China Mobile Enterprise Standard

China Mobile VoLTE Terminal NS-IOT Test Specification

V1.1.0

2014-10-13 Release

China Mobile Communication Corporation

Contents

Foreword

This specification is a part of China Mobile VoLTE terminal acceptance testing, to ensure the VoLTE terminal compliance with the China Mobile VoLTE requirements. The NS-IOT testing is a kind of IOT testing which is executed on system simulator.

The objective of this document is to define the VoLTE test cases for VoLTE terminals that are designed to operate in China Mobile network. This document will be used to guide the execution of VoLTE testing, and also be used to guide the VoLTE test system development.

1 Scope

The present document specifies the NS-IOT testing which involves IMS procedure, Supplymentary Service, SMS, Mobility and performance for VoLTE User Equipment(UE). For each test cases, the following information can be found in this document:

- the test configuration;
- the test purposes;
- the applicability of each test case;
- the test conditions;
- the brief description of the test procedure and the expected result

2 Reference

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 36.508: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Packet Core (EPC); Common Test Environments for User Equipment (UE) conformance Testing".

[3] 3GPP TS 36.331: “Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification”

[4] 3GPP TS 24.301: “Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3”

[5] 3GPP TS 24.229:” IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3”

3 Definitions, Symbols and Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1].

Table 3-1: Definitions, symbols and abbreviations

Abbreviation	Definitions
2G	The 2nd Generation

3G	The 3rd Generation
3GPP	The 3rd Generation Partnership Project
AMR	Adaptive Multi-Rate
AMR-WB	Adaptive Multi-Rate Wideband
APN	Access Point Name
BAOC	Barring of All Incoming Calls
BOIC	Barring of Outgoing International Calls
BAIC	Barring of All Incoming Calls
CFNRc	Call Forwarding on Not Reachable
CFNL	Call Forwarding on Not Logged in
CFU	Call Forwarding on Unconditional
CFNRy	Communication Forwarding on No Reply
CW	Communication Waiting
CS	Circuit Switching
DTM	Dual Transfer Mode
FDD	Frequency Division Duplex
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications
GAA	Generic Authentication Architecture
GBA	Generic Bootstrapping Architecture
GBR	Guaranteed Bitrate
HSPA	High Speed Packet Access
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identification Number
IMPI	IP Multimedia Private Identity
IMPU	IP Multimedia Public Identity
ISIM	International Protocal Multimedia Services SIM
LAU	Location Area Update
LTE	Long Term Evolution
LTE FDD	Long Term Evolution Frequency Division Duplex
ME	Mobile Equipment
MNC	Mobile Network Code
MSC	Mobile Switch Center
MSISDN	Mobile Subscriber International ISDN/PSTN Number
MT	Mobile Termination
OIP	Originating Identification Presentation
OIR	Originating Identification Restrction

PIN	Personal Identification Number
PLMN	Public Land Mobile Network
PCO	Protocol Configuration Options
P-CSCF	Proxy-Call Session Control Function
PDN	Public Data Nework
PS	Packet Switching
QCI	QoS Class Identifier
RoHC	Robust Header Compression
SAR	Specific Absorption Rate
SRVCC	Single Radio Voice Call Continuity
SPS	Semi-Persistent Scheduling
SIM	Subscriber Identity Module
TAU	Tracking Area Update
TD-SCDMA	Time Division-Synchronous Code Division Multiple Access
TD-HSPA	Time Division-High Speed Packet Access
TD-LTE	Time Division Duplex- Long Term Evolution
TE	Terminal Equipment
TIS	Total Isotropic Sensitivity
TRP	Total Radiated Power
TIP	Terminating Identification Presentation
TIR	Terminating Identification Restriction
RRM	Radio Resource Management
UE	User Equipment
USB	Universal Serial BUS
USIM	Universal Subscriber Identity Module
WCDMA	Wideband Code Division Multiple Access
XCAP	XML Configuration Access Protocol

4 Test Environment

4.1 Default Test Environment

A network system simulator is used to model the eNB, EPC and IMS. The default configuration of the simulator is described in “3GPP TS 36.508[2], 3GPP EUTRA and EPC Common Test Environments for User Equipment (UE) conformance Testing” which contains definitions of reference conditions, test signals, default parameters, reference radio bearer configurations, common requirements for test equipment and generic procedures.

The UE under test is connected to a laptop computer, which is used to control the test configuration, generate and receive data traffic.

4.2 Special Test Environment

If the test environment doesn't follow the default test environment and is common for several test cases, e.g. special cell configurations, the test environment should be described in this section.

4.2.1 Cell Configuration

The cell bandwidth of 10/20 MHz is applied to the TD-LTE terminal NS-IOT test. The test frequencies (f1, f2, f3, f4) are defined so that no frequency overlapping takes place, in order to avoid unnecessary inter-frequency interference. Test frequencies for E-UTRA TDD 38,39,40, 41, are specified in table 4.2.1-1, 4.2.1-2, 4.2.1-3 and 4.2.1-4 respectively.

Table 4.2.1-1: Test frequencies for E-UTRA TDD (20MHz)

E-UTRA OperatingBand	Occupied Bandwidth [MHz]	f1	f2	f3	f4
38	50	37850 (2580MHz)	38150 (2610MHz)	38000 (2595MHz)	N/A
39	40	38350 (1890MHz)	38550 (1910MHz)	38450 (1900MHz)	N/A
40	100	39150 (2350MHz)	39550 (2390MHz)	38750 (2310MHz)	39350 (2370MHz)
41	194	40620 (2593MHz)	41490 (2680MHz)	39750 (2506MHz)	FFS

Table 4.2.1-2: Test frequencies for E-UTRA TDD (20MHz)

GSM Band	Bandwidth [MHz]	f1(Mid)	f2(High)	f3(Low)
Band 3 (DCS 1800)	75	590 (UL:1725.8MHz/ DL:1820.8MHz)	700 (UL:1747.8MHz/ DL:1842.8MHz)	515 (UL:1710.8MHz/ DL:1805.8MHz)
Band 8 (GSM 900)	25	20 (UL:894MHz/DL: 939MHz)	110 (UL:912MHz/DL: 957MHz)	5 (UL:891MHz/DL: 936MHz)

Test equipment shall be able to simulate cells of Radio Access Technology (RAT) E-UTRA, UTRA TDD and GERAN. Regardless of respective RAT, the overall number and configuration of cells to be simulated simultaneously by test equipments shall not exceed the resources specified in the table 4.2.1-3:

Table 4.2.1-3: Maximum resources in terms of number / configuration of cells to be simulated simultaneously in a test setup

No.	Simulation of	Max. number / configuration of cells (SISO / SIMO / MIMO)
1	E-UTRA single-mode networks (TDD)	4x cells
2	E-UTRA dual-mode networks (FDD and TDD)	4x cells
3	Mixed E-UTRA / UTRA TDD networks	4x cells
4	Mixed E-UTRA / GSM networks	4x cells
5	Mixed E-UTRA / UTRA TDD/ GSM networks	4x cells

If not explicitly specified in the test case prose, the default cell bandwidth should be 20 MHz, the default radio condition should be ideal radio condition.

Following Cell Configuration parameters are defined in the Test case description and shall overwrite the parameters defined for Default test environment

- MCC
- MNC
- Bandwidth, E-ARFCN
- Cell ID, TAC
- Reference Signal EPRE
- UL/DL Modulation,
- MIMO Mode
- Antenna Configuration
- RB Allocation
- Propagation Condition
- SNR value
- Correlation Matrix

Default Cell Configurations shall be used unless mentioned in the Test Conditions of respective tests.

4.2.2 USIM/ISIM Parameters

Table 4.2.2-1: USIM Elementary File Parameters

.No.	Elementary File	Parameter	Value
1	EF_{IMSI}	(IMSI)	460001234567890
2	$EF_{HPLMNwAcT}$	(HPLMN selector with Access Technology)	CMCC China (460, 00, EUTRAN), CMCC China (460, 00, UTRAN), CMCC China (460, 00, GSM), CMCC China (460, 02, UTRAN), CMCC China (460, 02, GSM), CMCC China (460, 07, UTRAN), CMCC China (460, 07, GSM)

3	K	K Value of the USIM	000102030405060708090A0B0C0D0E0F
4	EF_{HPPLMN}	(Higher Priority PLMN search period)	6 minutes
5	$EF_{PLMNwAcT}$	(User controlled PLMN selector with Access Technology)	(MCC, MNC, Access Technology) = China Mobile Hong Kong(454,12,EUTRAN) China Mobile Hong Kong (454,12,GSM) Far EasTone Taiwan (466, 01, GSM) Verizon US (311, 480, EUTRAN) HUTCHISON (454,16, EUTRAN) Vodafone UK (234, 15, EUTRAN) Vodafone UK (234, 15, GSM)
6	$EF_{OPLMNwACT}$	(Operator controlled PLMN selector with Access Technology)	(MCC, MNC, Access Technology) = SmarTone Hong Kong (454, 06, EUTRAN) CTM Macau (455, 04, GSM) T Mobile Germany(310, 260, EUTRAN) T Mobile Germany(310, 260, GSM) AT&T US (310, 150, EUTRAN) AT&T US (310, 150, GSM) O2 Telefonica UK (234, 11, EUTRAN) O2 Telefonica UK (234, 11, GSM) TeliaSonera Sweden(240,01,EUTRAN) TeliaSonera Sweden(240,01,GSM) New World Hongkong (454, 10, EUTRAN)

Note: The priority of the PLMNs in $EF_{HPLMNwAcT}$, $EF_{PLMNwAcT}$ and $EF_{OPLMNwACT}$ follows top bottom sequence i.e. PLMN on the top has highest priority.

Table 4.2.2-2: ISIM Elementary File Parameters

.No.	Elementary File	Parameter	Value
1	Home Network Domain Name	EF_{DOMAIN}	ims.bj.chinamobile.com
2	IMS Private User Identity	EF_{IMPI}	460001234567890@ims.bj.chinamobile.com
3	IMS Public User Identity	EF_{IMPU}	sip: 460001234567890@ims.bj.chinamobile.com

Table 4.2.2-3: Visited PLMNs used in Roaming testing (Not a part of the USIM profile)

Parameter	Value
(MCC MNC RAT)	SwissCom Switzerland (228, 01, EUTRAN) Orange Switzerland (228, 03, EUTRAN) Telenor Norway (242, 01, EUTRAN) E-Plus Germany (262, 03, EUTRAN)

	France Telecom (208, 02, EUTRAN) PBW US (310, 170, EUTRAN)

4.3 Applicability for the UE Configuration

This clause contains the applicability information that the UE shall support.

Configuration 1: The UE shall support TD-LTE Band 38, 39 40 and 41.

Configuration 2: The UE shall support TD-LTE Band 38,39,40,41 and FDD LTE Band 7.

Configuration 3:The UE shall support TD-LTE Band 38,39,40,41 and TD-SCDMA Band 34 and 39.

Configuration 4:The UE shall support TD-LTE Band 38,39,40,41, TD-SCDMA Band 34 and 39, GSM Band 3 and Band 8 , IMS capability

5 IMS Procedure

5.1 Registration

5.1.1 IMS PDN Connection Establishment

5.1.1.1 IMS PDN Connection Establishment as second PDN

5.1.1.1.1 Test Purpose

VoLTE over CSFB UE could establish Data PDN as first PDN during a combined EPS/IMSI attach procedure. Afterwards, IMS PDN is created and an IMS Registration is done.

5.1.1.1.2 Reference specification

3GPP TS 24.229, clause L.2.2.1

5.1.1.1.3 Applicability

This test applies to VoLTE over CSFB UE.

The UE shall support configuration 4.

5.1.1.1.4 Test conditions

[SS configuration]
E-UTRAN Cell A is TD-LTE cell.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test UICC with USIM should be inserted

[Initial conditions]
SS

E-UTRAN Cell A is not active

The test shall be performed under ideal radio conditions.

UE

UE is powered off (State 1)

5.1.1.1.5 Test procedure

PREAMBLE

1. Activate E-UTRAN Cell A.
2. Power on the UE.

MAIN BODY

3. UE performs a combined EPS/IMSI Attach in TD-LTE cell. Verify *UE's usage setting* in Attach Request is "*Voice Centric*", *Voice domain preference for E-UTRAN* is "*IMS PS VOICE preferred, CS voice as secondary*" , *SRVCC to GERAN/UTRAN capability* is supported. Verify that the UE does not send an APN Name during the Attach procedure. Verify that "PDN Type" in PDN CONNECTIVITY REQUEST message is set to "IPv4v6". Verify UE requests P-CSCF address via PCO method and list of P-CSCF IPv4 Address Request (000CH) and P-CSCF IPv6 Address Request (0001H) included.
4. SS sends ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message to establish default EPS Bearer (QCI=9) on Data APN ("CMNet") with the "PDN Address" set to "IPv4" and the ESM cause value set to #50 "PDN type IPv4 only allowed". SS indicates that IMS voice over PS is supported by setting IMS VoPS flag in Attach Accept.
5. UE sends PDN Connectivity Request to request IMS PDN ("IMS"). Verify that "PDN Type" in PDN CONNECTIVITY REQUEST message is IPv4v6. Verify UE requests P-CSCF address via PCO method and list of P-CSCF IPv4 Address Request (000CH) and P-CSCF IPv6 Address Request (0001H) included.
6. SS sends ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message to establish the Default EPS bearer (QCI 5) for IMS PDN with "PDN Adress" set to "IPv6" and the ESM cause value set to #51 "PDN type IPv6 only allowed". SS allocates IPv6 P-CSCF address via PCO.
7. UE registers with IMS successfully and subscribes to reg – event package.

POSTAMBLE

8. Deactivate E-UTRAN Cell A.

Table 5.1.1.1.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
2	UE		Switch On UE	AT Command (switch ON)	
3	→	RRC	UE performs a combined	UE requests EPS/IMS	PASS

	←	NAS	EPS/IMSI registration procedure on E-UTRAN Cell A	combined attach, Voice-over-PS preference and voice-centric in Attach Request, SRVCC to GERAN/UTRAN capability is supported UE does not send an APN name during the attach procedure.	
4	→ ←	RRC NAS	SS sends ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message to create default EPS Bearer (QCI=9) on Data APN (“CMNet”)	IMS VoPS flag in Attach Accept is set to TRUE	
5	→ ←	RRC NAS	UE sends PDN Connectivity Request to request IMS PDN (“IMS”) establishment. APN is “IMS”		PASS
6			SS sends Activate Default EPS Bearer Context Request message to establishe the Default EPS bearer (QCI 5) for IMS PDN. SS allocates P-CSCF address via PCO.		
7	→ ←	IMS	UE registeres successfully on IMS		
8			Deactivate E-UTRAN Cell A		

5.1.1.1.6 Expected Result

To verify UE supports combined EPS/IMSI attach where the UE does not request for a particular APN name.
To verify UE supports multi-PDN connections. First APN is Data APN (“CMNet”) with default EPS Bearer QCI=9 and second IMS APN (“IMS”) with default EPS Bearer QCI=5
To verify UE supports P-CSCF Dynamic Discovery via PCO Method for IMS PDN.

5.1.1.1a IMS PDN Connection Establishment as second PDN, Dual Standby

5.1.1.1a.1 Test Purpose

VoLTE over Dual Standby UE could establish Data PDN as first PDN during EPS only attach procedure. Afterwards, IMS PDN is created and an IMS Registration is done.

5.1.1.1a.2 Reference specification

3GPP TS 24.229, clause L.2.2.1

5.1.1.1a.3 Applicability

This test applies to VoLTE over Dual Standby UE.

The UE shall support configuration 4.

5.1.1.1a.4 Test conditions

[SS configuration]
E-UTRAN Cell A is TD-LTE cell.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

GSM Cell B
Cell Id=02 LAC = 02
MCC-MNC = 460-00
ARFCN = f1
RF Signal Level = -65dBm

[UE configuration]
The test UICC with USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A and GSM Cell B are not active
The test shall be performed under ideal radio conditions.

UE

UE is powered off (State 1)

5.1.1.1a.5 Test procedure

PREAMBLE

1. Activate E-UTRAN Cell A and GSM Cell B.
2. Power on the UE.

MAIN BODY

3. UE performs EPS only Attach in TD-LTE cell. Verify *UE's usage setting* in Attach Request is "*Voice Centric*", *Voice domain preference for E-UTRAN* is "*IMS PS Voice only*" , *SRVCC to GERAN/UTRAN capability* is supported. Verify that the UE does not send an APN Name during the Attach procedure. Verify that "PDN Type" in PDN CONNECTIVITY REQUEST message is set to "IPv4v6". Verify UE requests P-CSCF address via PCO method and list of P-CSCF IPv4 Address Request (000CH) and P-CSCF IPv6 Address Request (0001H) included.
4. SS sends ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message to create default EPS Bearer (QCI=9) on Data APN ("CMNet") with "PDN Adress" set to "IPv4" and the ESM cause value set to #50 "PDN type IPv4 only allowed". SS indicates that IMS voice over PS is supported by setting IMS VoPS flag in Attach Accept.
5. UE sends PDN Connectivity Request to request IMS PDN ("IMS"). Verify that "PDN Type" in PDN CONNECTIVITY REQUEST message is IPv4v6. Verify UE requests P-CSCF address via PCO method and list of P-CSCF IPv4 Address Request (000CH) and P-CSCF IPv6 Address Request (0001H) included.
6. SS sends ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message to establish the Default EPS bearer (QCI 5) for IMS PDN with "PDN Adress" set to "IPv6" and the ESM cause value set to #51 "PDN type IPv6 only allowed". SS allocates IPv6 P-CSCF address via PCO.
7. In parallel with step3-6, UE performs CS attach in GSM Cell B according to Step7-12 defined in TS 51.010 26.2.2.3 procedure 3.
8. UE registers with IMS successfully and subscribes to reg – event package.

POSTAMBLE

9. Deactivate E-UTRAN Cell A.

Table 5.1.1.1a.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
2	UE		Switch On UE	AT Command (switch ON)	
3	→	RRC	UE performs EPS only Attach	UE requests EPS only	PASS
	←	NAS	procedure with Default EPS	attach, IMS PS Voice only	

			bear establishment on E-UTRAN Cell A	and voice-centric in Attach Request, SRVCC to GERAN/UTRAN capability is supported The UE does not send an APN name during the attach procedure.	
4	→ ←	RRC NAS	SS sends ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message to create an default EPS Bearer (QCI=9) on Data APN (“CMNet”)	IMS VoPS flag in Attach Accept is set to TRUE	
5	→ ←	RRC NAS	UE sends PDN Connectivity Request to request IMS PDN (“IMS”) establishment. APN is “IMS”		PASS
6	→ ←	RRC NAS	SS sends Activate Default EPS Bearer Context Request message to establishe the Default EPS bearer (QCI 5) for IMS PDN. SS allocates IPv6 P-CSCF address via PCO.		
7	→ ←	RRC NAS	In parallel with step3-6, UE performs CS attach in GSM Cell B according to Step7-12 defined in TS 51.010 26.2.2.3 procedure 3		PASS
8	→ ←	IMS	UE registeres successfully on IMS		
9			Deactivate E-UTRAN Cell A and GSM Cell B		

5.1.1.1a.6 Expected Result

UE shall in step 3 support EPS only attach in LTE where the UE does not request for a particular APN name.

UE shall in step 5 support multi-PDN connections and P-CSCF Dynamic Discovery via PCO Method for IMS PDN.

UE shall in step 7 perform CS attach in GSM Cell B.

5.1.1.2 IMS PDN Connection Establishment as first PDN

5.1.1.2.1 Test Purpose

VoLTE over CSFB UE could establish IMS PDN as first PDN during a combined EPS/IMSI attach procedure. Afterwards an IMS Registration is done and a Data PDN is created.

5.1.1.2.2 Reference specification

3GPP TS 24.229, clause L.2.2.1

5.1.1.2.3 Applicability

This test applies to VoLTE over CSFB UE.

The UE shall support configuration 4.

5.1.1.2.4 Test conditions

[SS configuration]
E-UTRAN Cell A is TD-LTE cell.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test UICC with USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is not active
The test shall be performed under ideal radio conditions.
UE
UE is powered off (State 1)

5.1.1.2.5 Test procedure

PREAMBLE
1. Activate E-UTRAN Cell A.

2. Power on the UE.

MAIN BODY

3. UE performs a combined EPS/IMSI Attach in TD-LTE cell. Verify *UE's usage setting* in Attach Request is "*Voice Centric*", *Voice domain preference for E-UTRAN* is "*IMS PS VOICE preferred, CS voice as secondary*" , *SRVCC to GERAN/UTRAN capability* is supported. Verify that the UE does not send an APN Name during the Attach procedure. Verify that "PDN Type" in PDN CONNECTIVITY REQUEST message is set to "IPv4v6". Verify UE requests P-CSCF address via PCO method and list of P-CSCF IPv4 Address Request (000CH) and P-CSCF IPv6 Address Request (0001H) included.
4. SS sends ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message to create an default EPS Bearer (QCI=5) on IMS APN ("IMS") with "PDN Adress" set to "IPv6" and the ESM cause value set to #51 "PDN type IPv6 only allowed". SS allocates IPv6 P-CSCF address via PCO. SS indicates that IMS voice over PS is supported by setting IMS VoPS flag in Attach Accept. (Note that the APN name "IMS" is assigned by the SS and the UE does not send APN Name during the Attach procedure.)
5. UE registers with IMS successfully and subscribes to reg – event package.
6. UE sends PDNConnectivityRequest to request Data PDN ("CMNet"). Verify that "PDN Type" in PDN CONNECTIVITY REQUEST message is IPv4v6. Verify that UE requests P-CSCF address via PCO method and list of P-CSCF IPv4 Address Request (000CH) and P-CSCF IPv6 Address Request (0001H) included.
7. SS sends ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message to establish the Default EPS bearer (QCI 9) for Data PDN with "PDN Adress" set to "IPv4" and the ESM cause value set to #50 "PDN type IPv4 only allowed". SS don't allocate any P-CSCF address..

POSTAMBLE

8. Deactivate E-UTRAN Cell A.

Table 5.1.1.1.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
2	UE		Switch On UE	AT Command (switch ON)	
3	→ ←	RRC NAS	UE registration procedure with Default EPS bearer establishment on E-UTRAN Cell A	UE requests EPS/IMS combined attach, Voice-over-PS preference and voice-centric in Attach Request, SRVCC to GERAN/UTRAN capability is supported. TheUE does not send APN name during the attach	PASS

				procedure.	
4	→ ←	RRC NAS	IMS PDN is created by SS with QCI=5 and includes IPv6 P-CSCF address in PCO	IMS VoPS flag in Attach Accept is set to TRUE	
5	→ ←	IMS	UE registeres successfully on IMS		
6	→ ←	RRC NAS	UE sends PDN Connectivity Request to request Data PDN. APN is “CMNet”		PASS
7			SS sends Activate Default EPS Bearer Context Request message to establish default EPS bear(QCI 9) for Data APN.SS don’t allocate any P-CSCF adress.		
8			Deactivate E-UTRAN Cell A		

5.1.1.2.6 Expected Result

To verify UE supports combined EPS/IMSI attach where the UE does not request for a particular APN name.
To verify UE supports multi-PDN connections. Data APN (“CMNet”) with default EPS Bearer QCI=9 and IMS APN (“IMS”) with default EPS Bear QCI=5
To verify UE supports P-CSCF Dynamic Discovery via PCO Method

5.1.1.2a IMS PDN Connection Establishment as first PDN, Dual Standby

5.1.1.2a.1 Test Purpose

VoLTE over Dual Standby UE could establish IMS PDN as first PDN during EPS only attach procedure. Afterwards an IMS Registration is done and a Data PDN is created.

5.1.1.2a.2 Reference specification

3GPP TS 24.229, clause L.2.2.1

5.1.1.2a.3 Applicability

This test applies to VoLTE over Dual Standby UE.

The UE shall support configuration 4.

5.1.1.2a.4 Test conditions

[SS configuration]
E-UTRAN Cell A is TD-LTE cell.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

GSM Cell B
Cell Id=02 LAC = 02
MCC-MNC = 460-00
ARFCN = f1
RF Signal Level = -65dBm

[UE configuration]
The test UICC with USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is not active
The test shall be performed under ideal radio conditions.

UE
UE is powered off (State 1)

5.1.1.2a.5 Test procedure

PREAMBLE
1. Activate E-UTRAN Cell A and GSM Cell B.
2. Power on the UE.

MAIN BODY
3. UE performs EPS only Attach in TD-LTE cell. Verify *UE's usage setting* in Attach Request is "*Voice Centric*", *Voice domain preference for E-UTRAN* is "*IMS PS Voice only*" , *SRVCC to GERAN/UTRAN capability* is supported. Verify that the UE does not send an APN Name during the Attach procedure. Verify that "PDN Type" in PDN CONNECTIVITY REQUEST message is set to "IPv4v6". Verify that the UE requests P-CSCF address via PCO method and list of P-CSCF IPv4 Address Request (000CH) and P-CSCF IPv6 Address Request (0001H) included.

4. SS sends ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message to create an default EPS Bearer (QCI=5) on IMS APN (“IMS”) with “PDN Adress” set to "IPv6" and the ESM cause value set to #51 "PDN type IPv6 only allowed". SS allocates IPv6 P-CSCF address via PCO. SS indicates that IMS voice over PS is supported by setting IMS VoPS flag in Attach Accept. (Note that the APN name “IMS” is assigned by the SS and the UE does not send APN Name during the Attach procedure.)
5. UE registers with IMS successfully and subscribes to reg – event package.
6. UE sends PDN Connectivity Request to request Data PDN (“CMNet”). Verify that “PDN Type” in PDN CONNECTIVITY REQUEST message is IPv4v6. Verify that UE requests P-CSCF address via PCO method and list of P-CSCF IPv4 Address Request (000CH) and P-CSCF IPv6 Address Request (0001H) included.
7. SS sends ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message to establish the Default EPS bearer (QCI 9) for Data PDN with “PDN Adress” set to "IPv4" and the ESM cause value set to #50 "PDN type IPv4 only allowed". SS don’t allocate any P-CSCF address.
8. In parallel with step3-7, UE performs CS attach in GSM Cell B according to Step7-12 defined in TS 51.010 26.2.2.3 procedure 3.

POSTAMBLE

9. Deactivate E-UTRAN Cell A.

Table 5.1.1.2a.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
2	UE		Switch On UE	AT Command (switch ON)	
3	→ ←	RRC NAS	UE registration procedure with Default EPS bearer establishment on E-UTRAN Cell A	UE requests EPS only attach, IMS PS Voice only and voice-centric in Attach Request, SRVCC to GERAN/UTRAN capability is supported. The UE does not send an APN name during the attach procedure.	PASS
4	→ ←	RRC NAS	IMS PDN is created by SS with QCI=5 and includes P-CSCF address in PCO	IMS VoPS flag in Attach Accept is set to TRUE	
5	→ ←	IMS	UE registeres successfully on IMS		
6	→ ←	RRC NAS	UE requests second PDN with default EPS bearer QCI=9. APN is “CMNet”.		PASS
7			SS sends Activate Default		

			EPS Bearer Context Request message to establish default EPS bear(QCI 9) for Data APN.SS don't allocate any P-CSCF adress.		
8	→ ←	RRC NAS	In parallel with step3-7, UE performs CS attach in GSM Cell B according to Step7-12 defined in TS 51.010 26.2.2.3 procedure 3		PASS
9			Deactivate E-UTRAN Cell A and GSM Cell B		

5.1.1.2a.6 Expected Result

UE shall in step 3 support EPS only attach in LTE where the UE does not request for a particular APN name.

UE shall in step 6 support multi-PDN connections and request second PDN ("CMNet").

UE shall in step 8 perform CS attach in GSM Cell B

5.1.2 IMS Registration with ISIM

5.1.2.1 Test Purpose

UE could derive authentication parameter from ISIM on UICC and register successfully to IMS.

5.1.2.2 Reference specification

3GPP TS 24.229, clause 5.1.1.1A

5.1.2.3 Applicability

This test applies to both VoLTE over CSFB UE and VoLTE over Dual standby UE.

The UE shall support configuration 4.

5.1.2.4 Test conditions

[SS configuration]

E-UTRAN Cell A is TD-LTE cell.

E-UTRAN Cell A

Cell Id=01 TAC = 01

MCC-MNC = 460-00

EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test UICC with ISIM should be inserted

[Initial conditions]
SS

E-UTRAN Cell A is not active
The test shall be performed under ideal radio conditions.

UE

UE is powered off (State 1)

5.1.2.5 Test procedure

PREAMBLE

1. Activate E-UTRAN Cell A. Power on the UE. UE attaches to TD-LTE according to the steps 1-19 defined in Annex B Table B-1

MAIN BODY

2. UE sends REGISTER message with following content:
   - IMPI, IMPU and home domain are derived from ISIM. IMPI and home domain are populated into Authorization header;
   - Security-client header shall be populated with HMAC-MD5-96 and HMAC-SHA-1-96 as integrity algorithm and DES-EDE3-CBC and AES-CBC as confidentiality algorithm.
   - *Expires* parameter is set to *600000*.
3. SS responds to REGISTER with 401 Unauthorized. 401 Unauthorized specifies HMAC-SHA-1-96 as integrity algorithm and DES-EDE3-CBC as confidentiality algorithm
4. UE send second IMS REGISTER message correctly over IPSec SAs. Verify that the *P-Access-Network-Info* in REGISTER is *3GPP-E-UTRAN-TDD*. SS responds to the second REGISTER request with 200 OK response.Two IMPU (SIP URI and TEL URI) are implicitly registered and contained in P-Associated-URI header of 200 OK.
   - TEL URI: “tel: +86xxxxxxxxxx”
   - SIP URI: “sip: +86xxxxxxxxxx@ ims.bj.chinamobile.com ”
5. UE sends SUBSCRIBE Message. The SS responds SUBSCRIBE with 200 OK
6. SSsends NOTIFY. The UEresponds NOTIFY with 200 OK

POSTAMBLE

7. Deactivate E-UTRAN Cell A.

Table 5.1.2.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1	→ ←	RRC NAS	Execute the steps 1-19 defined in Annex B Table B-1		
2	→	SIP	UE sends REGISTER message	Authorization and Security Client header and expires value are populated correctly	PASS
3	←	SIP	SS responds to REGISTER with 401 Unauthorized		
4	→ ←	SIP	UE sends REGISTER via IPSec The SS responds REGISTERwith 200 OK		PASS
5	→ ←	SIP	UE sends SUBSCRIBE Message. The SS responds SUBSCRIBE with 200 OK		PASS
6	→ ←	SIP	SSsends NOTIFY. The UEresponds NOTIFY with 200 OK		PASS
7			Deactivate E-UTRAN Cell A		

5.1.2.6 Expected Result

To verify UE derives correctly IMPI, IMPU and home domain from ISIM
To verify UE supports correctly IMS AKA and IPSec algorithms
To verify UE supports IMS registration procedure

5.1.3 IMS Registration with USIM

5.1.3.1 Test Purpose

UE could derive authentication parameter from USIM (when UICC without ISIM is used) and register successfully to IMS.

5.1.3.2 Reference specification

3GPP TS 24.229, clause 5.1.1.1A

5.1.3.3 Applicability

This test applies to both VoLTE over CSFB UE and VoLTE over Dual standby UE.

The UE shall support configuration 4.

5.1.3.4 Test conditions

[SS configuration]
E-UTRAN Cell A is TD-LTE cell.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test UICC with USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is not active
The test shall be performed under ideal radio conditions.
UE
UE is powered off (State 1)

5.1.3.5 Test procedure

PREAMBLE

1. Activate E-UTRAN Cell A. Power on the UE. UE attaches to TD-LTE according to steps 1-19 defined in Annex B Table B-1.

MAIN BODY

2. UE sends REGISTER message with following content:
   - IMPI (<IMSI>@ims.mnc000.mcc460.3gppnetwork.org), IMPU (sip:<IMSI>@ ims.mnc000.mcc460.3gppnetwork.org) and home domain are derived from USIM. IMPI and home domain are populated into Authorization header
   - Security-client header shall be populated with HMAC-MD5-96 and HMAC-SHA-1-96 as integrity algorithm and DES-EDE3-CBC and AES-CBC as confidentiality algorithm.
   - Expires parameter is set to 600000
3. SS responds to REGISTER with 401 Unauthorized. 401 Unauthorized specifies HMAC-SHA-1-96 as integrity algorithm and DES-EDE3-CBC as confidentiality algorithm
4. UE send second IMS REGISTER message correctly over IPSec SAs. Verify that the *P-Access-Network-Info* in REGISTER is *3GPP-E-UTRAN-TDD*. SS responds to the second REGISTER request with 200 OK response. Two IMPU (SIP URI and TELURI) are implicitly registered and contained in P-Associated-URI header of 200 OK.

- TEL URI: “tel: +86xxxxxxxxxx”
- SIP URI: “sip: +86xxxxxxxxxx@ ims.mnc000.mcc460.3gppnetwork.org ”

5. UE sends SUBSCRIBE Message. The SS responds SUBSCRIBE with 200 OK;
6. SSsends NOTIFY. The UEresponds NOTIFYwith 200 OK

POSTAMBLE

7. Deactivate E-UTRAN Cell A.

Table 5.1.3.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1	→ ←	RRC NAS	Execute the steps 1-19 defined in Annex B Table B-1		
2	→	SIP	UE sends REGISTER message	Authorization and Security Client header and expires value are populated correctly	PASS
3	←	SIP	SS responds to REGISTER with 401 Unauthorized		
4	→ ←	SIP	UE sends REGISTERvia IPSec The SS responds REGISTER with 200 OK		PASS
5	→ ←	SIP	UE sends SUBSCRIBE Message. The SS responds SUBSCRIBE with 200 OK		PASS
6	→ ←	SIP	SSsends NOTIFY. The UE responds NOTIFYwith 200 OK		PASS
7			Deactivate E-UTRAN Cell A		

5.1.3.6 Expected Result

To verify UE derives correctly IMPI, IMPU and home domain from USIM
To verify UE supports correctly IMS AKA and IPSec algorithms
To verify UE supports IMS registration procedure

5.1.4 UE Initiated IMS De-Registration

5.1.4.1 Test Purpose

UE could successfully deregister from the network.

5.1.4.2 Reference specification

3GPP TS 24.229, clause 5.1.1.6

5.1.4.3 Applicability

This test applies to both VoLTE over CSFB UE and VoLTE over Dual standby UE.

The UE shall support configuration 4.

5.1.4.4 Test conditions

[SS configuration]
E-UTRAN Cell A is TD-LTE cell.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test UICC with USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is not active
The test shall be performed under ideal radio conditions.

UE
UE is powered off (State 1)

5.1.4.5 Test procedure

PREAMBLE

1. Activate E-UTRAN Cell A. Power on the UE. UE attaches to TD-LTE according to steps 1-19 defined in Annex B Table B-1

MAIN BODY

2. Using IPSec, the UE registers with IMS successfully and subscribes to reg – event package.
3. The UE is put into airplane mode to initiate a deregistration procedure.UE sends REGISTER message. Verify the "expires" header in REGISTER set to 0
4. SS sends 200 OK.

POSTAMBLE

5. Deactivate E-UTRAN Cell A.

Table 5.1.4.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1	→ ←	RRC NAS	Execute the steps 1-19 defined in Annex B Table B-1		
2	→ ←	RRC SIP	UE registers with IMS		PASS
3	→	SIP	UE transmits REGISTER message	Either Expires header or expires parameter of contact header is populated with value "0"	PASS
4	←	SIP	SS sends 200 OK response to UE		
5			Deactivate E-UTRAN Cell A		

5.1.4.6 Expected Result

UE populates the expires value correctly in De-Register message

5.1.5 Network Initiated IMS De-Registration

5.1.5.1 Test Purpose

Test to verify that the UE performs the initial registration procedure after receiving a NOTIFY with the event attributes of all registration elements are set to “deactivated”

5.1.5.2 Reference specification

3GPP TS 24.229, clause 5.1.1.7

5.1.5.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual Standby UE .

The UE shall support configuration 4.

5.1.5.4 Test conditions

[SS configuration]

E-UTRAN Cell A is TD-LTE cell.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test UICC with USIM should be inserted

[Initial conditions]
SS

E-UTRAN Cell A is not active
The test shall be performed under ideal radio conditions.

UE

UE is powered off (State 1)

5.1.5.5 Test procedure

PREAMBLE

1. Execute the steps 1-6 of test procedure 5.1.1.1.5. UE is successfully registered to IMS.

MAIN BODY

2. The SS sends a NOTIFY in which each registration element is set such that
   - the state attribute of the registration element is set to "terminated" and the event attribute within the <contact> element belonging to this UE set to "deactivated" or that
   - the state attribute of the registration element is set to "active" and the state attribute within the <contact> element belonging to this UE set to "terminated", and associated event attribute element to "deactivated".
3. The UE responds to the NOTIFY correctly with 200 OK.
4. The UE performs successfully the initial registration procedure according to the test procedure of 5.1.3.5. steps 2 to 6.

POSTAMBLE

5. Deactivate E-UTRAN Cell A.

Table 5.1.4.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific	

				Contents	
1	→ ←	RRC NAS SIP	UE attaches to LTE and successfully performs an IMS registration according to the test procedure 5.1.3.5 steps 1 to 6.		
2	←	SIP	The SS sends a NOTIFY.	Registration elements are deactivated	
3	→	SIP	The UE replies to the NOTIFY with a 200 OK.		
4	→ ←	SIP	The UE performs successfully the initial registration procedure according to the test procedure of 5.1.3.5. steps 2 to 6.		PASS

5.1.5.6 Expected Result

UE shall in Step 4 correctly initiates the initial registration procedure after network initiated de-registration with event type “deactivated”.

5.1.6 Registration failed, Treg Timeout

5.1.6.1 Test Purpose

Test to verify UE could correctly support Treg timer when IMS registration and Re-registration failed.

5.1.6.2 Reference specification

3GPP TS 24.229, clause 5.1.1.2

5.1.6.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual Standby UE .

The UE shall support configuration 4.

5.1.6.4 Test conditions

[SS configuration]
E-UTRAN Cell A is TD-LTE cell.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0

Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test UICC with USIM should be inserted

[Initial conditions]
SS

E-UTRAN Cell A is not active

The test shall be performed under ideal radio conditions.

UE

UE is powered off (State 1)

5.1.6.5 Test procedure

PREAMBLE

1. Activate E-UTRAN Cell A. Power on the UE. UE attaches to TD-LTE according to steps 1-19 defined in Annex B Table B-1 with the exception that the SS allocates 3 P-CSCF addresses in step 17.

MAIN BODY

2. UE sends REGISTER via first P-CSCF and start Treg timer.
3. SS doesn't send any response. UE Treg timeout and registration fails. Treg timer value is 64s.Verify that UE retransmits REGISTER via first P-CSCF according to the interval of T1, 2T1,4T1, 8T1, T2, T2 before Treg timer timout.(T1 = 2s, T2 = 16s,refer to 24.229 table 7.7.1).
4. Verify that UE sends REGISTER via second P-CSCF when Treg timeout.
5. Execute the steps 3- 6 of test procedure 5.1.3.5. IMS registration succeed and SS specifies expiration time to 240 in 200 OK responding to REGISTER.
6. Verify that UE sends REGISTER to perform IMS re-registration before half of the time has expired from the initial registration. UE starts Treg timer.
7. SS doesn't send any response.Verify that UE retransmits REGISTER via second P-CSCF according to the interval of T1, 2T1,4T1, 8T1, T2, T2 before Treg timer timout .(T1 = 2s, T2 = 16s,refer to 24.229 table 7.7.1).
8. Verify that UE sends REGISTER via third P-CSCF when Treg timeout. Treg timer value is 64s.
9. Execute the steps 3- 6 of test procedure 5.1.3.5. IMS registration succeed

POSTAMBLE

10. Deactivate E-UTRAN Cell A.

Table 5.1.6.4-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1	→	RRC	UE attaches to TD-LTE according to	3 P-CSCF addresses	

	←	NAS	steps 1-19 defined in Annex B Table B-1	in step 17	
2	→	SIP	UE sends REGISTER message	Via first P-CSCF address	
3			SS doesn't send any response. UE retransmits REGISTER via first P-CSCF according to the interval of T1, 2T1,4T1, 8T1, T2, T2 before Treg timer timout	T1=2s,T2=16s	
4	→ ←	SIP	UE sends REGISTER	Via second P-CSCF address	PASS
5	→ ←	SIP	Execute the steps 3- 6 of test procedure 5.1.3.5. IMS registration succeed	SS specifies expiration time to 240	
6	→	SIP	UE transmits REGISTER message	Via second P-CSCF, IMS re-registration	PASS
7			SS doesn't send any response. UE retransmits REGISTER via second P-CSCF according to the interval of T1, 2T1,4T1, 8T1, T2, T2 before Treg timer timout.	T1=2s,T2=16s	
8			UE sends REGISTER	Via third P-CSCF	PASS
9	→ ←	SIP	Execute the steps 3- 6 of test procedure 5.1.3.5. IMS registration succeed	Via third P-CSCF	PASS
10			Deactivate E-UTRAN Cell A		

5.1.6.6 Expected Result

The UE shall in step 4 send the REGISTER request via second P-CSCF when Treg timeout due to Registration failure.

The UE shall in step 6 send the REGISTER request within 60 seconds from the time instant that it receives 200 OK in step 5 from the SS.

The UE shall in step 8 send the REGISTER request via third P-CSCF Treg timeout due to Re-registration failure.

5.2 Voice Call

5.2.1 Call Setup and Release, MO

5.2.1.1 Test Purpose

Verify that the UE could perform a correct IMS mobile originated voice call setup and release in TD-LTE cell.

5.2.1.2 Reference specification

3GPP TS 24.229, clause 5.1.3
RFC 3261

5.2.1.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE..

The UE shall support configuration 4

5.2.1.4 Test conditions

[SS configuration]
E-UTRAN Cell A is TD-LTE cell

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is not active
Enable IMS Settings.
The test shall be performed under ideal radio conditions.

UE
UE is powered off (State 1)

5.2.1.5 Test procedure

PREAMBLE
1. Execute the steps 1- 6 of test procedure 5.1.3.5.

MAIN BODY

2. Verify that the UE is successfully registered to IMS.
3. UE initiates INVITE request over SIP using IMS PDN to SS. Verify that the “precondition” IE should be included in Supported header , but should not in Require header. Verify that the INVITE message contains first SDP offer, including the media description of AMR-NB/ AMR-WB and QoS precondition. Verify that the precondition parameters in first SDP offer are set to: a=curr:qos local none, a=curr:qos Remote none, a=des:qos mandatory local sendrecv, a=des:qos optional remote sendrecv. Verify that the network domain name of MT UE is “ims.mnc<MNC>.mcc<MCC>.3gppnetwork.org”.Verify the MO UE IMPU used for this request as follows
   - If a P-Preferred-Identity was included, verify UE use that as the IMPU for this request
   - If no P-Preferred-Identity was included, verify UE use the first IMPU allocated in P-Associated-URI of 200 OK when registration.
4. SS responds to INVITE with 100 Trying and 183 Session Progress response which contains the first SDP answer. Verify that the precondition parameters in first SDP answer are set to: a=curr:qos local none,a=curr:qos remote none, a=des:qos mandatory local sendrecv, a=des:qos mandatory remote sendrecv, a=conf:qos remote sendrecv.
5. UE sends PRACK.
6. SS responds to PRACK with 200OK
7. SS sends ACTIVATE DEDICATED EPS BEARER CONTEXT REQUEST message to establish Dedicated EPS bearer (QCI 1) for voice call.
8. UE sends UPDATE request containing the second SDP offer. Verify that the precondition parameters are set to: a=curr:qos local sendrecv, a=curr:qos remote none, a=des:qos mandatory local sendrecv, a=des:qos mandatory remote sendrecv.
9. SS responds to the UPDATE with 200OK containing the second SDP answer. Verify that the precondition parameters are set to: a=curr:qos local sendrecv, a=curr:qos remote sendrecv, a=des:qos mandatory local sendrecv, a=des:qos mandatory remote sendrecv,
10. SS sends 180 Ringing.
11. SS responds to the INVITE request with a 200 OK.
12. UE sends ACK to acknowledge receipt of the 200 OK for INVITE.
13. Verify if RTP packets are ongoing to confirm successful call progress.
14. UE initiates call release procedure.

POSTAMBLE

15. SS sends Deactivate EPS Bearer Context Request (QCI 1). The UE shall respond with Deactivate EPS Bearer Context Accept.
16. SS initiates an MT Detach procedure.
17. The SS releases the RRC connection by sending the RRC Connection Release message to the UE.

