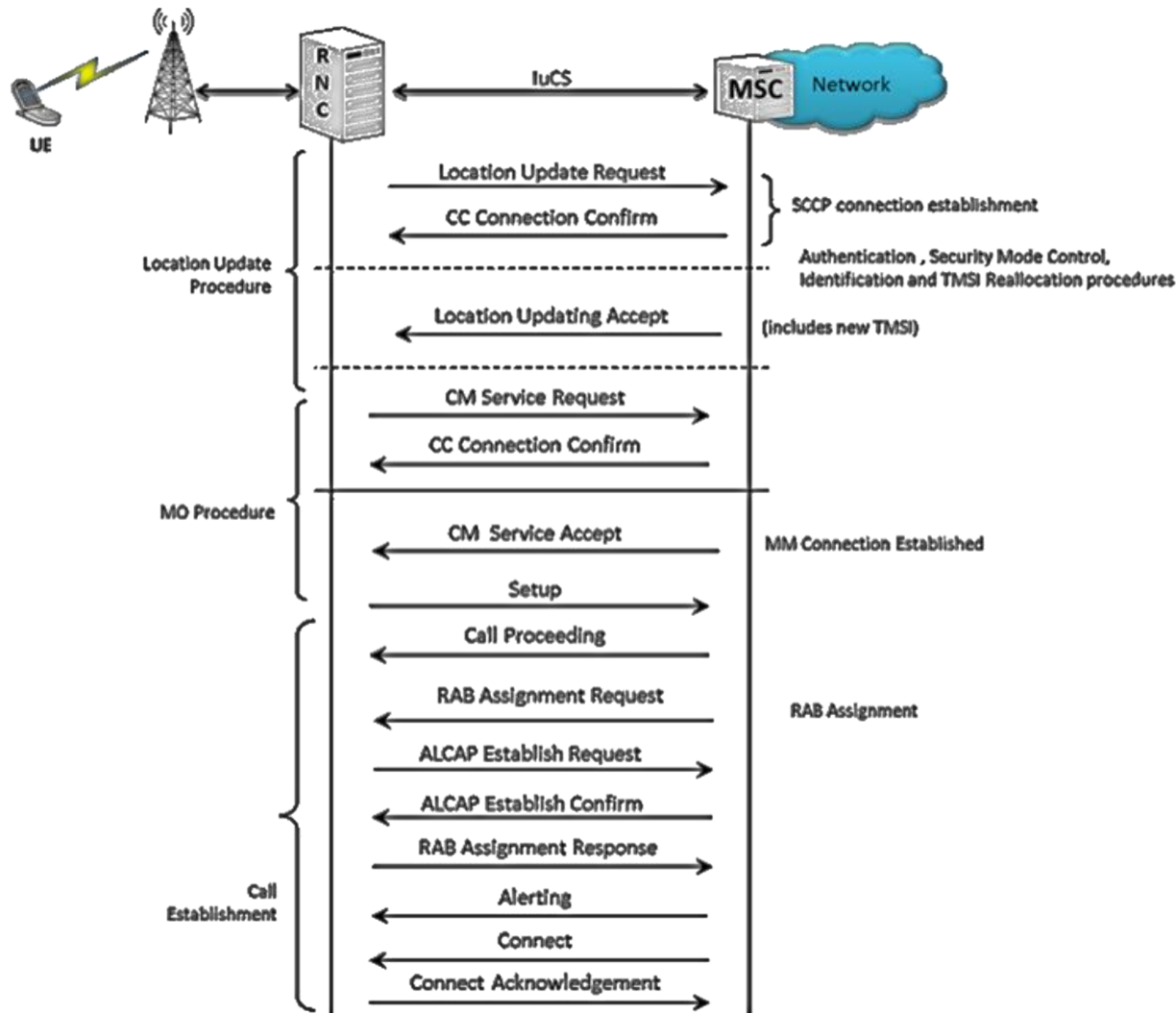


Relocation Call Procedure

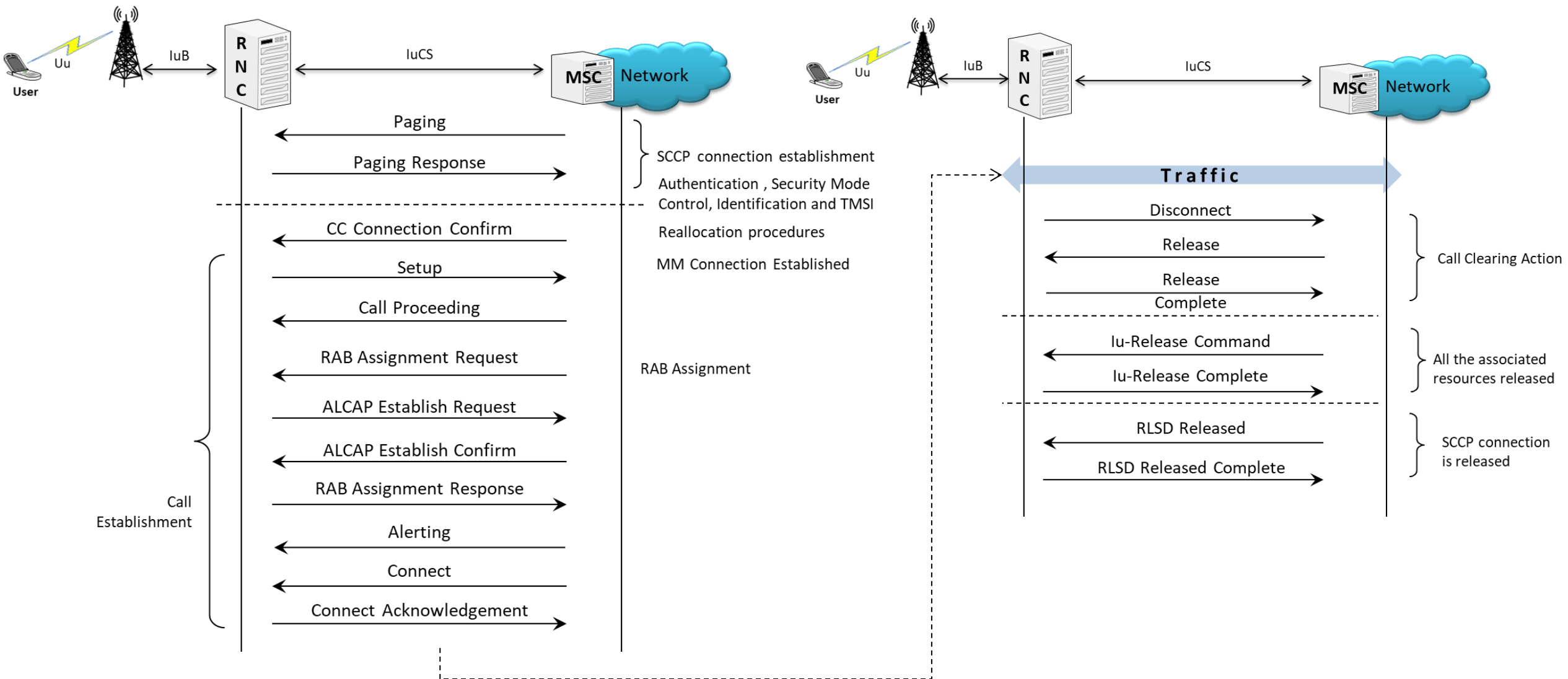


Call Emulation Procedures over ATM

MO Call Procedure



MT Call Procedure



Testbed Configuration

GL MAPS RNC (UMTS IUCS 3GPP SCTP) - [Testbed Setup - TestBedDefault]

Configurations Emulator Reports Editor Debug Tools Windows Help

Config Value

RNC Configurations

- M3UA Termination Type: IPSP
- Enable RTP Simulation: Enable
- RTP Hardware Interface Type: GL High Density Card On Rem...
- RNC
 - RNC 1
 - RNC IP Address: 192.168.13.34
 - MGW IP Address: 192.168.13.34
 - RNC Port: 2905
 - PLMN Identifiers
 - Mobile Country Code: 001
 - Mobile Network Code: 01
 - Location Area Identifiers
 - Location Area Code: 0001
 - Service Area Code: 0001
 - RNC ID: 2
 - M3UA Parameters
 - RNC Point Code: 1.1.2
 - Signaling Link Selection: 1
 - Network Indicator: National
 - RNC Address Indicator: National
 - M3UA Routing Context Indicator: Absent
 - M3UA Routing Context: 1
 - M3UA Network Appearance Indiac...: Absent
 - M3UA Network Appearance: 12
 - MSC Parameters
 - MSC IP Address: 192.168.13.28
 - MSC Port: 2905
 - MSC Point Code: 2.2.2
 - MSC Address Indicator: International
 - HD RTP Media Configuration
 - RTP Cores
 - RTP Cores 1
 - RTP Port Index On Local PC
 - RTP Port Index On Remote PC: Port_0
 - Remote HD RTP Media IP Address: 192.168.12.163
 - RTP Media IP Address: 192.168.12.70
 - Default Gateway Configuration

Start Edit

Initialisation Errors Error Events

Profile Configuration

MAPS RNC (UMTS IUCS 3GPP SCTP) - [Profile Editor -MS_Profiles]

Configurations Emulator Reports Editor Debug Tools Windows Help

Profiles (Edit-F2)

#	Profiles (Edit-F2)	Config	Value	Enable
1	MSProfile0001	MSProfile0001		<input checked="" type="checkbox"/>
2	MSProfile0002	CM Service Type	Mobile Originating Call Estab...	
3	MSProfile0003	Location Update Type	Normal location updating	
4	MSProfile0004	Supplementary Service Type	USSD	
5	MSProfile0005	Mobile ID		
6	MSProfile0006	Type Of Identity	IMSI	
7	MSProfile0007	IMEI	353887067326268	
8	MSProfile0008	IMEISV	3538870673262601	
9	MSProfile0009	IMSI	001013014041741	
10	MSProfile0010	TMSI	01110001	
11	MSProfile0011	MSISDN		
12	MSProfile0012	Called Number Parameters		
13	MSProfile0013	Numbering plan identification	ISDN/Telphony numbering p...	
14	MSProfile0014	Type of number	Unknown	
15	MSProfile0015	Called Number	3012041631	
16	MSProfile0016	Calling Number Parameters		
17	MSProfile0017	Numbering plan identification	ISDN/telphony numbering p...	
18	MSProfile0018	Type of number	National number	
19	MSProfile0019	Calling Number	3014041741	
20	MSProfile0020	Location Area Identifiers		
21	MSProfile0021	Location Area Code	0001	
22	MSProfile0022	Service Area Code	0001	
23	MSProfile0023	RNC ID	2	
24	MSProfile0024	Authentication Parameters		
25	MSProfile0025	Key	0123456789abcdef012345678...	
26	MSProfile0026	Operator Variant Parameter Type	OP	
27	MSProfile0027	OP	0102030405060708091011121...	
28	MSProfile0028	OPc	0102030405060708091011121...	
		Authentication Algorithm Type	Milenage	
		RES Length XOR	16 Bytes	
		ErrorSimulation		
		CC Failure Simulation		
		Enable CC Failure	Disable	
		CC Failure Causes	Call rejected	
		USSD Configuration		
		USSD Request String	*111*2#	
		USSD User Response	1.2.	

Insert Delete Clear

Add Insert Delete Properties

Initialisation Errors Error Events Captured Errors

Call Emulation over luCS IP

SMS over Voice Call Emulation

GL MAPS RNC (UMTS IUCS 3GPP SCTP) - [Call Generation - CallGenDefault]

Configurations Emulator Reports Editor Debug Tools Windows Help

Sr...	Script Name	Profile	Call Info	Script Execution	Status	Events	Eve...	Result	Total Iterat...	Completed Iteration
1	IuCS_Call.gls	MSPProfile0005	IMSI: 00101301404174...	Start	SCCP Connection Released	None				
2	IuCS_Call.gls	MSPProfile0055		Start		None				

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

Save Column Width Show Latest

InitialUE-Message, CM SERVICE REQUEST 14:46:27.072000

CC connection confirm 14:46:27.089000

DirectTransfer, AUTHENTICATION REQUEST 14:46:27.089000

DirectTransfer, AUTHENTICATION RESPONSE 14:46:27.090000

SecurityModeCommand, 14:46:27.106000

SecurityModeComplete, 14:46:27.107000

DirectTransfer, SMS-SUBMIT 14:46:27.108000

DirectTransfer, CP-ACK 14:46:27.130000

DirectTransfer, RP-ACK (SC->MS) 14:46:27.130000

DirectTransfer, CP-ACK 14:46:27.131000

Iu-ReleaseCommand, 14:46:27.242000

Iu-ReleaseComplete, 14:46:27.244000

Find

===== MTP3 User

0000 Version

0002 Message Class

0003 Transfer Message Type

0004 Message Length

Protocol Data

0008 Tag

000A Length

Originating Point Cod

000E Point Code

Destination Point Cod

0012 Point Code

0014 Service Indicator

0015 Network Indicator

0016 Message Priority

0017 Signalling Link Selec

Parameter Padding

===== SCCP Layer

0018 Message Type

Mandatory Fixed Parame

Destination Local Ref

0019 Destination Local Re

Segmenting Reassembli

001C More Data Indicator

Scripts Message Sequence Event Config Script Flow Capture Events

Initialisation Errors Error Events Cap

Relocation Procedure Emulation

GL MAPS MSC (UMTS IUCS 3GPP SCTP) - [Call Reception]

Configurations Emulator Reports Editor Debug Tools Windows Help

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Event...	Results
4	SCMG.gls		1005	Stop	Subsystem-Allowed	Initiate SST		Pass
5	IuCS_Call.gls	MSPProfile0001	IMSI: 001013014041741_Called...	Completed	Call Released	None		Pass

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

Save Column Width Show Latest

DirectTransfer, CONNECT 16:20:41.586000

DirectTransfer, CONNECT ACKNOWLEDGE 16:20:41.608000

RelocationRequired, 16:20:45.207000

RelocationRequest, 1

CC connection confirm 1

RelocationRequestAcknowledge, 1

RelocationCommand, 16:20:45.252000

RelocationDetect, 1

RelocationComplete, 1

Iu-ReleaseCommand, 16:20:46.283000

Iu-ReleaseComplete, 16:20:46.302000

RLSD released 16:20:46.305000

RLC release complete 16:20:46.324000

DirectTransfer, DISCONNECT

Find

Criticality = ENUMERATOR

Contents = 0 reject(0)

Value = Open Type

Length = 8

TargetID = CHOICE

Extensibility Marker = 0

Choice Index = 0

Preamble = 00

Preamble = 0

PLMNIdentity = OCTET STRING

MCC = 001

MNC = 01

LAC = OCTET STRING

Contents = x0002

RNC-ID = INTEGER

Contents = 3

ProtocolIE-Container = Instance 4

ProtocolIE-ID = INTEGER

Contents = 7 id-ClassmarkI

Criticality = ENUMERATOR

Contents = 0 reject(0)

Value = Open Type

Length = 2

ClassmarkInformation2 = OCTET STRING

Length Determinant = 1

Contents = x00

ProtocolIE-Container = Instance 5

ProtocolIE-ID = INTEGER

Scripts Message Sequence Event Config Script Flow

Initialisation Errors Error Events Captured Errors Link Status Up=2 Down=0

Call Emulation over luCS ATM

Call Control MO Procedure

MAPS (Message Automation Protocol Simulation) RNC (UMTS IUCS 3GPP ATM) - [Call Generation - Untitled]

Configurations Emulator Reports Editor Windows Help

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Events Profile	Result	Total Iterations	Completed Iterations
1	CallControl_MO.gls	Profile0001	MSI: 30170000	Start	Call Released	None	...	Pass	1	1
2	CallControl_MO.gls	Profile0002		Start		None	...	Unknown	1	0
3	CallControl_MO.gls	Profile0003		Start		None	...	Unknown	1	0

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

Save Column Width

MAPS DUT

InitialUE-Message, CM SERVICE REQUEST → 17.09.00.007000

CC connection confirm → 17.09.00.051000

DirectTransfer, AUTHENTICATION REQUEST → 17.09.00.051000

DirectTransfer, AUTHENTICATION RESPONSE → 17.09.00.051000

DirectTransfer, TMSI REALLOCATION COMMAND → 17.09.00.101000

DirectTransfer, TMSI REALLOCATION COMPLETE → 17.09.00.101000

DirectTransfer, CM SERVICE ACCEPT → 17.09.00.150000

DirectTransfer, SETUP → 17.09.00.151000

DirectTransfer, CALL PROCEEDING → 17.09.00.201000

RAB-AssignmentRequest, → 17.09.00.201000

Establish Request → 17.09.00.203000

Establish Confirm → 17.09.00.251000

RAB-AssignmentResponse, → 17.09.00.252000

DirectTransfer, ALERTING → 17.09.00.302000

DirectTransfer, CONNECT → 17.09.00.316000

DirectTransfer, CONNECT ACKNOWLEDGE → 17.09.00.376000

DirectTransfer, DISCONNECT → 17.11.00.395000

DirectTransfer, RELEASE → 17.11.00.447000

DirectTransfer, RELEASE COMPLETE → 17.11.00.448000

lu-ReleaseCommand, → 17.11.00.498000

lu-ReleaseComplete, → 17.11.00.498000

RLSD released → 17.11.00.548000

RLC release complete → 17.11.00.548000

===== MTP3b Layer =====

0000 Service Indicator =0011 SCCP

0000 Sub-service field = 0000.... Internati

0001 DPC = 1.1.1(00001001 ..0

0002 OPC = 2.2.2(10..... 000

0004 Signaling Link Code = 0001.... (1)

Pdu = x01000009020205034:

===== SCCP Layer =====

0005 Message Type = 00000001 CR connect

Mandatory Fixed Parameters

Source Local Reference Parameter = 9 (x000009)

Source Local Reference

Protocol Class Parameter =0010 Class 2

Class = 0000.... No Special

Message Handling (Class 0 and 1 only) = Param offset x02

000A Pointer to Mandatory Parameter = x05 (5)

000B Pointer to optional parameters

Mandatory Variable Length Parameters

Called Party Address

Parameter length = mandatory parameter

Address Indicators = 3

000D Point Code Indicators =1 Address co

000D SSN Indicators =0. Address de

000D Global Title Indicators = ..0000... No global

000D Routing Indicators = ..1..... Route on f

000D Nat1/Int1 Indicators = 0..... Address is

Optional Variable Length Parameters

Calling Party Address

Parameter name = optional parameter

0010 Parameter length = 04

0011 Address Indicators = 3

0012 Point Code Indicators =1 Address co

0012 SSN Indicators =0. Address de

0012 Global Title Indicators = ..0000... No global

0012 Routing Indicators = ..1..... Route on f

0012 Nat1/Int1 Indicators = ..1..... Address is

0013 Signalling Point Code = 2.2.2(00010010 ..0:

Data = optional parameter

0015 Parameter name = 0F

0016 Parameter length = 72

SCCP user data = x001340440000060000:

001F End of optional parameters octet = x00

===== RANAP Layer =====

RANAP PDU

Extensibility Marker = CHOICE

Choice Index = 0

ProcedureCode = INTEGER

Contents = 19 id-InitialUE-Me

Criticality = ENUMERATOR

Contents = 1 ignore(1)

Value = Open Type

Length = 68

Extensibility Marker =

Call Control MT Procedure

MAPS (Message Automation Protocol Simulation) MSC (UMTS IUCS 3GPP ATM) - [Call Generation - Untitled]

Configurations Emulator Reports Editor Windows Help

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Events ...	Result	Total Iterations	Completed Iterations
1	Call Control MT.gls	Profile0001	MSI: 301700000000624...	Abort	RAB Assignment Completed	Terminate	...	Pass	1	0
2	Call Control MT.gls	Profile0002		Start		None	...	Unknown	1	0
3	Call Control MT.gls	Profile0003		Start		None	...	Unknown	1	0
4	Call Control MT.gls	Profile0004		Start		None	...	Unknown	1	0

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

Save Column Width

MAPS DUT

Paging. → 15:15:36.361000

InitialUE-Message, PAGING RESPONSE → 15:15:36.459000

CC connection confirm → 15:15:36.464000

DirectTransfer, AUTHENTICATION REQUEST → 15:15:36.465000

DirectTransfer, AUTHENTICATION RESPONSE → 15:15:36.509000

DirectTransfer, TMSI REALLOCATION COMMAND → 15:15:36.509000

DirectTransfer, TMSI REALLOCATION COMPLETE → 15:15:36.535000

DirectTransfer, SETUP → 15:15:36.535000

DirectTransfer, CALL CONFIRMED → 15:15:36.559000

RAB-AssignmentRequest, → 15:15:36.559000

Establish Request → 15:15:36.585000

===== MTP3b Layer =====

0000 Service Indicator =0011 SCCP

0000 Sub-service field = 0000.... International network

0001 DPC = 2.2.2(00010010 ..010000)

0002 OPC = 1.1.1(01..... 000000100010)

0004 Signaling Link Code = 0001.... (1)

Pdu = x090003070B044312108E04C309088E23000E401F000C

===== SCCP Layer =====

0005 Message Type = 00001001 UDT undata

Mandatory Fixed Parameters

Protocol Class Parameter =0000 Class 0

Class = 0000.... No Special Options

0006 Message Handling (Class 0 and 1 only) = Param offset x03 (3)

0007 Pointer to Mandatory Parameter = Param offset x07 (7)

0008 Pointer to Mandatory Parameter = Param2 offset x0B (11)

0009 Mandatory Variable Length Parameters

Called Party Address

Parameter length = mandatory parameter

Address Indicators = 4

000A Point Code Indicators =1 Address contains signalling point cc

000B SSN Indicators =1. Address contains subsystem number

000B Global Title Indicators = ..0000... No global title included

000B Routing Indicators = ..1..... Route on SSN

000B Nat1/Int1 Indicators = 0..... Address is international

000C Signalling Point Code = 2.2.2(00010010 ..010000)

000E Subsystem number = 10001110 RANAP (National Network SSN)

Events Log

GL MAPS MSC (UMTS IUCS 3GPP SCTP) - [Events]