18. Deactivate E-UTRAN Cell A.

Table: 5.2.1.5-1 Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1-2	→ ←	RRC NAS SIP	Execute the steps 1- 6 of test procedure 5.1.3.5. UE successfully registers to IMS		PASS
3	→	SIP	UE initiates INVITE request	INVITE message content contains first SDP offer, including AMR/AMR-WB media description and QoS precondition. Check IMPU	PASS
4	→ ←	SIP	SS responses with 183 Session Progress		
5	→	SIP	UE sends PRACK		
6	←	SIP	SS sends 200OK		
7	→ ←	NAS RRC	SS sends ACTIVATE DEDICATED EPS BEARER CONTEXT REQUEST message to establish Dedicated EPS bearer (QCI 1) for voice call.		
8~9	→ ←	SIP	UPDATE -> 200 OK		PASS
10	←	SIP	SS sends 180 Ringing		
11~12	→ ←	SIP	Call answered:200 OK -> ACK		
13			Verify that the call is successfully set up.		PASS
14	← →	RRC SIP	The UE initiates clear call procedure on E-UTRAN cell A.	Session release: BYE -> 200 OK	PASS
15	← →	NAS RRC	SS Deactivates a mobile terminated Dedicated EPS bearer establishment(QCI 1)		
16	← →	NAS	SS initiates a mobile terminated Detach procedure (refer to 24.301 clause 5.5.2.3).		
17	←	RRC	SS sends RRC CONNECTION RELEASE message to UE		
18			Deactivate E-UTRAN Cell A		

5.2.1.6 Expected Result

Verify UE could perform a correct IMS mobile originated voice call setup and release in TD-LTE cell
Verify UE supports the following bearer combination:SRB1+SRB 2+ QCI9+QCI1 +QCI 5 ==SRB1+SRB2+2 AM+1 UM,
Verify UE supports RTP/RTCP signaling, QoS precondition and resource reservation

5.2.2 Call Setup and Release ,MT

5.2.2.1 Test Purpose

Verify that the UE could perform a correct IMS mobile terminated voice call setup and release in TD-LTE cell.

5.2.2.2 Reference specification

3GPP TS 24.229, clause 5.1.4
RFC 3261

5.2.2.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE..
The UE shall support Configuration 4.

5.2.2.4 Test conditions

[SS configuration]
E-UTRAN Cell A is TD-LTE cell
E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test USIM should be inserted.

[Initial conditions]
SS
E-UTRAN Cell A is not active.
Enable IMS Settings.
The test shall be performed under ideal radio conditions.

UE

UE is powered off (State 1)

5.2.2.5 Test procedure

PREAMBLE

1. Execute the steps 1- 6 of test procedure 5.1.3.5.

MAIN BODY

2. Verify that the UE is successfully registered to IMS.
3. SS initiates INVITE request over SIP using IMS PDN to UE. The “precondition” IE is included in Supported header , but not in Require header. The first SDP offer in INVITE message contains media description of AMR-NB/AMR-WB and QoS precondition. The precondition parameters in first SDP offer are set to: a=curr:qos local none, a=curr:qos remote none, a=des:qos mandatory local sendrecv, a=des:qos optional remote sendrecv. The IMPU is the first one allocated in P-Associated-URI of 200 OK when registration.
4. UE sends 183 Session Progress response. Verify that the precondition parameters in first SDP answer are set to: a=curr:qos local none, a=curr:qos remote none, a=des:qos mandatory local sendrecv, a=des:qos mandatory remote sendrecv, a=conf:qos remote sendrecv.
5. SS responds 183 Session Progress with PRACK.
6. UE responds PRACK with 200 OK.
7. SS sends Activate dedicated EPS bearer context request to establish MT Dedicated EPS bearer (QCI 1) for voice call.
8. SS sends UPDATE with second SDP offer indicating SS reserved resources. The QoS precondition parameters in the second SDP offer are set to: a=curr:qos local sendrecv, a=curr:qos remote none, a=des:qos mandatory local sendrecv, a=des:qos mandatory remote sendrecv .
9. UE sends 200 OK. Verify 200 OK contains the second SDP answer and QoS precondition parameters are set to: a=curr:qos local sendrecv,a=curr:qos remote sendrecv, a=des:qos mandatory local sendrecv, a=des:qos mandatory remote sendrecv
10. UE sends 180 ringing.
11. SS sends PRACK if “100rel” is included in the Require header of 180 Ringing.
12. UE sends 200 OK for PRACK.
13. UE sends 200 OK for INVITE.
14. SS sends ACK to the UE.
15. Verify if RTP packets are ongoing to confirm successful call progress.
16. SS release voice call.

POSTAMBLE

17. SS sends Deactivate EPS Bearer Context Request (QCI 1). The UE shall respond with Deactivate EPS Bearer Context Accept.

18. SS initiates an MT Detach procedure.
19. The SS releases the RRC connection by sending the RRC Connection Release message to the UE.
20. Deactivate E-UTRAN Cell A.

Table 5.2.2.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1-2	→ ←	RRC NAS SIP	Execute the steps 1- 6 of test procedure 5.1.3.5. UE successfully registers to IMS		PASS
3	→ ←	RRC SIP	SS initiates INVITE request	INVITE message content contains first SDP offer, including AMR-NB/AMR-WB media description and QoS precondition	
4	→ ←	SIP	UE sends 183 Session Progress	Verify first SDP answer contains QoS precondition.	PASS
5	←	SIP	SS sends PRACK for 183		
6	→	SIP	UE responds PRACK with 200 OK		
7	→ ←	NAS RRC	The SS sends Activate dedicated EPS bearer context request to establish the Dedicated EPS Bearer(QCI 1) for voice.		
8-9	→ ←	SIP	UPDATE -> 200 OK	Verify that SDP offer and SDP answer are contained.	PASS
10-12	→ ←	SIP	180 Ringing->PRACK (optional)->200OK(optional)		
13-14	→ ←	SIP	Call answered: 200 OK -> ACK		PASS
15			Verify if RTP packets are still ongoing to confirm successful call progress		PASS
16	← →	RRC SIP	SS releases voice call on E-UTRAN cell A.	Session release: BYE -> 200 OK	PASS
17	← →	NAS RRC	SS Deactivates a mobile terminated Dedicated EPS bearer establishment(QCI 1)		
18	←	NAS	SS initiates a mobile terminated		

	→		Detach procedure (refer to 24.301 clause 5.5.2.3).		
19	←	RRC	SS sends RRC CONNECTION RELEASE message to UE		
20			Deactivate E-UTRAN Cell A		

5.2.2.6 Expected Result

Verify UE could perform a correct IMS mobile terminated voice call setup and release in TD-LTE cell.
Verify UE supports the following bearer context combination : SRB1+SRB 2+ QCI9+QCI1 +QCI 5 == SRB1+SRB2+2 AM+1 UM,
Verify UE supports RTP/RTCP signaling, QoS precondition and resource reservation

5.2.3 Call Reject

5.2.3.1 Test Purpose

Verify that the UE correctly response to INVITE message with "603 Decline " when rejecting the incoming call.

5.2.3.2 Reference specification

3GPP TS 24.229, clause 5.1.4
RFC 3261

5.2.3.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE..
The UE shall support Configuration 4.

5.2.3.4 Test conditions

[SS configuration]
E-UTRAN Cell A is TD-LTE cell
E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test USIM should be inserted.

[Initial conditions]

SS

E-UTRAN Cell A is not active.

Enable IMS Settings.

The test shall be performed under ideal radio conditions.

UE

UE is powered off (State 1)

5.2.3.5 Test procedure

PREAMBLE

1. Execute the steps 1- 6 of test procedure 5.1.3.5.

MAIN BODY

2. Verify that the UE is successfully registered to IMS.
3. SS initiates a MT Call. SS initiates INVITE request over SIP using IMS PDN to UE.
4. SS establishes a MT Dedicated EPS bearer (QCI 1) with the UE for voice call.
5. Verify UE responses to INVITE with "603 Decline" when rejects the incoming call after UE starts alerting
6. SS initiates call release procedure.

POSTAMBLE

7. SS sends Deactivate EPS Bearer Context Request (QCI 1). The UE shall respond with Deactivate EPS Bearer Context Accept.
8. SS initiates an MT Detach procedure.
9. The SS releases the RRC connection by sending the RRC Connection Release message to the UE.
10. Deactivate E-UTRAN Cell A.

Table 5.2.3.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1-2	→ ←	RRC NAS	Execute the steps 1- 6 of test procedure 5.1.3.5. UE successfully registers to IMS		PASS
3	←	RRC SIP	SS initiates a MT Call on E-UTRAN cell A. SIP session establishment with preconditions: INVITE		
4	← →	NAS RRC	The SS initiates the Dedicated EPS Bearer(QCI 1) for Voice service by sending the RRC Connection Reconfiguration		

			message to the UE on Cell A.		
5			Verify UE responses to INVITE with "603 Decline" when rejects the incoming call after UE starts alerting		PASS
6	←	SIP	SS performs the SIP session release: ACK		
7	← →	NAS RRC	SS Deactivates a mobile terminated Dedicated EPS bearer establishment(QCI 1)		
8	← →	NAS	SS initiates a mobile terminated Detach procedure (refer to 24.301 clause 5.5.2.3).		
9	←	RRC	SS sends RRC CONNECTION RELEASE message to UE		
10			Deactivate E-UTRAN Cell A		

5.2.3.6 Expected Result

Verify that the UE correctly responds to INVITE message with "603 Decline " when rejecting the incoming call.

5.2.4 Voice Call, SPS

5.2.4.1 Test Purpose

UE in E-UTRA RRC_Connected state with DRB established. To verify UE support SPS functionality and PDCP header compression. Downlink SPS interval is 20ms. Uplink SPS enables TwoIntervals config(15ms+25ms for TDD configuration 2). Voice is ongoing.

5.2.4.2 Reference specification

TS 36.213 clause7.1, 8.0, 9.2
TS 36.321 clause 5.3.1, 5.4.1, 5.10
TS 36.331 clause 5.5.1, 5.5.2

5.2.4.3 Applicability

This test applies to both VoLTE over CSFB UE and VoLTE over Dual Standby UE
The UE shall support configuration 4.

5.2.4.4 Test conditions

[SS configuration]

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-08
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is not active
The test shall be performed under ideal radio conditions.
UE
UE is powered off (State 1)

5.2.4.5 Test procedure

PREAMBLE
1. Activate E-UTRAN Cell A.
2. Power on the UE.
3. The UE performs registration procedure followed by activation of the initial default EPS bearer for data PDN (QCI 9) (see 36.508, 4.5.2).

MAIN BODY
4. UE initiates the PDN connectivity request for IMS PDN.
5. SS establishes a MT SIP Default EPS bearer (QCI 5) with the UE.
6. Verify that the UE has successfully registered with the IMS PDN.
7. UE initiates INVITE request over SIP using IMS PDN to SS.
8. SS responds to INVITE with 100 Trying and 183 Session Progress response.
9. SS waits for UE to send PRACK.
10. SS establishes a MT Dedicated EPS bearer (QCI 1) with the UE for voice call. RRCConnectionReconfiguration message configures SPS with DL SPS interval 20ms and UL SPS TwoIntervasl (see Table 5.2.4.5-2 SPS-configure) and RoHC with profile 0x0001 and profile 0x0002 (see Table 5.2.4.5-3).
11. SS initiates answer call procedure.
12. The SS transimits PDCCH payload scrambled with the Semi-Persisitent Scheduling C-RNTI and the new data indicator(NDI) field is set to ‘0’ to activate DL SPS at SFN M subframe N1. SS disable DL dynamic scheduling.
13. The SS transimits PDCCH payload scrambled with the Semi-Persisitent Scheduling C-RNTI and the new data indicator(NDI) field is set to ‘0’ to activate UL SPS at SFN M subframe N2. SS disable UL dynamic scheduling.

14. Verify UE receives DL packets at SFN and subframe satisfied (10 * SFN + subframe) = [(10 * M + N1) + n* semiPersistSchedIntervalDL. ‘n’ is positive integer starting at zero
15. Verify UE sends UL packets at SFN and subframe satisfied (10 * SFN + subframe) = [(10 * M + N3) + n * semiPersistSchedIntervalUL +Subframe_Offset * (n modulo 2)] modulo 10240. ‘n’ is positive integer starting at zero
16. Keep the voice call for 1 minute. Verify voice call is ongoing correctly.
17. SS initiates CLEAR call procedure.
18. SS transmits PDCCH payload scrambled with the Semi-Persisitent Scheduling C-RNTI to release SPS(refer TS36.213 clause 9.2).

POSTAMBLE

19. SS sends Deactivate EPS Bearer Context Request (QCI 1). The UE shall respond with Deactivate EPS Bearer Context Accept.
20. SS initiates an MT Detach procedure.
21. The SS releases the RRC connection by sending the RRC Connection Release message to the UE.
22. Deactivate E-UTRAN Cell A.

Note:

1.semiPersistSchedIntervalDL=20ms, semiPersistSchedIntervalUL=20ms,

2. N2=9, N3=3, Subframe_Offset=-5, refers to 3GPP TS36.523 Table 7.4-1 and TS36.213 Table 8.2

Table 5.2.4.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1	←	RRC	Activate E-UTRAN Cell A		
2	UE		Switch On UE	AT Command (switch ON)	
3	→ ←	RRC NAS	UE attach procedure with Default EPS bearer establishment for Data PDN (QCI 9) (see 36.508, 4.5.2 (steps 1-16))		
4	→ ←	RRC NAS	UE initiates a PDN Connectivity Request for IMS PDN		PASS
5	→ ←	NAS RRC	SS initiates the Default EPS bearer(QCI 5) on E-UTRAN cell A for SIP establishment by sending the RRC Connection Reconfiguration message		PASS
6	→ ←	SIP	UE successfully registers to IMS Simulator; IMS Registration message flow: SIP Register -> 401 Unauthorized -> SIP Register -> 200 OK		PASS
7	→	RRC	UE initiates a MO Call on E-UTRAN		

		SIP	cell A. UE initiates INVITE request		
8	→ ←	SIP	SIP session establishment with preconditions: INVITE -> 183 Session Progress		
9	→	SIP	SS waits for UE to send PRACK		
10	→ ←	RRC NAS	SS establishes a MT Dedicated EPS bearer (QCI 1) with the UE for voice call. RRCConnectionReconfiguration message configs SPS and RoHC		
11	→ ←	SIP	SS initiates answer call procedure.		
12	←	PHY	The SS transimits PDCCH payload scrambled with the Semi-Persisitent Scheduling C-RNTI and the new data indicator(NDI) field is set to ‘0’ to activate DL SPS at SFN M subframe N1. SS disable DL dynamic scheduling..		
13	←	PHY	The SS transimits PDCCH payload scrambled with the Semi-Persisitent Scheduling C-RNTI and the new data indicator(NDI) field is set to ‘0’ to activate UL SPS at SFN M subframe N2. SS disable UL dynamic scheduling		
14			Verify UE receives DL packets at SFN and subframe satisfied (10 * SFN + subframe) = [(10 * M + N1) + n* semiPersistSchedIntervalDL.		PASS
15			Verify UE sends UL packets at SFN and subframe satisfied (10 * SFN + subframe) = [(10 * M + N2+delta) + n * semiPersistSchedIntervalUL +Subframe_Offset * (N modulo 2)] modulo 10240		PASS
16			Keep the voice call for 1 minute		
17	→ ←	SIP	SS initiates CLEAR call procedure. Session release: BYE -> 200 OK		
18	←	PHY	SS transmits PDCCH payload scrambled with the Semi-Persisitent Scheduling C-RNTI to release SPS(refer TS36.213 clause 9.2).		PASS
19	← →	NAS RRC	SS releases the MT Dedicated EPS bearer (QCI 1)		
20	← →	NAS	Mobile Terminated Detach procedure initiated by SS		

21	←	RRC	RRC connection release		
22	SS		Deactivate Cell A		

Table 5.2.4.5-2: SPS-Config

Derivation Path: 36.331 clause 6.3.2			
Information Element	Value/remark	Comment	Condition
sps-Config ::= CHOICE {			
semiPersistSchedC-RNTI	'FFF0'H		
sps-ConfigDL ::=SEQUENCE {			
setup SEQUENCE {			
semiPersistSchedIntervalDL	sf20	Set SPS period	
NumberOfConfSPS-Processes	7	Max DL SPS HARQ processes is 7 considering TDD configuration 2.	TDD
N1-PUCCH-AN-PersistenList	0		
}			
}			
sps-ConfigUL ::=SEQUENCE {			
setup SEQUENCE {			
semiPersistSchedIntervalUL	sf20		
implicitReleaseAfer	e2		
p0-Persistent SEQUENCE { }	Not Present		
twoIntervalsConfig	true		
}			
}			
}			

Table 5.2.4.5-3: RoHC config

Derivation Path: TS 36.508 Table 4.8.2.1.2.1-1			
Information Element	Value/remark	Comment	Condition
PDCP-Config-DRB-UM ::= SEQUENCE {			
rlc-UM SEQUENCE {			
pdcp-SN-Size	len7bits		
}			
headerCompression CHOICE {			
rohc SEQUENCE {			
maxCID	15	DEFAULT 15	
profiles SEQUENCE {			
profile0x0001	TRUE		
profile0x0002	TRUE		
profile0x0003	FALSE		
profile0x0004	FALSE		

profile0x0006	FALSE		
profile0x0101	FALSE		
profile0x0102	FALSE		
profile0x0103	FALSE		
profile0x0104	FALSE		
}			
}			
}			
}			

5.2.4.6 Expected Result

UE successfully completes registration procedure to cell A and voice call is ongoing when SPS and RoHC are enabled

5.2.5 Voice Call, TTI Bundling

5.2.5.1 Test Purpose

Simulate the cell edge scenario with weak coverage. TTI Bundling in uplink is enabled while voice call is ongoing. Verify UE supports TTI bundling and PDCP header compression correctly in Uplink-downlink configuration 0, configuration 1 and configuration 6.

5.2.5.2 Reference specification

TS 36.321, clause 5.4.2.1, 5.4.4.2 & 7.5, TS 36.213 clause 8, 8.3, 8.6.1 & 9.1.2

5.2.5.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE.

The UE shall support configuration 4.

5.2.5.4 Test conditions

[SS configuration]
E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

Special subframe configuration=ssp7

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS

E-UTRAN Cell A is not active

The test shall be performed under ideal radio conditions.

UE

UE is powered off (State 1)

5.2.5.5 Test procedure

Table 5.2.5.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A	Remark
T0	Reference Signal EPRE	dBm /15kHz	-85	
T1			-100	Cell Edge

PREAMBLE

1. Activate E-UTRAN Cell A, Uplink-downlink configuration is set to SA1.
2. Power on the UE.
3. The UE performs registration procedure followed by activation of the initial default EPS bearer for data PDN (QCI 9) (see 36.508, 4.5.2).

MAIN BODY

4. UE initiates the PDN connectivity request for IMS PDN.
5. SS establishes a MT SIP Default EPS bearer (QCI 5) with the UE.
6. Verify that the UE has successfully registered with the IMS PDN.
7. The SS decreases the TX power of Cell A according to T1 in Table 5.2.5.5-1
8. UE initiates INVITE request over SIP using IMS PDN to SS.
9. SS responds to INVITE with 100 Trying and 183 Session Progress response.
10. SS waits for UE to send PRACK.
11. SS establishes a MT Dedicated EPS bearer (QCI 1) with the UE for voice call. SS transmits RRCConnectionReconfiguration to configure TTI Bundling (see Table 5.2.5.5-3) and RoHC (see Table 5.2.5.5-4).
12. SS initiates answer call procedure.
13. The SS allocates an UL Grant with NDI indicating new transmission in subframe N
14. Verify UE transmit a MAC PDU with redundancy version 0 in subframe (N+k) mod 10 and repeat non-adaptive retransmission of MAC PDU for 3 consecutive UL subframes with redundancy version 2, 3 and 1 respectively. k=6 if N=1 or 6,k=4 if N=4 or 9

15. Maintain MTSI MO speech call for 1 minute. Verify RTP packet flow during active call
16. SS initiates call release procedure.
17. SS sends Deactivate EPS Bearer Context Request (QCI 1). The UE shall respond with Deactivate EPS Bearer Context Accept.
18. SS initiates an MT Detach procedure.
19. Uplink-downlink configuration in step 1 is set to SA0, repeat step 1-18.
20. Uplink-downlink configuration in step 1 is set to SA6, repeat step 1-18.

POSTAMBLE

21. Deactivate E-UTRAN Cell A.

Table 5.2.5.5-2: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1	←	RRC	Activate E-UTRAN Cell A	Uplink-downlink configuration 1	
2	UE		Switch On UE	AT Command (switch ON)	
3	→ RRC ← NAS		UE attach procedure with Default EPS bearer establishment for Data PDN (QCI 9) (see 36.508, 4.5.2 (steps 1-16))		
4	→ RRC ← NAS		UE initiates a PDN Connectivity Request for IMS PDN		PASS
5	→ NAS ← RRC		SS initiates the Default EPS bearer(QCI 5) on E-UTRAN cell A for SIP establishment by sending the RRC Connection Reconfiguration message		PASS
6	→ SIP ←		UE successfully registers to IMS Simulator; IMS Registration message flow: SIP Register -> 401 Unauthorized -> SIP Register -> 200 OK		PASS
7			TX power modification according to T1 in Table 5.2.5.5-1		
8	→	RRC SIP	UE initiates a MO Call on E-UTRAN cell A. UE initiates INVITE request		
9	→ SIP ←		SIP session establishment with preconditions: INVITE -> 183 Session Progress		
10	→	SIP	SS waits for UE to send PRACK		
11	→ RRC ← NAS		SS establishes a MT Dedicated EPS bearer (QCI 1) with the UE for voice call. TTI Bundling is configured		

12	→ ←	SIP	SS initiates answer call procedure.		
13	←	PHY	The SS allocates an UL Grant with NDI indicating new transmission in subframe N.		
14			Verify UE transmit a MAC PDU with redundancy version 0 in subframe (N+k) mod 10 and repeat non-adaptive retransmission of MAC PDU for 3 consecutive UL subframes with redundancy version 2, 3 and 1 respectively.		PASS
15			Keep the voice call for 1 minute		
16	→ ←	SIP	SS initiates CLEAR call procedure. Session release: BYE -> 200 OK		
17	← →	NAS RRC	SS releases the MT Dedicated EPS bearer (QCI 1)		
18	← →	NAS	Mobile Terminated Detach procedure initiated by SS		
19			Uplink-downlink configuration in step 1 is set to SA0, repeat step 1-18		
20			Uplink-downlink configuration in step 1 is set to SA6, repeat step 1-18		
21	SS		Deactivate Cell A		

Table 5.2.5.5-3: TTI Bundling config

Derivation Path: 36.508 table 4.8.2.1.5-1			
Information Element	Value/remark	Comment	Condition
MAC-MainConfigRBC- ::= SEQUENCE {			
ul-SCH-Configuration SEQUENCE {			
maxHARQ-Tx	n28	Max value allowed	
periodicBSR-Timer	Infinity		
retxBSR-Timer	sf10240		
ttiBundling	TRUE		
}			
}			

Table 5.2.5.5-4: RoHC config

Derivation Path: TS 36.508 Table 4.8.2.1.2.1-1			
Information Element	Value/remark	Comment	Condition
PDCP-Config-DRB-UM ::= SEQUENCE {			
rlc-UM SEQUENCE {			
pdcp-SN-Size	len7bits		
}			

headerCompression CHOICE {			
rohc SEQUENCE {			
maxCID	15	DEFAULT 15	
profiles SEQUENCE {			
profile0x0001	TRUE		
profile0x0002	TRUE		
profile0x0003	FALSE		
profile0x0004	FALSE		
profile0x0006	FALSE		
profile0x0101	FALSE		
profile0x0102	FALSE		
profile0x0103	FALSE		
profile0x0104	FALSE		
}			
}			
}			
}			

5.2.5.6 Expected Result

UE successfully completes registration procedure to cell A and voice call is ongoing when TTI Bundling and RoHC are enabled

5.2.6 Voice Call, DRX

5.2.6.1 Test Purpose

To Verify UE supports DRX and and PDCP header compression functionality in connected mode when Voice call is ongoing.

5.2.6.2 Reference specification

3GPP TS 36.321, clauses 3.1 and 5.7

3GPP TS 36.323, clauses 5.5.1 and 5.5.2

5.2.6.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE.

The UE shall support configuration 4.

5.2.6.4 Test conditions

[SS configuration]

E-UTRAN Cell A

Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS

E-UTRAN Cell A is not active
The test shall be performed under ideal radio conditions.

UE

UE is powered off (State 1)

5.2.6.5 Test procedure

PREAMBLE

1. Activate E-UTRAN Cell A.
2. Power on the UE.
3. The UE performs registration procedure followed by activation of the initial default EPS bearer for data PDN (QCI 9) (see 36.508, 4.5.2).

MAIN BODY

4. UE initiates the PDN connectivity request for IMS PDN.
5. SS establishes a MT SIP Default EPS bearer (QCI 5) with the UE.
6. Verify that the UE has successfully registered with the IMS PDN.
7. UE initiates INVITE request over SIP using IMS PDN to SS.
8. SS responds to INVITE with 100 Trying and 183 Session Progress response.
9. SS waits for UE to send PRACK.
10. SS establishes a MT Dedicated EPS bearer (QCI 1) with the UE for voice call. SS transmits RRCConnectionReconfiguration to configure specific DRX parameters (see Table 5.2.6.5-2) and RoHC (see Table 5.2.6.5-3).
11. UE sends RRCConnectionReconfigurationComplete message indicating the acceptance of DRX configuration by SS
12. SS initiates answer call procedure.
13. Verify UE receives Packet correctly.
14. Maintain MTSI MO speech call for 1 minute. Verify RTP packet flow during active call
15. SS initiates CLEAR call procedure.

POSTAMBLE

16. SS sends Deactivate EPS Bearer Context Request (QCI 1). The UE shall respond with Deactivate EPS Bearer Context Accept.
17. SS initiates an MT Detach procedure.
18. The SS releases the RRC connection by sending the RRC Connection Release message to the UE.
19. Deactivate E-UTRAN Cell A.

Table 5.2.6.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1	←	RRC	Activate E-UTRAN Cell A		
2	UE		Switch On UE	AT Command (switch ON)	
3	→ ←	RRC NAS	UE attach procedure with Default EPS bearer establishment for Data PDN (QCI 9) (see 36.508, 4.5.2 (steps 1-16))		
4	→ ←	RRC NAS	UE initiates a PDN Connectivity Request for IMS PDN		PASS
5	→ ←	NAS RRC	SS initiates the Default EPS bearer(QCI 5) on E-UTRAN cell A for SIP establishment by sending the RRC Connection Reconfiguration message		PASS
6	→ ←	SIP	UE successfully registers to IMS Simulator; IMS Registration message flow: SIP Register -> 401 Unauthorized -> SIP Register -> 200 OK		PASS
7	→	RRC SIP	UE initiates a MO Call on E-UTRAN cell A. UE initiates INVITE request		
8	→ ←	SIP	SIP session establishment with preconditions, SS response with 100 Trying and 183 Session Progress		
9	→	SIP	SS waits for UE to send PRACK		
10	→ ←	RRC NAS	SS establishes a MT Dedicated EPS bearer (QCI 1) with the UE for voice call. DRX and RoHC are configured		
11	→	RRC	UE sends RRCConnectionReconfigurationComplete		PASS
12	→ ←	SIP	SS initiates answer call procedure.		
13			Verify UE receives Packet correctly		PASS
14			Keep the voice call for 1 minute		
15	→ ←	SIP	SS initiates CLEAR call procedure. Session release: BYE -> 200 OK		

16	← →	NAS RRC	SS releases the MT Dedicated EPS bearer (QCI 1)		
17	← →	NAS	Mobile Terminated Detach procedure initiated by SS		
18	←	RRC	RRC connection release		
19	SS		Deactivate Cell A		

Table 5.2.6.5-2: DRX-CONFIG

Derivation Path: 36.508 Table 4.6.1-8			
Information Element	Value/remark	Comment	Condition
drx-Config CHOICE {			
setup SEQUENCE {			
onDurationTimer	psf2		
drx-InactivityTimer	psf2		
drx-RetransmissionTimer	psf2		
longDRX-CycleStartOffset CHOICE {			
sf40	3		
}			
shortDRX	Not present		
}			
}			

Table 5.2.6.5-3: RoHC config

Derivation Path: TS 36.508 Table 4.8.2.1.2.1-1			
Information Element	Value/remark	Comment	Condition
PDCP-Config-DRB-UM ::= SEQUENCE {			
rlc-UM SEQUENCE {			
pdcp-SN-Size	len7bits		
}			
headerCompression CHOICE {			
rohc SEQUENCE {			
maxCID	15	DEFAULT 15	
profiles SEQUENCE {			
profile0x0001	TRUE		
profile0x0002	TRUE		
profile0x0003	FALSE		
profile0x0004	FALSE		
profile0x0006	FALSE		
profile0x0101	FALSE		
profile0x0102	FALSE		
profile0x0103	FALSE		
profile0x0104	FALSE		

}			
}			
}			
}			

5.2.6.6 Expected Result

UE successfully completes registration procedure to cell A and voice call is ongoing when DRX and RoHC are enabled

5.2.7 Voice Call, DRX and SPS

5.2.7.1 Test Purpose

To Verify UE supports DRX combined with SPS and RoHC functionality in connected mode when Voice call is ongoing.

5.2.7.2 Reference specification

TS 36.321 clauses 3.1, 5.3.1, 5.4.1, 5.7 and 5.10

TS 36.213 clauses 7.1, 8.0 and 9.2

TS 36.323 clauses 5.5.1 and 5.5.2

5.2.7.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE.

The UE shall support configuration 4.

5.2.7.4 Test conditions

[SS configuration]
E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS

E-UTRAN Cell A is not active

The test shall be performed under ideal radio conditions.

UE

UE is powered off (State 1)

5.2.7.5 Test procedure

PREAMBLE

1. Activate E-UTRAN Cell A.
2. Power on the UE.
3. The UE performs registration procedure followed by activation of the initial default EPS bearer for data PDN (QCI 9) (see 36.508, 4.5.2).

MAIN BODY

4. UE initiates the PDN connectivity request for IMS PDN.
5. SS establishes a MT SIP Default EPS bearer (QCI 5) with the UE.
6. Verify that the UE has successfully registered with the IMS PDN.
7. UE initiates INVITE request over SIP using IMS PDN to SS.
8. SS responds to INVITE with 100 Trying and 183 Session Progress response.
9. SS waits for UE to send PRACK.
10. SS establishes a MT Dedicated EPS bearer (QCI 1) with the UE for voice call. SS transmits RRCConnectionReconfiguration to configure specific DRX parameters , SPS function and RoHC (see Table 5.2.7.5-2 / 5.2.7.5-3 / 5.2.7.5-4).
11. UE sends RRCConnectionReconfigurationComplete message indicating the acceptance of configuration by SS
12. SS initiates answer call procedure.
13. The SS transimits PDCCH payload scrambled with the Semi-Persisitent Scheduling C-RNTI and the new data indicator(NDI) field is set to ‘0’ to activate DL SPS at SFN M subframe N1. SS disable DL dynamic scheduling.
14. The SS transimits PDCCH payload scrambled with the Semi-Persisitent Scheduling C-RNTI and the new data indicator(NDI) field is set to ‘0’ to activate UL SPS at SFN M subframe N2. SS disable UL dynamic scheduling.
15. Verify UE receives DL packets at SFN and subframe satisfied (10 * SFN + subframe) = [(10 * M + N1) + n* semiPersistSchedIntervalDL] modulo 10240. ‘n’ is positive integer starting at zero
16. Verify UE sends UL packets at SFN and subframe satisfied (10 * SFN + subframe) = [(10 * M + N3) + n * semiPersistSchedIntervalUL +Subframe_Offset * (n modulo 2)] modulo 10240. ‘n’ is positive integer starting at zero
17. Maintain MTSI MO speech call for 1 minute. Verify RTP packet flow during active call
18. SS transmits PDCCH payload scrambled with the Semi-Persisitent Scheduling C-RNTI to release SPS(refer TS36.213 clause 9.2).
19. SS initiates CLEAR call procedure.

POSTAMBLE

20. SS sends Deactivate EPS Bearer Context Request (QCI 1). The UE shall respond with Deactivate EPS Bearer Context Accept.
21. SS initiates an MT Detach procedure.
22. The SS releases the RRC connection by sending the RRC Connection Release message to the UE.
23. Deactivate E-UTRAN Cell A.

Table 5.2.7.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1	←	RRC	Activate E-UTRAN Cell A		
2	UE		Switch On UE	AT Command (switch ON)	
3	→ ←	RRC NAS	UE attach procedure with Default EPS bearer establishment for Data PDN (QCI 9) (see 36.508, 4.5.2 (steps 1-16))		
4	→ ←	RRC NAS	UE initiates a PDN Connectivity Request for IMS PDN		PASS
5	→ ←	NAS RRC	SS initiates the Default EPS bearer(QCI 5) on E-UTRAN cell A for SIP establishment by sending the RRC Connection Reconfiguration message		PASS
6	→ ←	SIP	UE successfully registers to IMS Simulator; IMS Registration message flow: SIP Register -> 401 Unauthorized -> SIP Register -> 200 OK		PASS
7	→	RRC SIP	UE initiates a MO Call on E-UTRAN cell A. UE initiates INVITE request		
8	→ ←	SIP	SIP session establishment with preconditions: INVITE -> 183 Session Progress		
9	→	SIP	SS waits for UE to send PRACH		
10	→ ←	RRC NAS	SS establishes a MT Dedicated EPS bearer (QCI 1) with the UE for voice call. DRX , SPS and RoHC are configured		
11	→	RRC	UE sends RRCConnectionReconfigurationComplete		PASS
12	→ ←	SIP	SS initiates answer call procedure.		
13	←	PHY	The SS transimits PDCCH payload scrambled with the Semi-Persisitent Scheduling C-RNTI and the new data indicator(NDI) field is set to ‘0’ to activate		

			DL SPS at SFN M subframe N1. SS disable DL dynamic scheduling..		
14	←	PHY	The SS transimits PDCCH payload scrambled with the Semi-Persisitent Scheduling C-RNTI and the new data indicator(NDI) field is set to '0' to activate UL SPS at SFN M subframe N2. SS disable UL dynamic scheduling		
15			Verify UE receives DL packets at SFN and subframe satisfied (10 * SFN + subframe) = [(10 * M + N1) + n* semiPersistSchedIntervalDL.		PASS
16			Verify UE sends UL packets at SFN and subframe satisfied (10 * SFN + subframe) = [(10 * M + N2+delta) + n * semiPersistSchedIntervalUL +Subframe_Offset * (N modulo 2)] modulo 10240		PASS
17			Keep the voice call for 1 minute		
18	←	PHY	SS transmits PDCCH payload scrambled with the Semi-Persisitent Scheduling C-RNTI to release SPS(refer TS36.213 clause 9.2).		PASS
19	→ ←	SIP	SS initiates CLEAR call procedure. Session release: BYE -> 200 OK		
20	← →	NAS RRC	SS releases the MT Dedicated EPS bearer (QCI 1)		
21	← →	NAS	Mobile Terminated Detach procedure initiated by SS		
22	←	RRC	RRC connection release		
23	SS		Deactivate Cell A		

Table 5.2.7.5-2 SPS-Config

Derivation Path: 36.331 clause 6.3.2			
Information Element	Value/remark	Comment	Condition
sps-Config ::= CHOICE {			
semiPersistSchedC-RNTI	'FFF0'H		
sps-ConfigDL ::=SEQUENCE {			
setup SEQUENCE {			
semiPersistSchedIntervalDL	Sf40	Set SPS period	
NumberOfConfSPS-Processes	7	Max DL SPS HARQ processes is 7 considering TDD configuration 2.	TDD

N1-PUCCH-AN-PersistenList	0		
}			
}			
sps-ConfigUL ::=SEQUENCE {			
setup SEQUENCE {			
semiPersistSchedIntervalUL	Sf40		
implicitReleaseAfer	e2		
p0-Persistent SEQUENCE { }	Not Present		
twoIntervalsConfig	true		
}			
}			
}			

Table 5.2.7.5-3: DRX-CONFIG

Derivation Path: 36.508 Table 4.6.1-8			
Information Element	Value/remark	Comment	Condition
drx-Config CHOICE {			
setup SEQUENCE {			
onDurationTimer	psf8		
drx-InactivityTimer	psf4		
drx-RetransmissionTimer	psf4		
longDRX-CycleStartOffset CHOICE {			
sf40	3		
}			
shortDRX	Not present		
}			
}			

Table 5.2.7.5-4: RoHC config

Derivation Path: TS 36.508 Table 4.8.2.1.2.1-1			
Information Element	Value/remark	Comment	Condition
PDCP-Config-DRB-UM ::= SEQUENCE {			
rlc-UM SEQUENCE {			
pdcp-SN-Size	len7bits		
}			
headerCompression CHOICE {			
rohc SEQUENCE {			
maxCID	15	DEFAULT 15	
profiles SEQUENCE {			
profile0x0001	TRUE		
profile0x0002	TRUE		
profile0x0003	FALSE		

profile0x0004	FALSE		
profile0x0006	FALSE		
profile0x0101	FALSE		
profile0x0102	FALSE		
profile0x0103	FALSE		
profile0x0104	FALSE		
}			
}			
}			
}			

5.2.7.6 Expected Result

UE successfully completes registration procedure to cell A and voice call is ongoing when SPS, DRX and RoHC are enabled

5.2.8 PS voice and data simultaneously

5.2.8.1 Test Purpose

Verify UE supports PS voice and data simultaneously. UE performs voice call loopback via IMS APN, while FTP data transfer (download or upload) is ongoing via DataAPN.

5.2.8.2 Reference specification

3GPP TS 36.331, clause 5.3.8.3
3GPP TS 24.229, clause 5.1.3
RFC 3261

5.2.8.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE.

The UE shall support configuration4.

5.2.8.4 Test conditions

[SS configuration]
E-UTRAN Cell A is TD-LTE cell
E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0

Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS

E-UTRAN Cell A is not active
Enable IMS Settings.
The test shall be performed under ideal radio conditions.

UE

UE is powered off (State 1)

5.2.8.5 Test procedure

PREAMBLE

1. Execute the steps 1- 6 of test procedure 5.1.3.5
2. Verify that the UE is successfully registered to IMS.

MAIN BODY

3. SS establishes a MT Dedicated EPS bearer (QCI 6) with the UE.
4. Using the FTP client, begin FTP download from the application server. The file to be downloaded is large enough to ensure it is not finished before the end of the test.
5. UE initiates INVITE request over SIP using IMS PDN to SS.
6. SS establishes a MT Dedicated EPS bearer (QCI 1) with the UE for voice call.
7. SS initiates answer call procedure.
8. Verify if RTP packets are still ongoing to confirm successful call progress The call should continue for 1 minute.
9. Verify Data transfer is still ongoing on E-UTRAN cell A for 1 minute.
10. SS initiates CLEAR call procedure.

POSTAMBLE

11. SS sends Deactivate EPS Bearer Context Request (QCI 1). The UE shall respond with Deactivate EPS Bearer Context Accept.
12. SS sends Deactivate EPS Bearer Context Request (QCI 6). The UE shall respond with Deactivate EPS Bearer Context Accept
13. SS initiates an MT Detach procedure.
14. The SS releases the RRC connection by sending the RRC Connection Release message to the UE.
15. Deactivate E-UTRAN Cell A.

Table: 5.2.8.5-1 Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1~2	→ ←	RRC NAS SIP	Execute the steps 1- 6 of test procedure 5.1.3.5. UE successfully registers to IMS		PASS
3	→ ←	RRC NAS	SS initiates establishment of dedicated bearer(QCI 6) on EUTRAN Cell A.		
4			Using the FTP client, begin FTP download from the application server		PASS
5	→ ←	RRC SIP	UE initiates a MO Call on E-UTRAN cell A . SIP session establishment with preconditions: INVITE -> 183 Session Progress		
6	← →	NAS RRC	The SS initiates the Dedicated EPS Bearer(QCI 1) re-establishment by sending the RRC Connection Reconfiguration message to the UE on Cell A.		
7	←	NAS	SS initiates answer call procedure		PASS
8-9			Verify if data and Call continues simultaneously on E-UTRAN Cell A for 1 minute.		PASS
10	→ ←	RRC SIP	The SS Initiates clear call procedure on E-UTRAN cell A		
11	← →	NAS RRC	SS Deactivates a mobile terminated Dedicated EPS bearer establishment(QCI 1)		
12	← →	NAS RRC	SS Deactivates a mobile terminated Dedicated EPS bearer establishment(QCI 6)		
13	← →	NAS	SS initiates a mobile terminated Detach procedure (refer to 24.301 clause 5.5.2.3).		
14	←	RRC	SS sends RRC CONNECTION RELEASE message to UE		
15			Deactivate E-UTRAN Cell A		

5.2.8.6 Expected Result

Verify UE supports PS voice and PS data simultaneously on dedicated bearer both for Data and Voice.

5.2.9 Silent Redial

5.2.9.1 Voice call failed, Tcall Timeout

5.2.9.1.1 Test Purpose

Test to verify UE could correctly support Tcall timer when call setup. If UE doesn't receive any message from network after sending INVITE , UE will perform CSFB call once Tcall timeout. UE could perform IMS re-registration when the expiration time of registration has expired after the CS call is released and return to LTE .

5.2.9.1.2 Reference specification

3GPP TS 24.229, clause 5.1.1.4.1
3GPP TS 23.272, clause 6.3
3GPP TS 36.331, clause 5.3.8.3

5.2.9.1.3 Applicability

This test applies to VoLTE over CSFB UE.

The UE shall support configuration 4.

5.2.9.1.4 Test conditions

[SS configuration]
E-UTRAN Cell A is TD-LTE cell.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

GSM Cell B
Cell Id=02 LAC = 02
MCC-MNC = 460-00
ARFCN = f1
RF Signal Level = -65dBm

[UE configuration]
The test UICC with USIM should be inserted

[Initial conditions]
SS

E-UTRAN Cell A is not active

GSM Cell C is not active.

The test shall be performed under ideal radio conditions.

UE

UE is powered off (State 1)

5.2.9.1.5 Test procedure

PREAMBLE

1. Execute the steps 1- 6 of test procedure 5.1.3.5 with exception that SS specifies expiration time to 240 in 200 OK responding to REGISTER. UE is successfully registered to IMS

MAIN BODY

2. UE sends INVITE request using IMS PDN to initiates a MO Call.
3. SS doesn't response 100 trying.UE Tcalltimeout and call fails. The Tcall timer value is 10s
4. Verify UE initials CSFB MO call to GERAN Cell B via R8 Redirection when Tcall timeout. The voice call is ongoing in Cell B
5. SS disconnects voice call and sends ChannelRelease. Cell Selection Indicator doesn’t include any E-UTRAN carrier frequency
6. Verify that UE returns to E-UTRAN Cell A and transmits TRACKING AREA UPDATE REQUEST. Verify that the EPS update type in TAU is “combined TA/LA updating with IMSI attach”
7. SS transmits TRACKING AREA UPDATE ACCEPT and indicates that IMS voice over PS is supported by setting IMS VoPS flag to TRUE.
8. Untill expiration time expired, verify that UE sends REGISTER to perform IMS re-registration before half of the time has expired from the initial registration.
9. SS responds to the REGISTER request with valid 200 OK response

POSTAMBLE

10. Deactivate E-UTRAN Cell A and GERAN Cell B.

Table 5.2.9.1.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1	→ ←	RRC NAS SIP	Execute the steps 1- 6 of test procedure 5.1.3.5 . UE is successfully registered to IMS	SS specifies expiration time to 240 in 200 OK responding to REGISTER	
2	→	SIP	UE sends INVITE request		
3			SS doesn't response 100 trying, call fails		
4	→	RRC	UE performs CSFB procedure to	Refer to 3GPP TS	PASS

	←		GERAN Cell B.	23.272 clause 6.3	
5	←	NAS	Voice call disconnects. The SS sends ChannelRelease message	Cell selection indicator IE doesn't include any E-UTRAN carrier frequency	
6	→	NAS	UE returns to E-UTRAN Cell A and transmits TRACKING AREA UPDATE REQUEST	EPS update type in TAU is "combined TA/LA updating with IMSI attach"	PASS
7	←	NAS	SS transmits TRACKING AREA UPDATE ACCEPT	IMS VoPS flag is set to TRUE	
8-9	→ ←	SIP	UE initiate re-registration; IMS Registration message flow: SIP Register -> 200 OK	Expiration time expired	PASS
10			Deactivate E-UTRAN Cell A and GERAN Cell B		

5.2.9.1.6 Expected Result

The UE shall in step 4 initial CSFB call when Tcall timeout.

The UE shall in step 6 return to E-UTRAN cell A and perform TAU.

The UE shall in step 8 send the REGISTER request within 120 seconds from the time instant that it receives 200 OK in step 3 from the SS.

5.2.9.1a Voice call failed, Tcall Timeout, Dual Standby

5.2.9.1a.1 Test Purpose

Test to verify UE could correctly support Tcall timer when call setup. If UE doesn't receive any message from network after sending INVITE, UE will perform CS voice call once Tcall timeout.

5.2.9.1a.2 Reference specification

3GPP TS 24.229, clause 5.1.1.4.1

3GPP TS 23.272, clause 6.3

3GPP TS 36.331, clause 5.3.8.3

5.2.9.1a.3 Applicability

This test applies to VoLTE over Dual Standby UE .

The UE shall support configuration 4.

5.2.9.1a.4 Test conditions

[SS configuration]
E-UTRAN Cell A is TD-LTE cell.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

GSM Cell B
Cell Id=02 LAC = 02
MCC-MNC = 460-00
ARFCN = f1
RF Signal Level = -65dBm

[UE configuration]
The test UICC with USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is not active
GSM Cell C is not active.
The test shall be performed under ideal radio conditions.
UE
UE is powered off (State 1)

5.2.9.1a.5 Test procedure

PREAMBLE
1. Execute the steps 1- 6 of test procedure 5.1.3.5. UE is successfully registered to IMS
2. In parallel with step1, UE performs CS attach in GSM Cell B according to Step7-12 defined in TS 51.010 26.2.2.3 procedure 3

MAIN BODY
3. UE sends INVITE request using IMS PDN to initiates a MO Call.
4. SS doesn't response 100 trying. UE Tcall timeout and call fails. The Tcall timer value is 10s
5. Verify UE initials CS voice call in GSM Cell B according to the steps defined in TS 51.010 10.2.3. The voice call is ongoing in Cell B
6. SS disconnects voice call in Cell B

POSTAMBLE

7. Deactivate E-UTRAN Cell A and GERAN Cell B.

Table 5.2.9.1a-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1	→ ←	RRC NAS SIP	Execute the steps 1- 6 of test procedure 5.1.3.5 . UE is successfully registered to IMS		
2	→ ←	RRC NAS	In parallel with step1, UE performs CS attach in GSM Cell B according to Step7-12 defined in TS 51.010 26.2.2.3 procedure 3		
3	→	SIP	UE sends INVITE request		
4			SS doesn't response 100 trying, call fails		
5	→ ←	RRC	UE initials CS voice call in GSM Cell B. The voice call is ongoing in Cell B		PASS
6	→ ←	RRC	SS disconnects voice call in Cell B	Cell selection indicator IE doesn't include any E-UTRAN carrier frequency	
7			Deactivate E-UTRAN Cell A and GERAN Cell B		

5.2.9.1a.6 Expected Result

The UE shall in step 5 initial CS voice call in GSM Cell Bl when Tcall timeout.

5.2.9.2 Voice call failed, Tqos Timeout

5.2.9.2.1 Test Purpose

Test to verify UE could correctly support Tqos timer when voice call setup.UE initials VoLTE MO call and start Tqos once receiving 183 session progress. UE will cancel the VoLTE call and perform CSFB call when Tqos timeout in case of the network doesn't establish dedicated EPS bearer. After CSFB call release, UE could return to LTE via UE-controlled fast return. UE will perform IMS initial registration once return to LTE if the expiration time of registration has expired when UE is in GSM.

5.2.9.2.2 Reference specification

3GPP TS 24.229, clause 5.1.1.4.1, 5.2.3.1

3GPP TS 23.272, clause 6.3
3GPP TS 36.331, clause 5.3.8.3

5.2.9.2.3 Applicability

This test applies to VoLTE over CSFB UE.

The UE shall support configuration 4.

5.2.9.2.4 Test conditions

[SS configuration]
E-UTRAN Cell A is TD-LTE cell.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

GSM Cell B
Cell Id=02 LAC = 02
MCC-MNC = 460-00
ARFCN = f1
RF Signal Level = -65dBm

[UE configuration]
The test UICC with USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is not active
GSM Cell B is not active.
The test shall be performed under ideal radio conditions.
UE
UE is powered off (State 1)

5.2.9.2.5 Test procedure

PREAMBLE
1. Execute the steps 1-6 of test procedure 5.1.3.5 with exception that SS specifies expiration time to 120 in 200 OK responding to REGISTER. UE is successfully registered to IMS

MAIN BODY

2. UE sends INVITE request using IMS PDN to initiate a MO Call.
3. SS responds to INVITE with 100 Trying and 183 Session Progress responses which contains the first SDP answer. UE starts the Tqos Timer.
4. SS doesn't establish dedicate EPS Bearer(QCI 1).
5. Verify UE sends CANCEL after Tqos timeout. The Tqos timer value is 6s.
6. Verify UE initials CSFB MO call to GERAN Cell B via R8 Redirection when Tqos timeout. The voice call is ongoing Cell B.
7. After expiration time of registration has expired (120s after registration), SS disconnects voice call and sends ChannelRelease. Cell Selection Indicator doesn't include any E-UTRAN carrier frequency
8. Verify that UE returns to E-UTRAN Cell A and transmits TRACKING AREA UPDATE REQUEST. Verify that the EPS update type in TAU is "combined TA/LA updating with IMSI attach"
9. SS transmits TRACKING AREA UPDATE ACCEPT and indicates that IMS voice over PS is supported by setting IMS VoPS flag to TRUE.
10. Verify that UE registers with IMS successfully and subscribes to reg – event package.

POSTAMBLE

11. Deactivate E-UTRAN Cell A and GERAN Cell B.

Table 5.2.9.2.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1	→ ← 	RRC NAS SIP	Execute the steps 1- 6 of test procedure 5.1.3.5 with exception. UE is successfully registered to IMS	SS specifies expiration time to 120 in 200 OK responding to REGISTER	
2	→	SIP	UE sends INVITE request		
3	←	SIP	SS responds to INVITE with 100 Trying and 183 Session Progress responses		
4		SIP	SS doesn't establish dedicate EPS Bearer(QCI 1)		
5	→	SIP	UE sends CANCEL after Tqos timeout	Tqos timer value is 6s	PASS
6	→ ←	RRC	UE performs CSFB procedure to GERAN Cell B	Refer to 3GPP TS 23.272, clause 6.3	PASS
7	←	NAS	The SS disconnects voice call and sends ChannelRelease message	Cell selection indicator IE doesn't include any E-UTRAN carrier frequency	

8	→	NAS	UE returns to E-UTRAN Cell A and transmits TRACKING AREA UPDATE REQUEST	EPS update type in TAU is “combined TA/LA updating with IMSI attach”	PASS
9	←	NAS	SS transmits TRACKING AREA UPDATE ACCEPT	IMS VoPS flag is set to TRUE	
10	→ ←	SIP	UE initiate initial registration		PASS
11			Deactivate E-UTRAN Cell A and GERAN Cell B		

5.2.9.2.6 Expected Result

The UE shall in step 5-6 send CANCEL and initial CSFB call when Tqos timeout.
The UE shall in step 10 return to E-UTRAN cell A and perform TAU.
The UE shall in step 12 send the REGISTER request to initial IMS registration.

5.2.9.2a Voice call failed, Tqos Timeout, Dual Standby

5.2.9.2a.1 Test Purpose

Test to verify UE could correctly support Tqos timer when voice call setup.UE initials VoLTE MO call and start Tqos once receiving 183 session progress. UE will cancel the VoLTE call and initial CS voice call in GSM Cell when Tqos timeout in case of the network doesn't establish dedicated EPS bearer.

5.2.9.2a.2 Reference specification

3GPP TS 24.229, clause 5.1.1.4.1, 5.2.3.1
3GPP TS 23.272, clause 6.3
3GPP TS 36.331, clause 5.3.8.3

5.2.9.2a.3 Applicability

This test applies to VoLTE over Dual Standby UE .

The UE shall support configuration 4.

5.2.9.2a.4 Test conditions

[SS configuration]
E-UTRAN Cell A is TD-LTE cell.

E-UTRAN Cell A

Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

GSM Cell B
Cell Id=02 LAC = 02
MCC-MNC = 460-00
ARFCN = f1
RF Signal Level = -65dBm

[UE configuration]
The test UICC with USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is not active
GSM Cell B is not active.
The test shall be performed under ideal radio conditions.
UE
UE is powered off (State 1)

5.2.9.2a.5 Test procedure

PREAMBLE
1. Execute the steps 1- 6 of test procedure 5.1.3.5 with exception that SS specifies expiration time to 120 in 200 OK responding to REGISTER. UE is successfully registered to IMS
2. In parallel with step1, UE performs CS attach in GSM Cell B according to Step7-12 defined in TS 51.010 26.2.2.3 procedure 3

MAIN BODY
3. UE sends INVITE request using IMS PDN to initiate a MO Call.
4. SS responds to INVITE with 100 Trying and 183 Session Progress responses which contains the first SDP answer. UE starts Tqos timer.
5. SS doesn't establish dedicate EPS Bearer(QCI 1)
6. Verify UE sends CANCEL after Tqos timeout. The Tqos timer value is 6s.
7. Verify UE initials CS voice call in GSM Cell B according to the steps defined in TS 51.010 10.2.3. The voice call is ongoing Cell B
8. SS disconnects voice call.

POSTAMBLE
9. Deactivate E-UTRAN Cell A and GERAN Cell B.

Table 5.2.9.2a.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1	→ ←	RRC NAS SIP	Execute the steps 1- 6 of test procedure 5.1.3.5 with exception. UE is successfully registered to IMS	SS specifies expiration time to 120 in 200 OK responding to REGISTER	
2	→ ←	RRC NAS	In parallel with step1, UE performs CS attach in GSM Cell B according to Step7-12 defined in TS 51.010 26.2.2.3 procedure 3		
3	→	SIP	UE sends INVITE request		
4	←	SIP	SS responds to INVITE with 100 Trying and 183 Session Progress responses		
5		SIP	SS doesn't establish dedicate EPS Bearer (QCI 1)		
6	→	SIP	UE sends CANCEL after Tqos timeout	Tqos timer value is 6s	PASS
7	→ ←	RRC	UE initials CS voice call in GSM Cell B according to the steps defined in TS 51.010 10.2.3		PASS
8	←	NAS	The SS disconnects voice call		
9			Deactivate E-UTRAN Cell A and GERAN Cell B		

5.2.9.2a.6 Expected Result

The UE shall in step 6-7 send CANCEL and initial CS voice call in GSM when Tqos timeout.

5.3 IPv6

5.3.1 IPv4v6 Dual Stack in different PDN

5.3.1.1 Test Purpose

Verify that the UE supports IPv4v6 dual stack in different PDN.

5.3.1.2 Reference specification

3GPP TS 24.229, clause 5.1.3

3GPP TS 24.303, clause 5.1

3GPP TS 24.303, clause 6.2

5.3.1.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE.
The UE shall support Configuration 4.

5.3.1.4 Test conditions

[SS configuration]
E-UTRAN Cell A is TD-LTE cell
E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS

E-UTRAN Cell A is not active.
The test shall be performed under ideal radio conditions.

UE

UE is powered off (State 1)

5.3.1.5 Test procedure

PREAMBLE

1. Activate E-UTRAN Cell A.
2. Power on the UE.

MAIN BODY

3. UE sends ATTACH REQUEST and initials a PDN CONNECTIVITY REQUEST for Data PDN in E-UTRAN Cell A. Verify that “PDN Type” in *PDN CONNECTIVITY REQUEST* is IPv4v6. Verify UE requests P-CSCF address via PCO method.Verify list of P-CSCF IPv4 Address Request (000CH) and P-CSCF IPv6 Address Request (0001H) included.
4. SS establishes the default EPS bearer (QCI 9) on Data PDN and indicates that IMS voice over PS is supported by setting IMS voice over PS session indicator in

ATTACH ACCEPT. “PDN Address ”in *ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST* message is set to "IPv4" and the ESM cause value is set to #50 "PDN type IPv4 only allowed". SS doesn’t allocate any P-CSCF address.

5. UE initiates the *PDN CONNECTIVITY REQUEST* for IMS PDN. Verify that “PDN Type” is IPv4v6. Verify UE requests P-CSCF address via PCO method.Verify list of P-CSCF IPv4 Address Request (000CH) and P-CSCF IPv6 Address Request (0001H) included
6. SS establishes the Default EPS bearer (QCI 5) for IMS PDN (see 36.508, 4.5.2). “PDN Address” value in *ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST* message is set to "IPv6" and the ESM cause value is set to #51 "PDN type IPv6 only allowed". SS allocates IPv6 P-CSCF address via PCO.
7. Verify that the UE is successfully registered to IMS.
8. SS establishes a MT Dedicated EPS bearer (QCI 6) on Data PDN.
9. Using the FTP client, begin FTP download from the application server via data PDN (IPv4).
10. UE initiates INVITE request over SIP using IMS PDN to SS.
11. SS establishes a MT Dedicated EPS bearer (QCI 1) with the UE for voice call.
12. SS initiates answer call procedure.
13. Verify if RTP packets are still ongoing to confirm successful call progress via IMS PDN (IPv6). The call should continue for 1 minute
14. Verify Data transfer is still continue on E-UTRAN cell A for 1 minute
15. SS initiates CLEAR call procedure.

POSTAMBLE

16. SS sends Deactivate EPS Bearer Context Request (QCI 1). The UE shall respond with Deactivate EPS Bearer Context Accept.
17. SS sends Deactivate EPS Bearer Context Request (QCI 6). The UE shall respond with Deactivate EPS Bearer Context Accept
18. SS initiates an MT Detach procedure.
19. The SS releases the RRC connection by sending the RRC Connection Release message to the UE.
20. The SS Deactivate E-UTRAN Cell A.

Table 5.3.1.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1	←	RRC	Activate E-UTRAN Cell A		
2	UE		Switch On UE	AT Command (switch ON)	
3			UE sends ATTACH REQUEST and initials a PDN CONNECTIVITY REQUEST for Data PDN	Verify that the PDN Type is IPv4v6.	PASS
4	→	RRC	SS establishes the default EPS		

	←	NAS	bearer (QCI 9) on Data PDN on E-UTRAN Cell A (according to TS 36.508 sub clause 4.5.2 (steps 1-16))		
5	→ ←	RRC NAS	UE initiates a PDN Connectivity Request for IMS PDN (IPv4v6).	Verify that the PDN Type is IPv4v6. Verify UE requests P-CSCF IPv4 and IPv6 address via PCO method.	PASS
6	→ ←	NAS RRC	The SS initiates the Default EPS bearer (QCI 5) on E-UTRAN cell A for SIP establishment by sending the RRC Connection Reconfiguration		
7	→ ←	SIP	UE successfully registers to IMS Simulator; IMS Registration message flow: SIP Register -> 401 Unauthorized -> SIP Register -> 200 OK		PASS
8	→ ←	RRC NAS	SS initiates establishment of dedicated bearer(QCI 6) on EUTRAN Cell A.		
9			Using the FTP client, begin FTP download from the application server.(IPv4)		PASS
10	→ ←	RRC SIP	UE initiates a MO Call on E-UTRAN cell A. SIP session establishment with preconditions: INVITE -> 183 Session Progress		
11	← →	NAS RRC	The SS initiates the Dedicated EPS Bearer(QCI 1)for Voice service by sending the RRC Connection Reconfiguration message to the UE on Cell A.		PASS
12	→ ←	SIP	SS initiates answer call procedure:		
13	UE		Verify if RTP packets are still ongoing to confirm successful call progress (IPv6) The call should continue for 1 minute		PASS
14	UE		Verify Data transfer is still continue on E-UTRAN cell A for 1 minute.		PASS
15	←	RRC	The SS Initiates clear call		PASS

			procedure on E-UTRAN cell A		
16	← →	NAS RRC	SS Deactivates a mobile terminated Dedicated EPS bearer establishment(QCI 1)		
17	← →	NAS RRC	SS Deactivates a mobile terminated Dedicated EPS bearer establishment(QCI 6)		
18	← →	NAS	SS initiates a mobile terminated Detach procedure (refer to 24.301 clause 5.5.2.3).		
19	←	RRC	SS sends RRC CONNECTION RELEASE message to UE		
20			Deactivate E-UTRAN Cell A		

5.3.1.6 Expected Result

Verify UE supports IPv4v6 dual stack in different PDN and could establish and perform these two services in different PDN simultaneously.

5.3.2 IPv4v6 Dual Stack in Same PDN

5.3.2.1 Test Purpose

Verify that the UE supports IPv4v6 dual stack in same PDN.

5.3.2.2 Reference specification

3GPP TS 24.303, clauses 5.1
3GPP TS 24.303, clauses 6.2

5.3.2.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE.
The UE shall support Configuration 4.

5.3.2.4 Test conditions

[SS configuration]
E-UTRAN Cell A is TD-LTE cell
E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0

Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS

E-UTRAN Cell A is not active.
The test shall be performed under ideal radio conditions.

UE

UE is powered off (State 1)

5.3.2.5 Test procedure

PREAMBLE

1. Activate E-UTRAN Cell A.
2. Power on the UE.

MAIN BODY

3. UE sends ATTACH REQUEST and initials a PDN CONNECTIVITY REQUEST for Data PDN in E-UTRAN Cell A. Verify that “PDN Type” in *PDN CONNECTIVITY REQUEST* is IPv4v6. Verify UE requests P-CSCF address via PCO method. Verify list of P-CSCF IPv4 Address Request (000CH) and P-CSCF IPv6 Address Request (0001H) included.
4. SS establishes the default EPS bearer (QCI 9) on Data PDN and indicates that IMS voice over PS is supported by setting IMS voice over PS session indicator in *ATTACH ACCEPT*. PDN type value in *ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST* message is set to is set to "IPv4v6". IPv6 interface identifier and an IPv4 address are included in the PDN address information. SS doesn’t allocate any P-CSCF address.
5. UE initiates the *PDN CONNECTIVITY REQUEST* for IMS PDN. Verify that “PDN Type” is IPv4v6. Verify UE requests P-CSCF address via PCO method.Verify list of P-CSCF IPv4 Address Request (000CH) and P-CSCF IPv6 Address Request (0001H) included
6. SS establishes the Default EPS bearer (QCI 5) for IMS PDN (see 36.508, 4.5.2). PDN type value in *ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST* message is set to "IPv6" and the ESM cause value is set to #51 "PDN type IPv6 only allowed". SS allocates IPv6 P-CSCF address via PCO.
7. Verify that the UE is successfully registered to IMS.
8. SS establishes a MT Dedicated EPS bearer (QCI 6) on Data PDN.
9. Using the FTP client, begin FTP download from the application server via dedicated EPS bearer of Data PDN (IPv6).
10. Using the FTP client, begin FTP download from the application server via default EPS bearer of Data PDN (IPv4).

11. Verify IPv6 Data transfer is still ongoing.
12. Verify IPv4 Data transfer is still ongoing.
13. Data should be continued for 1 minute on IPv4 and IPv6 Data PDN

POSTAMBLE

14. SS sends Deactivate EPS Bearer Context Request (QCI 6). The UE shall respond with Deactivate EPS Bearer Context Accept
15. SS initiates an MT Detach procedure.
16. The SS releases the RRC connection by sending the RRC Connection Release message to the UE.
17. The SS Deactivate E-UTRAN Cell A.

Table 5.3.2.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1	←	RRC	Activate E-UTRAN Cell A		
2	UE		Switch On UE	AT Command (switch ON)	
3			UE sends ATTACH REQUEST and initials a PDN CONNECTIVITY REQUEST for Data PDN	Verify that the PDN Type is IPv4v6.	PASS
4	→ ←	RRC NAS	SS establishes the default EPS bearer (QCI 9) on Data PDN on E-UTRAN Cell A (according to TS 36.508 sub clause 4.5.2 (steps 1-16))		
5	→ ←	RRC NAS	UE initiates a PDN Connectivity Request for IMS PDN (IPv4v6)	Verify that the PDN Type is IPv4v6. Verify UE requests P-CSCF IPv4 and IPv6 address via PCO method.	PASS
6	→ ←	NAS RRC	The SS initiates the Default EPS bearer (QCI 5) on E-UTRAN cell A for SIP establishment by sending the RRC Connection Reconfiguration		
7	→ ←	SIP	UE successfully registers to IMS Simulator; IMS Registration message flow: SIP Register -> 401 Unauthorized -> SIP Register -> 200 OK		PASS
8	→	RRC	SS initiates establishment of		

	←	NAS	dedicated bearer(QCI 6) on EUTRAN Cell A.		
9	→ ←	FTP	Using the FTP client, begin FTP download from the application server via dedicated EPS bearer of Data PDN.(IPv6)		PASS
10	→ ←	FTP	Using the FTP client, begin FTP download from the application server via default EPS bearer of Data PDN.(IPv4)		PASS
11	→ ←	FTP	Verify IPv6 Data transfer is still ongoing		PASS
12	→ ←	FTP	Verify IPv4 Data transfer is still ongoing .		PASS
13	→ ←	FTP	Data should be continued for 1 minute on IPv4 and IPv6 Data PDN		PASS
14	← →	NAS RRC	SS Deactivates a mobile terminated Dedicated EPS bearer establishment(QCI 6)		
15	← →	NAS	SS initiates a mobile terminated Detach procedure (refer to 24.301 clause 5.5.2.3).		
16	←	RRC	SS sends RRC CONNECTION RELEASE message to UE		
17			Deactivate E-UTRAN Cell A		

5.3.2.6 Expected Result

Verify UE supports IPv4v6 dual stack in same PDN and could establish and perform these two services with different IP stack correctly.

5.3.3 IPv6 in IMS PDN

5.3.3.1 Test Purpose

Verify that UE will use IPv6 address when both IPv4 and IPv6 are allocated in IMS PDN.

5.3.3.2 Reference specification

3GPP TS 24.229, clauses 5.1.3
3GPP TS 24.303, clauses 5.1
3GPP TS 24.303, clauses 6.2

5.3.3.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE.
The UE shall support Configuration 4

5.3.3.4 Test conditions

[SS configuration]
E-UTRAN Cell A is TD-LTE cell
E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS

E-UTRAN Cell A is not active.

The test shall be performed under ideal radio conditions.

UE

UE is powered off (State 1)

5.3.3.5 Test procedure

PREAMBLE

1. Activate E-UTRAN Cell A.
2. Power on the UE.

MAIN BODY

3. UE sends ATTACH REQUEST and initials a PDN CONNECTIVITY REQUEST for Data PDN in E-UTRAN Cell A. Verify that “PDN Type” in *PDN CONNECTIVITY REQUEST* is IPv4v6. Verify UE requests P-CSCF address via PCO method.Verify list of P-CSCF IPv4 Address Request (000CH) and P-CSCF IPv6 Address Request (0001H) included.
4. SS establishes the default EPS bearer (QCI 9) on Data PDN and indicates that IMS voice over PS is supported by setting IMS voice over PS session indicator in *ATTACH ACCEPT*. PDN type value in *ACTIVATE DEFAULT EPS BEARER*

CONTEXT REQUEST message is set to "IPv4" and the ESM cause value is set to #50 "PDN type IPv4 only allowed". SS doesn't allocate any P-CSCF address.

5. UE initiates the *PDN CONNECTIVITY REQUEST* for IMS PDN. Verify that “PDN Type” is IPv4v6. Verify UE requests P-CSCF address via PCO method.Verify list of P-CSCF IPv4 Address Request (000CH) and P-CSCF IPv6 Address Request (0001H) included
6. SS establishes the Default EPS bearer (QCI 5) for IMS PDN (see 36.508, 4.5.2). PDN type value in *ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST* message is set to "IPv4v6". SS allocates IPv4 P-CSCF address and IPv6 P-CSCF address via PCO.
7. Verify that the UE is successfully registered to IMS with IPv6 address.
8. UE initiates INVITE request over SIP using IMS PDN to SS.
9. SS establishes a MT Dedicated EPS bearer (QCI 1) with the UE for voice call.
10. SS initiates answer call procedure.
11. Verify if RTP packets are still ongoing to confirm successful call progress via IMS PDN (IPv6). The call should continue for 1 minute.
12. SS initiates call release procedure.

POSTAMBLE

13. SS sends Deactivate EPS Bearer Context Request (QCI 1). The UE shall respond with Deactivate EPS Bearer Context Accept.
14. SS initiates an MT Detach procedure.
15. The SS releases the RRC connection by sending the RRC Connection Release message to the UE.
16. The SS Deactivate E-UTRAN Cell A.

Table 5.3.2.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1	←	RRC	Activate E-UTRAN Cell A		
2	UE		Switch On UE	AT Command (switch ON)	
3	→ ←	RRC NAS	UE sends ATTACH REQUEST and initials a PDN CONNECTIVITY REQUEST for Data PDN	Verify that the PDN Type is IPv4v6.	PASS
4	→ ←	RRC NAS	SS establishes the default EPS bearer (QCI 9) on Data PDN on E-UTRAN Cell A (according to TS 36.508 sub clause 4.5.2 (steps 1-16))		
5	→ ←	RRC NAS	UE initiates a PDN Connectivity Request for IMS PDN (IPv4v6)	Verify that the PDN Type is IPv4v6. Verify UE requests P-CSCF	PASS

				IPv4 and IPv6 address via PCO method.	
6	→ ←	NAS RRC	The SS initiates the Default EPS bearer (QCI 5) on E-UTRAN cell A for SIP establishment by sending the RRC Connection Reconfiguration		
7	→ ←	SIP	UE successfully registers to IMS Simulator with IPv6; IMS Registration message flow: SIP Register -> 401 Unauthorized -> SIP Register -> 200 OK		PASS
8	→ ←	RRC SIP	UE initiates INVITE request over SIP using IMS PDN to SS		
9	← →	NAS RRC	The SS initiates the Dedicated EPS Bearer(QCI 1)for Voice service by sending the RRC Connection Reconfiguration message to the UE on Cell A.		
10	→ ←	SIP	SS initiates answer call procedure:		
11	→ ←	RTP	Verify if RTP packets are still ongoing to confirm successful call progress (IPv6) The call should continue for 1 minute.		PASS
12	←	RRC	The SS Initiates clear call procedure on E-UTRAN cell A		
13	← →	NAS RRC	SS Deactivates a mobile terminated Dedicated EPS bearer establishment(QCI 6)		
14	← →	NAS	SS initiates a mobile terminated Detach procedure (refer to 24.301 clause 5.5.2.3).		
15	←	RRC	SS sends RRC CONNECTION RELEASE message to UE		
16			Deactivate E-UTRAN Cell A		

5.3.3.6 Expected Result

UE should use IPv6 address in IMS PDN and could perform IMS call with IPv6 correctly.

5.4 Video Call

5.4.1 Video Call Setup and Release, MO

5.4.1.1 Test Purpose

Verify that the UE could perform a correct IMS mobile originated video call setup with precondition. Verify that the UE could handle correctly when SS allocates less bandwidth than that UE requests in SDP offer. Verify that UE supports AVPF function.

5.4.1.2 Reference specification

3GPP TS 24.229, clause 5.1.3
RFC 3261

5.4.1.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE.
The UE shall support configuration 4.

5.4.1.4 Test conditions

[SS configuration]
E-UTRAN Cell A is TD-LTE cell
E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is not active
Enable IMS Settings.
The test shall be performed under ideal radio conditions.

UE
UE is powered off (State 1)

5.4.1.5 Test procedure

PREAMBLE

1. Execute the steps 1- 6 of test procedure 5.1.3.5.

MAIN BODY

2. Verify that the UE is successfully registered to IMS.
3. UE initiates INVITE request over SIP using IMS PDN to SS. Verify that the “video” tag is included in Accept-Contact header of INVITE message. Verify that the INVITE message contains first SDP offer, including audio and video media description. Verify that the AVPF is supported in video media attributes. Verify that the precondition parameters in the first SDP offer is set to: a=curr:qos local none, a=curr:qos Remote none, a=des:qos mandatory local sendrecv, a=des:qos optional remote sendrecv.
4. SS responds to INVITE with 100 Trying and 183 Session Progress response which contains the first SDP answer. Verify that the precondition related in first SDP answer is set to: a=curr:qos local none, a=curr:qos Remote none, a=des:qos mandatory local sendrecv, a=des:qos mandatory remote sendrecv，a=conf:qos remote sendrecv.
5. UE sends PRACK.
6. SS sends ACTIVATE DEDICATED EPS BEARER CONTEXT REQUEST to establish Dedicated EPS bearer (QCI 1) for audio and Dedicated EPS bearer (QCI 2) for video. The bandwidth allocated for video service should be 64kbps × ⌊Total bandwidth UE request /64kbps⌋, and the total bandwidth requested by UE is the sum of AA, RS and RR bandwidth of video service in the INVITE message. The allocated bandwidth is indicated by the “Guaranteed bit rate for uplink” and “Guaranteed bit rate for downlink” in the IE of EPS QoS.
7. UE sends UPDATE request containing the second SDP offer. Verify that the precondition parameters in the second SDP offer are set to: a=curr:qos local sendrecv, a=curr:qos Remote none, a=des:qos mandatory local sendrecv, a=des:qos mandatory remote sendrecv.
8. SS responds to the UPDATE with 200OK. 200OK contains the second SDP answer. Verify that the precondition parameters in the second SDP answer are set to: a=curr:qos local sendrecv, a=curr:qos Remote none, a=des:qos mandatory local sendrecv, a=des:qos mandatory remote sendrecv.
9. SS sends 180 ringing.
10. SS responds to the INVITE request with a 200 OK.
11. SS waits for the UE to send an ACK to acknowledge receipt of the 200 OK for INVITE.
12. Verify if RTP packets are ongoing to confirm successful call progress.
13. UE initiates call release procedure.

POSTAMBLE

14. SS sends Deactivate EPS Bearer Context Request (QCI 1). The UE shall respond with Deactivate EPS Bearer Context Accept.
15. SS sends Deactivate EPS Bearer Context Request (QCI 2). The UE shall respond with Deactivate EPS Bearer Context Accept.
16. SS initiates an MT Detach procedure.
17. The SS releases the RRC connection by sending the RRC Connection Release message to the UE.
18. Deactivate E-UTRAN Cell A.

Table 5.3.2.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1~2	→ ←	RRC NAS SIP	Execute the steps 1- 6 of test procedure 5.1.3.5. UE successfully registers to IMS		PASS
3	→	RRC SIP	UE initiates a MO Call on E-UTRAN cell A. UE initiates INVITE request	The “video” tag is included in Accept-Contact header. The INVITE message content contains first SDP offer, including audio/video media description and precondition parameters. The AVPF is supported in video media attributes,	PASS
4	→ ←	SIP	SS responses with 183 Session Progress		
5	→	SIP	UE sends PRACK		
6	→ ←	NAS RRC	The SS initiates the Dedicated EPS Bearer(QCI 1) for audio and Dedicated EPS Bearer(QCI 2) for video by sending the RRC Connection Reconfiguration message to the UE on Cell A.	The bandwidth allocated for video service should be 64kbps × ⌊Total bandwidth UE request /64kbps⌋	
7~8	→ ←	SIP	UPDATE -> 200 OK		PASS
9	→ ←	SIP	180 Ringing		

10~11	→ ←	SIP	Call answered:200 OK -> ACK		
12			Verify if RTP packets are still ongoing to confirm successful call progress		PASS
13	← →	RRC SIP	The UE initiates clear call procedur e on E-UTRAN cell A.	Session release: BYE -> 200 OK	PASS
14	← →	NAS RRC	SS Deactivates a mobile terminated Dedicated EPS bearer establishment(QCI 1)		
15	← →	NAS RRC	SS Deactivates a mobile terminated Dedicated EPS bearer establishment(QCI 2)		
16	← →	NAS	SS initiates a mobile terminated Detach procedure (refer to 24.301 clause 5.5.2.3).		
17	←	RRC	SS sends RRC CONNECTION RELEASE message to UE		
18			Deactivate E-UTRAN Cell A		

5.4.1.6 Expected Result

Verify UE could perform a correct IMS mobile originated video call setup and release.
Verify UE supports the following bearer combination: SRB1+SRB 2+DefaultBearer QCI9+QCI1+QCI2+QCI 5 ==SRB1+SRB2+2 AM+2 UM.
Verify UE could perform a correct IMS video call setup when SS allocates less bandwidth than that UE requests in SDP offer.

5.4.2 Video Call Setup and Release, MT

5.4.2.1 Test Purpose

Verify that the UE could perform a correct IMS mobile terminated video call setup and release with precondition. Verify that the UE could handle correctly when SS allocates less bandwidth than that UE requests in SDP offer. Verify that UE supports AVPF function.

5.4.2.2 Reference specification

3GPP TS 24.229, clause 5.1.4
RFC 3261

5.4.2.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE.

The UE shall support configuration 4.

5.4.2.4 Test conditions

[SS configuration]
E-UTRAN Cell A is TD-LTE cell
E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS

E-UTRAN Cell A is not active
Enable IMS Settings.
The test shall be performed under ideal radio conditions.

UE

UE is powered off (State 1)

5.4.2.5 Test procedure

PREAMBLE

1. Execute the steps 1- 6 of test procedure 5.1.3.5.

MAIN BODY

2. Verify that the UE is successfully registered to IMS.
3. SS initiates INVITE request over SIP using IMS PDN to UE. Verify that the “video” tag is included in Accept-Contact header of INVITE message. Verify that the INVITE message contains first SDP offer, including audio and video media description. Verify that the AVPF is supported in video media attributes. Verify that the precondition parameters in the first SDP offer is set to: a=curr:qos local none, a=curr:qos Remote none, a=des:qos mandatory local sendrecv, a=des:qos optional remote sendrecv.
4. UE sends 183 Session Progress response. Verify first SDP answer including audio and video media description is contained. Verify that the AVPF is supported in

video media attributes. Verify that the precondition parameters in the first SDP answer are set to: a=curr:qos local none, a=curr:qos remote none, a=des:qos mandatory local sendrecv, a=des:qos mandatory remote sendrecv, a=conf:qos remote sendrecv.

5. SS responds 183 Session Progress with PRACK.
6. UE responds PRACK with 200 OK.
7. SS sends ACTIVATE DEDICATED EPS BEARER CONTEXT REQUEST to establish Dedicated EPS bearers (QCI 1) for audio and Dedicated EPS bearers (QCI 2) for video. The bandwidth allocated for video service should be 64kbps × ⌊Total bandwidth UE request /64kbps⌋, and the total bandwidth requested by UE is the sum of AA, RS and RR bandwidth of video service in the 183 SESSION Progress message. The allocated bandwidth is indicated by the “Guaranteed bit rate for uplink” and “Guaranteed bit rate for downlink” in the IE of EPS QoS.
8. SS sends UPDATE with second SDP offer. Verify that the precondition parameters in the second SDP offer are set to: a=curr:qos local sendrecv, a=curr:qos remote none, a=des:qos mandatory local sendrecv, a=des:qos mandatory remote sendrecv.
9. UE sends 200 OK. Verify 200 OK contains the second SDP answer. Verify that the precondition related parameters in the second SDP answer is set as: a=curr:qos local sendrecv, a=curr:qos remote sendrecv, a=des:qos mandatory local sendrecv, a=des:qos mandatory remote sendrecv.
10. UE sends 180 Ringing.
11. SS sends PRACK if requested by UE in 180 Ringing.
12. UE sends 200 OK for PRACK.
13. UE sends 200 OK for INVITE.
14. SS sends ACK to the UE.
15. Verify if RTP packets are ongoing to confirm successful call progress.
16. SS initiates call release procedure.

POSTAMBLE

17. SS sends Deactivate EPS Bearer Context Request (QCI 1). The UE shall respond with Deactivate EPS Bearer Context Accept.
18. SS sends Deactivate EPS Bearer Context Request (QCI 2). The UE shall respond with Deactivate EPS Bearer Context Accept.
19. SS initiates an MT Detach procedure.
20. The SS releases the RRC connection by sending the RRC Connection Release message to the UE.
21. Deactivate E-UTRAN Cell A.

Table 5.4.2.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1	→ ←	RRC NAS	Execute the steps 1- 6 of test procedure 5.1.3.5. UE		PASS

		SIP	successfully registers to IMS		
3	→	RRC SIP	SS initiates INVITE request	The “video” tag is included in Accept-Contact header. The INVITE message content contains first SDP offer, including audio/video media description and precondition parameters. The AVPF is supported in vid eo media attributes	
4	→ ←	SIP	UE sends 183 Session Progress		PASS
5	←	SIP	SS sends PRACK for 183		
6	→	SIP	UE responds PRACK with 200 OK		
7	→ ←	NAS RRC	The SS initiates the Dedicated EPS Bearer(QCI 1) for audio and Dedicated EPS Bearer(QCI 2) for video by sending the RRC Connection Reconfiguration message to the UE on Cell A.	The bandwidth allocated for video service should be 64kbps × ⌊Total bandwidth UE request /64kbps⌋	
8~9	→ ←	SIP	Resource Reservation UPDATE -> 200 OK		PASS
10~ 12	→ ←	SIP	Ringing:180 Ringing->PRACK(optional)->200 OK(optional)		
13~ 14	→ ←	SIP	Call answered: 200 OK -> ACK		PASS
15			Verify if RTP packets are still ongoing to confirm successful call progress		PASS
16	← →	RRC SIP	SS initiates call release procedure on E-UTRAN cell A.	Session release: BYE -> 200 OK	PASS
17	← →	NAS RRC	SS Deactivates a mobile terminated Dedicated EPS bearer establishment(QCI 1)		
18	← →	NAS RRC	SS Deactivates a mobile terminated Dedicated EPS bearer establishment(QCI 2)		
19	←	NAS	SS initiates a mobile terminated		

	→		Detach procedure (refer to 24.301 clause 5.5.2.3).		
20	←	RRC	SS sends RRC CONNECTION RELEASE message to UE		
21			Deactivate E-UTRAN Cell A		

5.4.2.6 Expected Result

Verify UE could perform a correct IMS mobile terminated video call setup and release in TD-LTE cell.
Verify UE supports the EPS following bearer context combination: SRB1+SRB 2+DefaultBearer QCI9+QCI1+QCI2+QCI 5 ==SRB1+SRB2+2 AM+2 UM.
Verify UE could perform a correct IMS video call setup when SS allocates less bandwidth than that UE requests in SDP offer.

5.4.3 Video call failed, Tqos Timeout

5.4.3.1 Test Purpose

Test to verify UE could correctly support Tqos timer when video call setup.UE initials video MO call and start Tqos once receiving 183 session progress. In case of the network doesn't establish dedicated EPS bearer QCI 2 while establish dedicated EPS bear QCI 1 successfully before Tqos timeout, UE should cancel the VoLTE call and initial CSFB voice call or send UPDATE message to convert the video call to voice call.

5.4.3.2 Reference specification

3GPP TS 24.229, clause 5.1.1.4.1, 5.2.3.1
3GPP TS 23.272, clause 6.3
3GPP TS 36.331, clause 5.3.8.3

5.4.3.3 Applicability

This test applies to VoLTE over CSFB UE.

The UE shall support configuration 4.

5.4.3.4 Test conditions

[SS configuration]
E-UTRAN Cell A is TD-LTE cell.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1

Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

GSM Cell B
Cell Id=02 LAC = 02
MCC-MNC = 460-00
ARFCN = f1
RF Signal Level = -65dBm

[UE configuration]
The test UICC with USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is not active
GSM Cell B is not active.
The test shall be performed under ideal radio conditions.
UE
UE is powered off (State 1)

5.4.3.5 Test procedure

PREAMBLE
1. Execute the steps 1- 6 of test procedure 5.1.3.5. UE is successfully registered to IMS

MAIN BODY
2. UE sends INVITE request to initiate a MO Call.
3. SS responds to INVITE with 100 Trying and 183 Session Progress responses which contains the first SDP answer. UE starts the Tqos Timer.
4. SS sends ACTIVATE DEDICATED EPS BEARER CONTEXT REQUEST message and establishes dedicate EPS Bearer QCI 1. SS doesn't establish dedicate EPS Bearer QCI 2
5. Verify UE sends CANCEL or UPDATE after Tqos timeout. The Tqos timer value is 6s.
   - If UE sends CANCEL, the subsequent steps are 6-8;
   - If UE sends UPDATE, the subsequent steps are 6a-7a;
   - If UE doesn’t send any messages after Tqos timeout, this case will be failed.
6. Verify UE initials CSFB MO call to GERAN Cell B via R8 Redirection when Tqos timeout. The voice call is ongoing Cell B.
7. SS disconnects voice call and sends ChannelRelease. Cell Selection Indicator doesn’t include any E-UTRAN carrier frequency.
8. Verify that UE returns to E-UTRAN Cell A and transmits TRACKING AREA UPDATE REQUEST message. SS responses with TRACKING AREA UPDATE ACCEPT.

6a. Verify that the port value of video m lines in UPDATE message is set to “0”. UE performes voice call setup procedure. Verify the voice call is ongoing.

7a. SS sends BYE to release IMS voice call, UE responses with 200 OK.

POSTAMBLE

9. Deactivate E-UTRAN Cell A and GSM Cell B.

Table 5.4.3.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1	→ ←	RRC NAS SIP	Execute the steps 1- 6 of test procedure 5.1.3.5. UE is successfully registered to IMS		
2	→	SIP	UE sends INVITE request		
3	←	SIP	SS responds to INVITE with 100 Trying and 183 Session Progress responses		
4		SIP	SS sends ACTIVATE DEDICATED EPS BEARER CONTEXT REQUEST message and establishes dedicate EPS Bearer(QCI 1)		
5	→	SIP	UE sends CANCEL or UPDATE after Tqos timeout	Tqos timer value is 6s	PASS
			Perform step 6-8 if UE sends CANCEL or perform step 6a-7a if UE sends UPDATE		
6	→ ←	RRC	UE performs CSFB procedure to GSM Cell B	Refer to 3GPP TS 23.272, clause 6.3	PASS
7	←	RRC	The SS disconnects voice call and sends Channel Release message	Cell selection indicator IE doesn't include any E-UTRAN carrier frequency	
8	→ ←	NAS	UE returns to E-UTRAN Cell A and transmits TRACKING AREA UPDATE REQUEST .SS transmits TRACKING AREA UPDATE ACCEPT.		
6a	→ ←	SIP	UE performes voice call setup procedure. Verify the voice call is ongoing.	the port value of video m lines in UPDATE message is set to "0"	PASS
7a			SS sends BYE to release IMS voice call, UE responses with 200 OK		PASS
9			Deactivate E-UTRAN Cell A and GERAN Cell B		

5.4.3.6 Expected Result

The UE shall in step 5 send CANCEL or UPDATE message when Tqos timeout.

The UE shall in step 6 UE perform CSFB procedure to GSM Cell B and the call is ongoing in cell B or the UE in step 6a shall converted the video call to voice call under IMS coverage.

5.4.3a Video call failed, Tqos Timeout, Dual Standby

5.4.3a.1 Test Purpose

Test to verify UE could correctly support Tqos timer when video call setup.UE initials video MO call and start Tqos once receiving 183 session progress. In case of the network doesn't establish dedicated EPS bearer QCI 2 while establish dedicated EPS bear QCI 1 successfully before Tqos timeout, UE should cancel the VoLTE call and initial CS voice call in GSM Cell or send UPDATE message to convert the video call to voice call.

5.4.3a.2 Reference specification

3GPP TS 24.229, clause 5.1.1.4.1, 5.2.3.1
3GPP TS 23.272, clause 6.3
3GPP TS 36.331, clause 5.3.8.3

5.4.3a.3 Applicability

This test applies to VoLTE over Dual Standby UE .

The UE shall support configuration 4.

5.4.3a.4 Test conditions

[SS configuration]
E-UTRAN Cell A is TD-LTE cell.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

GSM Cell B
Cell Id=02 LAC = 02
MCC-MNC = 460-00
ARFCN = f1

RF Signal Level = -65dBm

[UE configuration]
The test UICC with USIM should be inserted

[Initial conditions]
SS

E-UTRAN Cell A is not active
GSM Cell B is not active.
The test shall be performed under ideal radio conditions.

UE

UE is powered off (State 1)

5.4.3a.5 Test procedure

PREAMBLE

1. Execute the steps 1- 6 of test procedure 5.1.3.5. UE is successfully registered to IMS
2. In parallel with step1, UE performs CS attach in GSM Cell B according to Step7-12 defined in TS 51.010 26.2.2.3 procedure 3

MAIN BODY

3. UE sends INVITE request using IMS PDN to initiate a MO Call.
4. SS responds to INVITE with 100 Trying and 183 Session Progress which contains the first SDP answer. UE starts Tqos Timer.
5. SS sends ACTIVATE DEDICATED EPS BEARER CONTEXT REQUEST message to establish dedicate EPS Bearer QCI 1. SS doesn't establish dedicate EPS Bearer QCI 2.
6. Verify UE sends CANCEL or UPDATE after Tqos timeout. The Tqos timer value is 6s.
   - If UE sends CANCEL, the subsequent steps are 7-8;
   - If UE sends UPDATE, the subsequent steps are 7a-8a;
   - If UE doesn’t send any messages after Tqos timeout, this case will be failed.
7. Verify UE initials CS voice call in GSM Cell B according to the steps defined in TS 51.010 10.2.3. The voice call is ongoing Cell B.
8. SS disconnects GSM call.

7a. Verify that the port value of video m=lines in UPDATE message is set to “0”. UE performes voice call setup procedure. Verify the voice call is ongoing.

8a. SS sends BYE to release IMS voice call, UE responses with 200 OK.

POSTAMBLE

9. Deactivate E-UTRAN Cell A and GERAN Cell B.

Table 5.4.3a.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	

1	→ ←	RRC NAS SIP	Execute the steps 1- 6 of test procedure 5.1.3.5 with exception. UE is successfully registered to IMS		
2	→ ←	RRC NAS	In parallel with step1, UE performs CS attach in GSM Cell B according to Step7-12 defined in TS 51.010 26.2.2.3 procedure 3		
3	→	SIP	UE sends INVITE request		
4	←	SIP	SS responds to INVITE with 100 Trying and 183 Session Progress responses		
5		SIP	SS sends ACTIVATE DEDICATED EPS BEARER CONTEXT REQUEST message and establishes dedicate EPS Bearer(QCI 1)		
6	→	SIP	UE sends CANCEL or UPDATE after Tqos timeout	Tqos timer value is 6s	PASS
			Perform step 7-8 if UE sends CANCEL in step 5 or perform step 7a-8a		
7	→ ←	NAS	UE initials CS voice call in GSM Cell B according to the steps defined in TS 51.010 10.2.3		PASS
8	←	RRC	The SS disconnects GSM call		
7a	→	NAS	UE performes voice call setup procedure. Verify the voice call is ongoing.	the port value of video m=lines in UPDATE message is set to “0”	PASS
8a	→ ←	SIP	SS sends BYE to release IMS voice call, UE responses with 200 OK		
9			Deactivate E-UTRAN Cell A and GERAN Cell B		

5.4.3a.6 Expected Result

The UE shall in step 6 send CANCEL or UPDATE message when Tqos timeout. The UE shall in step 7 perform CSFB procedure to GSM Cell B and the call is ongoing in cell B or the UE in step 7a shall converted the video call to voice call under IMS coverage.