Configurations Emulator Reports Editor Debug Tools Windows Help

Event Log | Error Events | Captured Errors

Date/Time	Captured Events	Call Trace Id	Script Name	Script Id
2018-12-28 12:26:36.863000	SCTP Up On ConnectionId = 1005		Check_SCTP_Status.gls	ProtScriptId-40-7481902-689...
2018-12-28 12:26:36.863000	ASP UP Sent	1005	M3UA.gls	ProtScriptId-42-7483736-689...
2018-12-28 12:26:36.883000	ASP Acknowledged	1005	M3UA.gls	ProtScriptId-42-7483736-689...
2018-12-28 12:26:36.883000	AS Status Notified	1005	M3UA.gls	ProtScriptId-42-7483736-689...
2018-12-28 12:26:36.899000	ASP Active Ack Received	1005	M3UA.gls	ProtScriptId-42-7483736-689...
2018-12-28 12:26:36.899000	AS Status Notified	1005	M3UA.gls	ProtScriptId-42-7483736-689...
2018-12-28 12:26:36.899000	M3UA Up On ConnectionId = 1005		Check_SCTP_Status.gls	ProtScriptId-40-7481902-689...
2018-12-28 12:26:36.901000	Subsystem-Status-Test	1005	SCMG.gls	ProtScriptId-43-7483772-689...
2018-12-28 12:26:36.902000	Subsystem-Allowed	1005	SCMG.gls	ProtScriptId-43-7483772-689...
2018-12-28 12:26:36.916000	Subsystem-Allowed	1005	SCMG.gls	ProtScriptId-43-7483772-689...
2018-12-28 12:26:54.500000	Location Update Requested		IuCS.gls	ProtScriptId-44-7501373-689...
2018-12-28 12:26:54.500000	CC Connection Confirmed		IuCS.gls	ProtScriptId-44-7501373-689...
2018-12-28 12:26:54.501000	MM Connection Requested	IMSI:,001013014041741,T...	IuCS_Call.gls	ProtScriptId-44-7501373-689...
2018-12-28 12:26:54.501000	Authentication Requested	IMSI:,001013014041741,T...	IuCS_Call.gls	ProtScriptId-44-7501373-689...
2018-12-28 12:26:54.521000	Authentication is Successful	IMSI:,001013014041741,T...	IuCS_Call.gls	ProtScriptId-44-7501373-689...
2018-12-28 12:26:54.521000	Ciphering Requested	IMSI:,001013014041741,T...	IuCS_Call.gls	ProtScriptId-44-7501373-689...
2018-12-28 12:26:54.544000	Ciphering Complete	IMSI:,001013014041741,T...	IuCS_Call.gls	ProtScriptId-44-7501373-689...
2018-12-28 12:26:54.547000	Location Update Completed	IMSI:,001013014041741,T...	IuCS_Call.gls	ProtScriptId-44-7501373-689...
2018-12-28 12:26:54.591000	SCCP Release Initiated		IuCS.gls	ProtScriptId-44-7501373-689...
2018-12-28 12:26:57.059000	RTP Stats Query Script started		RTP Stats Display.gls	ProtScriptId-41-7483513-689...

Clear

Save Events

☐ Capture Events to file

Initialisation Errors Error Events Captured Errors Link Status Up=1 Down:

Bulk Call Generation using CSV Profiles

GL MAPS RNC (UMTS IUCS 3GPP SCTP) - [Call Generation - CallGenDefault]

Configurations Emulator Reports Editor Debug Tools Windows Help

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Events Profile	Result	Total Iterations	Completed Iterations
1	IuCS_Call.gls		IMSI: 450803014043002,TMSI: 0x11113002,CalledN...	Start	SCCP Connection Released	None		Pass	1	1
2	IuCS_Call.gls		IMSI: 450803014043003,TMSI: 0x11113003,CalledN...	Start	SCCP Connection Released	None		Pass	1	1
3	IuCS_Call.gls		IMSI: 450803014043004,TMSI: 0x11113004,CalledN...	Start	SCCP Connection Released	None		Pass	1	1
4	IuCS_Call.gls		IMSI: 450803014043005,TMSI: 0x11113005,CalledN...	Start	SCCP Connection Released	None		Pass	1	1
5	IuCS_Call.gls		IMSI: 450803014043006,TMSI: 0x11113006,CalledN...	Start	SCCP Connection Released	None		Pass	1	1
6	IuCS_Call.gls		IMSI: 450803014043007,TMSI: 0x11113007,CalledN...	Start	SCCP Connection Released	None		Pass	1	1
7	IuCS_Call.gls		IMSI: 450803014043008,TMSI: 0x11113008,CalledN...	Start	SCCP Connection Released	None		Pass	1	1
8	IuCS_Call.gls		IMSI: 450803014043009,TMSI: 0x11113009,CalledN...	Start	SCCP Connection Released	None		Pass	1	1
9	IuCS_Call.gls		IMSI: 450803014043010,TMSI: 0x11113010,CalledN...	Start	SCCP Connection Released	None		Pass	1	1
10	IuCS_Call.gls		IMSI: 450803014043011,TMSI: 0x11113011,CalledN...	Start	SCCP Connection Released	None		Pass	1	1

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

Save Column Width Show Latest

RNC MSC

InitialUE-Message, CM SERVICE REQUEST 14:34:19.954000

CC connection confirm 14:34:20.038000

DirectTransfer, AUTHENTICATION REQUEST 14:34:20.040000

DirectTransfer, AUTHENTICATION RESPONSE 14:34:20.049000

SecurityModeCommand, 14:34:20.146000

SecurityModeComplete, 14:34:20.153000

DirectTransfer, SETUP 14:34:20.163000

DirectTransfer, CALL PROCEEDING 14:34:20.247000

RAB-AssignmentRequest, 14:34:20.253000

RAB-AssignmentResponse, 14:34:20.265000

DirectTransfer, ALERTING 14:34:20.405000

DirectTransfer, CONNECT 14:34:21.406000

DirectTransfer, CONNECT ACKNOWLEDGE 14:34:21.414000

DirectTransfer, DISCONNECT 14:35:23.428000

DirectTransfer, RELEASE 14:35:23.551000

DirectTransfer, RELEASE COMPLETE 14:35:23.557000

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 = 116 (x00000074)

Protocol Data =

0008 Tag = x0210 Transfer Protocol Data

000A Length = 108 (x006C)

Originating Point Code =

000C Mask = 0 (x00)

000E Point Code = 1.1.2(...001000 00001010)

Destination Point Code =

0010 Mask = 0 (x00)

0012 Point Code = 2.2.2(...010000 00010010)

0014 Service Indicator = ...0011 SCCP

0015 Network Indicator =10 National Network

0016 Message Priority =01 Priority Code 1

0017 Signalling Link Selection = 1 (x01)

----- SCCP Layer -----

0018 Message Type = 00000001 CR connection request

Mandatory Fixed Parameters =

Source Local Reference Parameter =

0019 Source Local Reference = 2 (x0000002)

Protocol Class Parameter =

001C Class = ...0010 Class 2

001C Message Handling (Class 0 and 1 only) = 0000... No Special Options

001D Pointer to Mandatory Parameter = Parm0 offset x02 (2)

001E Pointer to optional parameters = x06 (6)

Mandatory Variable Length Parameters =

Called Party Address = mandatory parameter

001F Parameter length = 4

Address Indicators =

0020 Point Code Indicators =1 Address contains sign

0020 SSN Indicators =1 Address contains subs

0020 Global Title Indicators = ..0000... No global title incl

Scripts Message Sequence Event Config Script Flow

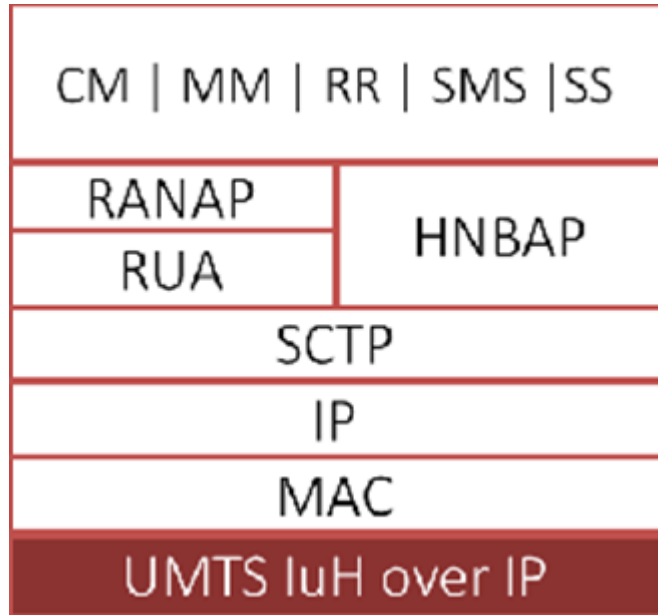
Initialisation Errors Error Events Captured Errors Link Status Up=1 Down=0

MAPS™ UMTS for IuH Interfaces

Key Features of luH Network

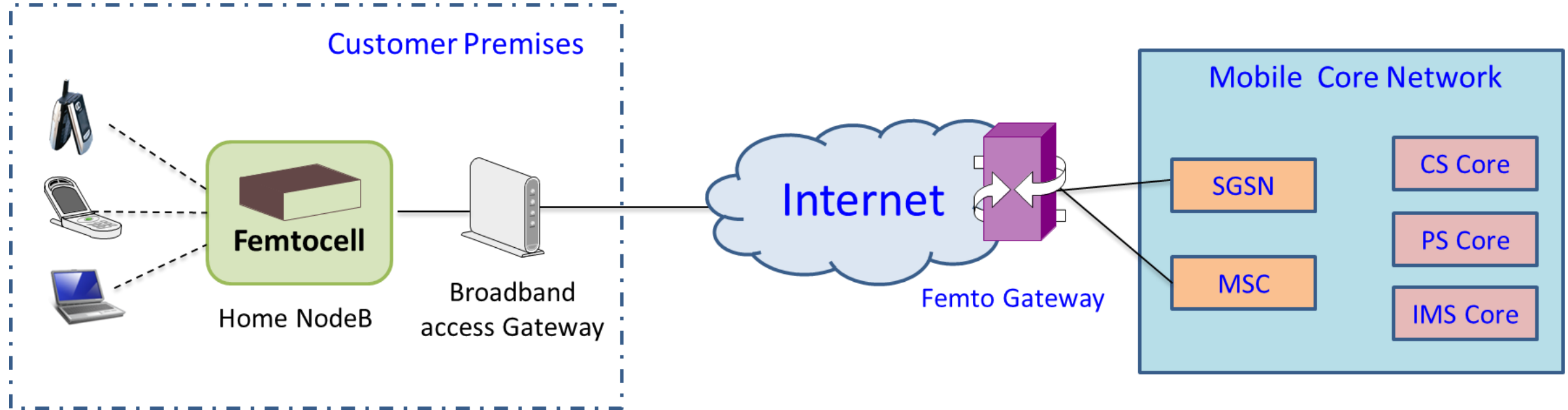
- Emulate RNC, MSC, Home NodeB (HnB) and Home NodeB Gateway (HN GW) entities
- Transmitting Voice Files
- Transmitting DTMF, MF Digits and other Tones and Dual Tones
- Recording Voice Files
- Monitoring Single and Dual Tones, DTMF, and MF digits
- Loopback, Talk using Microphone, Play to Speaker