5.5 Codec

5.5.1 Voice Call, AMR-WB

5.5.1.1 Test Purpose

Verify that the UE correctly supports AMR-WB speech encoding modes, sends RTP packet containing AMR-WB frame and also to ensure that the speech call is successfully established with the correct coding rates.

5.5.1.2 Reference specification

3GPP TS 24.229, clause 5.1.3
3GPP TS 26.201, clause 4.1.1
RFC 3267

5.5.1.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE.
The UE shall support Configuration 4..

5.5.1.4 Test conditions

[SS configuration]
E-UTRAN Cell A is TD-LTE cell.
E-UTRAN Cell A
Cell Id = 01 TAC = 01
MCC = 460 MNC = 00
EARFCN = f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE = -85 dBm/15kHz

[UE configuration]
The test USIM shall be inserted.
The UE is in AUTOMATIC network selection mode.

[Initial conditions]
SS
E-UTRAN Cell A is not active.
The test shall be performed under ideal radio conditions.
Enable IMS settings.

UE
UE is powered off (State 1)

5.5.1.5 Test procedure

PREAMBLE

1. Activate E-UTRAN Cell A.
2. Power on the UE.
3. The UE performs registration procedure followed by activation of the initial default EPS bearer for data PDN (QCI 9) (see 36.508, 4.5.2).

MAIN BODY

4. UE initiates the PDN connectivity request for IMS PDN.
5. SS establishes a MT SIP Default EPS bearer (QCI 5) with the UE.
6. Verify that the UE has successfully registered with the IMS PDN.
7. Configure SS for AMR-WB/16000 for 23.85 kbps
8. UE initiates INVITE request over SIP using IMS PDN to SS.
9. Verify from the INVITE message content that the UE correctly supports the AMR-WB speech encoding modes.
10. Verify from the INVITE message that the UE sends RTP packet containing AMR-WB frame.
11. SS establishes a MT Dedicated EPS bearer (QCI 1) with the UE for voice call.
12. SS initiates answer call procedure.
13. Verify that the AMR-WB packet corresponds to correct codec type/rate which is 23.85 kbps.
14. SS initiates CLEAR call procedure.

POSTAMBLE

15. SS sends Deactivate EPS Bearer Context Request (QCI 1). The UE shall respond with Deactivate EPS Bearer Context Accept.
16. SS initiates an MT Detach procedure.
17. The SS releases the RRC connection by sending the RRC Connection Release message to the UE.
18. Deactivate E-UTRAN Cell A.

Table 5.5.1.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1	←	RRC	Activate E-UTRAN Cell A		
2	UE		Switch On UE	AT Command (switch ON)	
3	→ ←	RRC NAS	UE attach procedure with Default EPS bearer establishment for Data PDN (QCI 9) (see 36.508, 4.5.2 (steps 1-16))		
4	→ ←	RRC NAS	UE initiates a PDN Connectivity Request for IMS PDN		PASS

5	→ ←	NAS RRC	SS initiates the Default EPS bearer(QCI 5) on E-UTRAN cell A for SIP establishment by sending the RRC Connection Reconfiguration message		PASS
6	→ ←	SIP	UE successfully registers to IMS Simulator; IMS Registration message flow: SIP Register -> 401 Unauthorized -> SIP Register -> 200 OK		PASS
7	SS		Configure SS for AMR-WB/16000 for 23.85 kbps		
8	→ ←	NAS SIP	UE initiates a MO Call on E-UTRAN cell A. SIP session establishment with preconditions: INVITE -> 183 Session Progress		PASS
9	SS		Verify from the INVITE message content that the UE correctly supports the AMR-WB speech encoding modes		PASS
10	SS		Verify from the INVITE message that the UE sends RTP packet containing AMR-WB frame		PASS
11	→ ←	NAS RRC	The SS initiates the MT Dedicated EPS Bearer(QCI 1) for Voice service by sending the RRC Connection Reconfiguration message to the UE on Cell A.		
12	→ ←	SIP	SS initiates answer call procedure. PRACK -> 200 OK (Resource Reservation) UPDATE -> 200 OK -> 180 Ringing Call answered:200 OK -> ACK		
13	SS		Verify that the AMR-WB packet corresponds to correct codec type/rate which is 23.85 kbit/s		PASS
14	→ ←	SIP	SS Initiates clear call procedure on E-UTRAN cell A Session release: BYE -> 200 OK		
15	← →	NAS RRC	SS releases the MT Dedicated EPS bearer (QCI 1)		
16	← →	NAS	Mobile Terminated Detach procedure initiated by SS		
17	←	RRC	RRC connection release		
18			Deactivate Cell A		

5.5.1.6 Expected Result

Verdict is based on the support of the AMR-WB speech encoding modes by the UE.

5.5.2 Voice Call, AMR-NB

5.5.2.1 Test Purpose

Verify that the UE correctly supports AMR-NB speech encoding modes, sends RTP packet containing AMR-NB frame and also to ensure that the speech call is successfully established with the correct coding rates.

5.5.2.2 Reference specification

3GPP TS 24.229, clause 5.1.3
3GPP TS 26.101, clause 4.1.1
RFC 3267

5.5.2.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE.
The UE shall support Configuration x.

5.5.2.4 Test conditions

[SS configuration]
E-UTRAN Cell A is TD-LTE cell.
E-UTRAN Cell A
Cell Id = 01 TAC = 01
MCC = 460 MNC = 00
EARFCN = f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE = -85 dBm/15kHz

[UE configuration]
The test USIM shall be inserted.
The UE is in AUTOMATIC network selection mode.

[Initial conditions]
SS
E-UTRAN Cell A is not active.
The test shall be performed under ideal radio conditions.
Enable IMS settings.

UE

UE is powered off (State 1)

5.5.2.5 Test procedure

PREAMBLE

1. Activate E-UTRAN Cell A.
2. Power on the UE.
3. The UE performs registration procedure followed by activation of the initial default EPS bearer for Internet PDN(QCI 9) (see 36.508, 4.5.2).

MAIN BODY

4. UE initiates the PDN connectivity request for IMS PDN (IPv6).
5. SS establishes a MT SIP Default EPS bearer (QCI 5) with the UE.
6. Verify that the UE has successfully registered with the IMS PDN.
7. Configure SS for AMR-NB/8000 for 12.2kbps.
8. UE initiates INVITE request over SIP using IMS PDN to SS.
9. Verify from the INVITE message content that the UE correctly supports the AMR-NB speech encoding modes.
10. Verify from the INVITE message that the UE sends RTP packet containing AMR-NB frame.
11. SS establishes a MT Dedicated EPS bearer (QCI 1) with the UE for voice call.
12. SS initiates answer call procedure.
13. Verify that the AMR-NBpacket corresponds to correct codec type/rate which is 12.2 kbps.
14. SS initiates CLEAR call procedure.

POSTAMBLE

15. SS sends Deactivate EPS Bearer Context Request (QCI 1). The UE shall respond with Deactivate EPS Bearer Context Accept.
16. SS initiates an MT Detach procedure.
17. The SS releases the RRC connection by sending the RRC Connection Release message to the UE.
18. Deactivate E-UTRAN Cell A.

Table 5.5.2.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1	←	RRC	Activate E-UTRAN Cell A		
2	UE		Switch On UE	AT Command (switch ON)	

3	→ RRC ← NAS		UE attach procedure with Default EPS bearer establishment for Data PDN (QCI 9) (see 36.508, 4.5.2 (steps 1-16))		
4	→ RRC ← NAS		UE initiates a PDN Connectivity Request for IMS PDN		PASS
5	→ NAS ← RRC		SS initiates the Default EPS bearer(QCI 5) on E-UTRAN cell A for SIP establishment by sending the RRC Connection Reconfiguration message		PASS
6	→ SIP ←		UE successfully registers to IMS Simulator; IMS Registration message flow: SIP Register -> 401 Unauthorized -> SIP Register -> 200 OK		PASS
7	SS		Configure SS for AMR-NB/8000 for 12.2kbps		
8	→ NAS ← SIP		UE initiates a MO Call on E-UTRAN cell A. SIP session establishment with preconditions: INVITE -> 183 Session Progress		PASS
9	SS		Verify from the INVITE message content that the UE correctly supports the AMR-WB speech encoding modes		PASS
10	SS		Verify from the INVITE message that the UE sends RTP packet containing AMR-WB frame		PASS
11	→ NAS ← RRC		The SS initiates the MT Dedicated EPS Bearer(QCI 1) for Voice service by sending the RRC Connection Reconfiguration message to the UE on Cell A.		
12	→ SIP ←		SS initiates answer call procedure. PRACK -> 200 OK (Resource Reservation) UPDATE -> 200 OK -> 180 Ringing Call answered:200 OK -> ACK		
13	SS		Verify that the AMR-WB packet corresponds to correct codec type/rate which is 23.85 kbit/s		PASS
14	→ SIP ←		SS Initiates clear call procedure on E-UTRAN cell A Session release: BYE -> 200 OK		
15	← NAS → RRC		SS releases the MT Dedicated EPS bearer (QCI 1)		
16	← RRC		RRC connection release		

17	← →	NAS	Mobile Terminated Detach procedure initiated by SS		
18	SS		Deactivate Cell A		

5.5.2.6 Expected Result

Verdict is based on the support of the AMR-NB speech encoding modes by the UE.

5.5.3 Video call, H.264

5.5.3.1 Test Purpose

Verify that the UE correctly supports H.264 Constrained Baseline Profile and Level 3.0. Verify that the video call with VGA(640x480) and 30fps frame rate is successfully established.

5.5.3.2 Reference specification

3GPP TS 24.229, clause 5.1.3
3GPP TS 26.114, clause 5.2.2
RFC 3261

5.5.3.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE.

The UE shall support configuration 4.

5.5.3.4 Test conditions

[SS configuration]
E-UTRAN Cell A is TD-LTE cell
E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is not active

Enable IMS Settings.

The test shall be performed under ideal radio conditions.

UE

UE is powered off (State 1)

5.5.3.5 Test procedure

PREAMBLE

1. Activate E-UTRAN Cell A.
2. Power on the UE.
3. The UE performs Registration procedure on E-UTRAN Cell A with the establishment of Default Data PDN (QCI 9).

MAIN BODY

4. UE initiates the PDN connectivity request for IMS APN.
5. SS establishes a MT SIP Default EPS bearer (QCI 5) with the UE.
6. Verify that the UE is successfully registered to IMS.
7. UE initiates a video call and sends INVITE request over SIP using IMS PDN to SS.
8. Verify that the INVITE message content contains video encoding modes support for H.264 Constrained Baseline Profile.
9. Verify from the INVITE message if the packetization mode sent by the UE is either Single NALU, non- interleaved or interleaved. VGA (640x480) and frame rate of 30 fps are supported.
10. SS establishes Dedicated EPS bearers (QCI 1) with the UE for audio in video call.
11. SS establishes Dedicated EPS bearers (QCI 2) with the UE for video call.
12. SS initiates answer call procedure.
13. Verify if RTP packets are ongoing to confirm successful call progress.
14. SS initiates CLEAR call procedure.

POSTAMBLE

15. SS sends Deactivate EPS Bearer Context Request (QCI 2). The UE shall respond with Deactivate EPS Bearer Context Accept.
16. SS sends Deactivate EPS Bearer Context Request (QCI 1). The UE shall respond with Deactivate EPS Bearer Context Accept.
17. SS initiates an MT Detach procedure.
18. The SS releases the RRC connection by sending the RRC Connection Release message to the UE.
19. Deactivate E-UTRAN Cell A.

Table 5.5.3.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	

1	←	RRC	Activate E-UTRAN Cell A		
2	UE		Switch On UE	AT Command (switch ON)	
3	→ ←	RRC NAS	UE attach procedure with Default EPS bearer establishment for Data PDN (QCI 9) (see 36.508, 4.5.2 (steps 1-16))		
4	→ ←	RRC NAS	UE initiates a PDN Connectivity Request for IMS PDN		PASS
5	→ ←	NAS RRC	SS initiates the Default EPS bearer(QCI 5) on E-UTRAN cell A for SIP establishment by sending the RRC Connection Reconfiguration message		PASS
6	→ ←	SIP	UE successfully registers to IMS Simulator; IMS Registration message flow: SIP Register -> 401 Unauthorized -> SIP Register -> 200 OK		PASS
7	→ ←	NAS SIP	UE initiates a MO Call on E-UTRAN cell A. SIP session establishment with preconditions: INVITE -> 183 Session Progress		PASS
8	SS		Verify that the INVITE message content contains video encoding modes support for H.264 CBP		PASS
9	SS		Verify from the INVITE message if the packetization mode sent by the UE is either Single NALU, non- interleaved or interleaved. VGA(640x480)and frame rate of 30fps are supported.		PASS
10	→ ←	NAS RRC	The SS initiates the MT Dedicated EPS Bearer(QCI 1) for Voice service by sending the RRC Connection Reconfiguration message to the UE on Cell A.		
11	→ ←	NAS RRC	The SS initiates the MT Dedicated EPS Bearer(QCI 2) for SIP service by sending the RRC Connection Reconfiguration message to the UE on Cell A.		
12	→ ←	SIP	SS initiates answer call procedure. PRACK -> 200 OK (Resource Reservation) UPDATE -> 200 OK -> 180 Ringing Call answered:200 OK -> ACK		

13	SS		Verify if RTP packets are still ongoing to confirm successful call progress		PASS
14	→ ←	SIP	SS Initiates clear call procedure on E-UTRAN cell A Session release: BYE -> 200 OK		
15	← →	NAS RRC	SS releases the MT Dedicated EPS bearer (QCI 1)		
16	← →	NAS RRC	SS releases the MT Dedicated EPS bearer (QCI 2)		
16	←	RRC	RRC connection release		
17	← →	NAS	Mobile Terminated Detach procedure initiated by SS		
18	SS		Deactivate Cell A		

5.5.3.6 Expected Result

To verify UE correctly supports video encoding modes H.264 Constrained Baseline Profile and Level 3.0

To verify UE supports VGA(640x480), Bi-directionTo verify UE supports the frame rate of 30 fps

6 Supplementary Service

The message flows in Ut interface refer to <China Mobile Ut interface specificaiton>

6.1 Identification Presentation

6.1.1 Originating Identification Presentation

6.1.1.1 Test Purpose

To verify UE correctly supports the Originating Identification Presentation service.

6.1.1.2 Reference specification

3GPP TS 24.607, clause 4.2.1 and 4.10.1

6.1.1.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE.

The UE shall support configuration 4.

6.1.1.4 Test conditions

[SS configuration]
E-UTRAN Cell A is TD-LTE cell.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test UICC with USIM should be inserted

[Initial conditions]
SS

E-UTRAN Cell A is not active
The test shall be performed under ideal radio conditions.

UE

UE is powered off (State 1)

6.1.1.5 Test procedure

PREAMBLE

1. Activate E-UTRAN Cell A
2. Power on the UE.
3. The UE performs registration procedure followed by activation of the initial default EPS bearer for data PDN (QCI 9) (see 36.508, 4.5.2).

MAIN BODY

4. UE initiates the PDN connectivity request for IMS PDN.
5. SS establishes a MT SIP Default EPS bearer (QCI 5) with the UE.
6. Verify that the UE has successfully registered with the IMS PDN.
7. SS initiates MT call. The INVITE message contains the Originating Identification
8. The call is altering at UE. Verify that the Originating Identification is presented at the UE. UE answers the call.
9. UE initiates CLEAR call procedure.

POSTAMBLE

10. SS sends Deactivate EPS Bearer Context Request (QCI 1). The UE shall respond with Deactivate EPS Bearer Context Accept.
11. SS initiates an MT Detach procedure.

12. The SS releases the RRC connection by sending the RRC Connection Release message to the UE.
13. Deactivate E-UTRAN Cell A.

Table 6.1.1.4-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1	←	RRC	Activate E-UTRAN Cell A		
2	UE		Switch On UE		
3	→ ←	RRC NAS	UE attach procedure with Default EPS bearer establishment for Data PDN (QCI 9) (see 36.508, 4.5.2 (steps 1-16))		
4	→ ←	RRC NAS	UE initiates a PDN Connectivity Request for IMS PDN		
5	 ←	NAS RRC	SS initiates the Default EPS bearer(QCI 5) on E-UTRAN cell A for SIP establishment by sending the RRC Connection Reconfiguration message		
6	→ ←	SIP	UE successfully registers to IMS Simulator; IMS Registration message flow: SIP Register -> 401 Unauthorized -> SIP Register -> 200 OK		PASS
7	←	SIP	SS initiates MT call. INVITE message contains the Originating Identification		
8	→ ←	SIP	The call is altering at UE .Verify The Originating Identification is presented at the UE. UE answers the call		PASS
9	→ ←	SIP	SS initiates CLEAR call procedure. Session release: BYE -> 200 OK		
10	← →	NAS RRC	SS releases the MT Dedicated EPS bearer (QCI 1)		
11	← →	NAS	Mobile Terminated Detach procedure initiated by SS		
12	←	RRC	RRC connection release		
13	SS		Deactivate Cell A		

6.1.1.6 Expected Result

UE supports the Originating Identification Presentation service

6.2 Communication Forwarding

6.2.1 Communication Forwarding, Unconditional

6.2.1.1 Test Purpose

To verify that the UE correctly supports activatation and deactivation of Communication Forwarding Unconditional using XCAP.

6.2.1.2 Reference specification

3GPP TS 24.604, clause 4.2.1.2

6.2.1.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE.

The UE shall support configuration 4.

6.2.1.4 Test conditions

[SS configuration]
E-UTRAN Cell A is TD-LTE cell.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test UICC with USIM should be inserted

[Initial conditions]
SS

E-UTRAN Cell A is not active
The test shall be performed under ideal radio conditions.

UE

UE is powered off (State 1)

6.2.1.5 Test procedure

PREAMBLE

1. Execute the steps 1- 6 of test procedure 5.1.3.5

MAIN BODY

2. Verify that the UE is successfully registered to IMS
3. Activation of Communication Forwarding Unconditional is triggered at the UE.
4. UE and SS exchange a sequence of HTTP requests and responses via Data APN . Verify UE could authenticate itself correctly with GBA and activate the service.
5. Deactivation of Communication Forwarding Unconditional is triggered at the UE.
6. UE and SS exchange a sequence of HTTP requests and responses via Data APN in order to deactivate the service.

POSTAMBLE

7. Deactivate E-UTRAN Cell A.

Table 6.2.1.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1-2	→ ←	RRC NAS SIP	Execute the steps 1- 6 of test procedure 5.1.3.5. UE successfully registers to IMS		PASS
3			Activation of Communication Forwarding Unconditional is triggered at the UE		
4	→ ←	HTTP	UE and SS exchange a sequence of HTTP requests and responses via Data APN to authenticate itself and activate the service.		PASS
5			Deactivation of Communication Forwarding Unconditional is triggered at the UE		
6	→ ←	HTTP	UE and SS exchange a sequence of HTTP requests and responses via Data APN to deactivate the service.		PASS
7			Deactivate E-UTRAN Cell A		

6.2.1.6 Expected Result

UE could authenticate itself correctly with GBA. UE could activate and deactivate Communication Forwarding Unconditional using XCAP.

6.2.2 Communication Forwarding, Busy

6.2.2.1 Test Purpose

To verify that the UE correctly supports activation and deactivation of Communication Forwarding on Busy using XCAP.

6.2.2.2 Reference specification

3GPP TS 24.604, clause 4.2.1.3

6.2.2.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE.

The UE shall support configuration 4.

6.2.2.4 Test conditions

[SS configuration]
E-UTRAN Cell A is TD-LTE cell.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test UICC with USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is not active
The test shall be performed under ideal radio conditions.

UE
UE is powered off.

6.2.2.5 Test procedure

PREAMBLE
1. Execute the steps 1- 6 of test procedure 5.1.3.5. UE successfully registers to IMS

MAIN BODY

2. Verify that the UE is successfully registered to IMS
3. Activation of Communication Forwarding on Busy is triggered at the UE.
4. UE and SS exchange a sequence of HTTP requests and responses via Data APN. Verify UE could authenticate itself correctly with GBA and activate the service.
5. Deactivation of Communication Forwarding on Busy is triggered at the UE.
6. UE and SS exchange a sequence of HTTP requests and responses via Data APN in order to deactivate the service.

POSTAMBLE

7. Deactivate E-UTRAN Cell A.

Table 6.2.2.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1~2	→ ←	RRC NAS SIP	Execute the steps 1- 6 of test procedure 5.1.3.5. UE successfully registers to IMS		PASS
3			Activation of Communication Forwarding on Busy is triggered at the UE		
4	→ ←	HTTP	UE and SS exchange a sequence of HTTP requests and responses via Data APN to authenticate itself and activate the service.		PASS
5			Deactivation of Communication Forwarding on Busy is triggered at the UE		
6	→ ←	HTTP	UE and SS exchange a sequence of HTTP requests and responses via Data APN to deactivate the service.		PASS
7			Deactivate E-UTRAN Cell A		

6.2.2.6 Expected Result

UE could authenticate itself correctly with GBA. UE could activate and deactivate Communication Forwarding on Busy using XCAP.

6.2.3 Communication Forwarding, No Reply

6.2.3.1 Test Purpose

To verify that the UE correctly supports activation and deactivation of Communication Forwarding on no Reply using XCAP

6.2.3.2 Reference specification

3GPP TS 24.604, clauses 4.2.1

6.2.3.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE.

The UE shall support configuration 4.

6.2.3.4 Test conditions

[SS configuration]
E-UTRAN Cell A is TD-LTE cell.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test UICC with USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is not active
The test shall be performed under ideal radio conditions.

UE
UE is powered off (State 1)

6.2.3.5 Test procedure

PREAMBLE
1. Execute the steps 1- 6 of test procedure 5.1.3.5. UE successfully registers to IMS

MAIN BODY

2. Verify that the UE is successfully registered to IMS
3. Activation of Communication Forwarding on no Reply is triggered at the UE.
4. UE and SS exchange a sequence of HTTP requests and responses via Data APN . Verify UE could authenticate itself correctly with GBA and activate the service
5. Deactivation of Communication Forwarding on no Reply is triggered at the UE.
6. UE and SS exchange a sequence of HTTP requests and responses via Data APN in order to deactivate the service.

POSTAMBLE

7. Deactivate E-UTRAN Cell A.

Table 6.2.3.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1~2	→ ←	RRC NAS SIP	Execute the steps 1- 6 of test procedure 5.1.3.5. UE successfully registers to IMS		PASS
3			Activation of Communication Forwarding on no Reply is triggered at the UE		
4	→ ←	HTTP	UE and SS exchange a sequence of HTTP requests and responses via Data APN to authenticate itself and activate the service.		PASS
5			Deactivation of Communication Forwarding on no Reply is triggered at the UE		
6	→ ←	HTTP	UE and SS exchange a sequence of HTTP requests and responses via Data APN to deactivate the service.		PASS
7			Deactivate E-UTRAN Cell A		

6.2.3.6 Expected Result

UE could authenticate itself correctly with GBA. UE could activate and deactivate Communication Forwarding on no Reply using XCAP.

6.2.4 Communication Forwarding, Not reachable

6.2.4.1 Test Purpose

To verify that the UE correctly supports activation and deactivation of Communication Forwarding on Not Reachable using XCAP.

6.2.4.2 Reference specification

3GPP TS 24.604, 4.2.1.5

6.2.4.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE.

The UE shall support configuration 4.

6.2.4.4 Test conditions

[SS configuration]
E-UTRAN Cell A is TD-LTE cell.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test UICC with USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is not active
The test shall be performed under ideal radio conditions.

UE
UE is powered off (State 1)

6.2.4.5 Test procedure

PREAMBLE
1. Execute the steps 1- 6 of test procedure 5.1.3.5. UE successfully registers to IMS

MAIN BODY
2. Verify that the UE is successfully registered to IMS
3. Activation of Communication Forwarding on not Reachable is triggered at the UE.
4. UE and SS exchange a sequence of HTTP requests and responses via Data APN. Verify UE could authenticate itself correctly with GBA and activate the service
5. Deactivation of Communication Forwarding on not Reachable is triggered at the UE.

6. UE and SS exchange a sequence of HTTP requests and responses via Data APN in order to deactivate the service.

POSTAMBLE

7. Deactivate E-UTRAN Cell A.

Table 6.2.4.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1-2	→ ←	RRC NAS SIP	Execute the steps 1- 6 of test procedure 5.1.3.5. UE successfully registers to IMS		PASS
3			Activation of Communication Forwarding on not Reachable is triggered at the UE		
4	→ ←	HTTP	UE and SS exchange a sequence of HTTP requests and responses via Data APN to authenticate itself and activate the service.		PASS
5			Deactivation of Communication Forwarding on not Reachable is triggered at the UE		
6	→ ←	HTTP	UE and SS exchange a sequence of HTTP requests and responses via Data APN to deactivate the service.		PASS
7			Deactivate E-UTRAN Cell A		

6.2.4.1 Expected Result

UE could authenticate itself correctly with GBA. UE could activate and deactivate Communication Forwarding on Not Reachable using XCAP.

6.2.5 Communication Forwarding, Specify a period

6.2.5.1 Test Purpose

To verify that the UE correctly supports activation and deactivation of Communication Forwarding for a certain period using the validity rule condition and XCAP.

6.2.5.2 Reference specification

3GPP TS 24.604, 4.2.1

6.2.5.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE.

The UE shall support configuration 4.

6.2.5.4 Test conditions

[SS configuration]
E-UTRAN Cell A is TD-LTE cell.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test UICC with USIM should be inserted

[Initial conditions]
SS

E-UTRAN Cell A is not active
The test shall be performed under ideal radio conditions.

UE

UE is powered off (State 1)

6.2.5.5 Test procedure

PREAMBLE

1. Execute the steps 1- 6 of test procedure 5.1.3.5.

MAIN BODY

2. Verify that the UE is successfully registered to IMS
3. Activation of Communication Forwarding for a certain period is triggered at the UE.
4. UE and SS exchange a sequence of HTTP requests and responses via Data APN. Verify UE could authenticate itself correctly with GBA and activate the service
5. Deactivation of Communication Forwarding for a certain period is triggered at the UE.
6. UE and SS exchange a sequence of HTTP requests and responses via Data APN in order to deactivate the service.

POSTAMBLE

7. Deactivate E-UTRAN Cell A.

Table 6.2.5.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1~2	→ ←	RRC NAS SIP	Execute the steps 1- 6 of test procedure 5.1.3.5. UE successfully registers to IMS		PASS
3			Activation of Communication Forwarding for a certain period is triggered at the UE		
4	→ ←	HTTP	UE and SS exchange a sequence of HTTP requests and responses via Data APN to authenticate itself and activate the service.		PASS
5			Deactivation of Communication Forwarding for a certain period is triggered at the UE		
6	→ ←	HTTP	UE and SS exchange a sequence of HTTP requests and responses via Data APN to deactivate the service.		PASS
7			Deactivate E-UTRAN Cell A		

6.2.5.6 Expected Result

UE could authenticate itself correctly with GBA. UE could activate and deactivate Communication Forwarding for a certain period using the validity rule condition and XCAP.

6.3 Call Barring

6.3.1 Barring of all incoming calls

6.3.1.1 Test Purpose

To verify that the UE correctly supports activation and deactivation of the Incoming Call Barring for all incoming calls using XCAP.

6.3.1.2 Reference specification

3GPP TS 24.611

6.3.1.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE.

The UE shall support configuration 4.

6.3.1.4 Test conditions

[SS configuration]
E-UTRAN Cell A is TD-LTE cell.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test UICC with USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is not active
The test shall be performed under ideal radio conditions.

UE
UE is powered off (State 1)

6.3.1.5 Test procedure

PREAMBLE
1. Execute the steps 1- 6 of test procedure 5.1.3.5.

MAIN BODY
2. Verify that the UE is successfully registered to IMS
3. Activation of Incoming Call Barring is triggered at the UE.
4. UE and SS exchange a sequence of HTTP requests and responses via Data APN. Verify UE could authenticate itself correctly with GBA and activate the service
5. Deactivation of Incoming Call Barring is triggered at the UE.
6. UE and SS exchange a sequence of HTTP requests and responses via Data APN in order to deactivate the service.

POSTAMBLE
7. Deactivate E-UTRAN Cell A

Table 6.3.1.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1-2	→ ←	RRC NAS SIP	Execute the steps 1- 6 of test procedure 5.1.3.5. UE successfully registers to IMS		PASS
3			Activation of Incoming Call Barring is triggered at the UE		
4	→ ←	HTTP	UE and SS exchange a sequence of HTTP requests and responses via Data APN to authenticate itself and activate the service.		PASS
5			Deactivation of Incoming Call Barring is triggered at the UE		
6	→ ←	HTTP	UE and SS exchange a sequence of HTTP requests and responses via Data APN to deactivate the service.		PASS
7			Deactivate E-UTRAN Cell A		

6.3.1.6 Expected Result

UE could authenticate itself correctly with GBA. UE could activate and deactivate Incoming Call Barring using XCAP

6.3.2 Barring of all incoming call when roaming

6.3.2.1 Test Purpose

To verify that the UE correctly supports activation and deactivation of Incoming Call Barring when roaming using XCAP.

6.3.2.2 Reference specification

3GPP TS 24.611, clause 4.9.1.4

6.3.2.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE.

The UE shall support configuration 4.

6.3.2.4 Test conditions

[SS configuration]

E-UTRAN Cell A is TD-LTE cell.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 228-01
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test UICC with USIM should be inserted

[Initial conditions]
SS

E-UTRAN Cell A is not active
The test shall be performed under ideal radio conditions.

UE

UE is powered off (State 1)

6.3.2.5 Test procedure

PREAMBLE

1. Execute the steps 1- 6 of test procedure 5.1.3.5

MAIN BODY

2. Verify that the UE is successfully registered to IMS
3. Activation of Incoming Call Barring when Roaming is triggered at the UE.
4. UE and SS exchange a sequence of HTTP requests and responses via Data APN. Verify UE could authenticate itself correctly with GBA and activate the service
5. Deactivation of Incoming Call Barring when Roaming is triggered at the UE.
6. UE and SS exchange a sequence of HTTP requests and responses via Data APN in order to deactivate the service

POSTAMBLE

7. Deactivate E-UTRAN Cell A.

Table 6.3.2.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1~2	→ ←	RRC NAS SIP	Execute the steps 1- 6 of test procedure 5.1.3.5. UE successfully registers to IMS		PASS

3			Activation of Incoming Call Barring when Roaming is triggered at the UE		
4	→ ←	HTTP	UE and SS exchange a sequence of HTTP requests and responses via Data APN to authenticate itself and activate the service.		PASS
5			Deactivation of Incoming Call Barring when Roaming is triggered at the UE		
6	→ ←	HTTP	UE and SS exchange a sequence of HTTP requests and responses via Data APN to deactivate the service.		PASS
7			Deactivate E-UTRAN Cell A		

6.3.2.6 Expected Result

UE could authenticate itself correctly with GBA. UE could activate and deactivate Incoming Call Barring when Roaming using XCAP.

6.4 Communication Hold

6.4.1 Communication Hold

6.4.1.1 Test Purpose

To verify UE correctly performs IMS Communication Hold and resume

6.4.1.2 Reference specification

3GPP TS 24.610
3GPP TS 34.229 clause 15.11

6.4.1.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE.

The UE shall support configuration 4.

6.4.1.4 Test conditions

[SS configuration]

E-UTRAN Cell A
Cell Id=01 TAC = 01

MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS

E-UTRAN Cell A is not active
IMS network works normally.

UE

UE is powered off(State 1)

6.4.1.5 Test procedure

PREAMBLE

1. Activate E-UTRAN Cell A
2. Power on the UE.
3. The UE performs registration procedure followed by activation of the initial default EPS bearer for data PDN (QCI 9) (see 36.508, 4.5.2).

MAIN BODY

4. UE initiates the PDN connectivity request for IMS PDN.
5. SS establishes a MT SIP Default EPS bearer (QCI 5) with the UE.
6. Verify that the UE has successfully registered with the IMS PDN.
7. Originate a VoLTE call from UE to SS
8. Call Hold is initiated on the UE. SS waits UE to send an INVITE or UPDATE request with a SDP offer
9. SS responds to the INVITE or UPDATE request with valid 200 OK response.
10. Call resume is initiated on the UE. SS waits UE to send an INVITE or UPDATE request with a SDP offer
11. SS responds to the INVITE or UPDATE request with valid 200 OK response.
12. Call is released on the UE. SS waits the UE to send a BYE request.

POSTAMBLE

13. SS sends Deactivate EPS Bearer Context Request (QCI 1). The UE shall respond with Deactivate EPS Bearer Context Accept.
14. SS initiates an MT Detach procedure.
15. The SS releases the RRC connection by sending the RRC Connection Release message to the UE.
16. Deactivate E-UTRAN Cell A.

Table 6.4.1.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1	←	RRC	Activate E-UTRAN Cell A		
2	UE		Switch On UE	AT Command (switch ON)	
3	→ ←	RRC NAS	UE attach procedure with Default EPS bearer establishment for Data PDN (QCI 9) (see 36.508, 4.5.2 (steps 1-16))		
4	→ ←	RRC NAS	UE initiates a PDN Connectivity Request for IMS PDN		
5	 ←	NAS RRC	SS initiates the Default EPS bearer(QCI 5) on E-UTRAN cell A for SIP establishment by sending the RRC Connection Reconfiguration message		
6	→ ←	SIP	UE successfully registers to IMS Simulator; IMS Registration message flow: SIP Register -> 401 Unauthorized -> SIP Register -> 200 OK		PASS
7	→ ←	SIP	Originate a VoLTE call from UE to SS		
8	→ ←	SIP	Call Hold is initiated on the UE. SS waits UE to send an INVITE or UPDATE request with a SDP offer		PASS
9	→ ←	SIP	SS responds to the INVITE or UPDATE request with valid 200 OK response		
10	→ ←	SIP	Call resume is initiated on the UE. SS waits UE to send an INVITE or UPDATE request with a SDP offer		PASS
11	→ ←	SIP	SS responds to the INVITE or UPDATE request with valid 200 OK response		
12	→ ←	SIP	SS initiates CLEAR call procedure. Session release: BYE -> 200 OK		
13	← →	NAS RRC	SS releases the MT Dedicated EPS bearer (QCI 1)		
14	← →	NAS	Mobile Terminated Detach procedure initiated by SS		

15	←	RRC	RRC connection release		
16	SS		Deactivate Cell A		

6.4.1.6 Expected Result

UE correctly supports call hold and call resume.

6.5 Communication Waiting

6.5.1 Communication Waiting, Call Accept

6.5.1.1 Test Purpose

To verify that the UE correctly supports Call Waiting and is able to accept a second call.

6.5.1.2 Reference specification

3GPP TS 24.615, clause 4.5.5.3

6.5.1.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE.

The UE shall support configuration 4.

6.5.1.4 Test conditions

[SS configuration]

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test USIM should be inserted
Configure SUE-1 and SUE-2 functionally same as UE.(The SUE is virtual UE that is simulated by SS)

[Initial conditions]
SS
E-UTRAN Cell A is not active

IMS network works normally.

UE

UE is powered off.

SUE-1 and SUE-2 are not activated. (The SUE is virtual UE that is simulated by SS)

6.5.1.5 Test procedure

PREAMBLE

1. Activate E-UTRAN Cell A.
2. Power on the UE and activate SUE-1 and SUE-2. UE activates the communication waiting service.
3. The UE performs registration procedure followed by activation of the initial default EPS bearer for data PDN (QCI 9) (see 36.508, 4.5.2).

MAIN BODY

4. UE initiates the PDN connectivity request for IMS PDN.
5. SS establishes a MT SIP Default EPS bearer (QCI 5) with the UE.
6. Verify that the UE has successfully registered with the IMS PDN.
7. Originate a VoLTE call from UE to SUE-1
8. Answer this call on SUE-1.
9. After the call is connected, originate a VoLTE call from SUE-2 to UE.
10. Answer this call (call waiting) on UE and put the first call on hold.
11. On UE, put the call with SUE-2 on-hold, and resume the call with SUE-1.
12. On UE, end the call with SUE-1.
13. On UE, end the call with SUE-2.
14. UE detaches from SS

POSTAMBLE

15. Deactivate E-UTRAN Cell A.

Table 6.5.1.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1	←	RRC	Activate E-UTRAN Cell A		
2	UE		Switch On UE	AT Command	
3	→ ←	RRC NAS	UE attach procedure with Default EPS bearer establishment for Data PDN (QCI 9)		
4	→ ←	RRC NAS	UE initiates a PDN Connectivity Request for IMS PDN		
5	 ←	NAS RRC	SS initiates the Default EPS bearer(QCI 5) on E-UTRAN cell A		

6	→ ←	SIP	UE successfully registers to IMS Simulator		PASS
7	→ ←	IMS	MO Standard VoLTE call procedure from UE to SUE-1		
8			Answer this call on SUE-1		
9	→ ←	IMS	MT Standard VoLTE call procedure until 180 Ringing from SUE-2 to UE		
10	→ ←	IMS	1) Verify that UE sends SIP re-INVITE with SDP a=sendonly to SUE-1. 2) Verify that UE sends SIP 200 OK with SDP a=sendrecv to SUE-2, after receiving SIP 200 OK with SDP a=recvonly from SUE-1. 3) Verify that RTP packets flow between UE and SUE-2 in both directions. 4) Verify that no RTP packets flow between UE and SUE-1 in either direction.		
11	→ ←	IMS	1) Verify that UE sends SIP re-INVITE with SDP a=sendonly to SUE-2. 2) Verify that UE sends SIP re-INVITE with SDP a=sendrecv to SUE-1, after receiving SIP 200 OK with SDP a=recvonly from SUE-2. 3) Verify that RTP packets flow between UE and SUE-1 in both directions. 4) Verify that no RTP packets flow between UE and SUE-2 in either direction.		
12	→ ←	IMS	1) Verify that UE sends SIP BYE to SUE-1. 2) Verify that UE sends SIP re-INVITE with SDP a=sendrecv to SUE-2, after receiving SIP 200 OK from SUE-1. 3) Verify that RTP packets flow between UE and SUE-2 in both directions. 1) Verify that no RTP packets flow between UE and SUE-1 in either direction		
13	→ ←	IMS	1) Verify that UE sends SIP BYE to SUE-2. 2) Verify that no RTP packets flow between UE and SUE-2 in either direction.		
14	→ ←	RRC NAS	UE detach procedure		
15			Deactivate E-UTRAN Cell A		

6.5.1.6 Expected Result

UE correctly supports call waiting

6.5.2 Communication Waiting, Call Reject

6.5.2.1 Test Purpose

To verify that the UE correctly sends 603 DECLINE message to reject a second call while the first call is ongoing if the Communication Waiting service is activated. If the Communication Waiting service isn't activated, UE could correctly sends 486 BUSY HERE message to reject the second call that is arriving while the first call is ongoing.

6.5.2.2 Reference specification

3GPP TS 24.615,4.5.5.3

6.5.2.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE.

The UE shall support configuration 4.

6.5.2.4 Test conditions

[SS configuration]

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test USIM should be inserted
Configure SUE-1 and SUE-2 functionally same as UE.(The SUE is virtual UE that is simulated by SS)

[Initial conditions]
SS
E-UTRAN Cell A is not active
IMS network works normally.

UE

UE is powered off.

SUE-1 and SUE-2 are not activated. (The SUE is virtual UE that is simulated by SS)

6.5.2.5 Test procedure

PREAMBLE

1. Activate E-UTRAN Cell A.
2. Power on the UE and activate SUE-1 and SUE-2. UE activates the communication waiting service.
3. The UE performs registration procedure followed by activation of the initial default EPS bearer for data PDN (QCI 9) (see 36.508, 4.5.2).

MAIN BODY

4. UE initiates the PDN connectivity request for IMS PDN.
5. SS establishes a MT SIP Default EPS bearer (QCI 5) with the UE.
6. Verify that the UE has successfully registered with the IMS PDN.
7. Originate a VoLTE call from UE to SUE-1
8. Answer this call on SUE-1.
9. After the call is connected, originate a VoLTE call from SUE-2 to UE.
10. Reject the incoming call on the UE. Verify UE responds with “603 Decline”.
11. UE disactivates the communication waiting service.
12. Perform step 7-9 again.
13. Verify that UE responses “486 Busy Here” to reject the second call automatically without any operation.

POSTAMBLE

14. The UE detached from SS
15. Deactivate E-UTRAN Cell A.

Table 6.5.1.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1	←	RRC	Activate E-UTRAN Cell A		
2	UE		Switch On UE		
3	→ ←	RRC NAS	UE attach procedure with Default EPS bearer establishment for Data PDN (QCI 9) (see 36.508, 4.5.2 (steps 1-16))		
4	→ ←	RRC NAS	UE initiates a PDN Connectivity Request for IMS PDN		
5	 ←	NAS RRC	SS initiates the Default EPS bearer(QCI 5) on E-UTRAN cell A for SIP establishment by sending the RRC Connection Reconfiguration		

			message		
6	→ ←	SIP	UE successfully registers to IMS Simulator; IMS Registration message flow: SIP Register -> 401 Unauthorized -> SIP Register -> 200 OK		PASS
7	→ ←	IMS	MO Standard VoLTE call procedure from UE to SUE-1		
8		IMS	Answer this call on SUE-1.		
9	→ ←	IMS	MT Standard VoLTE call procedure until 180 Ringing from SUE-2 to UE		
10	→ ←	IMS	Upon call reject the UE sends.”603 Decline”		PASS
11			UE disactivates the communication waiting service		
12	→ ←	SIP	Perform step7-9 again		
13	→	SIP	UE responses “486 Busy Here” message automatically		PASS
14	→ ←	RRC NAS	UE detach procedure		
15			Deactivate E-UTRAN Cell A		

6.5.2.6 Expected Result

The UE shall in step 10 send the 603 DECLINE message when the user reject the second call while the first call is ongoing.

The UE shall in step 13 automatically send the “486 Busy Here” message to reject all the new arriving calls while the first call is ongoing.

6.6 Conference Call

6.6.1 Conference Call

6.6.1.1 Test Purpose

To verify UE correctly creates and leaves conference call .To verify UE correctly adds and drops participantes

6.6.1.2 Reference specification

3GPP TS 24.229, clauses 5.1.2A and 5.1.3

3GPP TS 24.173, Annex G

3GPP TS 24.147, clause 5.3.1.3

6.6.1.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE.

The UE shall support configuration 4.

6.6.1.4 Test conditions

[SS configuration]

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test USIM should be inserted
Configure SUE-1 and SUE-2 functionally same as UE. (The SUE is virtual UE that is simulated by SS)

[Initial conditions]
SS
E-UTRAN Cell A is not active
IMS network works normally.

UE
UE is powered off.(state 1)
SUE-1, SUE-2 and SUE-3 are not activated

6.6.1.5 Test procedure

PREAMBLE
1. Activate E-UTRAN Cell A.
2. Enable N-way conference calling in IMS network
3. Power on the UE and activate SUE-1, SUE-2, SUE-3.

MAIN BODY
4. Allow UE, SUE-1, SUE-2 and SUE-3 to attach to LTE network and register with IMS.
5. Originate a VoLTE call from UE to SUE-1
6. Wait until RTP packets start to flow between UE and SUE-1 in both directions.
7. From UE, put the call between UE and SUE-1 on hold.
8. Wait until RTP packets stop flowing between UE and SUE-1 in both directions.
9. Originate a VoIP call from UE to SUE-2.

10. Wait until RTP packets start to flow between UE and SUE-2 in both directions.
11. From UE, join SUE-1 and SUE-2 into a 3-way conference call, i.e., a conference call between UE (the initiator), SUE-1 and SUE-2. The call to SUE-2 should be automatically put on hold before an INVITE to the conference server is sent by the UE.
12. From UE, add another participant, SUE-3, to the conference call.
13. From UE, drop the last participant who joined the call, i.e., SUE-3, from the conference call.
14. From UE, end the N-way call.

POSTAMBLE

15. Deactivate E-UTRAN Cell A.

Table 6.6.1.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1	←	RRC	System information (BCCH) of E-UTRAN Cell A.		
2			Enable N-way conference calling in IMS network		
3	UE		Power on the UE and activate SUE-1, SUE-2, SUE-3.		
4	→ ←	RRC NAS	UE Attach and regestration in IMS network		
5	→ ←	IMS	Standard VoLTE MO procedure		
6	→ ←	RTP	Wait until RTP packets start to flow between UE and SUE-1 in both directions		
7	→ ←	IMS	From UE, put the call between UE and SUE-1 on hold.		
8	→ ←	IMS	Wait until RTP packets stop flowing between UE and SUE-1 in both directions		
9	→ ←	IMS	Standard VoLTE MO procedure		
10	→ ←		Wait until RTP packets start to flow between UE and SUE-2 in both directions		
11	→ ←	IMS	1) UE sends SIP re-INVITE to SUE-2 with a=sendonly SDP offer (i.e., UE puts SUE-2 on hold).		

			2) After receiving SIP 200 OK for its SIP re-INVITE to SUE-2, UE stops sending RTP packets to SUE-2. 3) After receiving SIP 200 OK for its SIP re-INVITE to SUE-2, UE sends SIP INVITE to the conference server URI (i.e., UE attempts a VoIP call with the conference server). 4) After receiving SIP 200 OK for its SIP INVITE to the conference server, RTP packets start to flow in both directions between UE and the conference server. 5) After receiving SIP 200 OK for its SIP INVITE to the conference server, UE sends SIP REFER with the following characteristics: a) Request-URI set to the conference sever URI. b) Dialog ID same as the Dialog ID of the call between UE and the conference server. c) Refer-To header set to <SUE-1 URI;method=INVITE;Replaces=<Dialog ID between UE and SUE-1>. 6) UE sends SIP 200 OK in response to SIP NOTIFY with "100 Trying" in the message body. 7) UE sends SIP 200 OK in response to SIP NOTIFY with "200 OK" in the message body (i.e., the confirmation that SUE-1 has joined the conference call) 8) UE sends SIP BYE on the dialog between UE and SUE-1.		

			9) UE sends SIP REFER with the following characteristics: a) Request-URI set to the conference sever URI. b) Dialog ID same as the Dialog ID of the call between UE and the conference server. c) Refer-To header set to <SUE-2 URI;method=INVITE;Replaces=<Dialog ID between UE and SUE-2>. 10) UE sends SIP 200 OK in response to SIP NOTIFY with "100 Trying" in the message body. 11) UE sends SIP 200 OK in response to SIP NOTIFY with "200 OK" in the message body (i.e., the confirmation that SUE-2 has joined the conference call) 12) UE sends SIP BYE on the dialog between UE and SUE-2		
12	→ ←	IMS	1) UE sends SIP re-INVITE to the conference server with a=sendonly in SDP (i.e., UE puts the call with conference server on hold). 2) After receiving SIP 200 OK for its re-INVITE to the conference server, UE stops sending RTP packets to the conference server. 3) After receiving SIP 200 OK for its SIP INVITE to the conference server, UE send SIP INVITE to SUE-3. 4) After receiving SIP 200 OK for its SIP INVITE to SUE-3, RTP packets start flowing between UE and SUE-3 in both directions.		

			5) After receiving SIP 200 OK for its SIP INVITE to SUE-3, UE sends SIP REFER with the following characteristics: a) Request-URI set to the conference sever URI. b) Dialog ID same as the Dialog ID of the call between UE and the conference server. c) Refer-To header set to <SUE-3 URI;method=INVITE;Replaces=<Dialog ID between UE and SUE-3>. 6) UE sends SIP 200 OK in response to SIP NOTIFY with "100 Trying" in the message body. 7) UE sends SIP 200 OK in response to SIP NOTIFY with "200 OK" in the message body (i.e., the confirmation that SUE-3 has joined the conference call) 8) UE sends SIP BYE on the dialog between UE and SUE-3. 9) UE sends SIP re-INVITE to the conference server with a=sendrecv in SDP (i.e., UE resumes the call with conference server).		
13	→ ←	IMS	1) UE sends SIP REFER to the conference server with the following characteristics: a) Request-URI set to the conference sever URI. b) Dialog ID same as the Dialog ID of the call between UE and the conference server. c) Refer-To header set to <SUE-3 URI;method=BYE >.		

			2) UE sends SIP 200 OK in response to SIP NOTIFY with "100 Trying" in the message body. 3) UE sends SIP 200 OK in response to SIP NOTIFY with "200 OK" in the message body.		
14	→ ←	IMS	UE sends SIP BYE to the conference server, on the dialog established with the conference server.		
15			Deactivate E-UTRAN Cell A		

6.6.1.6 Expected Result

UE correctly creates and leaves conference call . UE correctly adds and drops participantes

7 SMS

7.1 SMS over IMS

7.1.1 Send SMS over IMS

7.1.1.1 Test Purpose

UE is IMS-registered for IMS-based service including SMS over IP. To verify UE could send short message over IMS correctly.

7.1.1.2 Reference specification

3GPP TS 24.341
3GPP TS 34.229 section18

7.1.1.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE.

The UE shall support configuration 4.

7.1.1.4 Test conditions

[SS configuration]

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-08
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS

E-UTRAN Cell A is not active
IMS network works normally.

UE

UE is powered off.

7.1.1.5 Test procedure

PREAMBLE

1. Execute the steps 1- 6 of test procedure 5.1.3.5.

MAIN BODY

2. Verify that the UE is successfully registered to IMS.
3. Sending of a Mobile Originating SMS over IMS is initiated at the UE. The SS waits for the UE to send a SIP MESSAGE request including a vnd.3gpp.sms payload that contains the short message.Verify the SMS context is correct
4. The SS responds to the SIP MESSAGE request with a 202 Accepted response.
5. The SS sends a SIP MESSAGE request to the UE including a vnd.3gpp.sms payload that contains a short message submission report indicating a positive acknowledgement of the short message sent by the UE at Step 3.
6. The SS waits for the UE to respond to the SIP MESSAGE request with a 200 OK response.
7. The SS sends a SIP MESSAGE request to the UE including a vnd.3gpp.sms payload that contains a status report.
8. The SS waits for the UE to respond to the SIP MESSAGE request with a 200 OK response.
9. The SS waits for the UE to send a SIP MESSAGE request including a vnd.3gpp.sms payload that contains a delivery report for the status report received at Step 7.
10. The SS responds to the SIP MESSAGE request with a 202 Accepted response

POSTAMBLE

11. Deactivate E-UTRAN Cell A.

Table 7.1.1.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1-2	→ ←	RRC NAS SIP	Execute the steps 1- 6 of test procedure 5.1.3.5. UE successfully registers to IMS		
3	→		SIP MESSAGE request		
4	←		202 Accepted		
5	←		SIP MESSAGE request		
6	→		200 OK		
7	←		SIP MESSAGE request		
8	→		200 OK		
9	→		SIP MESSAGE request		
10	←		202 Accepted		
11			Deactivate E-UTRAN Cell A		

7.1.1.6 Expected Result

UE could send short message over IMS correctly.

7.1.2 Receiving SMS over IMS

7.1.2.1 Test Purpose

UE is IMS-registered for IMS-based service including SMS over IMS. To verify UE could send short message over IMS correctly.

7.1.2.2 Reference specification

3GPP TS 24.341
3GPP TS 34.229 section18

7.1.2.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE.

The UE shall support configuration 4.

7.1.2.4 Test conditions

[SS configuration]

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-08

EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -85 dBm/15kHz

[UE configuration]
The test USIM should be inserted.

[Initial conditions]
SS
E-UTRAN Cell A is not active
IMS network works normally.

UE
UE is powered off.

7.1.2.5 Test procedure

PREAMBLE
1. Execute the steps 1- 6 of test procedure 5.1.3.5.

MAIN BODY
2. Verify that the UE is successfully registered to IMS.
3. SS sends a Short Message included in the message-body of MESSAGE.
4. UE responds with a 200 OK.
5. When the payload is extracted, the UE responds with a delivery report included in the message-body of MESSAGE.
6. SS responds with a 202 ACCEPTED.

POSTAMBLE
7. Deactivate E-UTRAN Cell A.

Table 7.1.2.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	

1~2	→ ←	RRC NAS	Execute the steps 1- 6 of test procedure 5.1.3.5. UE successfully registers to IMS		
3	←		MESSAGE		
4	→		200 OK		
5	→		MESSAGE		
6	←		202 ACCEPTED		
7			Deactivate E-UTRAN Cell A		

7.1.2.6 Expected Result

UE could receive short message over IMS and display the message correctly.

8 Mobility

8.1 Intra E-UTRAN

8.1.1 Handover when voice call is ongoing, E-UTRAN

8.1.1.1 Test Purpose

Two TD-LTE cells supported VoLTE. DUT establish Voice Call in Cell1. Change cell power to make Cell 2 the better cell. DUT handovers from Cell 1 to Cell 2 and the voice call is ongoing without interruption

8.1.1.2 Reference specification

3GPP TS 36.331

8.1.1.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE.

The UE shall support configuration 4.

8.1.1.4 Test conditions

[SS configuration]

E-UTRAN Cell A and Cell B are TD-LTE inter-frequency cells.

E-UTRAN Cell A

Cell Id=01 TAC = 01

MCC-MNC = 460-00

EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -70 dBm/15kHz

E-UTRAN Cell B
Cell Id=02 TAC = 02
MCC-MNC = 460-00
EARFCN= f2
Bandwidth = 20 MHz
rootSequenceIndex TDD = 8
Reference Signal EPRE= -110 dBm/15kHz

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS

E-UTRAN Cell A is active
E-UTRAN Cell B is active.
The test shall be performed under ideal radio conditions.

UE

UE is powered off (State 1)

8.1.1.5 Test procedure

Table 8.1.1.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A(dBm)	Cell B(dBm)	Remark
T0	Reference Signal EPRE	dBm/15kHz	-70	-110	UE stays in Cell A with a VoLTE Voice call
T1			-90(Down 0.5dB step per 0.1s)	-70(Up 1dB step per 0.1s)	UE handovers to Cell B

PREAMBLE

1. Activate E-UTRAN Cell A, Cell B (Refer Table 8.1.1.5-1: Time T0).
2. Execute the steps 1- 13 of test procedure 5.2.1.5 to start the VoLTE Call

MAIN BODY

3. Decrease E-UTRAN Cell A and Increase E-UTRAN Cell B signal according to Time T1 in Table 8.1.1.5-1.
4. Keep the VoLTE Call up in Cell A

5. During the signal level change duration, SS configures inter-frequency measurement. Verify UE transmits a MeasurementReport message on Cell A to report the measured RSRP, RSRQ value for Cell B.
6. The SS transmits an RRCConnectionReconfiguration message on Cell A to trigger the inter-frequency handover process from Cell A to Cell B .
7. Verify UE transmits an RRCConnectionReconfigurationComplete message on Cell B to confirm the successful completion of inter-frequency handover
8. The UE performs TRACKING AREA UPDATE procedure on E-UTRAN Cell B
9. Verify the voice call is ongoing on Cell B without interruption.
10. UE initiates CLEAR call procedure.

POSTAMBLE

11. SS sends Deactivate EPS Bearer Context Request (QCI 1). The UE shall respond with Deactivate EPS Bearer Context Accept.
12. SS initiates an MT Detach procedure.
13. Deactivate E-UTRAN Cell A.

Table 8.1.1.5-2: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1			Activate E-UTRAN Cell A, Cell B (Refer Table 8.1.1.5-1: Time T0)		
2	→ ←	RRC NAS	Execute the steps 1- 13 of test procedure 5.2.1.5 to start the VoLTE Call		PASS
3			TX Power modification according to Time T1 in Table 8.1.1.5-1		
4	→ ←	RTP	Keep the VoLTE Call up in Cell A		
5	→ ←	RRC	SS configures inter-frequency measurement. UE transmits a MeasurementReport message on Cell A.		PASS
6	←	RRC	SS transmits an RRCConnectionReconfiguration message on Cell A to trigger the inter-frequency handover		
7	→	RRC	Verify UE transmits an RRCConnectionReconfigurationComplete message on Cell B		PASS
8	→ ←	NAS	The UE performs TRACKING AREA UPDATE procedure on E-UTRAN Cell B		PASS

9	→ ←	RTP	Verify the voice call is ongoing on Cell B without interruption		PASS
10	← →	SIP	The UE initiates clear call procedure on E-UTRAN cell B.	Session release: BYE -> 200 OK	PASS
11	← →	NAS RRC	SS Deactivates a mobile terminated Dedicated EPS bearer establishment(QCI 1)		
12	← →	NAS	SS initiates a mobile terminated Detach procedure (refer to 24.301 clause 5.5.2.3).		
13			Deactivate E-UTRAN Cell A		

8.1.1.6 Expected Result

UE successfully performs inter-frequency handovers from TD-LTE Cell A to Cell B and the voice call is ongoing without interruption.

8.1.2 Handover to non-IMS-Voice-Capable Cell, IMS Deregistration

8.1.2.1 Test Purpose

UE could perform TAU and keep the voice call ongoing without interruption when handover from IMS-voice-capable TD-LTE cell to non-IMS-voice-capable TD-LTE cell. UE will perform IMS De-registration and PDN disconnect procedure after call release.

8.1.2.2 Reference specification

3GPP TS 36.331 clause 5.3.7
3GPP TS 24.229, clause 5.1.1.6

8.1.2.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE.

The UE shall support configuration 4.

8.1.2.4 Test conditions

[SS configuration]
E-UTRAN Cell A and Cell B are TD-LTE inter-frequency cells.

E-UTRAN Cell A

Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -70 dBm/15kHz
Cell A supports IMS voice over PS

E-UTRAN Cell B
Cell Id=02 TAC = 02
MCC-MNC = 460-00
EARFCN= f2
Bandwidth = 20 MHz
rootSequenceIndex TDD = 8
Reference Signal EPRE= -110 dBm/15kHz
Cell B doesn't support IMS voice over PS

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is active
E-UTRAN Cell B is active.
The test shall be performed under ideal radio conditions.
UE
UE is powered off (State 1)

8.1.2.5 Test procedure

Table 8.1.2.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A(dBm)	Cell B(dBm)	Remark
T0	Reference Signal EPRE	dBm/15kHz	-70	-110	UE stays in Cell A with a VoLTE Voice call
T1			-90(Down 0.5dB step per 0.1s)	-70(Up 1dB step per 0.1s)	UE handovers to Cell B

PREAMBLE
1. Activate E-UTRAN Cell A, Cell B (Refer Table 8.1.2.5-1: Time T0).
2. Execute the steps 1- 13 of test procedure 5.2.1.5 to start the VoLTE Call

MAIN BODY
3. Decrease E-UTRAN Cell A and Increase E-UTRAN Cell B signal according to Time T1 in Table 8.1.2.5-1.

4. Keep the VoLTE Call up in Cell A
5. During the signal level change duration, verify UE transmits a MeasurementReport message on Cell A to report the measured RSRP, RSRQ value for Cell B.
6. The SS transmits an RRCConnectionReconfiguration message on Cell A to trigger the inter-frequency handover process from Cell A to Cell B .
7. Verify UE transmits an RRCConnectionReconfigurationComplete message on Cell B to confirm the successful completion of inter-frequency handover
8. Verify UE transmits TRACKING AREA UPDATE REQUEST on E-UTRAN Cell B
9. SS transmits TRACKING AREA UPDATE ACCEPT and indicates that IMS voice over PS is not supported by setting IMS VoPS flag to FALSE.
10. Verify the voice call is ongoing on Cell B without interruption.
11. SS releases call and sends Deactivate EPS Bearer Context Request (QCI 1). The UE shall response with Deactivate EPS Bearer Context Accept.
12. Verify that UE initiates IMS DeRegistration procedure.UE sends REGISTER with "expires" header set to 0
13. SS sends 200 OK
14. Verify that UE sends PDN Disconnect Request to disconnect the IMS PDN.
15. SS responses with Deactivate EPS Bearer Context Request including the linked EPS bearer identity of the default bearer of IMS PDN
16. UE shall response with Deactivate EPS Bearer Context Accept

POSTAMBLE

17. SS initiates MT Detach procedure.
18. Deactivate E-UTRAN Cell A and Cell B.

Table 8.1.2.5-2: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1			Activate E-UTRAN Cell A, Cell B (Refer Table 8.1.2.5-1: Time T0)		
2	→ ←	RRC NAS	Execute the steps 1- 13 of test procedure 5.2.1.5 to start the VoLTE Call		PASS
3			TX Power modification according to Time T1 in Table 8.1.2.5-1		
4	→ ←	RTP	Keep the VoLTE Call up in Cell A		
5	→ ←	RRC	UE transmits a MeasurementReport message on Cell A.		PASS
6	←	RRC	SS transmits an RRCConnectionReconfiguration message on Cell A to trigger the		

			inter-frequency handover		
7	→	RRC	Verify UE transmits an RRCConnectionReconfigurationComplete message on Cell B		PASS
8	→	NAS	UE sends TRACKING AREA UPDATE Request on E-UTRAN Cell B		PASS
9	←	NAS	SS transmits TRACKING AREA UPDATE ACCEPT and indicates that IMS voice over PS is not supported		
10	→ ←	RTP	Verify the voice call is ongoing on Cell B without interruption		PASS
11	→ ←	SIP NAS	SS releases call. Deactivate Dedicated EPS Bearer Procedure		
12	→ ←	SIP	UE initiates IMS Deregistration procedure		PASS
13	←	SIP	SS sends 200 OK		
14	→	NAS	UE sends PDN Disconnect Request to disconnect the IMS PDN		PASS
15	←	NAS	SS responses with Deactivate EPS Bearer Context Request		
16	→	NAS	UE shall response with Deactivate EPS Bearer Context Accept		
17	← →	NAS	SS initiates mobile terminated Detach procedure (refer to 24.301 clause 5.5.2.3).		
18			Deactivate E-UTRAN Cell A and Cell B		

8.1.2.6 Expected Result

UE successfully performs TAU and keep the voice call ongoing when handover from IMS-voice-capable cell to non-IMS-voice-capable cell. UE successfully performs IMS De-registration and PDN disconnect procedure after call release.

8.1.3 Reselect to non-IMS-Voice-Capable Cell, IMS Deregistration

8.1.3.1 Test Purpose

UE could perform IMS De-registration and PDN disconnect procedure when reselecting from IMS-voice-capable TD-LTE cell to non-IMS-voice-capable TD-LTE cell.

8.1.3.2 Reference specification

3GPP TS 36.331 clause 5.3.7
3GPP TS 24.229, clause 5.1.1.6

8.1.3.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE.

The UE shall support configuration 4.

8.1.3.4 Test conditions

[SS configuration]
E-UTRAN Cell A and Cell B are TD-LTE inter-frequency cells.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -70 dBm/15kHz
Cell A supports IMS voice over PS

E-UTRAN Cell B
Cell Id=02 TAC = 02
MCC-MNC = 460-00
EARFCN= f2
Bandwidth = 20 MHz
rootSequenceIndex TDD = 8
Reference Signal EPRE= -110 dBm/15kHz
Cell B doesn’t support IMS voice over PS

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is active
E-UTRAN Cell B is active.
The test shall be performed under ideal radio conditions.
UE
UE is powered off (State 1)

8.1.3.5 Test procedure

Table 8.1.3.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A(dBm)	Cell B(dBm)	Remark
T0	Reference Signal EPRE	dBm/15kHz	-70	-110	UE stays in Cell A
T1			-90(Down 0.5dB step per 0.1s)	-70(Up 1dB step per 0.1s)	UE reselect to Cell B

PREAMBLE

1. Activate E-UTRAN Cell A, Cell B (Refer Table 8.1.3.5-1: Time T0).
2. Execute the steps 1- 6 of test procedure 5.1.3.5. UE successfully attaches to Cell A and registers to IMS

MAIN BODY

3. Decrease E-UTRAN Cell A and Increase E-UTRAN Cell B signal according to Time T1 in Table 8.1.3.5-1.
4. Verify UE reselects to Cell B and transmits TRACKING AREA UPDATE REQUEST on E-UTRAN Cell B
5. SS transmits TRACKING AREA UPDATE ACCEPT and indicates that IMS voice over PS is not supported by setting IMS VoPS flag to FALSE.
6. Verify that UE initiates IMS DeRegistration procedure.UE sends REGISTER with "expires" header set to 0
7. SS sends 200 OK
8. Verify that UE sends PDN Disconnect Request to disconnect the IMS PDN.
9. SS responses with Deactivate EPS Bearer Context Request including the linked EPS bearer identity of the default bearer of IMS PDN
10. UE shall response with Deactivate EPS Bearer Context Accept

POSTAMBLE

11. SS initiates MT Detach procedure.
12. The SS releases the RRC connection by sending the RRC Connection Release message to the UE.
13. Deactivate E-UTRAN Cell A and Cell B.

Table 8.1.3.5-2: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1			Activate E-UTRAN Cell A, Cell B (Refer Table 8.1.3.5-1: Time T0)		
2	→ ←	RRC NAS SIP	Execute the steps 1- 6 of test procedure 5.1.3.5		PASS

3			TX Power modification according to Time T1 in Table 8.1.3.5-1		
4	→	NAS	UE reselects to Cell B and sends TRACKING AREA UPDATE Request		PASS
5	←	NAS	SS transmits TRACKING AREA UPDATE ACCEPT	IMS VoPS flag is set to FALSE	
6	→ ←	SIP	UE initiates IMS Deregistration procedure		PASS
7	←	SIP	SS sends 200 OK		
8	→	NAS	UE sends PDN Disconnect Request to disconnect the IMS PDN		PASS
9	←	NAS	SS responses with Deactivate EPS Bearer Context Request		
10	→	NAS	UE shall response with Deactivate EPS Bearer Context Accept		
11	← →	NAS	SS initiates mobile terminated Detach procedure (refer to 24.301 clause 5.5.2.3).		
12	←	RRC	SS sends RRC CONNECTION RELEASE message to UE		
13			Deactivate E-UTRAN Cell A		

8.1.3.6 Expected Result

UE successfully performs IMS De-registration and PDN disconnect procedure when reselecting from IMS-voice-capable TD-LTE cell to non-IMS-voice-capable TD-LTE cell.

8.1.4 Reselect to IMS-Voice-Capable Cell, IMS Registration

8.1.4.1 Test Purpose

UE could perform IMS PDN establishment and IMS Registration when reselecting from non-IMS-voice-capable TD-LTE cell to IMS-voice-capable TD-LTE cell.

8.1.4.2 Reference specification

3GPP TS 36.331 clause 5.3.7

3GPP TS 24.229, clause 5.1.1.6

8.1.4.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE.

The UE shall support configuration 4.

8.1.4.4 Test conditions

[SS configuration]
E-UTRAN Cell A and Cell B are TD-LTE inter-frequency cells.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -70 dBm/15kHz
Cell A doesn’t support IMS voice over PS

E-UTRAN Cell B
Cell Id=02 TAC = 02
MCC-MNC = 460-00
EARFCN= f2
Bandwidth = 20 MHz
rootSequenceIndex TDD = 8
Reference Signal EPRE= -110 dBm/15kHz
Cell B supports IMS voice over PS

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is active
E-UTRAN Cell B is active.
The test shall be performed under ideal radio conditions.
UE
UE is powered off (State 1)

8.1.4.5 Test procedure

Table 8.1.4.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A(dBm)	Cell B(dBm)	Remark
T0	Reference	dBm/15kHz	-70	-110	UE stays in Cell A

T1	Signal EPRE		-90(Down 0.5dB step per 0.1s)	-70(Up 1dB step per 0.1s)	UE reselect to Cell B

PREAMBLE

1. Activate E-UTRAN Cell A, Cell B (Refer Table 8.1.4.5-1: Time T0).
2. Power on UE

MAIN BODY

3. UE sends ATTACH REQUESTon E-UTRAN Cell A. SS creates an default EPS Bearer (QCI=9) on Data APN (“CMNet”) and indicates that IMS voice over PS is not supported in Attach Accept.
4. Verify UE will not send PDNConnectivityRequset to request IMS PDN
5. Decrease E-UTRAN Cell A and Increase E-UTRAN Cell B signal according to Time T1 in Table 8.1.4.5-1.
6. Verify UE reselects to Cell B and transmits TRACKING AREA UPDATE REQUEST on E-UTRAN Cell B
7. SS transmits TRACKING AREA UPDATE ACCEPT and indicates that IMS voice over PS is supported by setting IMS VoPS flag to TRUE.
8. Verify that UE send PDN Connectivity Request to request IMS PDN (“IMS”) and requests P-CSCF address via PCO method.SS creates an default EPS Bearer(QCI=5) on IMS APN.
9. Verify that UE registers with IMS successfully and subscribes to reg – event package according to steps 2- 6 of test procedure 5.1.3.5.
10. UE initiates a IMS call. Verify that the UE could perform a correct IMS voice call setup and release according to steps 3-14 of test procedure 5.1.3.5.

POSTAMBLE

11. SS initiates MT Detach procedure.
12. Deactivate E-UTRAN Cell A and Cell B.

Table 8.1.4.5-2: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1			Activate E-UTRAN Cell A, Cell B (Refer Table 8.1.4.5-1: Time T0)		
2			Power on UE		
3	→ ←	RRC NAS	UE sends ATTACH REQUEST on E-UTRAN Cell A. SS creates an default EPS Bearer (QCI=9) on Data APN (“CMNet”) and indicates that IMS voice over PS is not supported in Attach Accept.		
4			Verify UE will not send		PASS

			PDNConnectivityRequset to request IMS PDN		
5			TX Power modification according to Time T1 in Table 8.1.4.5-1		
6	→	NAS	UE reselects to Cell B and sends TRACKING AREA UPDATE REQUEST		PASS
7	←	NAS	SS transmits TRACKING AREA UPDATE ACCEPT	IMS VoPS flag is set to TRUE	
8	→ ←	NAS	UE send PDN Connectivity Request and requests P-CSCF address via PCO method. SS creates an default EPS Bearer(QCI=5) on IMS APN		PASS
9	←	SIP	IMS REGISTRATION Procedure	Refer the steps 2-6 of test procedure 5.1.3.5	PASS
10	→ ←	SIP	Verify that UE establishes and releases the VoLTE call correctly	Refer the steps 3-14 of test procedure 5.2.1.5	
11	← →	NAS	SS initiates mobile terminated Detach procedure (refer to 24.301 clause 5.5.2.3).		
12			Deactivate E-UTRAN Cell A and Cell B		

8.1.4.6 Expected Result

UE successfully performs IMS PDN establishment and IMS registration when reselecting from non-IMS-voice-capable TD-LTE cell to IMS-voice-capable TD-LTE cell.Verify that UE could successully setup and release a IMS voice call after the reselection.

8.1.5 Handover to non-IMS-Voice-Capable Cell, Data, IMS Deregistration

8.1.5.1 Test Purpose

UE is IMS registrated and performing Data transfer. When UE handover to a non-IMS-voice-capable TD-LTE cell, it could initiates IMS De-registration and IMS PDN disconnect procedure. The data transfer keeps ongoing without interruption during handover.

8.1.5.2 Reference specification

3GPP TS 36.331 clause 5.3.5
3GPP TS 24.229 clause 5.1.1.6

8.1.5.3 Applicability

This test applies to VoLTE over CSFB UE UE and VoLTE over Dual Standby UE
The UE shall support configuration 4.

8.1.5.4 Test conditions

[SS configuration]
E-UTRAN Cell A and Cell B are TD-LTE inter-frequency cells.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -70 dBm/15kHz
Cell A supports IMS voice over PS

E-UTRAN Cell B
Cell Id=02 TAC = 02
MCC-MNC = 460-00
EARFCN= f2
Bandwidth = 20 MHz
rootSequenceIndex TDD = 8
Reference Signal EPRE= -110 dBm/15kHz
Cell B doesn’t support IMS voice over PS

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is not active
E-UTRAN Cell B is not active.
The test shall be performed under ideal radio conditions.
UE
UE is powered off (State 1)

8.1.5.5 Test procedure

Table 8.1.5.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A(dBm)	Cell B(dBm)	Remark
T0	Reference Signal EPRE	dBm/15kHz	-70	-110	UE camps on Cell A
T1			-90	-70	UE handovers to Cell B

PREAMBLE

1. Activate E-UTRAN Cell A, Cell B (Refer Table 8.1.5.5-1: Time T0).
2. Execute the steps 1- 6 of test procedure 5.1.3.5. UE is successfully registered to IMS.

MAIN BODY

3. SS establishes a MT Dedicated EPS bearer (QCI 6) with the UE.
4. Using the FTP client, begin FTP download from the application server. The file to be downloaded is large enough to ensure it is not finished before the end of the test.
5. Decrease E-UTRAN Cell A and Increase E-UTRAN Cell B signal according to Time T1 in Table 8.1.5.5-1.
6. Verify UE transmits a MeasurementReport message on Cell A to report the measured RSRP, RSRQ value for Cell B.
7. The SS transmits an RRCConnectionReconfiguration message on Cell A to trigger the inter-frequency handover process from Cell A to Cell B.
8. Verify UE transmits an RRCConnectionReconfigurationComplete message on Cell B to confirm the successful completion of inter-frequency handover.
9. Verify UE transmits TRACKING AREA UPDATE REQUEST on E-UTRAN Cell B.
10. SS transmits TRACKING AREA UPDATE ACCEPT and indicates that IMS voice over PS is not supported by setting IMS VoPS flag to FALSE.
11. Verify the Data transfer is still ongoing on Cell B without interruption.
12. Verify that UE initiates IMS DeRegistration procedure.UE sends REGISTER with "expires" header set to 0.
13. SS sends 200 OK.
14. Verify that UE sends PDN Disconnect Request to disconnect the IMS PDN.
15. SS responses with Deactivate EPS Bearer Context Request including the linked EPS bearer identity of the default bearer of IMS PDN.
16. UE shall response with Deactivate EPS Bearer Context Accept.

POSTAMBLE

17. SS initiates MT Detach procedure.
18. Deactivate E-UTRAN Cell A and Cell B.

Table 8.1.5.5-2: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1			Activate E-UTRAN Cell A, Cell B (Refer Table 8.1.5.5-1: Time T0).		
2	→ ←	RRC NAS SIP	Execute the steps 1- 6 of test procedure 5.1.3.5.UE is successfully registered to IMS		
3	→ ←	RRC NAS	SS establishes a MT Dedicated EPS bearer (QCI 6) with the UE.		
4			FTP download from the application server..		PASS
5	←		TX Power modification according to Time T1 in Table 8.1.5.5-1.		
6	→ ←	RRC	UE transmits MeasurementReporton Cell A.	Report RSRP, RSRQ of Cell B	PASS
7	←	RRC	The SS transmits an RRCConnectionReconfiguration message on Cell A		
8	→	RRC	UE transmits an RRCConnectionReconfigurationComplete message on Cell B		PASS
9	→	NAS	UE sends TRACKING AREA UPDATE Request on Cell B		PASS
10	←	NAS	SS transmits TRACKING AREA UPDATE ACCEPT	IMS VoPS flag is set to FALSE	
11			Verify the Data transfer is still ongoing on Cell B		PASS
12	→	SIP	UE sends REGISTER	"expires" header is set to 0	PASS
13	←	SIP	SS sends 200 OK		
14	→	NAS	UE sends PDN Disconnect Request to disconnect the IMS PDN		PASS
15	←	NAS	SS responses with Deactivate EPS Bearer Context Request		
16	→	NAS	UE shall response with Deactivate EPS Bearer Context Accept		
17	← →	NAS	SS initiates mobile terminated Detach procedure (refer to 24.301 clause 5.5.2.3).		
18			Deactivate E-UTRAN Cell A and Cell B		

8.1.5.6 Expected Result

When handover from IMS-voice-capable cell to non-IMS-voice-capable cell:

The UE shall successfully performs TAU and keep the data transfer ongoing.

The UE shall successfully performs IMS De-registration and PDN disconnect procedure.

8.1.6 Handover to IMS-Voice-Capable Cell, Data, IMS Registration

8.1.6.1 Test Purpose

UE is performing Data transfer in non-IMS-voice-capable TD-LTE cell. When UE handover to a IMS-voice-capable TD-LTE cell, it could request IMS PDN establishment and IMS registration. The data transfer keeps ongoing without interruption during handover.

8.1.6.2 Reference specification

3GPP TS 36.331 clause 5.3.5

3GPP TS 24.229, clause 5.1.1.2

8.1.6.3 Applicability

This test applies to VoLTE over CSFB UE UE and VoLTE over Dual Standby UE.

The UE shall support configuration 4.

8.1.6.4 Test conditions

[SS configuration]

E-UTRAN Cell A and Cell B are TD-LTE inter-frequency cells.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -70 dBm/15kHz
Cell A doesn’t support IMS voice over PS

E-UTRAN Cell B
Cell Id=02 TAC = 02
MCC-MNC = 460-00
EARFCN= f2
Bandwidth = 20 MHz

rootSequenceIndex TDD = 8
Reference Signal EPRE= -110 dBm/15kHz
Cell B supports IMS voice over PS

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is not active
E-UTRAN Cell B is not active.
The test shall be performed under ideal radio conditions.
UE
UE is powered off (State 1)

8.1.6.5 Test procedure

Table 8.1.6.5 -1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A(dBm)	Cell B(dBm)	Remark
T0	Reference Signal EPRE	dBm/15kHz	-70	-110	UE camps on Cell A
T1			-90	-70	UE handovers to Cell B

PREAMBLE
1. Activate E-UTRAN Cell A, Cell B (Refer Table 8.1.6.5-1: Time T0).
2. Power on UE

MAIN BODY
3. UE sends Attach Request on E-UTRAN Cell A. SS creates an default EPS Bearer (QCI=9) on Data APN (“CMNet”) and indicates that IMS voice over PS is not supported in Attach Accept.
4. Verify UE will not send PDNConnectivityRequset to request IMS PDN.
5. SS establishes a MT Dedicated EPS bearer (QCI 6) with the UE.
6. Using the FTP client, begin FTP download from the application server. The file to be downloaded is large enough to ensure it is not finished before the end of the test.
7. Decrease E-UTRAN Cell A and Increase E-UTRAN Cell B signal according to Time T1 in Table 8.1.6.5-1.
8. Verify UE transmits a MeasurementReport message on Cell A to report the measured RSRP, RSRQ value for Cell B.
9. The SS transmits an RRCConnectionReconfiguration message on Cell A to trigger the inter-frequency handover process from Cell A to Cell B.
10. Verify UE transmits an RRCConnectionReconfigurationComplete message on Cell B to confirm the successful completion of inter-frequency handover.
11. Verify UE transmits TRACKING AREA UPDATE REQUEST on E-UTRAN Cell B.

12. SS transmits TRACKING AREA UPDATE ACCEPT and indicates that IMS voice over PS is supported by setting IMS VoPS flag to TRUE.
13. Verify the Data transfer is still ongoing on Cell B without interruption.
14. Verify that UE sends PDN Connectivity Request to request IMS PDN (“IMS”) and requests P-CSCF address via PCO method. SS creates an default EPS Bearer(QCI=5) on IMS APN.
15. Verify that UE registers with IMS successfully and subscribes to reg – event package according to steps 1- 6 of test procedure 5.1.3.5.
16. UE initiates a IMS call. Verify that the UE could perform a correct IMS voice call setup and release according to steps 3- 14 of test procedure 5.1.3.5.

POSTAMBLE

17. SS initiates MT Detach procedure.
18. Deactivate E-UTRAN Cell A and Cell B.

Table 8.1.6.5-2: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1			Activate E-UTRAN Cell A, Cell B (Refer Table 8.1.6.5-1: Time T0).		
2			Power on UE		
3	→ ←	RRC NAS	UE sends Attach Request on E-UTRAN Cell A. SS creates an default EPS Bearer (QCI=9) on Data APN (“CMNet”)	IMS VoPS flag is set to FALSE	
4			Verify UE will not send PDNConnectivityRequset to request IMS PDN.		PASS
5	→ ←	RRC NAS	SS establishes a MT Dedicated EPS bearer (QCI 6) with the UE.		
6			FTP download from the application server.		PASS
7	←		TX Power modification according to Time T1 in Table 8.1.6.5-1.		
8	→ ←	RRC	UE transmits a MeasurementReport message.	Report RSRP, RSRQ value of Cell B	PASS
9	←	RRC	The SS transmits an RRCConnectionReconfiguration message on Cell A.		
10	→	RRC	UE transmits an RRCConnectionReconfigurationComplete message on Cell B		PASS

11	→	NAS	UE sends TRACKING AREA UPDATE Request on Cell B		PASS
12	←	NAS	SS transmits TRACKING AREA UPDATE ACCEPT	IMS VoPS flag is set to TRUE	
13			Verify the Data transfer is still ongoing on Cell B		PASS
14	→ ←	RRC NAS	UE sends PDN Connectivity Request to request IMS PDN (“IMS”) and requests P-CSCF address via PCO method. SS creates an default EPS Bearer(QCI=5) on IMS APN.		PASS
15	→ ←	SIP	UE registers with IMS successfully and subscribes to reg – event package	according to steps 1- 6 of test procedure 5.1.3.5	PASS
16	→ ←	SIP	UE initiates a IMS call. Verify that the UE could perform a correct IMS voice call setup and release	according to steps 3- 14 of test procedure 5.2.1.5	
17	← →	NAS	SS initiates mobile terminated Detach procedure (refer to 24.301 clause 5.5.2.3).		
18			Deactivate E-UTRAN Cell A and Cell B		

8.1.6.6 Expected Result

When handover from non-IMS-voice-capable cell to IMS-voice-capable cell:

The UE shall successfully performs TAU and keep the data transfer ongoing.

The UE shall successfully performs PDN connectivity and IMS registration procedure.

The UE shall successfully performs IMS voice call setup and release procedure.

8.1.7 Handover to non-IMS-Voice-Capable Cell, Video call, IMS Deregistration

8.1.7.1 Test Purpose

Test to verify UE could perform TAU and keep the video call ongoing without interruption when handover from IMS-voice-capable TD-LTE cell to non-IMS-voice-capable TD-LTE cell. UE will perform IMS De-registration and PDN disconnect procedure after call release.

8.1.7.2 Reference specification

3GPP TS 36.331 clause 5.3.5
3GPP TS 24.229, clause 5.1.1.6

8.1.7.3 Applicability

This test applies to VoLTE over CSFB UE and VoLTE over Dual Standby UE
The UE shall support configuration 4.

8.1.7.4 Test conditions

[SS configuration]
E-UTRAN Cell A and Cell B are TD-LTE inter-frequency cells.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -70 dBm/15kHz
Cell A supports IMS voice over PS

E-UTRAN Cell B
Cell Id=02 TAC = 02
MCC-MNC = 460-00
EARFCN= f2
Bandwidth = 20 MHz
rootSequenceIndex TDD = 8
Reference Signal EPRE= -110 dBm/15kHz
Cell B doesn’t support IMS voice over PS

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is not active
E-UTRAN Cell B is not active.
The test shall be performed under ideal radio conditions.
UE
UE is powered off (State 1)

8.1.7.5 Test procedure

Table 8.1.7.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A(dBm)	Cell B(dBm)	Remark
T0	Reference Signal EPRE	dBm/15kHz	-70	-110	UE camps on Cell A
T1			-90	-70	UE handovers to Cell B

PREAMBLE

1. Activate E-UTRAN Cell A, Cell B (Refer Table 8.1.7.5-1: Time T0).
2. Execute the steps 1- 15 of test procedure 5.4.1.5 to start the video Call

MAIN BODY

3. Decrease E-UTRAN Cell A and Increase E-UTRAN Cell B signal according to Time T1 in Table 8.1.7.5-1.
4. Keep the video call up in Cell A
5. Verify UE transmits a MeasurementReport message on Cell A to report the measured RSRP, RSRQ value for Cell B.
6. The SS transmits an RRCConnectionReconfiguration message on Cell A to trigger the inter-frequency handover process from Cell A to Cell B .
7. Verify UE transmits an RRCConnectionReconfigurationComplete message on Cell B to confirm the successful completion of inter-frequency handover
8. Verify UE transmits TRACKING AREA UPDATE REQUEST on E-UTRAN Cell B
9. SS transmits TRACKING AREA UPDATE ACCEPT and indicates that IMS voice over PS is not supported by setting IMS VoPS flag to FALSE.
10. Verify the video call is ongoing on Cell B without interruption.
11. SS releases call.
12. SS sends Deactivate EPS Bearer Context Request (QCI 1). The UE shall response with Deactivate EPS Bearer Context Accept.
13. SS sends Deactivate EPS Bearer Context Request (QCI 2). The UE shall response with Deactivate EPS Bearer Context Accept.
14. Verify that UE initiates IMS DeRegistration procedure. UE sends REGISTER with "expires" header set to 0.
15. SS sends 200 OK.
16. Verify that UE sends PDN Disconnect Request to disconnect the IMS PDN.
17. SS responses with Deactivate EPS Bearer Context Request including the linked EPS bearer identity of the default bearer of IMS PDN
18. UE shall response with Deactivate EPS Bearer Context Accept

POSTAMBLE

19. SS initiates MT Detach procedure.
20. Deactivate E-UTRAN Cell A and Cell B.

Table 8.1.7.5-2: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1			Activate E-UTRAN Cell A, Cell B		

			(Refer Table 8.1.7.5-1: Time T0).		
2	→ ←	RRC NAS	Execute the steps 1- 15 of test procedure 5.4.1.5 to start the video Call		
3	←		TX Power modification according to Time T1 in Table 8.1.7.5-1.		
4			Keep the video call up in Cell A		
5	→ ←	RRC	Verify UE transmits a MeasurementReport message on Cell A.	Report RSRP, RSRQ value for Cell B	PASS
6	←	RRC	The SS transmits an RRCConnectionReconfiguration message on Cell A.		
7	→	RRC	UE transmits an RRCConnectionReconfigurationComplete message on Cell B		PASS
8	→	NAS	UE sends TRACKING AREA UPDATE Request on E-UTRAN Cell B		PASS
9	←	NAS	SS transmits TRACKING AREA UPDATE ACCEPT	IMS VoPS flag is set to FALSE	
10			Verify the video call is ongoing on Cell B without interruption.		PASS
11	→ ←	SIP	SS releases call.		
12	→ ←	RRC NAS	SS sends Deactivate EPS Bearer Context Request (QCI 1). The UE shall response with Deactivate EPS Bearer Context Accept.		
13	→ ←	RRC NAS	SS sends Deactivate EPS Bearer Context Request (QCI 2). The UE shall response with Deactivate EPS Bearer Context Accept.		
14	→	SIP	UE sends REGISTER	"expires" header is set to 0	PASS
15	←	SIP	SS sends 200 OK		
16	→	NAS	UE sends PDN Disconnect Request to disconnect the IMS PDN		PASS
17	←	NAS	SS responses with Deactivate EPS Bearer Context Request		
18	→	NAS	UE responses with Deactivate EPS Bearer Context Accept		
19	←	NAS	SS initiates mobile terminated		

	→		Detach procedure (refer to 24.301 clause 5.5.2.3).		
20			Deactivate E-UTRAN Cell A and Cell B		

8.1.7.6 Expected Result

When handover from IMS-voice-capable cell to non-IMS-voice-capable cell:

1: UE successfully performs TAU and keep the video call ongoing.

2: UE successfully performs IMS De-registration and PDN disconnect procedure.

8.1.8 Handover to non-IMS-Voice-Capable Cell, Voice and data, IMS Deregistration

8.1.8.1 Test Purpose

UE could perform TAU and keep the voice call and data transfer ongoing without interruption when handover from IMS-voice-capable TD-LTE cell to non-IMS-voice-capable TD-LTE cell. UE will perform IMS De-registration and PDN disconnect procedure after call release.

8.1.8.2 Reference specification

3GPP TS 36.331 clause 5.3.7

3GPP TS 24.229, clause 5.1.1.6

8.1.8.3 Applicability

This test applies to Both VoLTE over CSFB UE and VoLTE over Dual standby UE.

The UE shall support configuration 4.

8.1.8.4 Test conditions

[SS configuration]

E-UTRAN Cell A and Cell B are TD-LTE inter-frequency cells.

E-UTRAN Cell A

Cell Id=01 TAC = 01

MCC-MNC = 460-00

EARFCN= f1

Bandwidth = 20 MHz

rootSequenceIndex TDD = 0

Reference Signal EPRE= -70 dBm/15kHz

Cell A supports IMS voice over PS

E-UTRAN Cell B
Cell Id=02 TAC = 02
MCC-MNC = 460-00
EARFCN= f2
Bandwidth = 20 MHz
rootSequenceIndex TDD = 8
Reference Signal EPRE= -110 dBm/15kHz
Cell B doesn't support IMS voice over PS

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is active
E-UTRAN Cell B is active.
The test shall be performed under ideal radio conditions.
UE
UE is powered off (State 1)

8.1.8.5 Test procedure

Table 8.1.8.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A(dBm)	Cell B(dBm)	Remark
T0	Reference Signal EPRE	dBm/15kHz	-70	-110	UE stays in Cell A
T1			-90	-70	UE handovers to Cell B

PREAMBLE
1. Activate E-UTRAN Cell A, Cell B (Refer Table 8.1.8.5-1: Time T0).
2. Execute the steps 1- 13 of test procedure 5.2.1.5 to start the VoLTE Call

MAIN BODY
3. SS establishes a MT Dedicated EPS bearer (QCI 6) with the UE.
4. Using the FTP client, begin FTP download from the application server. The file to be downloaded is large enough to ensure it is not finished before the end of the test.
5. Decrease E-UTRAN Cell A and Increase E-UTRAN Cell B signal according to Time T1 in Table 8.1.8.5-1.
6. Keep the VoLTE Call and data transfer up in Cell A
7. During the signal level change duration, verify UE transmits a MeasurementReport message on Cell A to report the measured RSRP, RSRQ value for Cell B.