UMTS IuH Protocol Stack

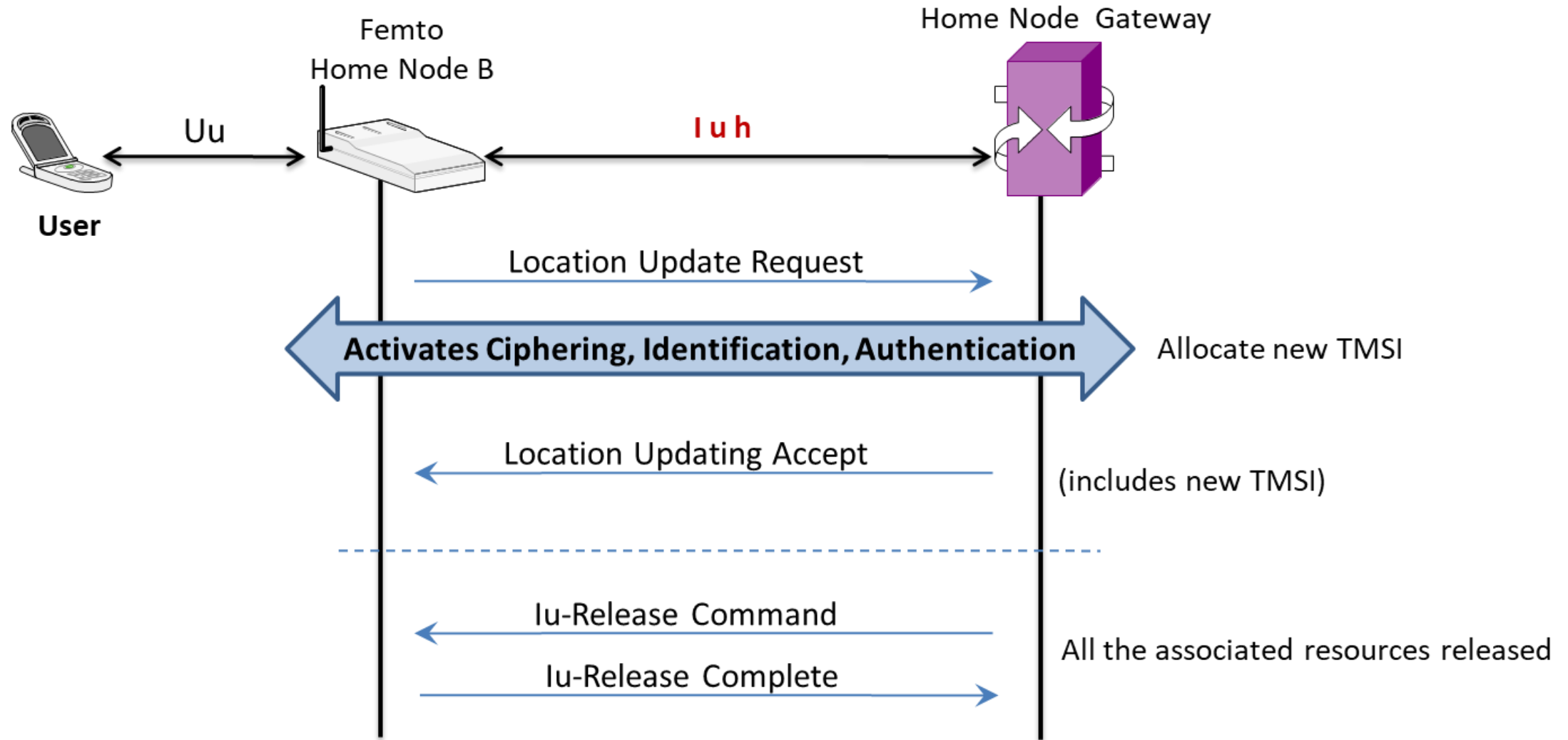


Supported Protocols	Specification Used
IuH Interface	
RUA	3GPP TS 25468 V9.1.0
RANAP	3GPP TS 25.413 V9.1.0
MM / CC	3GPP TS 04.08 V7.17.0
RR	3GPP TS 04.18 V8.13.0
SMS	3GPP TS 03.40 V7.5.0 & 3GPP TS 04.11 V7.1.0 GSM 03.38 version 7.2.0 Release 1998
SCTP	RFC 4960
HNBAP Home Node B (HNB) Application Part	Release 9 - 3GPP TS 25.469 V9.1.0 (2010-03) Release 12 - 3GPP TS 25.469 V12.2.0 (2014-09) (Release 12)