8. The SS transmits an RRCConnectionReconfiguration message on Cell A to trigger the inter-frequency handover process from Cell A to Cell B .
9. Verify UE transmits an RRCConnectionReconfigurationComplete message on Cell B to confirm the successful completion of inter-frequency handover
10. Verify UE transmits TRACKING AREA UPDATE REQUEST on E-UTRAN Cell B
11. SS transmits TRACKING AREA UPDATE ACCEPT and indicates that IMS voice over PS is not supported by setting IMS VoPS flag to FALSE.
12. Verify the voice call and data transfer are ongoing on Cell B without interruption.
13. SS releases call and sends Deactivate EPS Bearer Context Request (QCI 1). The UE shall response with Deactivate EPS Bearer Context Accept.
14. Verify that UE initiates IMS DeRegistration procedure.UE sends REGISTER with "expires" header set to 0
15. SS sends 200 OK
16. Verify that UE sends PDN Disconnect Request to disconnect the IMS PDN.
17. SS responses with Deactivate EPS Bearer Context Request including the linked EPS bearer identity of the default bearer of IMS PDN
18. UE shall response with Deactivate EPS Bearer Context Accept
19. Verify the data transfer are ongoing on Cell B without interruption during step13-18.

POSTAMBLE

20. SS stop data transfer.
21. SS initiates MT Detach procedure.
22. Deactivate E-UTRAN Cell A and Cell B.

Table 8.1.8.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1			Activate E-UTRAN Cell A, Cell B (Refer Table 8.1.8.5-1: Time T0)		
2	→ ←	RRC NAS	Execute the steps 1- 13 of test procedure 5.2.1.5 to start the VoLTE Call		PASS
3	→ ←	RRC NAS	SS establishes a MT Dedicated EPS bearer (QCI 6) with the UE.		
4			FTP download from the application server.		PASS
5			TX Power modification according to Time T1 in Table 8.1.8.5-1		
6	→ ←	RTP	Keep the VoLTE Call and data transfer up in Cell A		
7	→ ←	RRC	UE transmits a MeasurementReport message on Cell A.		PASS

8	←	RRC	SS transmits an RRCConnectionReconfiguration message on Cell A to trigger the inter-frequency handover		
9	→	RRC	Verify UE transmits an RRCConnectionReconfigurationComplete message on Cell B		PASS
10	→	NAS	UE sends TRACKING AREA UPDATE Request on E-UTRAN Cell B		PASS
11	←	NAS	SS transmits TRACKING AREA UPDATE ACCEPT and indicates that IMS voice over PS is not supported		
12	→ ←	RTP	Verify the voice call and data transfer are ongoing on Cell B without interruption		PASS
13	→ ←	SIP NAS	SS releases call. Deactivate Dedicated EPS Bearer Procedure		
14	→ ←	SIP	UE initiates IMS Deregistration procedure		PASS
15	←	SIP	SS sends 200 OK		
16	→	NAS	UE sends PDN Disconnect Request to disconnect the IMS PDN		PASS
17	←	NAS	SS responses with Deactivate EPS Bearer Context Request		
18	→	NAS	UE shall response with Deactivate EPS Bearer Context Accept		
19	→ ←	FTP	Verify the data transfer are ongoing on Cell B without interruption during step13-18		PASS
20			SS stop data transfer		
21	← →	NAS	SS initiates mobile terminated Detach procedure (refer to 24.301 clause 5.5.2.3).		
22			Deactivate E-UTRAN Cell A and Cell B		

8.1.8.6 Expected Result

UE successfully performs TAU and keep the voice call and data transfer ongoing when handover from IMS-voice-capable cell to non-IMS-voice-capable cell. UE successfully performs IMS De-registration and PDN disconnect procedure after call release.

8.2 Inter-RAT

8.2.1 eSRVCC

8.2.1.1 eSRVCC from LTE to GSM

8.2.1.1.1 Test Purpose

To verify VoLTE over CSFB UE supports eSRVCC procedure from TD-LTE PS Voice to GSM CS Voice. Inter-RAT measurement and report in connected mode is required

8.2.1.1.2 Reference specification

3GPP TS 23.216 clause 6.2.2

8.2.1.1.3 Applicability

This test applies to VoLTE over CSFB UE

The UE shall support configuration 4.

8.2.1.1.4 Test conditions

[SS configuration]
E-UTRAN Cell A and GSM Cell B.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -70 dBm/15kHz

GSM Cell B
Cell Id=02 LAC = 02
MCC-MNC = 460-00
ARFCN = f1
RF Signal Level = -65dbm

[UE configuration]
The test USIM should be inserted

[Initial conditions]

SS

E-UTRAN Cell A is active

GSM Cell B is active.

The test shall be performed under ideal radio conditions.

UE

DUT is powered off (State 1)

8.2.1.1.5 Test procedure

Table 8.2.1.1.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A	Cell B	Remark
T0	Reference Signal EPRE	dBm/15kHz	-70	-	DUT stays in Cell A with a VoLTE Voice call
	RSSI	dBm	-	-65	
T1…Tn-1	Reference Signal EPRE	dBm/15kHz	Down 0.5dB step per 0.1s		
	RSSI	dBm	-	-65	
Tn	Reference Signal EPRE	dBm/15kHz	-90	-	UE eSRVCC to Cell B
	RSSI	dBm	-	-65	

PREAMBLE

1. Activate E-UTRAN Cell A, Cell B (Refer Table 8.2.1.1.5-1: Time T0).
2. Execute the steps 1- 13 of test procedure 5.2.1.5 to start the VoLTE Call

MAIN BODY

3. Decrease E-UTRAN Cell A signal(Refer Table 8.2.1.1.5: Time Tn).
4. Keep the VoLTE Call up in Cell A
5. During the signal level change duration, verify UE transmits a MeasurementReport message on Cell A to report the measured RSSI value for Cell B.
6. The SS transmits an *MobilityFromEUTRACommand* message on Cell A to trigger eSRVCC process from TD-LTE Cell A to GSM Cell B.
7. Verify UE transmits an HandoverComplete message on Cell B
8. Verify the voice call is ongoing on GSM Cell B without interruption.

POSTAMBLE

9. UE initiates CLEAR call procedure.

Table 8.2.1.1.5-2: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1			Activate E-UTRAN Cell A, Cell B		

			(Refer Table 8.2.1.1.5-1: Time T0)		
2	→ ←	RRC NAS	Execute the steps 1- 13 of test procedure 5.2.1.5 to start the VoLTE Call		PASS
3			TX Power modification according to Time Tn in Table 8.2.1.1.5-1		
4	→ ←	RTP	Keep the VoLTE Call up in Cell A		
5	→ ←	RRC	UE transmits a *MeasurementReport* message on Cell A.		PASS
6	←	RRC	SS transmits an *MobilityFromEUTRACommand* message on Cell A to trigger the eSRVCC process from TD-LTE Cell A to GSM Cell B		
7	→	RRC	Verify UE transmits an *HandoverComplete* message on Cell B		PASS
8	→ ←	RTP	Verify the voice call is ongoing on GSM Cell B without interruption		PASS
9	← →	RRC SIP	The UE initiates clear call procedure on GSM Cell B.		PASS

8.2.1.1.6 Expected Result

UE successfully handover voice call from TD-LTE PS Voice(Cell A) to GSM CS Voice(Cell B) and the voice call is ongoing without interruption.

8.2.1.1a eSRVCC from LTE to GSM, Dual Standby

8.2.1.1a.1 Test Purpose

To verify VoLTE over Dual Standby UE supports eSRVCC procedure from TD-LTE PS Voice to GSM CS Voice. Inter-RAT measurement and report in connected mode is required

8.2.1.1a.2 Reference specification

3GPP TS 23.216 clause 6.2.2

8.2.1.1a.3 Applicability

This test applies to VoLTE over Dual Standby UE.
The UE shall support configuration 4.

8.2.1.1a.4 Test conditions

[SS configuration]
E-UTRAN Cell A and GSM Cell B.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -70 dBm/15kHz

GSM Cell B
Cell Id=02 LAC = 02
MCC-MNC = 460-00
ARFCN = f1
RF Signal Level = -65dBm

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is active
GSM Cell B is active.
The test shall be performed under ideal radio conditions.

UE
DUT is powered off (State 1)

8.2.1.1a.5 Test procedure

Table 0.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A	Cell B	Remark
T0	Reference Signal EPRE	dBm/15kHz	-70	-	DUT stays in Cell A with a VoLTE Voice call
	RSSI	dBm	-	-65	
T1	Reference Signal EPRE	dBm/15kHz	Down 0.5dB step per 0.1s		
	RSSI	dBm	-	-65	
T2	Reference Signal EPRE	dBm/15kHz	-90	-	UE eSRVCC to Cell B

	RSSI	dBm	-	-65	

PREAMBLE

1. Activate E-UTRAN Cell A, Cell B (Refer Table 0.5-1: Time T0).
2. Power on the UE.
3. UE attaches on TD-LTE Cell A according to steps 1-19 defined in Annex B Table B-1.
4. In parallel with step3, UE performs CS attach in GSM Cell B according to Step7-12 defined in TS 51.010 26.2.2.3 procedure 3.
5. UE successfully registers to IMS according to steps 2- 6 of test procedure 5.1.3.5
6. UE initials a VoLTE call accroding to steps 3-15 of test procedure 5.2.2.5

MAIN BODY

7. Decrease E-UTRAN Cell A signal (Refer Table 0.5-1: Time T2).
8. Keep the VoLTE Call up in Cell A
9. During the signal level change duration, verify UE transmits a MeasurementReport message on Cell A to report the measured RSSI value for Cell B. The measurement report trigger type is eventB2.
10. The SS transmits an *MobilityFromEUTRACommand* message on Cell A to trigger eSRVCC process from TD-LTE Cell A to GSM Cell B.
11. Verify UE transmits an HandoverComplete message on Cell B
12. Verify the voice call is ongoing on GSM Cell B without interruption.
13. Verify UE sends TRACKING AREA UPDATE REQUEST on Cell A after Tint timeout. Verify UE set default EPS bearer(QCI 5) and dedicate EPS bearer(QCI 9) of IMS PDN to inactive via the IE of EPS bearer context. The Tint timer value is 2s.
14. SS sends TRACKING AREA UPDATE ACCEPT and indicates that only the default EPS bearer of Data PDN is active via the IE of EPS bearer context .
15. SS disconnect the call in GSM.

POSTAMBLE

16. SS initiates an MT Detach procedure.
17. Deactivate E-UTRAN Cell A and GSM Cell B

Table 8.2.1.1.5-2: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
3	→ ←	RRC NAS	UE attaches on TD-LTE Cell A according to steps 1-19 defined in Annex B Table B-1		
4	→ ←	RRC NAS	In parallel with step3, UE performs CS attach in GSM Cell B according to Step7~Step12 defined in TS 51.010 26.2.2.3 procedure 3		

5	→ ←	SIP	UE registers to IMS according to steps 2- 6 of test procedure 5.1.3.5		
6	→ ←	SIP	UE initials a VoLTE call accroding to steps 3~15 of test procedure 5.2.2.5		
7			TX Power modification according to Time T1 in Table 0.5-1		
8	→ ←	RTP	Keep the VoLTE Call up in Cell A		
9	→	RRC	UE transmits *MeasurementReport* message on Cell A.	RSSI value for Cell B	PASS
10	←	RRC	SS transmits *MobilityFromEUTRACommand* message on Cell A		
11	→	RRC	UE transmits *HandoverComplete* message on Cell B		PASS
12	→ ←	RTP	Verify the voice call is ongoing on GSM Cell B without interruption		PASS
13	→	NAS	UE sends TRACKING AREA UPDATE REQUEST on Cell A	set default EPS bearer(QCI 5) and dedicate EPS bearer(QCI 9) of IMS PDN to inactive	PASS
14	←	NAS	SS sends TRACKING AREA UPDATE ACCEPT on Cell A	indicates that only the default EPS bearer of Data PDN is active	
15	← →	RRC	SS disconnect the call in GSM		
16	← →	RRC NAS	SS initiates an MT Detach procedure		
17			Deactivate E-UTRAN Cell A and GSM Cell B		

8.2.1.1a.6 Expected Result

UE shall in step 9 report the measurement results of GSM Cell B.

UE shall in step 11 and step 12 successfully handover voice call from TD-LTE PS Voice(Cell A) to GSM CS Voice(Cell B) and the voice call is ongoing without interruption

UE shall in step 13 camp on TD-LTE Cell A and send TRACKING AREA UPDATE REQUEST when the voice call is ongoing in GSM Cell B.

8.2.1.2 eSRVCC from LTE to GSM without DTM

8.2.1.2.1 Test Purpose

To verify VoLTE over CSFB UE supports eSRVCC procedure from TD-LTE PS Voice+PS Data to GSM CS Voice, PS Data suspend. Inter-RAT measurement and report in connected mode is required.

8.2.1.2.2 Reference specification

3GPP TS 23.216 clause 6.2.2

8.2.1.2.3 Applicability

This test applies to VoLTE over CSFB UE.

The UE shall support configuration 4.

8.2.1.2.4 Test conditions

[SS configuration]
E-UTRAN Cell A and GSM Cell B.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -70 dBm/15kHz

GSM Cell B
Cell Id=02 LAC = 02
MCC-MNC = 460-00
ARFCN = f1
RF Signal Level = -65dbm

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS

E-UTRAN Cell A is active

GSM Cell B is active.

The test shall be performed under ideal radio conditions.

UE

DUT is powered off (State 1)

8.2.1.2.5 Test procedure

Table 8.2.1.2.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A	Cell	Remark
T0	Reference Signal EPRE	dBm/15kHz	-70	-	DUT stays in Cell A with a VoLTE Voice call
	RSSI	dBm	-	-65	
T1…Tn-1	Reference Signal EPRE	dBm/15kHz	Down 0.5dB step per 0.1s		
	RSSI	dBm	-	-65	
Tn	Reference Signal EPRE	dBm/15kHz	-90	-	UE eSRVCC to Cell B
	RSSI	dBm	-	-65	

PREAMBLE

1. Activate E-UTRAN Cell A, Cell B (Refer Table 8.2.1.2.5-1: Time T0).
2. Execute the steps 1- 13 of test procedure 5.2.1.5 to start the VoLTE Call

MAIN BODY

3. SS establishes a MT Dedicated EPS bearer (QCI 6) on Data PDN.
4. Using the FTP client, begin FTP download from the application server via data PDN.
5. Decrease E-UTRAN Cell A signal(Refer Table 8.2.1.2.5: Time Tn).
6. Keep the VoLTE Call up and FTP service in Cell A
7. During the signal level change duration, verify UE transmits a MeasurementReport message on Cell A to report the measured RSSIvalue for Cell B.
8. The SS transmits an *MobilityFromEUTRACommand* message on Cell A to trigger eSRVCC process from TD-LTE Cell A to GSM Cell B.
9. Verify UE transmits an HandoverComplete message on Cell B.
10. Verify The UE transmits a GPRS SUSPENSION REQUEST message on Cell B to suspend the data transfer.
11. Verify the voice call is ongoing on GSM Cell B without interruption and PS data suspended.

POSTAMBLE

12. UE initiates CLEAR call procedure.

Table 8.2.1.2.5-2: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1			Activate E-UTRAN Cell A, Cell B (Refer Table 8.2.1.2.5-1: Time T0)		
2	→ ←	RRC NAS	Execute the steps 1- 13 of test procedure 5.2.1.5 to start the VoLTE Call		PASS
3	→ ←	RRC NAS	SS establishes a MT Dedicated EPS bearer (QCI 6) on Data PDN		
4	→ ←	FTP	Using the FTP client, begin FTP download from the application server via data PDN		
5			TX Power modification according to Time T1 in Table 8.2.1.2.5-1		
6	→ ←	RTP	Keep the VoLTE Call up and FTP service in Cell A		
7	→ ←	RRC	UE transmits a MeasurementReport message on Cell A.		PASS
8	←	RRC	SS transmits an *MobilityFromEUTRACommand* message on Cell A to trigger the eSRVCC process from TD-LTE Cell A to GSM Cell B		
9	→	RRC	Verify UE transmits an HandoverComplete message on Cell B		PASS
10	→	RRC	Verify The UE transmits a GPRS SUSPENSION REQUEST message on Cell B		PASS
11	→ ←	RTP	Verify the voice call is ongoing on GSM Cell B without interruption and PS data suspended		PASS
12	← →	RRC SIP	The UE initiates clear call procedure on GSM Cell B.		PASS

8.2.1.2.6 Expected Result

UE successfully handover voice call from TD-LTE PS Voice+ PS Data(Cell A) to GSM CS Voice(Cell B) and the voice call is ongoing without interruption and PS data suspend.

8.2.1.2a eSRVCC from LTE to GSM without DTM, Dual Standby

8.2.1.2a.1 Test Purpose

To verify VoLTE over Dual Standby UE supports eSRVCC procedure from TD-LTE PS Voice+PS Data to GSM CS Voice. PS Data will be recovered in LTE Cell when the voice call is ongoing in GSM Cell. Inter-RAT measurement and report in connected mode is required

8.2.1.2a.2 Reference specification

3GPP TS 23.216 clause 6.2.2

8.2.1.2a.3 Applicability

This test applies to VoLTE over Dual Standby UE.
The UE shall support configuration 4.

8.2.1.2a.4 Test conditions

[SS configuration]
E-UTRAN Cell A and GSM Cell B.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -70 dBm/15kHz

GSM Cell B
Cell Id=02 LAC = 02
MCC-MNC = 460-00
ARFCN = f1
RF Signal Level = -65dbm

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is active
GSM Cell B is active.
The test shall be performed under ideal radio conditions.

UE

DUT is powered off (State 1)

8.2.1.2a.5 Test procedure

Table 8.2.1.2a.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A	Cell B	Remark
T0	Reference Signal EPRE	dBm/15kHz	-70	-	DUT stays in Cell A with a VoLTE Voice call
	RSSI	dBm	-	-65	
T1	Reference Signal EPRE	dBm/15kHz	Down 0.5dB step per 0.1s		
	RSSI	dBm	-	-65	
T2	Reference Signal EPRE	dBm/15kHz	-90	-	UE eSRVCC to Cell B
	RSSI	dBm	-	-65	

PREAMBLE

1. Activate E-UTRAN Cell A, Cell B (Refer Table 8.2.1.2a.5-1: Time T0).
2. Power on the UE.
3. UE attaches on TD-LTE Cell A according to steps 1-19 defined in Annex B Table B-1.
4. In parallel with step3, UE performs CS attach in GSM Cell B according to Step7-12 defined in TS 51.010 26.2.2.3 procedure 3.
5. UE successfully registers to IMS according to steps 2- 6 of test procedure 5.1.3.5
6. UE initials a VoLTE call accroding to steps 3-15 of test procedure 5.2.2.5

MAIN BODY

7. SS establishes a MT Dedicated EPS bearer (QCI 6) on Data PDN.
8. Using the FTP client, begin FTP download from the application server via data PDN.
9. Decrease E-UTRAN Cell A signal (Refer Table 8.2.1.2a.5: Time T2).
10. Keep the VoLTE Call up and FTP service in Cell A
11. During the signal level change duration, verify UE transmits a MeasurementReport message on Cell A to report the measured RSSI value for Cell B. The measurement report trigger type is eventB2.
12. The SS transmits an *MobilityFromEUTRACommand* message on Cell A to trigger eSRVCC process from TD-LTE Cell A to GSM Cell B.
13. Verify UE transmits an HandoverComplete message on Cell B.
14. Verify the voice call is ongoing on GSM Cell B without interruption.
15. Verify UE sends TRACKING AREA UPDATE REQUEST on Cell A after Tint timeout. Verify UE set default EPS bearer(QCI 5) and dedicate EPS bearer(QCI 9) of IMS PDN to inactive via the IE of EPS bearer context. The Tint timer value is 2s.

16. SS sends TRACKING AREA UPDATE ACCEPT and indicates that only the default EPS bearer of Data PDN is active via the IE of EPS bearer context.
17. Verify the FTP download is ongoing in TD-LTE Cell A.
18. SS disconnect the call in GSM and stop FTP download .

POSTAMBLE

19. SS initiates an MT Detach procedure.
20. Deactivate E-UTRAN Cell A and GSM Cell B

Table 8.2.1.1.5-2: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
3	→ ←	RRC NAS	UE attaches on TD-LTE Cell A according to steps 1-19 defined in Annex B Table B-1		
4	→ ←	RRC NAS	In parallel with step3, UE performs CS attach in GSM Cell B according to Step7~Step12 defined in TS 51.010 26.2.2.3 procedure 3		
5	→ ←	SIP	UE registers to IMS according to steps 2- 6 of test procedure 5.1.3.5		
6	→ ←	SIP	UE initials a VoLTE call accroding to steps 3~15 of test procedure 5.2.2.5		
7	→ ←	RRC NAS	SS establishes a MT Dedicated EPS bearer (QCI 6) on Data PDN		
8	→ ←	FTP	FTP download from the application server via data PDN		
9			TX Power modification according to Time T1 in Table 0.5-1		
10	→ ←	RTP FTP	Keep the VoLTE Call and FTP service up in Cell A		
11	→	RRC	UE transmits *MeasurementReport* message on Cell A.	RSSI value for Cell B	PASS
12	←	RRC	SS transmits *MobilityFromEUTRACommand* message on Cell A		
13	→	RRC	UE transmits		PASS

			HandoverComplete message on Cell B		
14	→ ←	RTP	Verify the voice call is ongoing on GSM Cell B without interruption		PASS
15	→	NAS	UE sends TRACKING AREA UPDATE REQUEST on Cell A	set default EPS bearer(QCI 5) and dedicate EPS bearer(QCI 9) of IMS PDN to inactive	PASS
16	←	NAS	SS sends TRACKING AREA UPDATE ACCEPT on Cell A	indicates that only the default EPS bearer of Data PDN is active	
17	→ ←	FTP	Verify the FTP download is ongoing in TD-LTE Cell A		PASS
18	← →	RRC	SS disconnect the call in GSM		
19	← →	RRC	SS initiates an MT Detach procedure		
20			Deactivate E-UTRAN Cell A and GSM Cell B		

8.2.1.2a.6 Expected Result

UE shall in step 11 report the measurement results of GSM Cell B.

UE shall in step 13 and step 14 successfully handover voice call from TD-LTE PS Voice(Cell A) to GSM CS Voice(Cell B) and the voice call is ongoing without interruption

UE shall in step 15 send TRACKING AREA UPDATE REQUEST and camp on TD-LTE Cell A when the voice call is ongoing in GSM Cell B.

UE shall in step 17 recover FTP download in TD-LTE Cell A when the voice call is ongoing in GSM Cell B

8.2.1.3 eSRVCC to GSM failure, SIP Re-INVITE

8.2.1.3.1 Test Purpose

To verify UE will reestablished IMS session by sending an INVITE, and voice call will continue, when SRVCC from TD-LTE to GSM is failed

8.2.1.3.2 Reference specification

3GPP TS 23.216 clause 6.2.2

8.2.1.3.3 Applicability

This test applies to VoLTE over CSFB UE.

The UE shall support configuration 4.

8.2.1.3.4 Test conditions

[SS configuration]
E-UTRAN Cell A and GSM Cell B.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -70 dBm/15kHz

GSM Cell B
Cell Id=02 LAC = 02
MCC-MNC = 460-00
ARFCN = f1
RF Signal Level = -65dbm

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is active
GSM Cell B is active.
The test shall be performed under ideal radio conditions.

UE
DUT is powered off (State 1)

8.2.1.3.5 Test procedure

Table 8.2.1.3.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A	Cell B	Remark
T0	Reference Signal EPRE	dBm/15kHz	-70	-	UE stays in Cell A with a VoLTE Voice call
	RSSI	dBm	-	-65	

T1	Reference Signal EPRE	dBm/15kHz	-90(Down 0.5dB step per 0.1s)		UE eSRVCC to Cell B
	RSSI	dBm	-	-65	
T2	Reference Signal EPRE	dBm/15kHz	-90	-	
	RSSI	dBm	-	-120	

PREAMBLE

1. Activate E-UTRAN Cell A, Cell B (Refer Table 8.2.1.3.5-1: Time T0).
2. Execute the steps 1- 13 of test procedure 5.2.1.5 to start the VoLTE Call

MAIN BODY

3. Decrease E-UTRAN Cell A signal(Refer Table 8.2.1.3.5: Time T1).
4. Keep the VoLTE Call up in Cell A
5. During the signal level change duration, verify UE transmits a MeasurementReport message on Cell A to report the measured RSRP, RSRQ value for Cell B.
6. Power down GSM Cell B (Time T2).
7. The SS transmits an *MobilityFromEUTRACommand* message on Cell A to trigger eSRVCC process from TD-LTE Cell A to GSM Cell B.
8. Verify UE transmits an rrcConnectionReestablishmentRequest message on LTE Cell A, which includes the ReestablishmentCause of handoverFailure.
9. UE transmits INVITE to reestablish IMS voice in LTE Cell A.
10. SS transmits SIP 100 TRYING, and SIP 200 OK (INVITE)
11. UE transmits SIP ACK.
12. Verify the voice call is ongoing in LTE Cell A.
13. UE initiates CLEAR call procedure.

POSTAMBLE

14. The SS initiates a Mobile Terminated Detach procedure by sending a DETACH
15. The SS releases the RRC connection by sending a RRC CONNECTION RELEASE message to the UE.
16. Deactivate TD-LTE Cell A.
17. Deactivate GSM Cell B.

Table 8.2.1.1.5-2: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1.			Activate E-UTRAN Cell A, Cell B (Refer Table 8.2.1.3.5-1: Time T0).		
2.	→ ←	RRC NAS	Execute the steps 1- 13 of test procedure 5.2.1.5 to start the VoLTE Call		
3.			Decrease E-UTRAN Cell A		

			signal(Refer Table 8.2.1.3.5: Time T1).		
4.	→ ←	RTP	Keep the VoLTE Call up in Cell A		
5.	→ ←	RRC	During the signal level change duration, verify UE transmits a MeasurementReport message on Cell A to report the measured RSRP, RSRQ value for Cell B.		
6.	←	RRC	Power down GSM Cell B (Time T2).		
7.	→	RRC	The SS transmits an MobilityFromEUTRACommand message on Cell A to trigger eSRVCC process from TD-LTE Cell A to GSM Cell B.		
8.	→ ←	RTP	Verify UE transmits an rrcConnectionReestablishmentRequest message on LTE Cell A	Reestablishment Cause of handoverFailure.	
9.	→	RRC SIP	UE transmits INVITE to reestablish IMS voice in LTE Cell A.		
10.	←	RRC SIP	SS transmits SIP 100 TRYING, and SIP 200 OK (INVITE)		
11.	→	RRC SIP	UE transmits SIP ACK.		
12.			Verify the voice call is ongoing in LTE Cell A.		PASS
13.			Voice Call release in LTE Cell A.		
14.			The SS initiates a Mobile Terminated Detach procedure by sending a DETACH		
15.			The SS releases the RRC connection by sending a RRC CONNECTION RELEASE message to the UE.		
16.			Deactivate TD-LTE Cell A.		
17.			Deactivate GSM Cell B.		

8.2.1.3.6 Expected Result

If UE fails to perform eSRVCC, UE will reestablish IMS voice in LTE

8.2.1.4 eSRVCC from LTE to GSM, video call

8.2.1.4.1 Test Purpose

Verify UE supports eSRVCC fall back from LTE video call to GSM voice call when LTE IMS video call is ongoing. Upon release the voice call, UE back to LTE via UE controlled FastReturn.

8.2.1.4.2 Reference specification

3GPP TS 23.216 clause 6.2.2.1

8.2.1.4.3 Applicability

This test applies to VoLTE over CSFB UE
The UE shall support configuration 4.

8.2.1.4.4 Test conditions

[SS configuration]
E-UTRAN Cell A and GSM Cell B.

E-UTRAN Cell A
Cell ID=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -70 dBm/15kHz

GSM Cell B
Cell ID=02 LAC = 02
MCC-MNC = 460-00
ARFCN = f1
RF Signal Level = -65dbm

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is active
GSM Cell B is active.
The test shall be performed under ideal radio conditions.

UE

DUT is powered off (State 1)

8.2.1.4.5 Test procedure

Table 8.2.1.3.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A	Cell B	Remark
T0	Reference Signal EPRE	dBm/15kHz	-70	-	UE stays in Cell A with a Video call
	RSSI	dBm	-	-65	
T1	Reference Signal EPRE	dBm/15kHz	Down 0.5dB step per 0.1s		
	RSSI	dBm	-	-65	
T2	Reference Signal EPRE	dBm/15kHz	-90	-	UE eSRVCC to Cell B
	RSSI	dBm	-	-65	

PREAMBLE

1. Activate E-UTRAN Cell A and GSM Cell B(Refer Table 8.2.1.1.5-1: Time T0).
2. Execute the steps 1- 15 of test procedure 5.2.1.5 to start the IMS Video Call

MAIN BODY

3. Decrease E-UTRAN Cell A signal (Refer Table 8.2.1.1.5: Time T1).
4. Keep the Video Call up in Cell A
5. During the signal level change duration, verify UE transmits a MeasurementReport message on Cell A to report the measured RSSI value for Cell B. The measurement report trigger type is eventB2.
6. The SS transmits an MobilityFromEUTRACommand message on Cell A to trigger PS to CS voice only eSRVCC process from TD-LTE Cell A to GSM Cell B.
7. Verify UE transmits an HandoverComplete message on Cell B
8. Verify the voice call is ongoing on GSM Cell B without interruption.
9. SS initiates voice call disconnect in GSM Cell B and sends ChannelRelease. Cell selection indicator IE doesn't include any E-UTRAN carrier frequency
10. The UE performs TAU procedure and registrated to LTE Cell A. Verify that the EPS update type in TAU is "combined TA/LA updating with IMSI attach".
11. SS transmits TRACKING AREA UPDATE ACCEPT and indicates that IMS voice over PS is supported

POSTAMBLE

12. The SS initiates a Mobile Originated Detach procedure
13. Deactivate TD-LTE Cell A and GSM Cell B.

Table 8.2.1.1.5-2: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1			Activate E-UTRAN Cell A, Cell B (Refer Table 8.2.1.1.5-1: Time T0)		
2	→ ←	RRC NAS	Execute the steps 1- 15 of test procedure 5.2.1.5 to start the IMS Video Call		PASS
3			TX Power modification according to Time Tn in Table 8.2.1.1.5-1		
4	→ ←	RTP	Keep the IMS Video Call up in Cell A		
5	→ ←	RRC	UE transmits a *MeasurementReport* message on Cell A.	Event B2	PASS
6	←	RRC	SS transmits an *MobilityFromEUTRACommand* message on Cell A		
7	→	RRC	UE transmits an *HandoverComplete* message on Cell B		PASS
8	→ ←	RTP	Verify the voice call is ongoing on GSM Cell B without interruption		PASS
9			SS initiates voice call disconnect and sends *Channel Release*.	Cell selection indicator IE doesn't include any E-UTRAN carrier frequency	
10	← →	N AS	UE sends TRACKING AREA UPDATE REQUEST procedure on LTE Cell A		
11	←	NAS	SS transmits TRACKING AREA UPDATE ACCEPT	IMS VoPS flag is set to TRUE	
12	← →	RRC	The SS initiates a Mobile Originated Detach procedure		
13	←		Deactivate Cell A and Cell B		

8.2.1.4.6 Expected Result

The UE shall in step 8 perform eSRVCC from LTE video call to GSM voice call successfully

The UE shall in step 8 keep the voice call ongoing in GSM Cell B

8.2.2 Fast Return

8.2.2.1 Back to TD-LTE via fast return

8.2.2.1.1 Test Purpose

UE perform eSRVCC procedure from TD-LTE PS Voice to GSM CS Voice.When call release, SS indicates target E-UTRAN cell frequency in "Channel Release". Verify UE could return to the target TD-LTE cell indicated in "Channel Release" . Measure the return latency.

8.2.2.1.2 Reference specification

3GPP TS 23.216 clause 6.2.2
3GPP TS 36.304, clause 5.2.4

8.2.2.1.3 Applicability

This test applies to VoLTE over CSFB UE..

The UE shall support configuration 4.

8.2.2.1.4 Test conditions

[SS configuration]
E-UTRAN Cell A and GSM Cell B.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -70 dBm/15kHz

E-UTRAN Cell B
Cell Id=02 TAC = 01
MCC-MNC = 460-00
EARFCN= f2
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -90 dBm/15kHz

GSM Cell C
Cell Id=02 LAC = 02
MCC-MNC = 460-00
ARFCN = f1
RF Signal Level = -65dBm

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS

E-UTRAN Cell A is active
GSM Cell B is active.
The test shall be performed under ideal radio conditions.

UE

UE is powered off (State 1)

8.2.2.1.5 Test procedure

Table 8.2.2.1.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A	Cell B	Cell C	Remark
T0	Reference Signal EPRE	dBm/15kHz	-70	-90	-	UE stays in Cell A with a VoLTE Voice call
	RSSI	dBm	-	-	-65	
T1	Reference Signal EPRE	dBm/15kHz	-90(Down 0.5dB step per	-90	-	UE eSRVCC to Cell C
	RSSI	dBm	-	-	-65	

PREAMBLE

1. Activate E-UTRAN Cell A, Cell B, GERAN Cell C (Refer Table 8.2.2.1.5-1: Time T0).
2. Execute the steps 1- 13 of test procedure 5.2.1.5 to start the VoLTE Call

MAIN BODY

3. Decrease E-UTRAN Cell A signal(Refer Table 8.2.2.1.5-1: Time T1).
4. Keep the VoLTE Call up in Cell A
5. During the signal level change duration, verify UE transmits a MeasurementReport message on Cell A to report the measured RSSI value for Cell C.
6. The SS transmits an *MobilityFromEUTRACommand* message on Cell A to trigger eSRVCC process from TD-LTE Cell A to GSM Cell C.
7. Verify UE transmits an *HandoverComplete* message on Cell C
8. Verify the voice call is ongoing on GSM Cell C without interruption.
9. UE initiates voice call disconnect in GSM Cell C. The SS sends *ChannelRelease* message with IE "*Cell Selection indicator after release of all TCH and SDCCH*" including E-UTRAN carrier frequency of Cell B
10. Verify that the UE performs TAU procedure and registrated to LTE Cell B . Verify that the EPS update type in TAU is "combined TA/LA updating with IMSI attach"

11. SS transmits TRACKING AREA UPDATE ACCEPT and indicates that IMS voice over PS is supported
12. Measure the latency of the return to LTE Cell B.The latency is defined as the duration between *ChannelRelease* in GSM and *Tracking area update complete* in LTE.

POSTAMBLE

13. The SS initiates a Mobile Originated Detach procedure
14. Deactivate TD-LTE Cell A, Cell B.
15. Deactivate GSM Cell C.

Table 8.2.2.1.5-2: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1.			Activate E-UTRAN Cell A, Cell B, GERAN Cell C (Refer Table 8.2.2.1.5-1: Time T0).		
2.	→ ←	RRC NAS	Execute the steps 1- 13 of test procedure 5.2.1.5 to start the VoLTE Call		PASS
3.			Decrease E-UTRAN Cell A signal(Refer Table 8.2.2.1.5-1: Time T1).		
4.	→ ←	RTP	Keep the VoLTE Call up in Cell A		
5.	→ ←	RRC	During the signal level change duration, verify UE transmits a MeasurementReport message on Cell A to report the measured RSRP, RSRQ value for Cell C.		PASS
6.	←	RRC	The SS transmits an *MobilityFromEUTRACommand* message on Cell A to trigger eSRVCC process from TD-LTE Cell A to GSM Cell C.		
7.	→	RRC	Verify UE transmits an HandoverComplete message on Cell C		PASS
8.	→ ←	RTP	Verify the voice call is ongoing on GSM Cell C without interruption.		PASS
9.			UE initiates voice call disconnect in GSM Cell C. The SS sends Channel Release message indicating the E-UTRAN carrier		

			frequency of Cell B		
10.	← →	NAS	The UE performs TAU procedure and registrated to LTE Cell B		
11.	←	NAS	SS transmits TRACKING AREA UPDATE ACCEPT and indicates that IMS voice over PS is supported		
12.	← →	RRC	Measure the latency of the return to LTE Cell B		PASS
13.	← →	RRC	The SS initiates a Mobile Originated Detach procedure		
14.			Deactivate TD-LTE Cell A, Cell B		
15.			Deactivate GSM Cell C.		

Table 8.2.2.1.5-3: ChannelRelease parameters content

Derivation Path: 51.101-1 section 40.2.4.7			
Information Element	Value/remark	Comment	Condition
<Cell Selection Indicator after release of all TCH and SDCCH IE > ::=			
E-UTRAN Description	11	{1<E-UTRAN Description : < E-UTRAN Description struct >> }	
EARFCN	Same as Cell B		
Measurement Bandwidth	Same as Cell B		
TARGET_PCID	Same as Cell B		

8.2.2.1.6 Expected Result

UE successfully handover voice call from TD-LTE PS Voice (Cell A) to GSM CS Voice(Cell C) and the voice call is ongoing without interruption. UE can do fast return back to TD-LTE after GSM voice call is released within [TBD] seconds.

8.2.2.2 Back to TD-LTE via UE-controlled fast return

8.2.2.2.1 Test Purpose

UE perform eSRVCC procedure from TD-LTE PS Voice to GSM CS Voice.When call release, SS doesn't indicate any target E-UTRAN cell in "Channel Release". Verify UE could return to the original TD-LTE cell before eSRVCC . Measure the return latency.

8.2.2.2.2 Reference specification

3GPP TS 23.216 clause 6.2.2
3GPP TS 36.304, clause 5.2.4

8.2.2.2.3 Applicability

This test applies to VoLTE over CSFB UE..

The UE shall support configuration 4.

8.2.2.2.4 Test conditions

[SS configuration]
E-UTRAN Cell A and GSM Cell B.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -70 dBm/15kHz

GSM Cell B
Cell Id=02 LAC = 02
MCC-MNC = 460-00
ARFCN = f1
RF Signal Level = -65dBm

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is active
GSM Cell B is active.
The test shall be performed under ideal radio conditions.

UE
UE is powered off (State 1)

8.2.2.2.5 Test procedure

Table 8.2.2.2.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A	Cell B	Remark
T0	Reference Signal EPRE	dBm/15kHz	-70	-	UE stays in Cell A with a VoLTE Voice call
	RSSI	dBm	-	-65	
T1	Reference Signal EPRE	dBm/15kHz	-90(Down 0.5dB step per 0.1s)		UE eSRVCC to Cell B
	RSSI	dBm	-	-65	

PREAMBLE

1. Activate E-UTRAN Cell A, Cell B (Refer Table 8.2.2.2.5-1: Time T0).
2. Execute the steps 1- 13 of test procedure 5.2.1.5 to start the VoLTE Call

MAIN BODY

3. Decrease E-UTRAN Cell A signal(Refer Table 8.2.2.2.5-1: Time T1).
4. Keep the VoLTE Call up in Cell A
5. During the signal level change duration, verify UE transmits a MeasurementReport message on Cell A to report the measured RSSI value for Cell B.
6. The SS transmits an MobilityFromEUTRACommand message on Cell A to trigger eSRVCC process from TD-LTE Cell A to GSM Cell B.
7. Verify UE transmits an HandoverComplete message on Cell B
8. Verify the voice call is ongoing on GSM Cell B without interruption.
9. UE initiates voice call disconnect in GSM Cell B. The SS sends ChannelRelease. Cell selection indicator IE doesn't include any E-UTRAN carrier frequency
10. The UE performs TAU procedure and registrated to LTE Cell A. Verify that the EPS update type in TAU is "combined TA/LA updating with IMSI attach".
11. SS transmits TRACKING AREA UPDATE ACCEPT and indicates that IMS voice over PS is supported
12. Measure the latency of the return to LTE Cell A. The latency is defined as the duration between ChannelRelease in GSM and Tracking area update complete in LTE.

POSTAMBLE

13. The SS initiates a Mobile Originated Detach procedure
14. Deactivate TD-LTE Cell A.
15. Deactivate GSM Cell B.

Table 8.2.2.2.5-2: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1.			Activate E-UTRAN Cell A, Cell B (Refer Table 8.2.2.2.5-1: Time T0).		
2.	→ ←	RRC NAS	Eecute the steps 1- 13 of test procedure 5.2.1.5 to start the VoLTE Call		PASS

3.			Decrease E-UTRAN Cell A signal(Refer Table 8.2.2.2.5-1: Time T1).		
4.	→ ←	RTP	Keep the VoLTE Call up in Cell A		
5.	→ ←	RRC	During the signal level change duration, verify UE transmits a MeasurementReport message on Cell A to report the measured RSRP, RSRQ value for Cell B.		PASS
6.	←	RRC	The SS transmits an *MobilityFromEUTRACommand* message on Cell A to trigger eSRVCC process from TD-LTE Cell A to GSM Cell B.		
7.	→	RRC	Verify UE transmits an *HandoverComplete* message on Cell B		PASS
8.	→ ←	RTP	Verify the voice call is ongoing on GSM Cell B without interruption.		PASS
9.			UE initiates voice call disconnect in GSM Cell B. The SS sends *Channel Release*. Cell selection indicator IE doesn't include any E-UTRAN carrier frequency		
10.	← →	N AS	The UE performs TAU procedure and registrated to LTE Cell A		
11.	←	NAS	SS transmits TRACKING AREA UPDATE ACCEPT and indicates that IMS voice over PS is supported		
12.	← →	RRC	Measure the latency of the return to LTE Cell A		PASS
13.	← →	RRC	The SS initiates a Mobile Originated Detach procedure		
14.	←		Deactivate TD-LTE Cell A.		
15.			Deactivate GSM Cell B.		

8.2.2.2.6 Expected Result

UE successfully handover voice call from TD-LTE PS Voice (Cell A) to GSM CS Voice(Cell B) and the voice call is ongoing without interruption. UE can do fast returnback to TD-LTE after GSM voice call is released within [TBD] seconds.

8.2.2.3 Back to TD-LTE via UE-controlled fast return, failure, attach on GSM

8.2.2.3.1 Test Purpose

UE perform eSRVCC procedure from TD-LTE PS Voice to GSM CS Voice.When call release, SS doesn't indicate any target E-UTRAN cell in "ChannelRelease". Verify UE could attach on GSM when there is no available TD-LTE cell for 4 seconds after "Channel Release". Verify UE could initial IMS DeRegistration and IMS PDP deactivation in GSM

8.2.2.3.2 Reference specification

3GPP TS 23.216 clause 6.2.2
3GPP TS 36.304, clause 5.2.4

8.2.2.3.3 Applicability

This test applies to VoLTE over CSFB UE

The UE shall support configuration 4.

8.2.2.3.4 Test conditions

[SS configuration]
E-UTRAN Cell A and GSM Cell B.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -70 dBm/15kHz

GSM Cell B
Cell Id=02 LAC = 02
MCC-MNC = 460-00
ARFCN = f1
RF Signal Level = -65dBm

[UE configuration]
The test USIM should be inserted

[Initial conditions]

SS

E-UTRAN Cell A is active

GSM Cell B is active.

The test shall be performed under ideal radio conditions.

UE

UE is powered off (State 1)

8.2.2.3.5 Test procedure

Table 8.2.2.3.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A	Cell B	Remark
T0	Reference Signal EPRE	dBm/15kHz	-70	-	UE stays in Cell A with a VoLTE Voice call
	RSSI	dBm	-	-65	
T1	Reference Signal EPRE	dBm/15kHz	-90(Down 0.5dB step per 0.1s)		UE eSRVCC to Cell B
	RSSI	dBm	-	-65	
T2	Reference Signal EPRE	dBm/15kHz	-140	-	
	RSSI	dBm	-	-65	

PREAMBLE

1. Activate E-UTRAN Cell A, GERAN Cell B (Refer Table 8.2.2.3.5-1: Time T0).
2. Execute the steps 1- 13 of test procedure 5.2.1.5 to start the VoLTE Call

MAIN BODY

3. Decrease E-UTRAN Cell A signal(Refer Table 8.2.2.3.5-1: Time T1).
4. Keep the VoLTE Call up in Cell A
5. During the signal level change duration, verify UE transmits a MeasurementReport message on Cell A to report the measured RSSI value for Cell B. The measurement report trigger type is eventB2.
6. The SS transmits an MobilityFromEUTRACommand message on Cell A to trigger eSRVCC process from TD-LTE Cell A to GSM Cell B.
7. Verify UE transmits an HandoverComplete message on Cell B
8. Verify the voice call is ongoing on GSM Cell B without interruption.
9. Power off LTE Cell A according to time T2.
10. UE initiates voice call disconnect in GSM Cell B. The SS sends ChannelRelease. Cell Selection Indicator doesn't include any E-UTRAN carrier frequency
11. Verify UE performs a RAU and LAU procedure to keep IMS PDP and Data PDP activated in GSM Cell B at the time of 4 seconds after ChannelRelease.
12. Verify that UE initiates IMS DeRegistration procedure in GSM.UE sends REGISTER with "expires" header set to 0
13. SS sends 200 OK

14. Verify that UE sends DEACTIVATE PDP CONTEXT REQUEST to deactivate IMS PDP.
15. SS responses with DEACTIVATE PDP CONTEXT ACCEPT including transaction identifier of IMS PDP

POSTAMBLE

16. The SS initiates a Mobile Originated Detach procedure
17. Deactivate TD-LTE Cell A.
18. Deactivate GSM Cell B.

Table 8.2.2.3.5-2: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1.			Activate E-UTRAN Cell A, Cell B (Refer Table 8.2.2.3.5-1: Time T0).		
2.	→ ←	RRC NAS	Execute the steps 1- 13 of test procedure 5.2.1.5 to start the VoLTE Call		PASS
3.			Decrease E-UTRAN Cell A signal(Refer Table 8.2.2.3.5-1: Time T1).		
4.	→ ←	RTP	Keep the VoLTE Call up in Cell A		
5.	→ ←	RRC	During the signal level change duration, verify UE transmits a MeasurementReport message on Cell A to report the measured RSRP, RSRQ value for Cell B.		PASS
6.	←	RRC	The SS transmits an RRCConnectionReconfiguration message on Cell A to trigger eSRVCC process from TD-LTE Cell A to GSM Cell B.		
7.	→	RRC	Verify UE transmits an HandoverComplete message on Cell B to confirm the successful completion of inter-frequency handover		PASS
8.	→ ←	RTP	Verify the voice call is ongoing on GSM Cell B without interruption.		PASS
9.			Power off LTE Cell A according to time T3.		
10.	←	RRC	UE initiates voice call disconnect in		

	→		GSM Cell B. The SS sends Channel release. Cell Selection Indicator doesn't include any E-UTRAN carrier frequency		
11.	← →	RRC	UE performs a RAU and LAU procedure to keep IMS PDP and Data PDP activated in GSM Cell B at the time of 4 seconds after ChannelRelease.		PASS
12.	→	SIP	UE initiates IMS DeRegistration procedure in GSM		PASS
13.	←	SIP	SS sends 200 OK		
14.	→	NAS	UE sends DEACTIVATE PDP CONTEXT REQUEST to deactivate IMS PDP		PASS
15.	←	NAS	SS responses with DEACTIVATE PDP CONTEXT ACCEPT including transaction identifier of IMS PDP		
16.	← →	RRC	The SS initiates a Mobile Originated Detach procedure		
17.	←		Deactivate TD-LTE Cell A.		
18.			Deactivate GSM Cell B.		

8.2.2.3.6 Expected Result

UE successfully handover voice call from TD-LTE PS Voice (Cell A) to GSM CS Voice(Cell B) and the voice call is ongoing without interruption. UE could attach on GSM when there is no available TD-LTE cell at the time of 4 seconds after "*ChannelRelease*" . UE could initial IMS DeRegistration and IMS PDP deactivation in GSM

8.2.2.4 Back to non-IMS-Voice-Capable Cell, IMS Deregistration

8.2.2.4.1 Test Purpose

UE perform eSRVCC procedure from TD-LTE PS Voice to GSM CS Voice. When call release, UE could return to non-IMS-voice-capable TD-LTE cell and perform IMS deregistration and IMS PDN disconnection

8.2.2.4.2 Reference specification

3GPP TS 23.216 clause 6.2.2
3GPP TS 36.304, clause 5.2.4

8.2.2.4.3 Applicability

This test applies to VoLTE over CSFB UE

The UE shall support configuration 4.

8.2.2.4.4 Test conditions

[SS configuration]
E-UTRAN Cell A , Cell B and GSM Cell C.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -70 dBm/15kHz

E-UTRAN Cell B
Cell Id=02 TAC = 02
MCC-MNC = 460-00
EARFCN= f2
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -90 dBm/15kHz

GSM Cell C
Cell Id=03 LAC = 03
MCC-MNC = 460-00
ARFCN = f1
RF Signal Level = -65dBm

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is active
GSM Cell B is active.
The test shall be performed under ideal radio conditions.

UE
UE is powered off (State 1)

8.2.2.4.5 Test procedure

Table 8.2.2.4.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A	Cell B	Cell C	Remark
T0	Reference Signal EPRE	dBm/15kHz	-70	-90	-	UE stays in Cell A with a VoLTE call
	RSSI	dBm	-	-	-65	
T1	Reference Signal EPRE	dBm/15kHz	-90(Down 0.5dB step per 0.1s)	-90	-	UE eSRVCC to Cell C
	RSSI	dBm	-	-	-65	
T2	Reference Signal EPRE	dBm/15kHz	-140(Down 0.5dB step per 0.1s)	-70(Up 0.5dB step per 0.1s)	-	
	RSSI	dBm	-	-	-65	

PREAMBLE

1. Activate E-UTRAN Cell A, Cell B, GERAN Cell C (Refer Table 8.2.2.4.5-1: Time T0).
2. Execute the steps 1- 13 of test procedure 5.2.1.5 to start the VoLTE Call

MAIN BODY

3. Decrease E-UTRAN Cell A signal(Refer Table 8.2.2.4.5-1: Time T1).
4. Keep the VoLTE Call up in Cell A
5. During the signal level change duration, verify UE transmits a MeasurementReport message on Cell A to report the measured RSSI value for Cell C.
6. The SS transmits an *MobilityFromEUTRACommand* message on Cell A to trigger eSRVCC process from TD-LTE Cell A to GSM Cell C.
7. Verify UE transmits an *HandoverComplete* message on Cell C
8. Verify the voice call is ongoing on GSM Cell C without interruption.
9. Decrease E-UTRAN Cell A signal and increase E-UTRAN Cell B signal (Refer Table 8.2.2.4.5-1: Time T2)
10. UE initiates voice call disconnect in GSM Cell C. The SS sends *ChannelRelease* message without including E-UTRAN carrier frequency of Cell B
11. Verify that UE returns to E-UTRAN Cell B and transmits TRACKING AREA UPDATE REQUEST. Verify that the EPS update type in TAU is “combined TA/LA updating with IMSI attach”
12. SS transmits TRACKING AREA UPDATE ACCEPT and indicates that IMS voice over PS is not supported
13. Verify that UE initiates IMS DeRegistration procedure.UE sends REGISTER with "expires" header set to 0
14. SS sends 200 OK
15. Verify that UE sends PDN Disconnect Request to disconnect the IMS PDN.
16. SS responses with Deactivate EPS Bearer Context Request including the linked EPS bearer identity of the default bearer of IMS PDN
17. UE shall response with Deactivate EPS Bearer Context Accept

POSTAMBLE

18. The SS initiates a Mobile Originated Detach procedure
19. Deactivate TD-LTE Cell A, Cell B and GERAN Cell C.

Table 8.2.2.4.5-2: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1.			Activate E-UTRAN Cell A, Cell B, GERAN Cell C (Refer Table 8.2.2.4.5-1: Time T0).		
2.	→ ←	RRC NAS	Execute the steps 1- 13 of test procedure 5.2.1.5 to start the VoLTE Call		PASS
3.			Decrease E-UTRAN Cell A signal		
4.	→ ←	RTP	Keep the VoLTE Call up in Cell A		
5.	→ ←	RRC	UE transmits a MeasurementReport message on Cell A		PASS
6.	←	RRC	The SS transmits an *MobilityFromEUTRACommand* message on Cell A to trigger eSRVCC process		
7.	→	RRC	UE transmits HandoverComplete message on Cell C		PASS
8.	→ ←	RTP	Verify the voice call is ongoing on GSM Cell C without interruption.		PASS
9.			Decrease E-UTRAN Cell A signal and increase Cell B signal		
10.	→ ←	RRC	UE initiates voice call disconnect in GSM Cell C. The SS sends Channel Release.		
11.	← →	NAS	UE returns to E-UTRAN Cell B and transmits TRACKING AREA UPDATE REQUEST.	EPS update type is “combined TA/LA updating with IMSI attach”	
12.	←	NAS	SS transmits TRACKING AREA UPDATE ACCEPT	IMS VoPS flag is set to FALSE	
13.	→ ←	SIP	UE initiates IMS Deregistration procedure		PASS
14.	←	SIP	SS sends 200 OK		
15.	→	NAS	UE sends PDN Disconnect		PASS

			Request to disconnect the IMS PDN		
16.	←	NAS	SS responses with Deactivate EPS Bearer Context Request		
17.	→	NAS	UE shall response with Deactivate EPS Bearer Context Accept		
18.	← →	RRC	The SS initiates a Mobile Originated Detach procedure		
19.			Deactivate TD-LTE Cell A, Cell B and GERAN Cell C		

8.2.2.4.6 Expected Result

UE successfully returns to non-IMS-voice-capable TD-LTE cell and performs IMS deregistration and IMS PDN disconnection

8.2.2.5 Back to IMS-Voice-Capable Cell, IMS Registration

8.2.2.5.1 Test Purpose

Verify VoLTE over CSFB UE will perform CSFB incomming call procedure properly when attaching in a non-IMS-voice-capable TD-LTE cell. After returning to a IMS-voice-capable TD-LTE cell via UE-controlled fast return, UE could perform IMS PDN establishment and IMS Registration.

8.2.2.5.2 Reference specification

3GPP TS 36.331 clause 5.3.7
3GPP TS 24.229, clause 5.1.1.2

8.2.2.5.3 Applicability

This test applies to VoLTE over CSFB UE..

The UE shall support configuration 4.

8.2.2.5.4 Test conditions

[SS configuration]
E-UTRAN Cell A, Cell B and GSM Cell C.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1

Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -70 dBm/15kHz
Cell A doesn't support IMS voice over PS.

E-UTRAN Cell B
Cell Id=02 TAC = 02
MCC-MNC = 460-00
EARFCN= f2
Bandwidth = 20 MHz
rootSequenceIndex TDD = 8
Reference Signal EPRE= -110 dBm/15kHz
Cell B supports IMS voice over PS

GERAN Cell C
Cell Id=03 LAC = 03
MCC-MNC = 460-00
ARFCN = f1
RF Signal Level = -65dBm

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is active
E-UTRAN Cell B is active.
The test shall be performed under ideal radio conditions.
UE
UE is powered off (State 1)

8.2.2.5.5 Test procedure

Table 8.2.2.5.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A	Cell B	Cell C	Remark
T0	Reference Signal EPRE	dBm/15kHz	-70	-90	-	UE stays in Cell A
	RSSI	dBm	-	-	-65	
T1	Reference Signal EPRE	dBm/15kHz	-140(Down 0.5dB step	-70(UP 0.5dB step per	-	UE CSFB to Cell B
	RSSI	dBm	-	-	-65	

PREAMBLE
1. Activate E-UTRAN Cell A, Cell B, GERAN Cell C (Refer Table 8.2.2.5.5-1: Time T0).

2. Power on the UE

MAIN BODY

3. UE performs a combined EPS/IMSI Attach on E-UTRAN Cell A. SS creates an default EPS Bearer (QCI=9) on Data APN (“CMNet”) and indicates that IMS voice over PS is not supported in Attach Accept.
4. Verify UE will not send PDNConnectivityRequset to request IMS PDN
5. SS initials an MT CSFB call
6. UE performs CSFB procedure to GERAN Cell C via R8 Redirection and the voice call is ongoing Cell C
7. Decrease E-UTRAN Cell A signal and increase E-UTRAN Cell B siganl (Refer Table 8.2.2.5.5-1: Time T1).
8. UE initiates voice call disconnect in GSM Cell C. The SS sends ChannelRelease message. Cell selection indicator IE doesn’t include any E-UTRAN carrier frequency
9. Verify that UE returns to E-UTRAN Cell B and transmits TRACKING AREA UPDATE REQUEST. Verify that the EPS update type in TAU is “combined TA/LA updating with IMSI attach”
10. SS transmits TRACKING AREA UPDATE ACCEPT and indicates that IMS voice over PS is supported by setting IMS VoPS flag to TRUE.
11. Verify that UE send PDN Connectivity Request to request IMS PDN (“IMS”) and requests P-CSCF address via PCO method.SS creates an default EPS Bearer(QCI=5) on IMS APN.
12. Verify that UE registers with IMS successfully and subscribes to reg – event package according to steps 1- 6 of test procedure 5.1.3.5.
13. UE initiates a IMS call. Verify that the UE could perform a correct IMS voice call setup and release according to steps 3-14 of test procedure 5.2.1.5.

POSTAMBLE

14. The SS initiates a Mobile Originated Detach procedure
15. Deactivate TD-LTE Cell B and GERAN Cell C.

Table 8.2.2.5.5-2: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
3	→ ←	RRC	UE performs a combined EPS/IMSI Attach on E-UTRAN Cell A .SS establishes Data PDN (CMNet)		
4			Verify UE will not send PDNConnectivityRequset to request IMS PDN.		PASS
5	←	RRC	SS initials an MT CSFB call		
6	→ ←	RRC	UE performs CSFB procedure to GERAN Cell C		PASS

8	←	NAS	UE initiates voice call disconnect in GSM Cell C. The SS sends ChannelRelease message	Cell selection indicator IE doesn't include any E-UTRAN carrier frequency	
9	→	NAS	UE returns to E-UTRAN Cell B and transmits TRACKING AREA UPDATE REQUEST	EPS update type in TAU is "combined TA/LA updating with IMSI attach"	PASS
10	←	NAS	SS transmits TRACKING AREA UPDATE ACCEPT	IMS VoPS flag is set to TRUE	
11	→ ←	NAS	UE send PDN Connectivity Request and requests P-CSCF address via PCO method. SS creates an default EPS Bearer(QCI=5) on IMS APN		PASS
12	→ ←	SIP	Verify that UE registers with IMS successfully and subscribes to reg – event package	According to steps 1- 6 of test procedure 5.1.3.5	PASS
13	→ ←	SIP	UE initiates a IMS call. Verify that the UE could perform a correct IMS voice call setup and release	According to steps 3-14 of test procedure 5.2.1.5	PASS
13	← →	NAS	SS initiates mobile terminated Detach procedure (refer to 24.301 clause 5.5.2.3).		
14			Deactivate E-UTRAN Cell B and GERAN Cell C		

8.2.2.5.6 Expected Result

UE successfully perform CSFB procedure when attaching in a non-IMS-voice-capable TD-LTE cell. UE could successfully perform IMS PDN establishment,IMS Registration and IMS voice call setup and release after returning to a IMS-voice-capable TD-LTE cell.

8.2.2.5a Move to IMS-Voice-Capable Cell, IMS Registration, Dual Standby

8.2.2.5a.1 Test Purpose

Verify VoLTE over Dual Standby UE will initial CS Call in GSM Cell when attaching in a non-IMS-voice-capable TD-LTE cell. When move to a IMS-voice-capable TD-LTE cell, UE could perform IMS PDN establishment and IMS Registration.

8.2.2.5a.2 Reference specification

3GPP TS 24.229, clause 5.1.1.2

8.2.2.5a.3 Applicability

This test applies to VoLTE over Dual Standby UE..

The UE shall support configuration 4.

8.2.2.5a.4 Test conditions

[SS configuration]
E-UTRAN Cell A, Cell B and GSM Cell C.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -70 dBm/15kHz
Cell A doesn't support IMS voice over PS.

E-UTRAN Cell B
Cell Id=02 TAC = 02
MCC-MNC = 460-00
EARFCN= f2
Bandwidth = 20 MHz
rootSequenceIndex TDD = 8
Reference Signal EPRE= -110 dBm/15kHz
Cell B supports IMS voice over PS

GERAN Cell C
Cell Id=03 LAC = 03
MCC-MNC = 460-00
ARFCN = f1
RF Signal Level = -65dBm

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is active
E-UTRAN Cell B is active.

The test shall be performed under ideal radio conditions.

UE

UE is powered off (State 1)

8.2.2.5a.5 Test procedure

Table 8.2.2.5a.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A	Cell B	Cell C	Remark
T0	Reference Signal EPRE	dBm/15kHz	-70	-90	-	UE stays in Cell A
	RSSI	dBm	-	-	-65	
T1	Reference Signal EPRE	dBm/15kHz	-140(Down 0.5dB step	-70(UP 0.5dB step per	-	
	RSSI	dBm	-	-	-65	

PREAMBLE

1. Activate E-UTRAN Cell A, Cell B, GERAN Cell C (Refer Table 8.2.2.5.5-1: Time T0).
2. Power on the UE

MAIN BODY

3. UE performs EPS only Attach on E-UTRAN Cell A. SS creates an default EPS Bearer (QCI=9) on Data APN (“CMNet”) and indicates that IMS voice over PS is not supported in Attach Accept.
4. In parallel with step3, UE performs CS attach in GSM Cell C according to Step7-12 defined in TS 51.010 26.2.2.3 procedure 3
5. Verify UE will not send PDN CONNECTIVITY REQUEST for IMS PDN
6. UE initial CS voice call in GSM Cell C according to the steps defined in TS 51.010 10.2.3.
7. Decrease E-UTRAN Cell A signal and increase E-UTRAN Cell B siganl (Refer Table 8.2.2.5.5-1: Time T1).
8. Verify that UE reselects to E-UTRAN Cell B and transmits TRACKING AREA UPDATE REQUEST on Cell B.
9. SS transmits TRACKING AREA UPDATE ACCEPT and indicates that IMS voice over PS is supported by setting IMS VoPS flag to TRUE on Cell B.
10. Verify that UE send PDN CONNECTIVITY REQUEST for IMS PDN (“IMS”) and requests P-CSCF address via PCO method.SS creates an default EPS Bearer(QCI=5) on IMS APN.
11. Verify that UE registers with IMS successfully and subscribes to reg – event package according to steps 1- 6 of test procedure 5.1.3.5.
12. Verify the CS voice call in GSM Cell C is still ongoing.
13. SS disconnect the call in GSM.
14. UE initiates a IMS call. Verify that the UE could perform a correct IMS voice call setup and release according to steps 3-14 of test procedure 5.2.1.5.

POSTAMBLE

15. The SS initiates a Mobile Originated Detach procedure
16. Deactivate TD-LTE Cell A, Cell B and GERAN Cell C.

Table 8.2.2.5.5-2: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
3	→ ←	NAS RRC	UE performs EPS only Attach on E-UTRAN Cell A .SS establishes Data PDN (CMNet)	IMS VoPS flag is set to FALSE	
4	→ ←	NAS RRC	In parallel with step3, UE performs CS attach in GSM Cell C according to Step7~Step12 defined in TS 51.010 26.2.2.3 procedure 3		
5			Verify UE will not send PDNConnectivityRequset.		PASS
6	→ ←	NAS RRC	UE initial CS voice call in GSM Cell C according to the steps defined in TS 51.010 10.2.3.		PASS
7			TX Power modification according to Time T1 in Table 8.2.2.5a.5-1		
8	→	NAS	UE reselects to E-UTRAN Cell B and transmits TRACKING AREA UPDATE REQUEST		PASS
9	←	NAS	SS transmits TRACKING AREA UPDATE ACCEPT	IMS VoPS flag is set to TRUE	
10	→ ←	NAS	UE send PDN CONNECTIVITY REQUEST and requests P-CSCF address via PCO method. SS creates an default EPS Bearer(QCI=5) on IMS APN		PASS
11	←	SIP	IMS REGISTRATION Procedure, according to steps 1- 6 of test procedure 5.1.3.5		PASS
12	→ ←		CS voice call in GSM Cell C is still ongoing		PASS
13	→ ←		SS disconnect the call in GSM		
14	← →	SIP	UE initiates a IMS call. Verify that the UE could perform a correct IMS voice call setup and release	According to steps 3-14 of test procedure 5.2.1.5	PASS
15	← →	NAS	SS initiates mobile terminated Detach procedure		

16			Deactivate E-UTRAN Cell A, Cell B and GERAN Cell C		

8.2.2.5a.6 Expected Result

UE shall in step 6 successfully perform GSM voice call when attaching in a non-IMS-voice-capable TD-LTE cell.

UE shall in step 10 and step 11 successfully perform IMS PDN establishment and IMS Registration when reselects to a IMS-voice-capable TD-LTE cell.

UE shall in step 14 successfully perform a correct IMS mobile originated voice call setup and release when reselects to a IMS-voice-capable TD-LTE cell.

8.2.3 aSRVCC

8.2.3.1 aSRVCC from TD-LTE to GSM

8.2.3.1.1 Test Purpose

To verify DUT supports eSRVCC procedure from TD-LTE PS Voice to GSM CS Voice in alerting phase duing an IMS MO voice call

8.2.3.1.2 Reference specification

3GPP TS 23.216, clause 6.2.2.2

8.2.3.1.3 Applicability

This test applies to VoLTE over CSFB UE..

The UE shall support configuration 4.

8.2.3.1.4 Test conditions

[SS configuration]
E-UTRAN Cell A and GSM Cell B.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -70 dBm/15kHz

GSM Cell B

Cell Id=02 LAC = 02
MCC-MNC = 460-00
ARFCN = f1
RF Signal Level = -65dBm

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS

E-UTRAN Cell A is active
GSM Cell B is active.
The test shall be performed under ideal radio conditions.

UE

UE is powered off (State 1)

8.2.3.1.5 Test procedure

Table 8.2.3.1.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A	Cell B(dBm)	Remark
T0	Reference Signal EPRE	dBm/15kHz	-70	-	UE stays in Cell A with a VoLTE Voice call
	RSSI	dBm	-	-65	
T1…Tn	Reference Signal EPRE	dBm/15kHz	Down 0.5dB step per 0.1s		
	RSSI	dBm	-	-65	
T2	Reference Signal EPRE	dBm/15kHz	-90	-	UE aSRVCC to Cell B
	RSSI	dBm	-	-65	

PREAMBLE

1. Activate E-UTRAN Cell A, Cell B (Refer Table 8.2.3.1.5-1: Time T0).
2. Execute the steps 1- 10 of test procedure 5.2.1.5 to keep the VoLTE Call alerting in Cell A

MAIN BODY

3. Decrease E-UTRAN Cell A signal(Refer Table 8.2.3.1.5-1: Time T1).
4. Keep the VoLTE Call altering in Cell A
5. During the signal level change duration, verify UE transmits a MeasurementReport message on Cell A to report the measured RSRP, RSRQ value for Cell B.
6. The SS transmits an *MobilityFromEUTRACommand* message on Cell A to trigger aSRVCC process from TD-LTE Cell A to GSM Cell B.
7. Verify UE transmits an HandoverComplete message on Cell B.

8. Verify the voice call is altering on GSM Cell B without interruption.
9. Answer the call and setup a GSM Voice Call
10. Verify the voice call is ongoing correctly on GSM Cell B

POSTAMBLE

11. UE initiates CLEAR call procedure.

Table 8.2.3.1.5-2: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1			Activate E-UTRAN Cell A, Cell B (Refer Table 8.2.3.1.5-1:Time T0)		
2	→ ←	RRC NAS	Execute the steps 1- 10 of test procedure 5.2.1.5 to start the VoLTE Call		PASS
3			TX Power modification according to Time T1 in Table 8.2.3.1.5-1		
4	→ ←	RTP	Keep the VoLTE Call altering in Cell A		
5	→ ←	RRC	UE transmits a MeasurementReport message on Cell A.		PASS
6	←	RRC	SS transmits an RRCConnectionReconfiguration message on Cell A to trigger the aSRVCC process from TD-LTE Cell A to GSM Cell B		
7	→	RRC	Verify UE transmits an HandoverComplete message on Cell B		PASS
8	→ ←	SIP	Verify the voice call is altering on GSM Cell B without interruption		PASS
9	→ ←	SIP	Answer the call and setup a GSM Voice Call		
10	→ ←	RTP	Verify the voice call is ongoing correctly on GSM Cell B		PASS
11	← →	RRC SIP	The UE initiates clear call procedure on GSM Cell B.		

8.2.3.1.6 Expected Result

UE successfully handover voice alerting from TD-LTE PS Voice(Cell A) to GSM CS Voice(Cell B) and can be answered in GSM mode.

8.2.3.2 aSRVCC from TD-LTE to GSM, MT call

8.2.3.2.1 Test Purpose

To verify DUT supports eSRVCC procedure from TD-LTE PS Voice to GSM CS Voice in alerting phase duing a MT voice call.

8.2.3.2.2 Reference specification

3GPP TS 23.216 clause 6.2.2
3GPP TS 36.304, clause 5.2.4

8.2.3.2.3 Applicability

This test applies to VoLTE over CSFB UE..

The UE shall support configuration 4.

8.2.3.2.4 Test conditions

[SS configuration]
E-UTRAN Cell A and GSM Cell B.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -70 dBm/15kHz

GSM Cell B
Cell Id=02 LAC = 02
MCC-MNC = 460-00
ARFCN = f1
RF Signal Level = -65dBm

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is active
GSM Cell B is active.
The test shall be performed under ideal radio conditions.

UE

UE is powered off (State 1)

8.2.3.2.5 Test procedure

Table 8.2.3.2.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A	Cell B	Remark
T0	Reference Signal EPRE	dBm/15kHz	-70	-	UE stays in Cell A with a VoLTE Voice call
	RSSI	dBm	-	-65	
T1	Reference Signal EPRE	dBm/15kHz	-90(Down 0.5dB step per		UE eSRVCC to Cell B
	RSSI	dBm	-	-65	

PREAMBLE

1. Activate E-UTRAN Cell A, Cell B (Refer Table 8.2.3.2.5-1: Time T0).
2. Execute the steps 1- 12 of test procedure 5.2.1.5 to start the VoLTE Call

MAIN BODY

3. Keep the VoLTE Call up in Cell A
4. Decrease E-UTRAN Cell A signal(Refer Table 8.2.3.2.5-1: Time T1).
5. During the signal level change duration, verify UE transmits a MeasurementReport message on Cell A to report the measured RSRP, RSRQ value for Cell B.
6. The SS transmits an MobilityFromEUTRANCommand message on Cell A to trigger aSRVCC process from TD-LTE Cell A to GSM Cell B.
7. Verify UE transmits an HandoverComplete message on Cell B
8. Verify the voice call is altering on GSM Cell B without interruption.
9. Answer the call to complete the GSM Voice Call setup procedure
10. Verify the voice call is ongoing on GSM Cell B without interruption.

POSTAMBLE

11. UE initiates MO call release in GSM Cell B.
12. Power off UE to trigger an MO Detach procedure in GSM Cell B.
13. Deactivate TD-LTE Cell A.
14. Deactivate GSM Cell B.

Table 8.2.3.2.5-2: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1.			Activate E-UTRAN Cell A, Cell B (Refer Table 8.2.3.2.5-1: Time T0).		
2.	→	RRC	Execute the steps 1- 12 of test		PASS

	←	NAS	procedure 5.2.1.5 to start the VoLTE Call		
3.			Keep the VoLTE Call up in Cell A		
4.	→ ←	RTP	Decrease E-UTRAN Cell A signal(Refer Table 8.2.3.2.5-1: Time T1).		
5.	→ ←	RRC	During the signal level change duration, verify UE transmits a MeasurementReport message on Cell A to report the measured RSRP, RSRQ value for Cell B.		PASS
6.	←	RRC	The SS transmits an MobilityFromEUTRAN message on Cell A to trigger eSRVCC process from TD-LTE Cell A to GSM Cell B.		
7.	→	RRC	Verify UE transmits an HandoverComplete message on Cell B		PASS
8.	→ ←	RTP	Verify the voice call is altering on GSM Cell B without interruption.		PASS
9.			Answer the call to complete the GSM Voice Call setup procedure		
10.	← →	RRC	Verify the voice call is ongoing on GSM Cell B without interruption.		
11.	← →	RRC	UE initiates MO call release in GSM Cell B.		PASS
12.	← →	RRC	Power off UE to trigger an MO detach procedure in GSM Cell B.		
13.			Deactivate TD-LTE Cell A.		
14.			Deactivate GSM Cell B		

8.2.3.2.6 Expected Result

UE successfully handover voice call from TD-LTE PS Voice (Cell A) to GSM CS Voice(Cell B) and the voice call is ongoing without interruption. UE can do fast returnback to TD-LTE after GSM voice call is released within [TBD] seconds

8.2.4 IMS Procedure Caused by Mobility

8.2.4.1 Reselect to GPRS Cell, IMS Deregistration

8.2.4.1.1 Test Purpose

Test to verify UE could perform RAU to keep IMS PDP and CMNet PDP activated when reselect from IMS-voice-capable TD-LTE cell to GPRS cell. UE could perform IMS De-registration and IMS PDP deactivate after RAU complete.

8.2.4.1.2 Reference Specification

3GPP TS 36.304 clause 5.2.4
3GPP TS 24.008 clause 9.4, 9.5
3GPP TS 24.229 clause 5.1.1.6

8.2.4.1.3 Applicability

This test applies to VoLTE over CSFB UE.
The UE shall support configuration 4.

8.2.4.1.4 Test conditions

[SS configuration]

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC = 460 MNC = 00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE = -70 dBm/15kHz
Cell A supports IMS voice over PS

GPRS Cell B
Cell Id = 02 LAC =0 2
MCC = 460 MNC = 00
ARFCN = f1
RF Signal level = - 110 dBm
NMO I
[UE configuration]
The test USIM shall be inserted.

[Initial conditions]
SS
E-UTRAN Cell A is not active.

GSM Cell B is not active.

The test shall be performed under ideal radio conditions.

UE

UE is powered off

8.2.4.1.5 Test procedure

Table 8.2.4.1.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A	Cell B	Remark
T0	Reference Signal EPRE	dBm/15kHz	-70	-	UE stays in Cell A
	RSSI	dBm	-	-110	
T1	Reference Signal EPRE	dBm/15kHz	-90(Down 0.5dB step per 0.1s)	-	
	RSSI	dBm	-	-70(Up 1dB step per 0.1s)	

PREAMBLE

1. Activate E-UTRAN Cell A and GERAN Cell B (Refer Table 8.1.3.5-1: Time T0).
2. Execute the steps 1- 6 of test procedure 5.1.1.1.5. UE is successfully registered to IMS

MAIN BODY

3. RRC Connection is released by the SS.
4. Decrease E-UTRAN Cell A and Increase GERAN Cell B signal according to Time T1 in Table 8.1.3.5-1
5. Verify UE reselects to Cell B and transmits ROUTING AREA UPDATE REQUEST with PDP Context Status updating the status for IMS and CMNet sessions on GERAN Cell B
6. SS transmits ROUTING AREA UPDATE ACCEPT with PDP Context Status updating the status for IMS and CMNet sessions and indicates that IMS voice over PS is not supported by setting IMS VoPS flag to FALSE.
7. Verify that UE initiates IMS DeRegistration procedure.UE sends REGISTER with "expires" header set to 0
8. SS sends 200 OK
9. Verify that UE sends Deactivate PDP Context Request to disconnect the IMS Session.
10. SS shall response with Deactivate PDP Context Accept Message.

POSTAMBLE

11. The SS initiates a Mobile Terminated Detach procedure
12. Deactivate E-UTRAN Cell A and GPRS Cell B.

Table 8.2.4.1.5-2: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
2	→ ←	SIP NAS	Execute the steps 1- 6 of test procedure 5.1.1.1.5		
3	←	RRC	RRCConnectionRelease		
4			TX Power modification according to Time T1 in Table 8.1.3.5-1		
5	→	NAS	UE reselects to Cell B and sends ROUTING AREA UPDATE REQUEST	In PDP Context Status updating the status for IMS and CMNet sessions	PASS
6	←	NAS	SS transmits ROUTING AREA UPDATE ACCEPT	In PDP Context Status updating for the status for IMS and CMNet sessions , IMS VoPS flag to FALSE	
7	→ ←	SIP	UE sends REGISTER	"expires" header is set to 0	PASS
8	←	SIP	SS sends 200 OK		
9	→	NAS	UE sends DeactivatePDP ContextRequestto disconnect the IMS Session		PASS
10	←	NAS	SS responses with Deactivate PDP Context Accept		
11	← →	NAS	SS initiates mobile terminated Detach procedure (refer to 24.301 clause 5.5.2.3).		
12			Deactivate E-UTRAN Cell A and Cell B		

Specific message contents

Table 8.2.4.1.5-3: Routing Area Update Accept Message

Derivation path: 24.008 table 9.4.14		
Information Element	Value/Remark	Comment
Update type	001 'combined RA/LA updating'	
PDP context status	0000000100010000	Indicating IMS(NSAPI 5) and CMNet(NSAPI 9) contexts enabled
Network feature support	IMS VoPS = 0	IMS voice over PS session in Iu mode and A/Gb mode not supported

8.2.4.1.6 Expected Result

UE shall in step 5 reselect to GPRS Cell B and send ROUTING AREA UPDATE REQUEST to keep IMS PDP and CMNet PDP activated

UE shall in step 7 and step 9 successfully performs IMS De-registration and Deactivate IMS PDP.

8.2.4.2 Redirect to GPRS Cell with Data, IMS Deregistration

8.2.4.2.1 Test Purpose

UE is performing Data transfer in IMS-voice-capable TD-LTE cell. Test to verify UE could perform RAU to keep IMS PDP and CMNet PDP activated when redirect to GPRS cell. If the GPRS cell doesn't support IMS Voice over PS, UE could perform IMS De-registration and IMS PDP deactivate after RAU complete. The data transfer could resume in GPRS Cell

8.2.4.2.2 Reference specification

3GPP TS 36.304 clause 5.2.7
3GPP TS 24.008 clause 9.4, 9.5

8.2.4.2.3 Applicability

This test applies to VoLTE over CSFB UE.
The UE shall support configuration 4.

8.2.4.2.4 Test conditions

[SS configuration]

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC = 460 MNC = 00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE = -70 dBm/15kHz
Cell A supports IMS voice over PS

GPRS Cell B
Cell Id = 02 LAC = 02
MCC = 460 MNC = 00
ARFCN = f1
RF Signal level = - 110 dBm
NMO I

[UE configuration]

The test USIM shall be inserted.

[Initial conditions]

SS

E-UTRAN Cell A is not active.

GSM Cell B is not active.

The test shall be performed under ideal radio conditions.

UE

UE is powered off

8.2.4.2.5 Test procedure

Table 8.2.4.2.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A	Cell B	Remark
T0	Reference Signal EPRE	dBm/15kHz	-70	-	
	RSSI	dBm	-	-110	
T1	Reference Signal EPRE	dBm/15kHz	-90(Down 0.5dB step per 0.1s)	-	
	RSSI	dBm	-	-70(Up 1dB step per 0.1s)	

PREAMBLE

1. Activate E-UTRAN Cell A and GERAN Cell B (Refer Table 8.1.3.5-1: Time T0).
2. Execute the steps 1- 6 of test procedure 5.1.1.1.5. UE is successfully registered to IMS
3. SS establishes a MT Dedicated EPS bearer (QCI 6) on Data PDN.
4. Using the FTP client, begin FTP download from the application server via dedicated EPS bearer of Data PDN

MAIN BODY

5. Decrease E-UTRAN Cell A and Increase GERAN Cell B signal according to Time T1 in Table 8.1.3.5-1
6. SS Transmit RRCConnectionRelease message including redirectedCarrierInfo IE with ARFCN of Cell B
7. Verify UE redirects to Cell B and transmits ROUTING AREA UPDATE REQUEST with PDP Context Status updating the status for IMS and CMNet sessions on GERAN Cell B
8. SS transmits ROUTING AREA UPDATE ACCEPT with PDP Context Status updating the status for IMS and CMNet sessions and indicates that IMS voice over PS is not supported by setting IMS voice over PS session indicator flag to FALSE.

9. Verify that UE initiates IMS DeRegistration procedure.UE sends REGISTER with "expires" header set to 0
10. SS sends 200 OK
11. Verify that UE sends Deactivate PDP Context Request to disconnect the IMS Session.
12. SS shall response with Deactivate PDP Context Accept message.
13. Verify that the FTP download resumes on GERAN Cell B

POSTAMBLE

14. Stop FTP transfer hereafter.
15. SS initiates a MT Detach procedure on GERAN Cell B.
16. Deactivate E-UTRAN Cell A and GPRS Cell B

Table 8.2.4.2.5-2: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
2	→ ←	SIP	Execute the steps 1- 6 of test procedure 5.1.1.1.5		
3	→ →	SIP	SS establishes a Dedicated EPS bearer	QCI 6	
4	←		FTP download from application server.		
5			TX Power modification according to Time T1 in Table 8.1.3.5-1		
6	←	RRC	SS send the RRC connection Release with ARFCN of Cell B		
7	→	NAS	UE performs ROUTING AREA UPDATE REQUEST on GERAN Cell B	In PDP Context Status updating the status for IMS and CMNet sessions	PASS
8	←	NAS	SS transmits ROUTING AREA UPDATE ACCEPT	In PDP Context Status updating for the status for IMS and CMNet sessions , IMS VoPS flag to FALSE	
9	→ ←	SIP	UE initiates IMS Deregistration procedure	“expires” header is set to 0	PASS
10	←	SIP	SS sends 200 OK		
11	→	NAS	UE sends Deactivate PDP Context Request to disconnect the IMS Session		PASS
12	←	NAS	SS responses with Deactivate		

			PDP Context Accept		
13			Verify that the FTP download resumes on GPRS Cell B		PASS
14			Stop FTP transfer hereafter		
15	← →	NAS	SS initiates mobile terminated Detach procedure (refer to 24.301 clause 5.5.2.3).		
16	SS		Deactivate E-UTRAN Cell A and GPRS Cell B		

Specific message contents

Table 8.2.4.2.5-3: Routing Area Update Accept Message

Derivation path: 24.008 table 9.4.14		
Information Element	Value/Remark	Comment
Update type	001 'combined RA/LA updating'	
PDP context status	0000000100010000	Indicating IMS(NSAPI 5) and CMNet(NSAPI 9) context enabled
Network feature support	IMS VoPS = 0	IMS voice over PS session in Iu mode and A/Gb mode not supported

8.2.4.2.6 Expected Result

UE shall in step 7 redirect to GPRS Cell B and send ROUTING AREA UPDATE REQUEST to keep IMS PDP and CMNet PDP activated.

UE shall in step 9 and step 11 successfully performs IMS De-registration and Deactivate IMS PDP.

UE shall in step 13 resume FTP Download

8.2.4.3 Reselect to IMS-voice-capable Cell, IMS Registration

8.2.4.3.1 Test Purpose

UE could perform TAU when reselect from GPRS cell to TD-LTE cell. The LTE cell indicates that IMS Voice over PS is supported via TAU Accept. Verify UE could request IMS PDN establishment and IMS Registration after TAU complete.

8.2.4.3.2 Reference specification

3GPP TS 24.008 clause 9.4,9.5

3GPP TS 51.010-1 clause 44.2.1.2.1.3, 45.2.1.1.3

3GPP TS 24.301 clause 5.5.3

8.2.4.3.3 Applicability

This test applies to VoLTE over CSFB UE.
The UE shall support configuration 4.

8.2.4.3.4 Test conditions

[SS configuration]

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC = 460 MNC = 00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE = -110 dBm/15kHz
Cell A supports IMS voice over PS

GPRS Cell B
Cell Id = 02 LAC = 02
MCC = 460 MNC = 00
ARFCN = f1
RF Signal level = - 70 dBm
NMO I

[UE configuration]
The test USIM shall be inserted.

[Initial conditions]
SS
E-UTRAN Cell A is not active.
GSM Cell B is not active.
The test shall be performed under ideal radio conditions.
UE
UE is powered off (State 1)

8.2.4.3.5 Test procedure

Table 8.2.4.3.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A	Cell B	Remark
T0	Reference Signal EPRE	dBm/15kHz	-120	-	
	RSSI	dBm	-	-70	

T1	Reference Signal EPRE	dBm/15kHz	-70(Up 0.5dB step per 0.1s)	-	
	RSSI	dBm	-	-90(Down 1dB step per 0.1s)	

PREAMBLE

1. Activate E-UTRAN Cell A and GERAN Cell B (Refer Table 8.1.3.5-1: Time T0).
2. Power on the UE.
3. UE selects Cell B and performs Combined Attach Procedure as per steps 3-5 of 3GPP TS 51.010-1 section 44.2.1.2.1.3
4. Mobile originating PDP context activation procedure is performed as per steps 8-9 of 3GPP TS 51.010-1 section 45.2.1.1.3

MAIN BODY

5. Increase E-UTRAN Cell A and Decrease GERAN Cell B signal according to Time T1 in Table 8.1.3.5-1
6. Verify UE reselects to Cell A and transmits TRACKING AREA UPDATE REQUEST message.
7. SS transmits TRACKING AREA UPDATE ACCEPT and indicates that IMS voice over PS is supported by setting IMS VoPS flag to TRUE.
8. Verify that UE send PDN Connectivity Request to request IMS PDN (“IMS”) and requests P-CSCF address via PCO method.SS creates an EPS Default Bearer(QCI=5) on IMS APN.
9. Verify that UE registers with IMS successfully and subscribes to reg – event package according to steps 2- 6 of test procedure 5.1.3.5.
10. UE initiates a IMS call. Verify that the UE could perform a correct IMS voice call setup and release according to steps 3-14 of test procedure 5.2.1.5..

POSTAMBLE

11. The SS initiates a Mobile Terminated Detach procedure.
12. RRC Connection is released by SS.
13. Deactivate E-UTRAN Cell A and GSM Cell B.

Table 8.2.4.3.5-2: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1			Activate E-UTRAN Cell A, Cell B (Refer Table 8.1.1.5-1: Time T0)		
3	→ ←	NAS	UE selects Cell B and performs Combined Attach Procedure as per steps 3-5 of 3GPP TS 51.010-1 section 44.2.1.2.1.3		
4	→ ←	NAS	Mobile originating PDP context activation procedure is performed		

			as per steps 8-9 of of 3GPP TS 51.010-1 section 45.2.1.1.3		
5			TX Power modification according to Time T1 in Table 8.1.1.5-1		
6	→	NAS	UE reselects to Cell A and sends TRACKING AREA UPDATE Request		PASS
7	←	NAS	SS transmits TRACKING AREA UPDATE ACCEPT	IMS VoPS flag is set to TRUE	
8	→ ←	NAS	UE send PDN Connectivity Request and requests P-CSCF address via PCO method. SS creates an default EPS Bearer(QCI=5) on IMS APN		PASS
9	← →	SIP	UE registers with IMS successfully and subscribes to reg – event package	according to steps 1- 6 of test procedure 5.1.3.5	PASS
10	← →	SIP	UE initiates a IMS call. Verify that the UE could perform a correct IMS voice call setup and release	according to steps 3-14 of test procedure 5.2.1.5	PASS
11	← →	NAS	SS initiates mobile terminated Detach procedure (refer to 24.301 clause 5.5.2.3).		
12	←	RRC	SS sends RRC CONNECTION RELEASE message to UE		
13			Deactivate E-UTRAN Cell A and GPRS Cell B		

8.2.4.3.6 Expected Result

UE shall in step 5 reselcet to LTE Cell A and sends TRACKING AREA UPDATE Request

UE shall in step 8 send PDN Connectivity Request for IMS PDN and requests P-CSCF address via PCO method

UE shall in step 9 complete IMS initial Registration after TAU complete.

UE shall in step 10 successfully perform a correct IMS mobile originated voice call setup and release after TAU complete.

8.2.4.4 Reselect to IMS-voice-capable Cell with Data, IMS Registration

8.2.4.4.1 Test Purpose

UE could perform TAU and recover data transfer when reselect from GPRS cell to TD-LTE cell. The LTE cell indicates that IMS Voice over PS is supported via TAU Accept. Verify UE could request IMS PDN establishment and IMS Registration after TAU complete.

8.2.4.4.2 Reference specification

3GPP TS 24.008 clause 9.4,9.5
3GPP TS 51.010-1 clause 44.2.1.2.1.3, 45.2.1.1.3
3GPP TS 24.301 clause 5.5.3

8.2.4.4.3 Applicability

This test applies to VoLTE over CSFB UE.
The UE shall support configuration 4.

8.2.4.4.4 Test conditions

[SS configuration]

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC = 460 MNC = 00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE = -110 dBm/15kHz
Cell A supports IMS voice over PS

GPRS Cell B
Cell Id = 02 LAC = 02
MCC = 460 MNC = 00
ARFCN = f1
RF Signal level = - 70 dBm
NMO I

[UE configuration]
The test USIM shall be inserted.

[Initial conditions]

SS

E-UTRAN Cell A is not active.

GSM Cell B is not active.

The test shall be performed under ideal radio conditions.

UE

UE is powered off (State 1)

8.2.4.4.5 Test procedure

Table 8.2.4.4.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A	Cell B	Remark
T0	Reference Signal EPRE	dBm/15kHz	-120	-	
	RSSI	dBm	-	-70	
T1	Reference Signal EPRE	dBm/15kHz	-70(Up 0.5dB step per 0.1s)	-	
	RSSI	dBm	-	-90(Down 1dB step per 0.1s)	

PREAMBLE

1. Activate E-UTRAN Cell A and GERAN Cell B (Refer Table 8.2.4.4.5-1: Time T0).
2. Power on the UE.
3. UE selects Cell B and performs Combined Attach Procedure as per steps 3-5 of 3GPP TS 51.010-1 section 44.2.1.2.1.3
4. Mobile originating PDP context activation procedure is performed as per steps 8-9 of 3GPP TS 51.010-1 section 45.2.1.1.3

MAIN BODY

5. Using the FTP client, UE begins FTP download from the application server in GPRS cell B.
6. Increase E-UTRAN Cell A and Decrease GERAN Cell B signal according to Time T1 in Table 8.2.4.4.5-1
7. Verify UE reselects to Cell A and transmits TRACKING AREA UPDATE REQUEST message.
8. SS transmits TRACKING AREA UPDATE ACCEPT and indicates that IMS voice over PS is supported by setting IMS VoPS flag to TRUE.
9. Verify the FTP download is recovered in E-UTRAN Cell A.
10. Verify that UE send PDN Connectivity Request to request IMS PDN (“IMS”) and requests P-CSCF address via PCO method. SS creates an EPS Default Bearer(QCI=5) on IMS APN.
11. Verify that UE registers with IMS successfully and subscribes to reg – event package according to steps 2- 6 of test procedure 5.1.3.5.
12. UE initiates a IMS call. Verify that the UE could perform a correct IMS voice call setup and release according to steps 3-14 of test procedure 5.2.1.5.