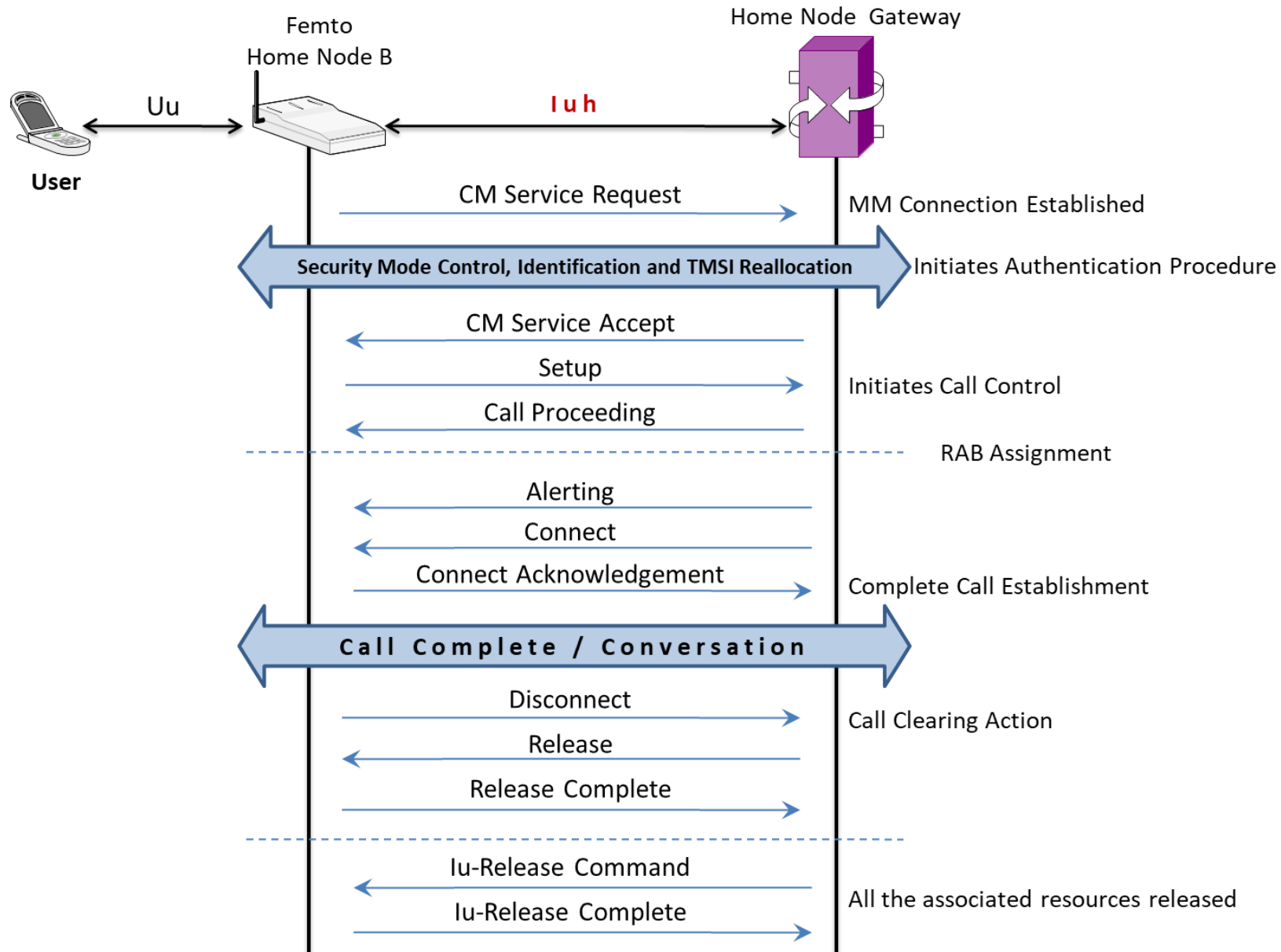
Femtocells Overview



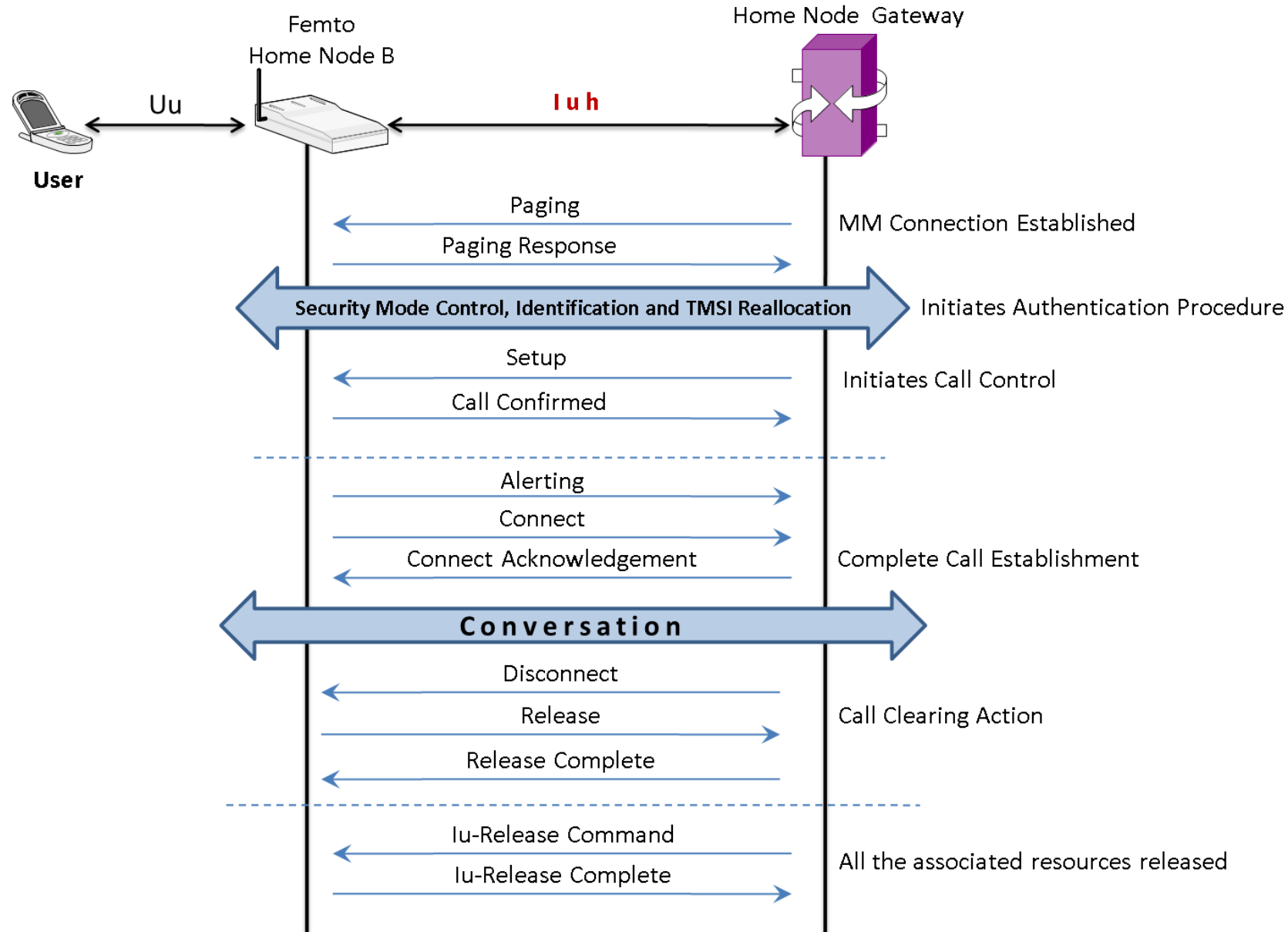
Location Update Call over IuH IP



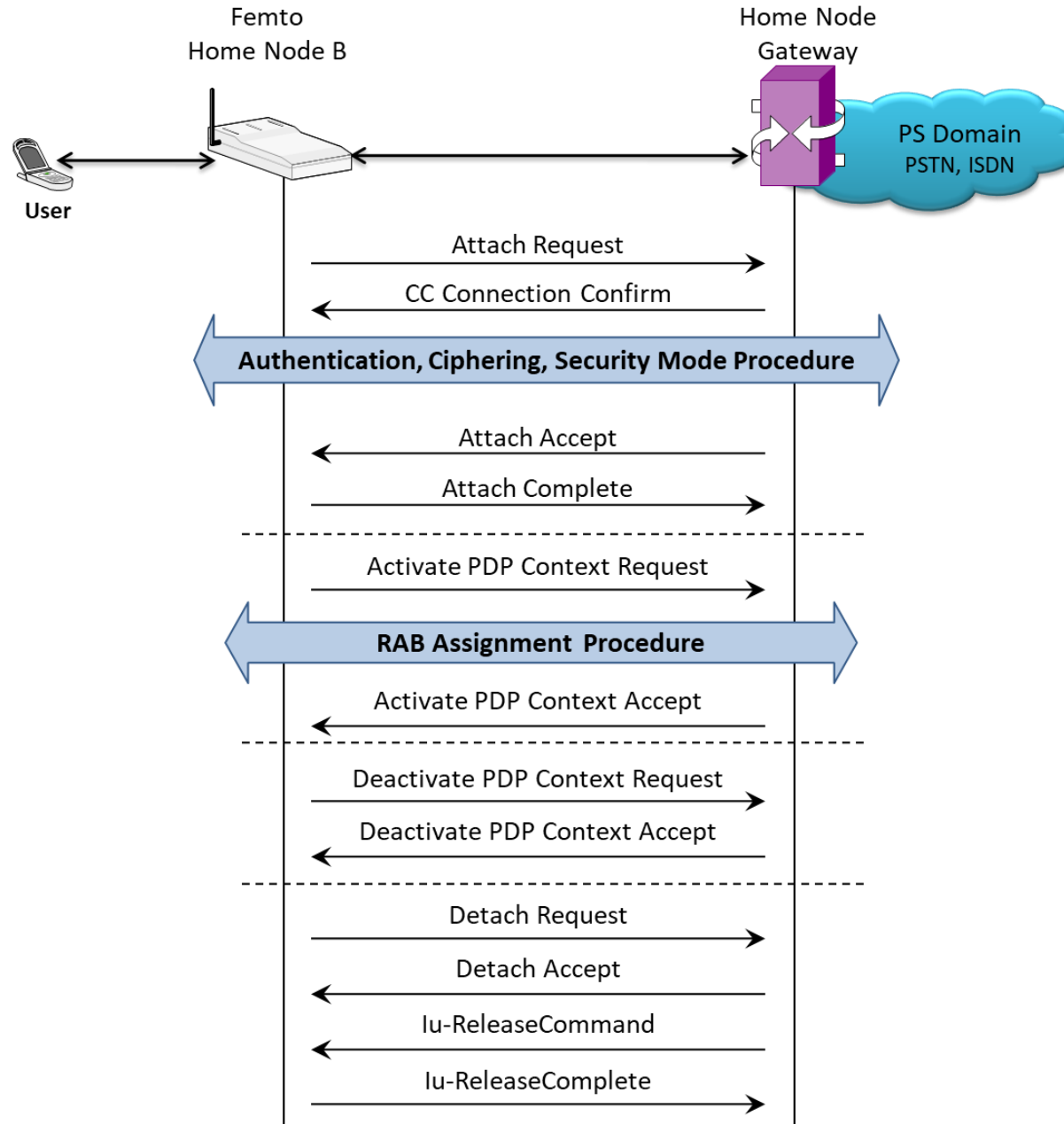
Mobile Originating Call over IuH IP



Mobile Terminating Call over IuH IP



PS Domain IuH Call Procedure



IuH over IP Testbed Configuration

GL MAPS HNB (UMTS IuH 3GPP) - [Testbed Setup - TestBedDefault]

Configurations Emulator Reports Editor Debug Tools Windows Help

Config Value

HNB Configurations

- Enable RTP Simulation: Enable
- RTP Hardware Interface Type: PC NIC
- SCTP Mode: client
- HNB: 1
 - HNB 1
 - HNB IP Address: 192.168.1.31
 - MGW IP Address: 192.168.1.31
 - HNB GTP IP Address: 192.168.18.26
 - GTP Port For Traffic: 2152
 - HNB Port: 29169
 - HNB Identity: 90170886740421@GLHNB.c...
 - HNB ID: 00000001
 - PLMN Identifiers
 - Mobile Country Code: 001
 - Mobile Network Code: 01
 - Location Area Identifiers
 - Location Area Code: 0001
 - Service Area Code: 0001
 - Routing Area Code: 01
 - RNCID: 01
 - Cell Identity: 00000010
 - HNBGW Parameters
 - HNBGW IP Address: 192.168.1.129
 - HNBGW Port: 29169
- Packet Switched Userplane Configuration
 - Adapter Index: 1
 - Enable or Disable GTP Traffic: Disabled
 - GTP TrafficType: MobileTraffic
- HD RTP Media Configuration
 - End User Configurations: MS_Profiles.xml
 - CSV File Name: MS_Profiles_IMSI.CSV
 - Enable SMS Ratio For CSV: False
 - Ratio of SMS Calls: 10 %

Start Edit

Initialisation Errors Error Events

luH over IP Profile Configuration

MAPS HNB (UMTS luH 3GPP) - [Profile Editor -MS_Profiles]

Configurations Emulator Reports Editor Debug Tools Windows Help

Profiles (Edit-F2)

#	Profiles (Edit-F2)	Config	Value	Enable
1	MSPProfile0001	MSPProfile0001		<input checked="" type="checkbox"/>
2	MSPProfile0002	CM Service Type	Mobile Originating Call ...	
3	MSPProfile0003	Location Update Type	Normal location updating	
4	MSPProfile0004	Supplimentary Service Type	USSD	
5	MSPProfile0005	Mobile ID		
6	MSPProfile0006	Type Of Identity	IMSI	
7	MSPProfile0007	IMEI	353887067326268	
8	MSPProfile0008	IMEISV	3538870673262681	
9	MSPProfile0009	IMSI	001013014041741	
10	MSPProfile0010	TMSI	11111001	
11	MSPProfile0011	MSISDN		
12	MSPProfile0012	Called Number Parameters		
13	MSPProfile0013	Numbering plan identification	ISDN/Telphony numberi...	
14	MSPProfile0014	Type of number	Unknown	
15	MSPProfile0015	Called Number	3014041791	
16	MSPProfile0016	Calling Number Parameters		
17	MSPProfile0017	Numbering plan identification	ISDN/Telphony numberi...	
18	MSPProfile0018	Type of number	Unknown	
19	MSPProfile0019	Calling Number	3014041741	
20	MSPProfile0020	Location Area Identifiers		
21	MSPProfile0021	Location Area Code	0001	
22	MSPProfile0022	Service Area Code	0001	
23	MSPProfile0023	RAC	01	
24	MSPProfile0024	RNC ID	01	
25	MSPProfile0025	Authentication Parameters		
26	MSPProfile0026	Key	0123456789abcdef01234...	
27	MSPProfile0027	Operator Variant Parameter Type	OP	
		OP	010203040506070809101...	
		OPc	010203040506070809101...	
		Authentication Algorithm Type	Milenage	
		RES Length XOR	8 Bytes	
		Authentication Failure Parameters		
		False Key	44444444444444444444...	
		USSD Configuration		
		USSD Request String	*111*2#	
		USSD User Response	1.2.	

Insert Delete Clear

Add Insert Delete Properties

Initialisation Errors Error Events Captur

luH over IP Incoming Call Handler Configuration

GL MAPS HNBGateWay (UMTS luH 3GPP) - [Incoming Call Handlers Configuration - default]

Configurations Emulator Reports Editor Debug Tools Windows Help

Message Name Script Name

CM SERVICE REQUEST	luH_CS_Call.gls
LOCATION UPDATING REQUEST	luH_CS_Call.gls
PAGING RESPONSE	luH_CS_Call.gls
HNBRegisterRequest	Mgmt_HNBGW.gls
UERegisterRequest	Mgmt_HNBGW.gls
ATTACH REQUEST	luH_PS_Call.gls
SERVICE REQUEST	luH_PS_Call.gls
ROUTING AREA UPDATE REQUEST	luH_PS_Call.gls
IMSI DETACH INDICATION	luH_CS_Call.gls

Scripts

luH_CS_Call.gls

☒ Sequence
☐ Random

Up
Down

Add Delete

Add Delete Apply Scripts Clear Scripts

IuH over IP Call Generation

MAPS HNB (UMTS IuH 3GPP) - [Call Generation - CallGenDefault]

Configurations Emulator Reports Editor Debug Tools Windows Help

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Events Profile	Result	Total Iterations	Completed Iterations
1	IuH_CS_Call.gls	MSPProfile0001	IMSI_001013014041741.TMSI_0x716499FB.CalledNumber_3014041791	Start	Iu Connection Released	None		Pass	1	1
2	IuH_CS_Call.gls	MSPProfile0002		Start		None		Unknown	1	0
3	IuH_CS_Call.gls	MSPProfile0003		Start		None		Unknown	1	0

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

Save Column Width Show Latest

HNB HNBGW

LOCATION UPDATING REQUEST 14:59:18.824000

AUTHENTICATION REQUEST 14:59:19.662000

AUTHENTICATION RESPONSE 14:59:19.667000

SecurityModeCommand 14:59:19.761000

SecurityModeComplete 14:59:19.765000

LOCATION UPDATING ACCEPT 14:59:19.862000

TMSI REALLOCATION COMPLETE 14:59:19.864000

Iu-ReleaseCommand 14:59:19.962000

Iu-ReleaseComplete 14:59:19.967000

CM SERVICE REQUEST 14:59:19.977000

AUTHENTICATION REQUEST 14:59:20.062000

AUTHENTICATION RESPONSE 14:59:20.065000

SecurityModeCommand 14:59:20.161000

SecurityModeComplete 14:59:20.162000

SETUP 14:59:20.168000

CALL PROCEEDING 14:59:20.263000

RAB-AssignmentRequest 14:59:20.267000

RAB-AssignmentResponse 14:59:20.320000

Find

----- RUA Layer -----

0000 RUA PDU = InitiatingMessage (0)

0000 InitiatingMessage =

0001 Procedure Code = 1 id-Connect

0002 Criticality = 0 reject(0)

0004 Value =

0004 Connect =

0004 ProtocolIE-Container = 5 Items

0007 Item = 0

0007 ProtocolIE-Field =

0007 ProtocolIE-ID = 7 id-CN-DomainIndicator

0009 Criticality = 0 reject(0)

000B Value =

000B Domain Indicator =

000B CN-DomainIndicator = 0 cs-domain(0)

000C Item = 1

000C ProtocolIE-Field =

000C ProtocolIE-ID = 3 id-Context-ID

000E Criticality = 0 reject(0)

0010 Value =

0010 Context ID =

0000 Context-ID = 2 (x000002)

0013 Item = 2

0013 ProtocolIE-Field =

0013 ProtocolIE-ID = 5 id-IntraDomainNasNodeSelector

0015 Criticality = 1 ignore(1)

0017 Value =

0017 IntraDomainNasNodeSelector =

0017 version = release99 (0)

0017 release99 =

0017 cn_Type = Gsm_map_IDNNS (0)

0017 Gsm_map_IDNNS =

0017 routingbasis = IMSIcauseUEInitiatedEvent (4)

0017 IMSIcauseUEInitiatedEvent =

0017 RoutingParameter = 0100

0018 Dummy = FALSE(0)

0019 Item = 3

0019 ProtocolIE-Field =

0019 ProtocolIE-ID = 6 id-Establishment-Cause

001B Criticality = 0 reject(0)

Scripts Message Sequence Event Config Script Flow

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

IuH over IP Call Reception

GL MAPS HNBGateWay (UMTS IuH 3GPP) - [Call Reception]

Configurations Emulator Reports Editor Debug Tools Windows Help

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Events Profile	Results
1	Mgmt_HNBGW.gls		HNBID:0x00000001	Stop	HNB Register Accepted	HNBDeRegistration		Pass
2	IuH_CS_Call.gls	MSPProfile0001	IMSI:001013014041741,TMSI:0x716499FB	Completed	Call Released	None		Pass
3	IuH_CS_Call.gls	MSPProfile0001	IMSI:001013014041741,CalledNumber:3014041791	Completed	Call Released	None		Pass

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

Save Column Width ☐ Show Latest

HNB HNBGW

CM SERVICE REQUEST → 14:59:20.029000

← AUTHENTICATION REQUEST 14:59:20.037000

← AUTHENTICATION RESPONSE 14:59:20.123000

← SecurityModeCommand 14:59:20.126000

← SecurityModeComplete 14:59:20.223000

← SETUP 14:59:20.224000

← CALL PROCEEDING 14:59:20.232000

← RAB-AssignmentRequest 14:59:20.240000

← RAB-AssignmentResponse 14:59:20.423000

← ALERTING 14:59:20.429000

← CONNECT 14:59:21.452000

← CONNECT ACKNOWLEDGE 14:59:21.524000

← DISCONNECT 14:59:33.528000

← RELEASE 14:59:33.655000

← RELEASE COMPLETE 14:59:33.656000

← Iu-ReleaseCommand 14:59:33.656000

← Iu-ReleaseComplete 14:59:33.758000

Find

```
===== RUA Layer =====
0000 RUA PDU = InitiatingMessage
0000 InitiatingMessage =
0001 Procedure Code = 1 id-Connect
0002 Criticality = 0 reject(0)
0004 Value =
0004 Connect =
0004 ProtocolIE-Container = 5 Items
0007 Item = 0
0007 ProtocolIE-Field =
0007 ProtocolIE-ID = 7 id-CN-DomainIn
0009 Criticality = 0 reject(0)
000B Value =
000B Domain Indicator =
000B CN-DomainIndicator = 0 cs-domain(0)
000C Item = 1
000C ProtocolIE-Field =
000C ProtocolIE-ID = 3 id-Context-ID
000E Criticality = 0 reject(0)
0010 Value =
0010 Context ID =
0010 Context-ID = 3 (x000003)
0013 Item = 2
0013 ProtocolIE-Field =
0013 ProtocolIE-ID = 5 id-IntraDomain
0015 Criticality = 1 ignore(1)
0017 Value =
0017 IntraDomainNasNodeSelector =
0017 version = release99 (0)
0017 release99 =
0017 cn_Type = Gsm_map_IDNNS (0)
0017 Gsm_map_IDNNS =
0017 routingbasis = iMSIcauseUEiniti
0017 iMSIcauseUEinitiatedEvent =
0017 RoutingParameter = 0180
0018 Dummy = FALSE(0)
0019 Item = 3
0019 ProtocolIE-Field =
0019 ProtocolIE-ID = 6 id-Establishme
001B Criticality = 0 reject(0)
001D Value =
```

Scripts Message Sequence Event Config Script Flow

Initialisation Errors Error Events Captured Errors Link Status Up

IuH over IP Event and Traffic Log

Server Traffic Log

Untitled - BasicServer

File Edit View Setup Help

Connected: client #908 at 192.168.12.29

908(1): end tasks on disconnect;

908(2): run task "MobileIpCoreSrv:StartServer";

908(3): inform task "CONFIGURE Client HTTP 0 GTP";

908(4): inform task "ADDGTPSTREAM 192.168.45.1 2 2 192.168.12.181 2152 192.168.12.197 2152";

908(5): inform task "ADDCONNECTION 2 1 192.168.14.80 80 192.168.45.1 img5a.flixcart.com ITERATION_COUNT 1";

908(6): inform task "DELETGTPSTREAM 192.168.45.1 2";

Events Log

MAPS HNB (UMTS IuH 3GPP) - [Events]

Configurations Emulator Reports Editor Debug Tools Windows Help

Event Log Error Events Captured Errors

Date/Time	Captured Events	Call Trace Id	Script Name	Script Id
2025-3-10 12:32:04.848000	Monitoring SCTP Status		Check_SCTP_Status.gls	ProtScriptId-1-592393666-20160-18480
2025-3-10 12:32:06.355000	Traffic=Enabled		MapsInit.gls	
2025-3-10 12:32:07.120000	GTP User Traffic Session Started on Task Id :: 1		GTPSessionInit.gls	ProtScriptId-3-592395707-20164-18480
2025-3-10 12:32:07.203000	RTP Stats Query Script started		RTP_Stats_Display.gls	ProtScriptId-2-592394741-20162-18480
2025-3-10 12:32:09.377000	SCTP Up On ConnectionId = 1		Check_SCTP_Status.gls	ProtScriptId-1-592393666-20160-18480
2025-3-10 12:32:09.377000	SCTP UP		Check_SCTP_Status.gls	ProtScriptId-1-592393666-20160-18480
2025-3-10 12:32:09.959000	HNB Register Request Initiated	HNBId,0x00000001	HNBAP.gls	ProtScriptId-4-592398717-20166-18480
2025-3-10 12:32:10.178000	HNB Register Accepted	HNBId,0x00000001	HNBAP.gls	ProtScriptId-4-592398717-20166-18480
2025-3-10 12:32:10.179000	HNB Registered On ConnectionId = 1		Check_SCTP_Status.gls	ProtScriptId-1-592393666-20160-18480
2025-3-10 12:32:10.179000	HNB Registered on SCTP connection Id 1		Check_SCTP_Status.gls	ProtScriptId-1-592393666-20160-18480
2025-3-10 12:34:48.524000	ContextId=50001		IuH_PS.gls	CGProtScriptId-0-592556144-20169-9604
2025-3-10 12:34:49.384000	Attach Accepted, GMM Registered	IMSI,001013014041741	IuH_PS_Call.gls	CGProtScriptId-0-592556144-20169-9604
2025-3-10 12:34:49.671000	RAB Assignment Complete	IMSI,001013014041741	IuH_PS_Call.gls	CGProtScriptId-0-592556144-20169-9604
2025-3-10 12:34:49.867000	PDP Context Accepted	IMSI,001013014041741	IuH_PS_Call.gls	CGProtScriptId-0-592556144-20169-9604
2025-3-10 12:34:49.867000	FileName = img5a.flixcart.com	IMSI,001013014041741	IuH_PS_Call.gls	CGProtScriptId-0-592556144-20169-9604
2025-3-10 12:34:49.867000	GTP-U Mobile-Traffic Started	IMSI,001013014041741	IuH_PS_Call.gls	CGProtScriptId-0-592556144-20169-9604
2025-3-10 12:34:49.873000	GTPTEID 2 MICConnectionID 1 EventType TrafficStarted=	IMSI,001013014041741	IuH_PS_Call.gls	CGProtScriptId-0-592556144-20169-9604
2025-3-10 12:35:27.896000	GTPTEID 2 MICConnectionID 1 EventType TxCompleted=	IMSI,001013014041741	IuH_PS_Call.gls	CGProtScriptId-0-592556144-20169-9604
2025-3-10 12:35:27.919000	Deactivate PDP Context Requested	IMSI,001013014041741	IuH_PS_Call.gls	CGProtScriptId-0-592556144-20169-9604
2025-3-10 12:35:28.123000	RAB Released	IMSI,001013014041741	IuH_PS_Call.gls	CGProtScriptId-0-592556144-20169-9604
2025-3-10 12:35:28.322000	Deactivate PDP Context Accepted	001013014041741	IuH_PS.gls	CGProtScriptId-0-592556144-20169-9604
2025-3-10 12:35:29.355000	Detach Initiated	IMSI,001013014041741	IuH_PS_Call.gls	CGProtScriptId-0-592556144-20169-9604
2025-3-10 12:35:29.523000	Detach Completed, GMM Context Released	IMSI,001013014041741	IuH_PS_Call.gls	CGProtScriptId-0-592556144-20169-9604
2025-3-10 12:35:29.537000	Traffic sent successfully	IMSI,001013014041741	IuH_PS_Call.gls	CGProtScriptId-0-592556144-20169-9604
2025-3-10 12:35:29.537000	Iu Release Complete	IMSI,001013014041741	IuH_PS_Call.gls	CGProtScriptId-0-592556144-20169-9604

Save Events

Clear

☐ Capture Events to file

...

Bulk Call Generation using XML profiles

GL MAPS HNB (UMTS IuH 3GPP) - [Call Generation]

Configurations Emulator Reports Editor Debug Tools Windows Help

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Events Profile	Result	Total Iterations	Completed Iterations
1	IuH_CS_Call.gls	MSPProfile0001		Start		None		Unknown	10	0
2	IuH_CS_Call.gls	MSPProfile0002		Start		None		Unknown	10	0
3	IuH_CS_Call.gls	MSPProfile0003		Start		None		Unknown	10	0
4	IuH_CS_Call.gls	MSPProfile0004		Start		None		Unknown	10	0
5	IuH_CS_Call.gls	MSPProfile0005		Start		None		Unknown	10	0
6	IuH_CS_Call.gls	MSPProfile0006		Start		None		Unknown	10	0
7	IuH_CS_Call.gls	MSPProfile0007		Start		None		Unknown	10	0
8	IuH_CS_Call.gls	MSPProfile0008		Start		None		Unknown	10	0
9	IuH_CS_Call.gls	MSPProfile0009		Start		None		Unknown	10	0
10	IuH_CS_Call.gls	MSPProfile0010		Start		None		Unknown	10	0

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

☐ View Executing Line

Script Contents

```
//Initialize Variables
ReportEvent (Script = "Started");
CallDurationTimeOut=$_CallDuration;
InterCallDurationTimeOut=$_InterCallDuration;
AnswerCallTimeOut=$_CallAnswerTime;
IuHScriptId="IuH";
ScriptIdCounter = 0;
RtpSessionState = "Null";
ReportCause = "Idle";
AppendInAscii (IuHScriptId,ScriptIdCounter);
ProtocolStandard="IuH";
IuHMMState = "IDLE";
RUADisconnectSent = 0;
MobileState = "Idle";
IuHSSState = "Idle";
IMSIstr="IMSI:";
TMSIstr="TMSI:";
CallIdString="CalledNumber:";
KeyIdentifier: IMSIstr,IMSI,TMSIstr,TMSI,CallIdString,CalledNumber;
RTPSessionStarted = "False";
SetupTime = 0;
CallControlEnabled = "False";
IuHStatus = "Null";
Status = $IuHStatus;
CallConnected = "False";
SMSInitiation_CCActive = "False";
IUUPackRecieved = "Not Received";
Paging_IdentifyStatus = "Fail";
//RTP Commands Parameters//
Enablesrtp = 0;
```

Scripts Message Sequence Event Config Script Flow

Bulk Call Generation using CSV Profiles

MAPS HNB (UMTS luH 3GPP) - [Call Generation - CallGenDefault]

Configurations Emulator Reports Editor Debug Tools Windows Help

Sr No	Script Name	Profile	Call Info	Script Execution	Status	Events	Events Profile	Result	Total Iterations	Completed Iterations
2	luH_CS_Call.gls		IMSI: .001013014041772,TMSI: .0x11110032,C...	Stop	AMR Send_File-Started	Hold		Pass	1	0
3	luH_CS_Call.gls		IMSI: .001013014041773,TMSI: .0x11110033,C...	Stop	AMR Send_File-Started	Hold		Pass	1	0
4	luH_CS_Call.gls		IMSI: .001013014041774,TMSI: .0x11110034,C...	Stop	AMR Send_File-Started	Hold		Pass	1	0
5	luH_CS_Call.gls		IMSI: .001013014041775,TMSI: .0x11110035,C...	Stop	AMR Send_File-Started	Hold		Pass	1	0
6	luH_CS_Call.gls		IMSI: .001013014041776,TMSI: .0x11110036,C...	Stop	AMR Send_File-Started	Hold		Pass	1	0
7	luH_CS_Call.gls		IMSI: .001013014041777,TMSI: .0x11110037,C...	Stop	AMR Send_File-Started	Hold		Pass	1	0
8	luH_CS_Call.gls		IMSI: .001013014041778,TMSI: .0x11110038,C...	Stop	AMR Send_File-Started	Hold		Pass	1	0
9	luH_CS_Call.gls		IMSI: .001013014041779,TMSI: .0x11110039,C...	Stop	AMR Send_File-Started	Hold		Pass	1	0
10	luH_CS_Call.gls		IMSI: .001013014041780,TMSI: .0x11110040,C...	Stop	AMR Send_File-Started	Hold		Pass	1	0
11	luH_CS_Call.gls		IMSI: .001013014041781,TMSI: .0x11110041,C...	Stop	AMR Send_File-Started	Hold		Pass	1	0
12	luH_CS_Call.gls		IMSI: .001013014041782,TMSI: .0x11110042,C...	Stop	AMR Send_File-Started	Hold		Pass	1	0
13	luH_CS_Call.gls		IMSI: .001013014041783,TMSI: .0x11110043,C...	Stop	AMR Send_File-Started	Hold		Pass	1	0
14	luH_CS_Call.gls		IMSI: .001013014041784,TMSI: .0x11110044,C...	Stop	AMR Send_File-Started	Hold		Pass	1	0

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

Save Column Width Show Latest

HNB HNBGW

CM SERVICE REQUEST 15:21:00.290000

AUTHENTICATION REQUEST 15:21:00.339000

AUTHENTICATION RESPONSE 15:21:00.339000

SecurityModeCommand 15:21:00.539000

SecurityModeComplete 15:21:00.539000

SETUP 15:21:00.540000

CALL PROCEEDING 15:21:00.588000

RAB-AssingmentRequest 15:21:00.588000

RAB-AssingmentResponse 15:21:00.624000

ALERTING 15:21:00.758000

CONNECT 15:21:01.856000

CONNECT ACKNOWLEDGE 15:21:01.858000

Find

```

===== RUA Layer =====
0000 RUA PDU = InitiatingMessage (0)
0000 InitiatingMessage =
0001 Procedure Code = 1 id-Connect
0002 Criticality = 0 reject(0)
0004 Value =
0004 Connect =
0004 ProtocolIE-Container = 5 Items
0007 Item = 0
0007 ProtocolIE-Field =
0007 ProtocolIE-ID = 7 id-CN-DomainIndicator
0009 Criticality = 0 reject(0)
000B Value =
000B Domain Indicator =
000B CN-DomainIndicator = 0 cs-domain(0)
000C Item = 1
000C ProtocolIE-Field =
000C ProtocolIE-ID = 3 id-Context-ID
000E Criticality = 0 reject(0)
0010 Value =
0010 Context ID =
0010 Context-ID = 35 (x000023)
0013 Item = 2
0013 ProtocolIE-Field =
0013 ProtocolIE-ID = 5 id-IntraDomainNasNodeS
0015 Criticality = 1 ignore(1)
0017 Value =
0017 IntraDomainNasNodeSelector =
0017 version = release99 (0)
0017 release99 =
0017 CN Type = Gsm map TDNNS (0)

```

Scripts Message Sequence Event Config Script Flow

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

Bulk Call Reception using CSV Profiles

GL MAPS HNBGateWay (UMTS IuH 3GPP) - [Call Reception]

Configurations Emulator Reports Editor Debug Tools Windows Help

Sr No	Script Name	Profile	Call Info	Script Execut...	Status	Events	Events Profile	Results
1	Mgmt_HNBGW.gls		HNBID:0x00000001	Stop	HNB Register Accepted	HNBDeRegistration		Pass
2	IuH_CS_Call.gls	MSPProfile0031	IMSI:001013014041771.CalledNumb...	Completed	Call Released	None		Pass
3	IuH_CS_Call.gls	MSPProfile0032	IMSI:001013014041772.CalledNumb...	Completed	Call Released	None		Pass
4	IuH_CS_Call.gls	MSPProfile0033	IMSI:001013014041773.CalledNumb...	Completed	Call Released	None		Pass
5	IuH_CS_Call.gls	MSPProfile0034	IMSI:001013014041774.CalledNumb...	Completed	Call Released	None		Pass
6	IuH_CS_Call.gls	MSPProfile0035	IMSI:001013014041775.CalledNumb...	Completed	Call Released	None		Pass
7	IuH_CS_Call.gls	MSPProfile0036	IMSI:001013014041776.CalledNumb...	Completed	Call Released	None		Pass
8	IuH_CS_Call.gls	MSPProfile0037	IMSI:001013014041777.CalledNumb...	Completed	Call Released	None		Pass
9	IuH_CS_Call.gls	MSPProfile0038	IMSI:001013014041778.CalledNumb...	Completed	Call Released	None		Pass
10	IuH_CS_Call.gls	MSPProfile0039	IMSI:001013014041779.CalledNumb...	Completed	Call Released	None		Pass
11	IuH_CS_Call.gls	MSPProfile0040	IMSI:001013014041780.CalledNumb...	Completed	Call Released	None		Pass
12	IuH_CS_Call.gls	MSPProfile0041	IMSI:001013014041781.CalledNumb...	Completed	Call Released	None		Pass
13	IuH_CS_Call.gls	MSPProfile0042	IMSI:001013014041782.CalledNumb...	Completed	Call Released	None		Pass
14	IuH_CS_Call.gls	MSPProfile0043	IMSI:001013014041783.CalledNumb...	Completed	Call Released	None		Pass
15	IuH_CS_Call.gls	MSPProfile0044	IMSI:001013014041784.CalledNumb...	Completed	Call Released	None		Pass
16	IuH_CS_Call.gls	MSPProfile0045	IMSI:001013014041785.CalledNumb...	Completed	Call Released	None		Pass

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

Save Column Width ☐ Show Latest

HNB HNBGW

CM SERVICE REQUEST

15:21:00.319000

AUTHENTICATION REQUEST

15:21:00.320000

AUTHENTICATION RESPONSE

15:21:00.430000

SecurityModeCommand

15:21:00.431000

SecurityModeComplete

15:21:00.563000

SETUP

15:21:00.564000

CALL PROCEEDING

15:21:00.564000

RAB-AssignmentRequest

15:21:00.565000

RAB-AssignmentResponse

15:21:00.652000

ALERTING

15:21:00.652000

Find

===== RUA Layer =====
0000 RUA PDU
0000 InitiatingMessage
0001 Procedure Code
0002 Criticality
0004 Value
0004 Connect
0004 ProtocolIE-Container
0007 Item
0007 ProtocolIE-Field
0007 ProtocolIE-ID
0009 Criticality
000B Value
000B Domain Indicator
000B CN-DomainIndicator
000C Item
000C ProtocolIE-Field
000C ProtocolIE-ID
000E Criticality
0010 Value
0010 Context ID
0000 Context-ID

Scripts Message Sequence Event Config Script Flow

Initialisation Errors Error Events Captured Errors

Message Statistics

Configurations Emulator Reports Editor Debug Tools Windows Help				
Call Stats Message Stats				
Message Type	Tx Count	Rx Count	Retransmit Count	
ALERTING	10003	0	0	
ASP Active	0	1	0	
ASP Active Acknowledgement	1	0	0	
ASP Up	0	1	0	
ASP Up Acknowledgement	1	0	0	
AUTHENTICATION REQUEST	10006	0	0	
AUTHENTICATION RESPONSE	0	10006	0	
CALL PROCEEDING	10003	0	0	
CC connection confirm	10006	0	0	
CM SERVICE REQUEST	0	10003	0	
CONNECT	10003	0	0	
CONNECT ACKNOWLEDGE	0	10003	0	
DISCONNECT	2	8001	0	
IDENTITY REQUEST	3	0	0	
IDENTITY RESPONSE	0	3	0	
IT Inactivity test	9998	9998	0	
Iu-ReleaseCommand	8006	0	0	
Iu-ReleaseComplete	0	8006	0	
LOCATION UPDATING ACCEPT	3	0	0	
LOCATION UPDATING REQUEST	0	3	0	
Notify	2	0	0	
RAB-AssignmentRequest	10003	0	0	
RAB-AssignmentResponse	0	10003	0	
RELEASE	8001	2	0	
RELEASE COMPLETE	2	8001	0	
RLC release complete	0	8006	0	
RLSD released	8006	0	0	
SETUP	0	10003	0	
SSA subsystem-allowed	1	0	0	
SST subsystem-status-test	0	1	0	
SecurityModeCommand	10006	0	0	
SecurityModeComplete	0	10006	0	
TMSI REALLOCATION COMPLETE	0	3	0	

Customizations - Statistics and Reports

MOS, R-Factor

Packet Loss

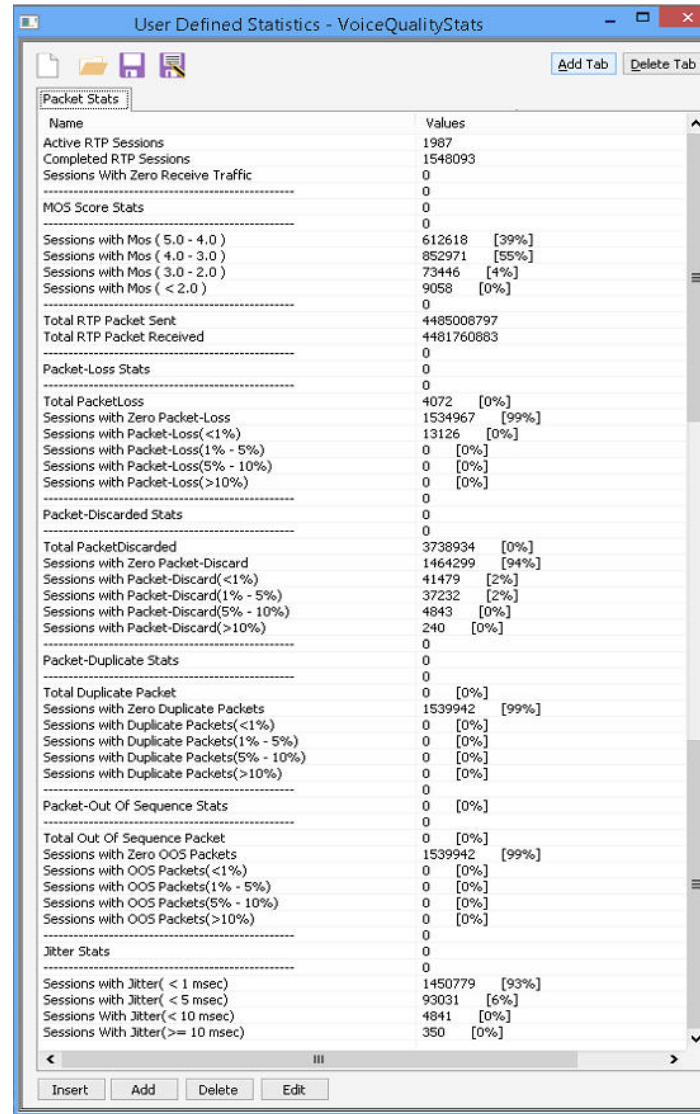
Packets Discarded

Duplicate Packets

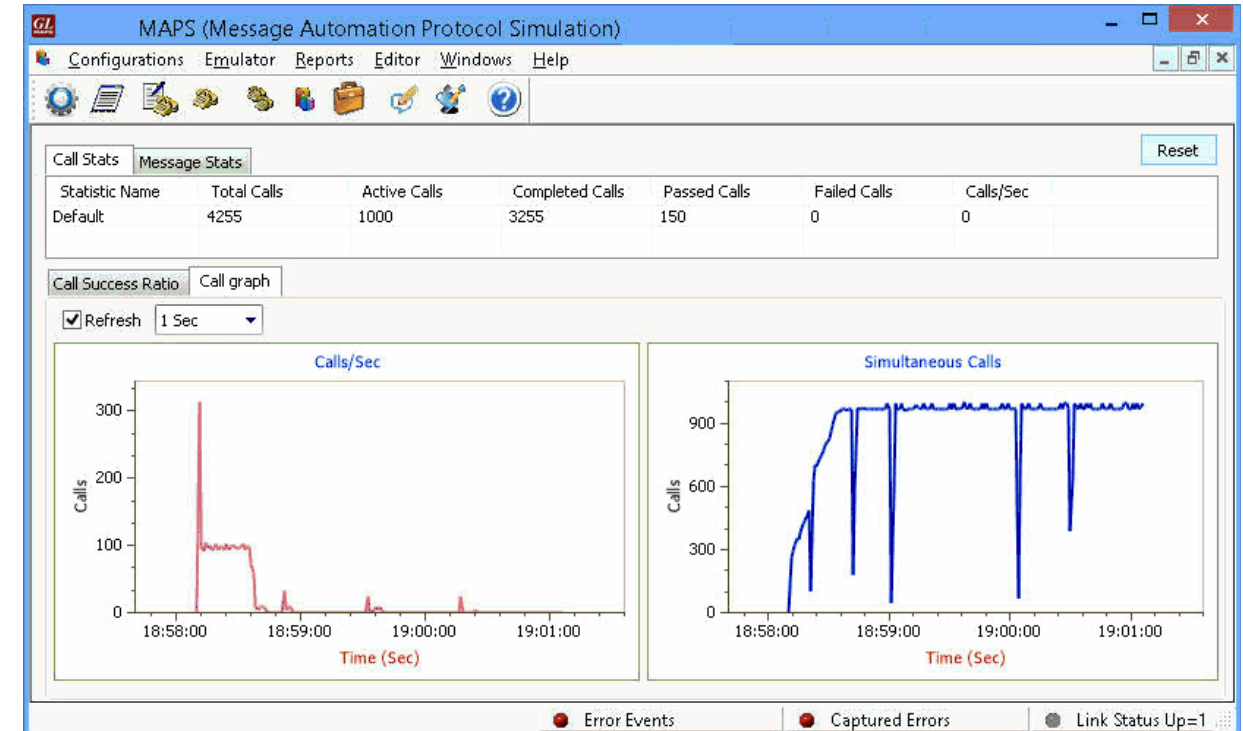
Out-Of-Sequence

Packets

Jitter Statistics

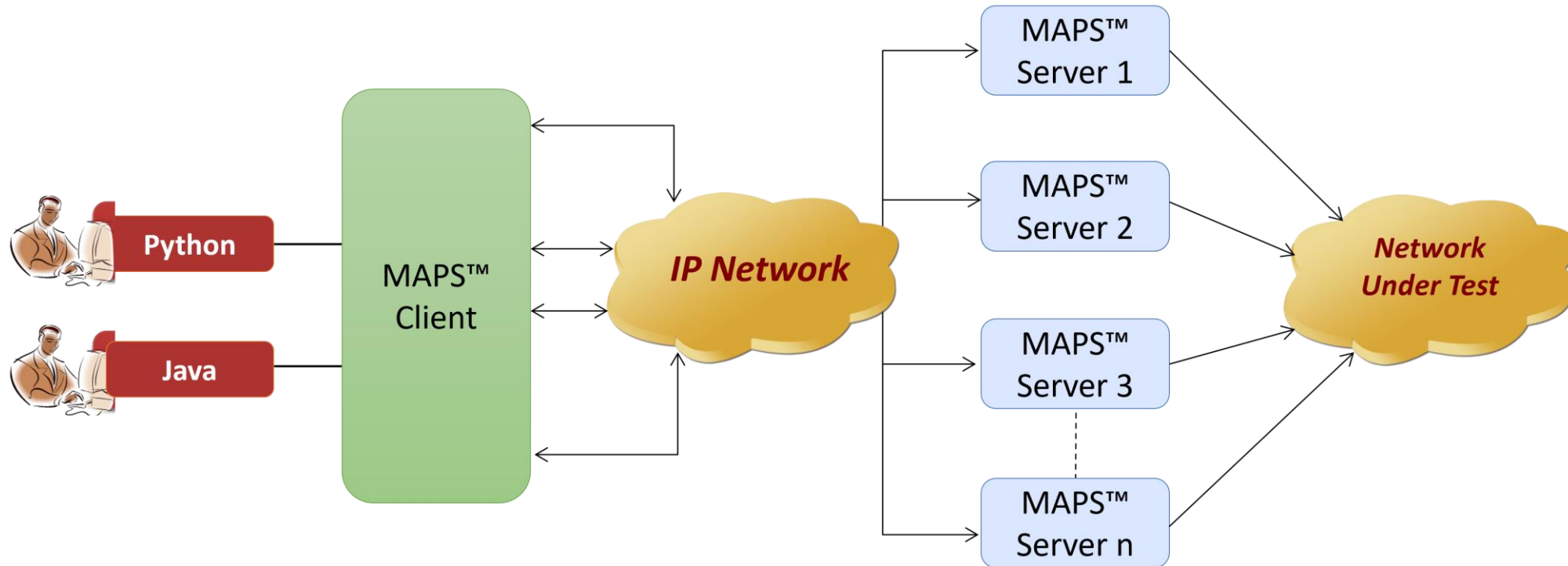


Name	Values
Active RTP Sessions	1987
Completed RTP Sessions	1548093
Sessions With Zero Receive Traffic	0
MOS Score Stats	0
Sessions with Mos (5.0 - 4.0)	612618 [39%]
Sessions with Mos (4.0 - 3.0)	852971 [55%]
Sessions with Mos (3.0 - 2.0)	73446 [4%]
Sessions with Mos (< 2.0)	9058 [0%]
Total RTP Packet Sent	4485008797
Total RTP Packet Received	4481760883
Packet-Loss Stats	0
Total PacketLoss	4072 [0%]
Sessions with Zero Packet-Loss	1534967 [99%]
Sessions with Packet-Loss(<1%)	13126 [0%]
Sessions with Packet-Loss(1% - 5%)	0 [0%]
Sessions with Packet-Loss(5% - 10%)	0 [0%]
Sessions with Packet-Loss(>10%)	0 [0%]
Packet-Discarded Stats	0
Total PacketDiscarded	3738934 [0%]
Sessions with Zero Packet-Discard	1464299 [94%]
Sessions with Packet-Discard(<1%)	41479 [2%]
Sessions with Packet-Discard(1% - 5%)	37232 [2%]
Sessions with Packet-Discard(5% - 10%)	4843 [0%]
Sessions with Packet-Discard(>10%)	240 [0%]
Packet-Duplicate Stats	0
Total Duplicate Packet	0 [0%]
Sessions with Zero Duplicate Packets	1539942 [99%]
Sessions with Duplicate Packets(<1%)	0 [0%]
Sessions with Duplicate Packets(1% - 5%)	0 [0%]
Sessions with Duplicate Packets(5% - 10%)	0 [0%]
Sessions with Duplicate Packets(>10%)	0 [0%]
Packet-Out Of Sequence Stats	0
Total Out Of Sequence Packet	0 [0%]
Sessions with Zero OOS Packets	1539942 [99%]
Sessions with OOS Packets(<1%)	0 [0%]
Sessions with OOS Packets(1% - 5%)	0 [0%]
Sessions with OOS Packets(5% - 10%)	0 [0%]
Sessions with OOS Packets(>10%)	0 [0%]
Jitter Stats	0
Sessions with Jitter(< 1 msec)	1450779 [93%]
Sessions with Jitter(< 5 msec)	93031 [6%]
Sessions With Jitter(< 10 msec)	4841 [0%]
Sessions With Jitter(>= 10 msec)	350 [0%]



Call Stats provide a running tabular log of system level stats, tracked stats include: Total Calls, Active Calls, Completed Calls, Passed Calls, Failed Calls, Instantaneous Calls/Sec

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 Support

```
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-IuCS\MAPSCLI\PythonClient\examples\IuCS\RNC\IuCS_PlaceCall.py
IuCS Server Connection... True
IuCS Testbed Starting ... True
IuCS Profile Loading... True
Check M3UA Health Status... True
IuCS Call Initiated... True
Call Connecting...
Call Answered...
Send File started
IuCS Call Status...CALL ACTIVE
IuCS Call Terminating... True
CMOS = 4.15625
LMOS = 4.15625
CR_FACTOR = 91
LR_FACTOR = 91
TX_PACKETS = 502
RX_PACKETS = 1604
LOST_PACKETS = 0
DISCARDED_PACKETS = 0
OUT_OF_SEQ_PACKETS = 0
DUPLICATE_PACKETS = 0
AVG_JITTER = 0.6875

IuCS Script Stopping... True
IuCS Server Disconnecting... True
>>> |
```

```
CLI MapsCLI RNC (UMTS IUCS 3GPP SCTP)
File Edit View
View Latest Command
1 :: 2019-1-11 12:08:13.519000 : UserEvent 1 "GetMessageInfo"# "Index"=12;
1 :: 2019-1-11 12:08:13.619000 : UserEvent 1 "GetMessageInfo"# "Index"=13;
1 :: 2019-1-11 12:08:13.717000 : UserEvent 1 "GetMessageInfo"# "Index"=14;
1 :: 2019-1-11 12:08:13.826000 : UserEvent 1 "GetMessageInfo"# "Index"=15;
1 :: 2019-1-11 12:08:13.926000 : UserEvent 1 "GetMessageInfo"# "Index"=16;
1 :: 2019-1-11 12:08:14.024000 : UserEvent 1 "GetMessageInfo"# "Index"=17;
1 :: 2019-1-11 12:08:14.123000 : UserEvent 1 "GetMessageInfo"# "Index"=18;
1 :: 2019-1-11 12:08:14.222000 : UserEvent 1 "GetMessageInfo"# "Index"=19;
1 :: 2019-1-11 12:08:15.288000 : StopScript 1;
```

Thank you