13. Verify the data transfer are ongoing on Cell B without interruption during step 9-12.

POSTAMBLE

14. SS stops FTP download.
15. The SS initiates a Mobile Terminated Detach procedure.
16. RRC Connection is released by SS.
17. Deactivate E-UTRAN Cell A and GSM Cell B.

Table 8.2.4.3.5-2: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1			Activate E-UTRAN Cell A, Cell B (Refer Table 8.1.1.5-1: Time T0)		
3	→ ←	NAS	UE selects Cell B and performs Combined Attach Procedure as per steps 3-5 of 3GPP TS 51.010-1 section 44.2.1.2.1.3		
4	→ ←	NAS	Mobile originating PDP context activation procedure is performed as per steps 8-9 of of 3GPP TS 51.010-1 section 45.2.1.1.3		
5	→ ←	FTP	Using the FTP client, UE begins FTP download from the application server in GPRS cell B		
6			TX Power modification according to Time T1 in Table 8.1.1.5-1		
7	→	NAS	UE reselects to Cell A and sends TRACKING AREA UPDATE Request		PASS
8	←	NAS	SS transmits TRACKING AREA UPDATE ACCEPT	IMS VoPS flag is set to TRUE	
9	→ ←	FTP	Verify the FTP download is recovered in E-UTRAN Cell A		PASS
10	→ ←	NAS	UE send PDN Connectivity Request and requests P-CSCF address via PCO method. SS creates an default EPS Bearer(QCI=5) on IMS APN		PASS
11	← →	SIP	UE registers with IMS successfully and subscribes to reg – event package	According to steps 1- 6 of test procedure 5.1.3.5	PASS
12	← →	SIP	UE initiates a IMS call. Verify that the UE could perform a correct IMS voice call setup and release	According to steps 3-14 of test procedure 5.2.1.5	PASS

13	← →	FTP	Verify the data transfer are ongoing on Cell B without interruption during step 9-12		PASS
14	← →	FTP	SS stops FTP download		
15	← →	NAS	SS initiates mobile terminated Detach procedure (refer to 24.301 clause 5.5.2.3).		
16	←	RRC	SS sends RRC CONNECTION RELEASE message to UE		
17			Deactivate E-UTRAN Cell A and GPRS Cell B		

8.2.4.4.6 Expected Result

UE shall in step 7 reselcet to LTE Cell A and sends TRACKING AREA UPDATE Request

UE shall in step 9 recover FTP download successfully.

UE shall in step 10 send PDN Connectivity Request for IMS PDN and requests P-CSCF address via PCO method

UE shall in step 11-13 complete IMS initial Registration, successfully perform a correct IMS mobile originated voice call setup and release after TAU complete.

8.2.4.5 Registration Expiration Time, expires in LTE, IMS re-registration

8.2.4.5.1 Test Purpose

Test to verify that UE could extracts expiration time of the registration for public user identity from 200 OK response to the REGISTER request, and the UE can maintain the expiration time during the voice call in GSM and re-register a previously registered public user identity when the expiration time expires in LTE

8.2.4.5.2 Reference specification

3GPP TS 23.216 clause 6.2.2.1

3GPP TS 24.229 clause 5.1.1.4.1

8.2.4.5.3 Applicability

This test applies to VoLTE over CSFB UE.

The UE shall support configuration 4.

8.2.4.5.4 Test conditions

[SS configuration]
E-UTRAN Cell A and GSM Cell B.

E-UTRAN Cell A
Cell ID=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -70 dBm/15kHz

GSM Cell B
Cell ID=02 LAC = 02
MCC-MNC = 460-00
ARFCN = f1
RF Signal Level = -65dbm

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is active
GSM Cell B is active.
The test shall be performed under ideal radio conditions.

UE
DUT is powered off (State 1)

8.2.4.5.5 Test procedure

Table 8.2.4.5.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A	Cell B	Remark
T0	Reference Signal EPRE	dBm/15kHz	-70	-	UE stays in Cell A with a VoLTE call
	RSSI	dBm	-	-65	
T1	Reference Signal EPRE	dBm/15kHz	Down 0.5dB step per 0.1s		
	RSSI	dBm	-	-65	
T2	Reference Signal EPRE	dBm/15kHz	-90	-	UE eSRVCC to Cell B

	RSSI	dBm	-	-65	

PREAMBLE

1. Activate E-UTRAN Cell A and GSM Cell B(Refer Table 8.2.4.5.5-1: Time T0).
2. Execute the steps 1- 13 of test procedure 5.2.1.5 with the exception that SS specifies expiration time to 240 in 200 OK responding to REGISTER

MAIN BODY

3. Decrease E-UTRAN Cell A signal(Refer Table 8.2.4.5.5: Time T1).
4. Keep the voice call up in Cell A
5. During the signal level change duration, verify UE transmits a MeasurementReport message on Cell A to report the measured RSSI value for Cell B. The measurement report trigger type is eventB2
6. The SS transmits an *MobilityFromEUTRACommand* message on Cell A to trigger PS to CS voice only eSRVCC process from TD-LTE Cell A to GSM Cell B.
7. Verify UE transmits an HandoverComplete message on Cell B
8. Verify the voice call is ongoing on GSM Cell B without interruption.
9. SS initiates voice call disconnect and sends ChannelRelease in GSM Cell B. Cell selection indicator IE doesn't include any E-UTRAN carrier frequency
10. The UE performs TAU procedure and register to LTE Cell A. Verify that the EPS update type in TAU is "combined TA/LA updating with IMSI attach".
11. SS transmits TRACKING AREA UPDATE ACCEPT and indicates that IMS voice over PS is supported
12. Verify that UE sends REGISTER to perform IMS re-registration before half of the time has expired from the initial registration.
13. The SS responses with 200 OK.

POSTAMBLE

14. The SS initiates a Mobile Originated Detach procedure
15. Deactivate TD-LTE Cell A and GSM Cell B.

Table 8.2.4.5.5-2: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1		SS	Activate E-UTRAN Cell A (Refer Table 5.6.1.5-1: Time T0).		
2	→ ←	NAS SIP	Execute the steps 1- 13 of test procedure 5.2.1.5	Expiration time in 200 OK responding to REGISTER is set to 240	
3		SS	Decrease E-UTRAN Cell A signal (Refer Table 5.6.1.5: Time T2).		

4	→ ←	RTP	Keep the Voice Call up in Cell A		
5	→ ←	RRC	UE transmits a MeasurementReport message on Cell A.	Event B2. Report the RSSI for Cell B	PASS
6	←	RRC	The SS transmits an MobilityFromEUTRACommand message on Cell A.		
7	→	RRC	UE transmits an HandoverComplete message on Cell B		
8	→ ←	RTP	Verify the voice call is ongoing on GSM Cell B without interruption.		PASS
9	←	RRC	SS initiates voice call disconnect and sends ChannelRelease on GSM Cell B.	Cell selection indicator IE doesn't include any E-UTRAN carrier frequency	
10	← →	NAS	UE sends TRACKING AREA UPDATE REQUEST on LTE Cell A.	EPS update type in TAU is "combined TA/LA updating with IMSI attach".	PASS
11	←	NAS	SS transmits TRACKING AREA UPDATE ACCEPT	IMS VoPS flag is set to TRUE	
12	→	SIP	UE sends REGISTER		
13	←	SIP	The SS responses with 200 OK		PASS
14	← →	RRC NAS	The SS initiates a Mobile Originated Detach procedure		
15			Deactivate TD-LTE Cell A and GSM Cell B.		

8.2.4.5.6 Expected Result

UE shall in step 12 perform an IMS re-registration, when expiration timer of registration expires after UE returns to LTE.

8.2.4.6 Registration Expiration Time, expires in GSM, IMS initial registration

8.2.4.6.1 Test Purpose

Test to verify that the UE could extract expiration time ofregistration for public user identity from 200 OK response to the REGISTER request, and also maintain the registration expiration

time during the voice call in GSM. UE will perform initial registration once return to LTE if the expiration time has expired when UE is in GSM.

8.2.4.6.2 Reference specification

3GPP TS 23.216 clause 6.2.2.1
3GPP TS 24.229 clause 5.1.1.4.1

8.2.4.6.3 Applicability

This test applies to VoLTE over CSFB UE.
The UE shall support configuration 4.

8.2.4.6.4 Test conditions

[SS configuration]
E-UTRAN Cell A and GSM Cell B.

E-UTRAN Cell A
Cell ID=01 TAC = 01
MCC-MNC = 460-00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -70 dBm/15kHz

GSM Cell B
Cell ID=02 LAC = 02
MCC-MNC = 460-00
ARFCN = f1
RF Signal Level = -65dbm

[UE configuration]
The test USIM should be inserted

[Initial conditions]
SS
E-UTRAN Cell A is active
GSM Cell B is active.
The test shall be performed under ideal radio conditions.

UE
DUT is powered off (State 1)

8.2.4.6.5 Test procedure

Table 8.2.1.3.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A	Cell B	Remark
T0	Reference Signal EPRE	dBm/15kHz	-70	-	UE stays in Cell A with voice call
	RSSI	dBm	-	-65	
T1	Reference Signal EPRE	dBm/15kHz	Down 0.5dB step per 0.1s		
	RSSI	dBm	-	-65	
T2	Reference Signal EPRE	dBm/15kHz	-90	-	UE eSRVCC to Cell B
	RSSI	dBm	-	-65	

PREAMBLE

1. Activate E-UTRAN Cell A, Cell B (Refer Table 8.2.1.1.5-1: Time T0).
2. Execute the steps 1- 13 of test procedure 5.2.1.5 with the exception that SS specifies expiration time to 120 in 200 OK responding to REGISTER

MAIN BODY

3. Decrease E-UTRAN Cell A signal(Refer Table 8.2.1.1.5: Time T2).
4. Keep the Voice Call up in Cell A
5. During the signal level change duration, verify UE transmits a MeasurementReport message on Cell A to report the measured RSSI value for Cell B. The measurement report trigger type is eventB2
6. The SS transmits an *MobilityFromEUTRACommand* message on Cell A to trigger PS to CS voice only eSRVCC process from TD-LTE Cell A to GSM Cell B.
7. Verify UE transmits an HandoverComplete message on Cell B
8. Verify the voice call is ongoing on GSM Cell B without interruption.
9. Hold voice call for 60 seconds
10. SS initiates voice call disconnectand sends ChannelRelease in GSM Cell B.. Cell selection indicator IE doesn't include any E-UTRAN carrier frequency
11. The UE performs TAU procedure and register to LTE Cell A. Verify that the EPS update type in TAU is "combined TA/LA updating with IMSI attach".
12. SS transmits TRACKING AREA UPDATE ACCEPT and indicates that IMS voice over PS is supported
13. Verify UE send REGISTER to initial IMS Initial Registration. IMS registration succeed

POSTAMBLE

14. The SS initiates a Mobile Originated Detach procedure
15. Deactivate TD-LTE Cell A and GSM Cell B.

Table 8.2.1.1.5-2: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1		SS	Activate E-UTRAN Cell A, Cell B (Refer Table 5.6.1.5-1: Time T0).		
2	→ ←	RRC NAS	Execute the steps 1- 13 of test procedure 5.2.1.5	Expiration time in 200 OK responding to REGISTER is set to 120	PASS
3		SS	Decrease E-UTRAN Cell A signal(Refer Table 5.6.1.5: Time Tn).		
4	→ ←	RTP	Keep the voice call up in Cell A		
5	→ ←	RRC	UE transmits a MeasurementReport message on Cell A.	Event B2. Report the RSSI for Cell B	PASS
6	←	RRC	The SS transmits an MobilityFromEUTRACommand message on Cell A.		
7	→	RRC	UE transmits an HandoverComplete message on Cell B		PASS
8	→ ←	RTP	Verify the voice call is ongoing on GSM Cell B without interruption.		PASS
9	→ ←	RTP	Hold voice call for 60 seconds		
10	← →	N AS	SS initiates voice call disconnect andsends ChannelRelease in GSM Cell B..	Cell selection indicator IE doesn't include any E-UTRAN carrier frequency	
11	←	NAS	The UE sends TRACKING AREA UPDATE REQUEST on Cell A..	EPS update type in TAU is "combined TA/LA updating with IMSI attach"	
12	← →	RRC	SS transmits TRACKING AREA UPDATE ACCEPT	IMS VoPS flag is set to TRUE	
13	← →	SIP	UE performs IMS Initial Registration: Execute the steps 1-6 of test procedure 5.1.1.1.5.		PASS
14	← →	RRC NAS	The SS initiates a Mobile Originated Detach procedure		

15			Deactivate TD-LTE Cell A and GSM Cell B.		

8.2.4.6.6 Expected Result

UE shall in step 13 perform an IMS initial registration, when expiration timer of registration expires before UE returns to LTE.

9 Performance

9.1 Power Consumption

9.1.1 Voice Call Power Consumption, Cell Center

9.1.1.1 Test Purpose

To measure the average current of VoLTE over CSFB UE when voice call is ongoing in a good coverage area, RoHC and DRX are enabled.

9.1.1.2 Reference specification

3GPP TS36.508
3GPP TS24.229 clause 5.1.3

9.1.1.3 Applicability

This test applies to VoLTE over CSFB UE..

The UE shall support configuration 4.

9.1.1.4 Test conditions

[SS configuration]
E-UTRAN Cell A is a TD-LTE cell.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC = 460 MNC = 00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -80 dBm/15kHz
ReferenceSignalPower = 18

DL Modulation / Coding = Dynamic (based on UE reporting)
RB Allocation UL= Dynamic
RB Allocation DL = Dynamic

[UE configuration]
The test USIM should be inserted
The UE is in AUTOMATIC network selection mode.

[Initial conditions]
SS

E-UTRAN Cell A is not active
The test shall be performed under ideal radio conditions.

UE

UE is powered off (State 1)

9.1.1.5 Test procedure

Table 9.1.1.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A	Remark
T0	Reference Signal EPRE	dBm/15kHz	-80	

PREAMBLE

1. Connect the power consumption tester to UE.
2. Activate E-UTRAN Cell A
3. Power on the UE.
4. The UE performs registration procedure followed by activation of the initial default EPS bearer for data PDN (QCI 9) (see 36.508, 4.5.2).

MAIN BODY

5. UE initiates the PDN connectivity request for IMS PDN.
6. SS establishes a MT SIP Default EPS bearer (QCI 5) with the UE.
7. Verify that the UE has successfully registered with the IMS PDN according to steps 2-6 of test procedure 5.1.3.5.
8. UE initiates INVITE request over SIP using IMS PDN to SS.
9. SS responds to INVITE with 100 Trying and 183 Session Progress response.
10. SS waits for UE to send PRACK.
11. SS establishes a MT Dedicated EPS bearer (QCI 1) with the UE for voice call. SS transmits RRCConnectionReconfiguration to configure specific DRX parameters, RoHC profile 0x0001 and profile 0x0002
12. SS initiates answer call procedure.
13. Verify UE support DRX (refer to TC 5.2.6)
14. Verify UE support RoHC (refer to TC **错误!未找到引用源。**)
15. Verify UE transmit power is 0dBm

16. Keep the IMS voice call for 5 minutes.
17. Get the value of the power consumption tester during step 16 and calculate the power consumption
18. The UE initiates the IMS voice call end procedure.
19. Repeat step 8-18 once.
20. Average the value of power consumption

POSTAMBLE

21. SS sends Deactivate EPS Bearer Context Request (QCI 1). The UE shall respond with Deactivate EPS Bearer Context Accept.
22. SS initiates an MT Detach procedure.
23. The SS releases the RRC connection by sending the RRC Connection Release message to the UE.
24. Deactivate E-UTRAN Cell A.

Table 9.1.1.5-2: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1			Connect power consumption tester to UE		
2	←	RRC	Activate E-UTRAN Cell A		
3	UE		Switch On UE	AT Command (switch ON)	
4	→ ←	RRC NAS	UE attach procedure with Default EPS bearer establishment for Data PDN (QCI 9) (see 36.508, 4.5.2 (steps 1-16))		
5	→ ←	RRC NAS	UE initiates a PDN Connectivity Request for IMS PDN		
6	→ ←	NAS RRC	SS initiates the Default EPS bearer(QCI 5) on E-UTRAN cell A for SIP establishment by sending the RRC Connection Reconfiguration message		
7	→ ←	SIP	UE successfully registers to IMS Simulator; IMS Registration message flow: SIP Register -> 401 Unauthorized -> SIP Register -> 200 OK	according to steps 2-6 of test procedure 5.1.3.5	PASS
8	→	RRC SIP	UE initiates a MO Call on E-UTRAN cell A. UE initiates INVITE request		
9	→ ←	SIP	SIP session establishment with preconditions: INVITE -> 183 Session Progress		
10	→	SIP	SS waits for UE to send PRACK		

11	→ ←	RRC NAS	SS establishes a MT Dedicated EPS bearer (QCI 1) with the UE for voice call. DRX parameters and RoHC are configured		
12	→ ←	SIP	SS initiates answer call procedure.		
13	←	PHY	Verify UE support DRX		PASS
14	→ ←	PDCP	Verify UE support RoHC		PASS
15			Verify UE transmit power is 0dBm		PASS
16	→ ←	RTP	Keep the voice call for 5 minute		
17			Get the value of the power consumption tester during step 16 and calculate the power consumption		
18	→ ←	SIP	SS initiates CLEAR call procedure. Session release: BYE -> 200 OK		
19			Repeat step 8-18once		
20			Average the value of power consumption		PASS
21	← →	NAS RRC	SS releases the MT Dedicated EPS bearer (QCI 1)		
22	← →	NAS	Mobile Terminated Detach procedure initiated by SS	Refer to 4.2.3.1	
23	←	RRC	RRC connection release		
24	SS		Deactivate Cell A		

Table 9.1.1.5-3: UplinkPowerControl Config

Derivation Path: 36.331 clause 6.3.2			
Information Element	Value/remark	Comment	Condition
UplinkPowerControlCommon-DEFAULT ::= SEQUENCE {			
p0-NominalPUSCH	-100 (-100 dBm)		
alpha	al10 (1.0)		
p0-NominalPUCCH	-100 (-100 dBm)		
deltaFList-PUCCH SEQUENCE {			
deltaF-PUCCH-Format1	deltaF0		
deltaF-PUCCH-Format1b	deltaF3		
deltaF-PUCCH-Format2	deltaF1		
deltaF-PUCCH-Format2a	deltaF2		
deltaF-PUCCH-Format2b	deltaF2		
}			
deltaPreambleMsg3	4		

}			

Table 9.1.1.5-4: DRX-Config

Derivation Path: 36.508 Table 4.6.1-8			
Information Element	Value/remark	Comment	Condition
drx-Config CHOICE {			
setup SEQUENCE {			
onDurationTimer	psf8		
drx-InactivityTimer	psf4		
drx-RetransmissionTimer	psf4		
longDRX-CycleStartOffset CHOICE {			
sf40	0		
}			
shortDRX	Not present		
}			
}			

Table 9.1.1.5-5: RoHC-Config

Derivation Path: TS 36.508 Table 4.8.2.1.2.1-1			
Information Element	Value/remark	Comment	Condition
PDCP-Config-DRB-UM ::= SEQUENCE {			
rlc-UM SEQUENCE {			
pdcp-SN-Size	len7bits		
}			
headerCompression CHOICE {			
rohc SEQUENCE {			
maxCID	15	DEFAULT 15	
profiles SEQUENCE {			
profile0x0001	TRUE		
profile0x0002	TRUE		
profile0x0003	FALSE		
profile0x0004	FALSE		
profile0x0006	FALSE		
profile0x0101	FALSE		
profile0x0102	FALSE		
profile0x0103	FALSE		
profile0x0104	FALSE		
}			
}			
}			
}			

9.1.1.6 Expected Result

The current should be less than 140 mA

9.1.1a Voice Call Power Consumption, Cell Center, Dual Standby

9.1.1a.1 Test Purpose

To measure the average current of VoLTE over Dual Standby UE when voice call is ongoing in a good coverage area, RoHC and DRX are enabled.

9.1.1a.2 Reference specification

3GPP TS 24.229 clause5.1.3

9.1.1a.3 Applicability

This test applies to VoLTE over Dual Standby UE.

The UE shall support configuration 4.

9.1.1a.4 Test conditions

[SS configuration]

E-UTRAN Cell A is a TD-LTE cell.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC = 460 MNC = 00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -80 dBm/15kHz
ReferenceSignalPower = 18
DL Modulation / Coding = Dynamic (based on UE reporting)
RB Allocation UL= Dynamic
RB Allocation DL = Dynamic

GSM Cell B
Cell Id=02 LAC = 02
MCC-MNC = 460-00
ARFCN = f1
RF Signal Level = -65dBm

[UE configuration]
The test USIM should be inserted
The UE is in AUTOMATIC network selection mode.

[Initial conditions]
SS
E-UTRAN Cell A is not active
The test shall be performed under ideal radio conditions.

UE
UE is powered off (State 1)

9.1.1a.5 Test Procedure

Table 9.1.1a.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A	Cell B	Remark
T0	Reference Signal EPRE	dBm/15kHz	-80	-	
	RSSI	dBm	-	-65	

PREAMBLE
1. Connect the power consumption tester to UE.
2. Activate E-UTRAN Cell A
3. Power on the UE.
4. The UE performs registration procedure followed by activation of the initial default EPS bearer for data PDN (QCI 9) (see 36.508, 4.5.2).

MAIN BODY
5. UE initiates the PDN connectivity request for IMS PDN.
6. SS establishes a MT SIP Default EPS bearer (QCI 5) with the UE.
7. Verify that the UE has successfully registered with the IMS PDN according to steps 2-6 of test procedure 5.1.3.5.
8. In parallel with step 4-7, UE performs CS attach in GSM Cell B according to Step7-12 defined in TS 51.010 26.2.2.3 procedure 3. UE is in GSM idle.
9. UE initiates INVITE request over SIP using IMS PDN to SS.
10. SS responds to INVITE with 100 Trying and 183 Session Progress response.
11. SS waits for UE to send PRACK.
12. SS establishes a MT Dedicated EPS bearer (QCI 1) with the UE for voice call. SS transmits RRCConnectionReconfiguration to configure specific DRX parameters and RoHC profile 0x0001 and profile 0x0002
13. SS initiates answer call procedure.
14. Verify UE support DRX (refer to TC 5.2.6)
15. Verify UE support RoHC (refer to TC 错误!未找到引用源。)

16. Verify UE transmit power is 0dBm
17. Keep the IMS voice call for 5 minutes.
18. Get the value of the power consumption tester during step 16 and calculate the power consumption
19. The UE initiates the IMS voice call end procedure.
20. Repeat step 9-19 once.
21. Average the value of power consumption

POSTAMBLE

22. SS sends Deactivate EPS Bearer Context Request (QCI 1). The UE shall respond with Deactivate EPS Bearer Context Accept.
23. SS initiates an MT Detach procedure.
24. The SS releases the RRC connection by sending the RRC Connection Release message to the UE.
25. Deactivate E-UTRAN Cell A.

Table 9.1.1.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1			Connect power consumption tester to UE		
2	←	RRC	Activate E-UTRAN Cell A		
3	UE		Switch On UE	AT Command (switch ON)	
4	→ ←	RRC NAS	UE attach procedure with Default EPS bearer establishment for Data PDN (QCI 9)		
5	→ ←	RRC NAS	UE initiates a PDN Connectivity Request for IMS PDN		
6	→ ←	NAS RRC	SS initiates the Default EPS bearer(QCI 5) on E-UTRAN cell A for SIP establishment by sending the RRC Connection Reconfiguration message		
7	→ ←	SIP	UE successfully registers to IMS Simulator; IMS Registration message flow: SIP Register -> 401 Unauthorized -> SIP Register -> 200 OK	According to steps 2-6 of test procedure 5.1.3.5	PASS
8	→ ←	NAS RRC	In parallel with step4-7, UE performs CS attach in GSM Cell B	According to Step7-12 defined in TS 51.010 26.2.2.3 procedure 3	
9	→	RRC	UE initiates a MO Call on E-UTRAN		

		SIP	cell A. UE initiates INVITE request		
10	→ ←	SIP	SS sends 183 Session Progress		
11	→	SIP	SS waits for UE to send PRACK		
12	→ ←	RRC NAS	SS establishes a MT Dedicated EPS bearer (QCI 1) with the UE for voice call. DRX parameters and RoHC are configured		
13	→ ←	SIP	SS initiates answer call procedure.		
14	←	PHY	Verify UE support DRX		PASS
15	→ ←	PDCP	Verify UE support RoHC		PASS
16			Verify UE transmit power is 0dBm		PASS
17	→ ←	RTP	Keep the voice call for 5 minute		
18			Get the value of the power consumption tester during step 16 and calculate the power consumption		
19	→ ←	SIP	SS initiates CLEAR call procedure. Session release: BYE -> 200 OK		
20			Repeat step 8-19 once		
21			Average the value of power consumption		PASS
22	← →	NAS RRC	SS releases the MT Dedicated EPS bearer (QCI 1)		
23	← →	NAS	Mobile Terminated Detach procedure initiated by SS		
24	←	RRC	RRC connection release		
25	SS		Deactivate Cell A and Cell B		

Specific Message Contents Refer to 9.1.1.5.

9.1.1a.5 Expected Result

The current should be less than 140 mA

9.1.2 Voice Call Power Consumption, Cell Edge

9.1.2.1 Test Purpose

To measure the average current of VoLTE over CSFB UE when voice call is ongoing in a poor coverage area, RoHC and DRX are enabled.

9.1.2.2 Reference specification

3GPP TS24.229 clause5.1.3

9.1.2.3 Applicability

This test applies to VoLTE over CSFB UE..

The UE shall support configuration 4.

9.1.2.4 Test conditions

[SS configuration]
E-UTRAN Cell A is a TD-LTE cell.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC = 460 MNC = 00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -110 dBm/15kHz
ReferenceSignalPower = 18
DL Modulation / Coding = Dynamic (based on UE reporting)
RB Allocation UL= Dynamic
RB Allocation DL = Dynamic

[UE configuration]
The test USIM should be inserted
The UE is in AUTOMATIC network selection mode.

[Initial conditions]
SS
E-UTRAN Cell A is not active
The test shall be performed under ideal radio conditions.

UE
UE is powered off (State 1)

9.1.2.5 Test procedure

Table 9.1.2.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A	Remark
T0	Reference Signal EPRE	dBm/15kHz	-110	

PREAMBLE

1. Connect the power consumption tester to UE.
2. Activate E-UTRAN Cell A
3. Power on the UE.
4. The UE performs registration procedure followed by activation of the initial default EPS bearer for data PDN (QCI 9) (see 36.508, 4.5.2).

MAIN BODY

5. UE initiates the PDN connectivity request for IMS PDN.
6. SS establishes a MT SIP Default EPS bearer (QCI 5) with the UE.
7. Verify that the UE has successfully registered with the IMS PDN according to steps 2-6 of test procedure 5.1.3.5.
8. UE initiates INVITE request over SIP using IMS PDN to SS.
9. SS responds to INVITE with 100 Trying and 183 Session Progress response.
10. SS waits for UE to send PRACK.
11. SS establishes a MT Dedicated EPS bearer (QCI 1) with the UE for voice call. SS transmits RRCConnectionReconfiguration to configure specific DRX parameters, RoHC profile 0x0001 and profile 0x0002
12. SS initiates answer call procedure.
13. Verify UE support DRX (refer to TC 5.2.6)
14. Verify UE support RoHC (refer to TC **错误!未找到引用源。**)
15. Verify UE transmit power is Maximum
16. Keep the IMS voice call for 5 minutes.
17. Get the value of the power consumption tester during step 16 and calculate the power consumption
18. The UE initiates the IMS voice call end procedure.
19. Repeat step 8-18 once.
20. Average the value of power consumption

POSTAMBLE

21. SS sends Deactivate EPS Bearer Context Request (QCI 1). The UE shall respond with Deactivate EPS Bearer Context Accept.
22. SS initiates an MT Detach procedure.
23. The SS releases the RRC connection by sending the RRC Connection Release message to the UE.
24. Deactivate E-UTRAN Cell A.

Table 9.1.2.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1			Connect power consumption tester to UE		
2	←	RRC	Activate E-UTRAN Cell A		
3	UE		Switch On UE	AT Command	

				(switch ON)	
4	→ ←	RRC NAS	UE attach procedure with Default EPS bearer establishment for Data PDN (QCI 9) (see 36.508, 4.5.2 (steps 1-16))		
5	→ ←	RRC NAS	UE initiates a PDN Connectivity Request for IMS PDN		
6	→ ←	NAS RRC	SS initiates the Default EPS bearer(QCI 5) on E-UTRAN cell A for SIP establishment by sending the RRC Connection Reconfiguration message		
7	→ ←	SIP	UE successfully registers to IMS Simulator; message flow: SIP Register -> 401 Unauthorized -> SIP Register -> 200 OK	according to steps 2-6 of test procedure 5.1.3.5	PASS
8	→	RRC SIP	UE initiates a MO Call on E-UTRAN cell A. UE initiates INVITE request		
9	→ ←	SIP	SS sends 183 Session Progress		
10	→	SIP	SS waits for UE to send PRACK		
11	→ ←	RRC NAS	SS establishes a MT Dedicated EPS bearer (QCI 1) with the UE for voice call. DRX parameters and RoHC are configured		
12	→ ←	SIP	SS initiates answer call procedure.		
13	←	PHY	Verify UE support DRX		PASS
14	→ ←	PDCP	Verify UE support RoHC		PASS
15			Verify UE transmit power is maximum		PASS
16	→ ←	RTP	Keep the voice call for 5 minute		
17			Get the value of the power consumption tester during step 16 and calculate the power consumption		
18	→ ←	SIP	SS initiates CLEAR call procedure. Session release: BYE -> 200 OK		
19			Repeat step 8-18once		
20			Average the value of power consumption		PASS
21	← →	NAS RRC	SS releases the MT Dedicated EPS bearer (QCI 1)		
22	←	NAS	Mobile Terminated Detach procedure		

	→		initiated by SS		
23	←	RRC	RRC connection release		
24	SS		Deactivate Cell A		

Specific Message Contents Refer to 9.1.1.5

9.1.2.6 Expected Result

The current should be less than [TBD] mA

9.1.2a Voice Call Power Consumption, Cell Edge, Dual Standby

9.1.2a.1 Test Purpose

To measure the average current of VoLTE over Dual Standby UE when voice call is ongoing in a poor coverage area, RoHC and DRX are enabled.

9.1.2a.2 Reference specification

3GPP TS24.229 clause5.1.3

9.1.2a.3 Applicability

This test applies to VoLTE over Dual Standby UE..

The UE shall support configuration 4.

9.1.2a.4 Test conditions

[SS configuration]

E-UTRAN Cell A is a TD-LTE cell.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC = 460 MNC = 00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -80 dBm/15kHz
ReferenceSignalPower = 18
DL Modulation / Coding = Dynamic (based on UE reporting)
RB Allocation UL= Dynamic
RB Allocation DL = Dynamic

GSM Cell B
Cell Id=02 LAC = 02

MCC-MNC = 460-00
ARFCN = f1
RF Signal Level = -65dBm

[UE configuration]
The test USIM should be inserted
The UE is in AUTOMATIC network selection mode.

[Initial conditions]
SS

E-UTRAN Cell A is not active
The test shall be performed under ideal radio conditions.

UE

UE is powered off (State 1)

9.1.2a.5 Test Procedure

Table 9.1.1a.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A	Cell B	Remark
T0	Reference Signal EPRE	dBm/15kHz	-110	-	
	RSSI	dBm	-	-65	

PREAMBLE

1. Connect the power consumption tester to UE.
2. Activate E-UTRAN Cell A
3. Power on the UE.
4. The UE performs registration procedure followed by activation of the initial default EPS bearer for data PDN (QCI 9) (see 36.508, 4.5.2).

MAIN BODY

5. UE initiates the PDN connectivity request for IMS PDN.
6. SS establishes a MT SIP Default EPS bearer (QCI 5) with the UE.
7. Verify that the UE has successfully registered with the IMS PDN according to steps 1-6 of test procedure 5.1.3.5.
8. In parallel with step4-7, UE performs CS attach in GSM Cell B according to Step7-12 defined in TS 51.010 26.2.2.3 procedure 3. UE is in GSM idle.
9. UE initiates INVITE request over SIP using IMS PDN to SS.
10. SS responds to INVITE with 100 Trying and 183 Session Progress response.
11. SS waits for UE to send PRACK.
12. SS establishes a MT Dedicated EPS bearer (QCI 1) with the UE for voice call. SS transmits RRCConnectionReconfiguration to configure specific DRX parameters and RoHC profile 0x0001 and profile 0x0002

13. SS initiates answer call procedure.
14. Verify UE support DRX (refer to TC 5.2.6)
15. Verify UE support RoHC (refer to TC 错误!未找到引用源。)
16. Verify UE transmit power is 0dBm
17. Keep the IMS voice call for 5 minutes.
18. Get the value of the power consumption tester during step 16 and calculate the power consumption
19. The UE initiates the IMS voice call end procedure.
20. Repeat step 9-19 once.
21. Average the value of power consumption

POSTAMBLE

22. SS sends Deactivate EPS Bearer Context Request (QCI 1). The UE shall respond with Deactivate EPS Bearer Context Accept.
23. SS initiates an MT Detach procedure.
24. The SS releases the RRC connection by sending the RRC Connection Release message to the UE.
25. Deactivate E-UTRAN Cell A.

Table 9.1.1.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1			Connect power consumption tester to UE		
2	←	RRC	Activate E-UTRAN Cell A		
3	UE		Switch On UE	AT Command (switch ON)	
4	→ ←	RRC NAS	UE attach procedure with Default EPS bearer establishment for Data PDN (QCI 9)		
5	→ ←	RRC NAS	UE initiates a PDN Connectivity Request for IMS PDN		
6	→ ←	NAS RRC	SS initiates the Default EPS bearer(QCI 5) on E-UTRAN cell A for SIP establishment by sending the RRC Connection Reconfiguration message		
7	→ ←	SIP	UE successfully registers to IMS Simulator; IMS Registration message flow: SIP Register -> 401 Unauthorized -> SIP Register -> 200 OK	according to steps 1- 6 of test procedure 5.1.3.5	PASS
8			In parallel with step4-7, UE performs CS attach in GSM Cell B	according to Step7-12 defined in TS 51.010 26.2.2.3	

				procedure 3	
9	→	RRC SIP	UE initiates a MO Call on E-UTRAN cell A. UE initiates INVITE request		
10	→ ←	SIP	SS sends 183 Session Progress		
11	→	SIP	SS waits for UE to send PRACK		
12	→ ←	RRC NAS	SS establishes a MT Dedicated EPS bearer (QCI 1) with the UE for voice call. DRX parameters and RoHC are configured		
13	→ ←	SIP	SS initiates answer call procedure.		
14	←	PHY	Verify UE support DRX		PASS
15	→ ←	PDCP	Verify UE support RoHC		PASS
16			Verify UE transmit power is 0dBm		PASS
17	→ ←	RTP	Keep the voice call for 5 minute		
18			Get the value of the power consumption tester during step 16 and calculate the power consumption		
19	→ ←	SIP	SS initiates CLEAR call procedure. Session release: BYE -> 200 OK		
20			Repeat step 8-19 once		
21			Average the value of power consumption		PASS
22	← →	NAS RRC	SS releases the MT Dedicated EPS bearer (QCI 1)		
23	← →	NAS	Mobile Terminated Detach procedure initiated by SS		
24	←	RRC	RRC connection release		
25	SS		Deactivate Cell A and Cell B		

Specific Message Contents Refer to 9.1.1.5

9.1.2a.5 Expected Result

The current should be less than [TBD] mA

9.1.3 Video Call Power Consumption, Cell Center

9.1.3.1 Test Purpose

To measure the average current of VoLTE over CSFB UE when video call is ongoing in a good coverage area, RoHC and DRX are enabled.

9.1.3.2 Reference specification

3GPP TS24.229 clause5.1.3

9.1.3.3 Applicability

This test applies to VoLTE over CSFB UE..

The UE shall support configuration 1.

9.1.3.4 Test conditions

[SS configuration]
E-UTRAN Cell A is a TD-LTE cell.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC = 460 MNC = 00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -80 dBm/15kHz
ReferenceSignalPower = 18
DL Modulation / Coding = Dynamic (based on UE reporting)
RB Allocation UL= Dynamic
RB Allocation DL = Dynamic

[UE configuration]
The test USIM should be inserted
The UE is in AUTOMATIC network selection mode.

[Initial conditions]
SS
E-UTRAN Cell A is not active
The test shall be performed under ideal radio conditions.

UE
UE is powered off (State 1)

9.1.3.5 Test procedure

Table 9.1.3.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A	Remark
T0	Reference Signal EPRE	dBm/15kHz	-80	

PREAMBLE

1. Connect the power consumption tester to UE.
2. Activate E-UTRAN Cell A
3. Power on the UE.
4. The UE performs registration procedure followed by activation of the initial default EPS bearer for data PDN (QCI 9) (see 36.508, 4.5.2).

MAIN BODY

5. UE initiates the PDN connectivity request for IMS PDN.
6. SS establishes a MT SIP Default EPS bearer (QCI 5) with the UE.
7. Verify that the UE has successfully registered with the IMS PDN according to steps 1- 6 of test procedure 5.1.3.5.
8. UE initiates INVITE request over SIP using IMS PDN to establish video call.
9. SS responds to INVITE with 100 Trying and 183 Session Progress.
10. SS waits for UE to send PRACK.
11. SS establishes a MT Dedicated EPS bearer (QCI 1) with the UE for video call. SS ransmits RRCConnectionReconfiguration to configure specific DRX parameters, RoHC profile 0x0001 and profile 0x0002
12. SS establishes a MT Dedicated EPS bearer (QCI 2) with the UE for video call. SS transmits RRCConnectionReconfiguration to configure specific DRX parameters, RoHC profile 0x0001 and profile 0x0002
13. SS initiates answer call procedure.
14. Verify UE support DRX (refer to TC 5.2.6)
15. Verify UE support RoHC (refer to TC 错误!未找到引用源。)
16. Verify UE transmit power is 0dBm
17. Keep medium screen intensity and medium voice volume. Keep the IMS video call for 5 minutes.
18. Get the value of the power consumption tester during step 16 and calculate the power consumption
19. The UE initiates the IMS video call release procedure.
20. Repeat step 8-19 once.
21. Average the value of power consumption

POSTAMBLE

22. SS sends Deactivate EPS Bearer Context Request (QCI 1). The UE shall respond with Deactivate EPS Bearer Context Accept.
23. SS sends Deactivate EPS Bearer Context Request (QCI 2). The UE shall respond with Deactivate EPS Bearer Context Accept.

24. SS initiates an MT Detach procedure.
25. The SS releases the RRC connection by sending the RRC Connection Release message to the UE.
26. Deactivate E-UTRAN Cell A.

Table 9.1.3.5-2: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1			Connect power consumption tester to UE		
2	←	RRC	Activate E-UTRAN Cell A		
3	UE		Switch On UE	AT Command (switch ON)	
4	→ ←	RRC NAS	UE attach procedure with Default EPS bearer establishment for Data PDN (QCI 9) (see 36.508, 4.5.2 (steps 1-16))		
5	→ ←	RRC NAS	UE initiates a PDN Connectivity Request for IMS PDN		
6	→ ←	NAS RRC	SS initiates the Default EPS bearer(QCI 5) on E-UTRAN cell A for SIP establishment by sending the RRC Connection Reconfiguration message		
7	→ ←	SIP	UE successfully registers to IMS Simulator; IMS Registration message flow: SIP Register -> 401 Unauthorized -> SIP Register -> 200 OK	According to steps 1- 6 of test procedure 5.1.3.5	PASS
8	→	RRC SIP	UE initiates a MO Call on E-UTRAN cell A. UE initiates INVITE request		
9	→ ←	SIP	SIP session establishment with preconditions: INVITE -> 183 Session Progress		
10	→	SIP	SS waits for UE to send PRACK		
11	→ ←	RRC NAS	SS establishes a MT Dedicated EPS bearer (QCI 1) with the UE for video call. DRX parameters and RoHC are configured		
12	→ ←	RRC NAS	SS establishes a MT Dedicated EPS bearer (QCI 2) with the UE for video call. DRX parameters and RoHC are configured		
13	→ ←	SIP	SS initiates answer call procedure.		

14	←	PHY	Verify UE support DRX		PASS
15	→ ←	PDCP	Verify UE support RoHC		PASS
16			Verify UE transmit power is 0dBm		PASS
17	→ ←	RTP	Keep the video call for 5 minute		
18			Get the value of the power consumption tester during step 16 and calculate the power consumption		
19	→ ←	SIP	SS initiates CLEAR call procedure. Session release: BYE -> 200 OK		
20			Repeat step 8-19 once		
21			Average the value of power consumption		PASS
22	← →	NAS RRC	SS releases the MT Dedicated EPS bearer (QCI 1)		
23	← →	NAS RRC	SS releases the MT Dedicated EPS bearer (QCI 2)		
24	← →	NAS	Mobile Terminated Detach procedure initiated by SS		
25	←	RRC	RRC connection release		
26	SS		Deactivate Cell A		

Specific Message Contents Refer to 9.1.1.5

9.1.3.6 Expected Result

The current should be less than [TBD] mA

9.1.3a Video Call Power Consumption, Cell Center, Dual Standby

9.1.3a.1 Test Purpose

To measure the average current of VoLTE over Dual Standby UE when voice call is ongoing in a good coverage area, RoHC and DRX are enabled.

9.1.3a.2 Reference specification

3GPP 24.229 clause5.1.39.1.3a.3 Applicability

This test applies to VoLTE over Dual Standby UE.

The UE shall support configuration 4.

9.1.3a.4 Test conditions

[SS configuration]
E-UTRAN Cell A is a TD-LTE cell.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC = 460 MNC = 00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -80 dBm/15kHz
ReferenceSignalPower = 18
DL Modulation / Coding = Dynamic (based on UE reporting)
RB Allocation UL= Dynamic
RB Allocation DL = Dynamic

GSM Cell B
Cell Id=02 LAC = 02
MCC-MNC = 460-00
ARFCN = f1
RF Signal Level = -65dBm

[UE configuration]
The test USIM should be inserted
The UE is in AUTOMATIC network selection mode.

[Initial conditions]
SS
E-UTRAN Cell A is not active
The test shall be performed under ideal radio conditions.

UE
UE is powered off (State 1)

9.1.3a.5 Test Procedure

Table 9.1.1a.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A	Cell B	Remark
T0	Reference Signal EPRE	dBm/15kHz	-80	-	
	RSSI	dBm	-	-65	

PREAMBLE

1. Connect the power consumption tester to UE.
2. Activate E-UTRAN Cell A
3. Power on the UE.
4. The UE performs registration procedure followed by activation of the initial default EPS bearer for data PDN (QCI 9) (see 36.508, 4.5.2).

MAIN BODY

5. UE initiates the PDN connectivity request for IMS PDN.
6. SS establishes a MT SIP Default EPS bearer (QCI 5) with the UE.
7. Verify that the UE has successfully registered with the IMS PDN according to steps 1- 6 of test procedure 5.1.3.5.
8. In parallel with step4-7, UE performs CS attach in GSM Cell B according to Step7-12 defined in TS 51.010 26.2.2.3 procedure 3. UE is in GSM idle.
9. UE initiates INVITE request over SIP using IMS PDN to establish video call.
10. SS responds to INVITE with 100 Trying and 183 Session Progress.
11. SS waits for UE to send PRACK.
12. SS establishes a MT Dedicated EPS bearer (QCI 1) with the UE for video call. SS ransmits RRCConnectionReconfiguration to configure specific DRX parameters, RoHC profile 0x0001 and profile 0x0002
13. SS establishes a MT Dedicated EPS bearer (QCI 2) with the UE for video call. SS transmits RRCConnectionReconfiguration to configure specific DRX parameters, RoHC profile 0x0001 and profile 0x0002
14. SS initiates answer call procedure.
15. Verify UE support DRX (refer to TC 5.2.6)
16. Verify UE support RoHC (refer to TC **错误!未找到引用源。**)
17. Verify UE transmit power is 0dBm
18. Keep medium screen intensity and medium voice volume. Keep the IMS video call for 5 minutes.
19. Get the value of the power consumption tester during step 16 and calculate the power consumption
20. The UE initiates the IMS video call release procedure.
21. Repeat step 9-20 once.
22. Average the value of power consumption

POSTAMBLE

23. SS sends Deactivate EPS Bearer Context Request (QCI 1). The UE shall respond with Deactivate EPS Bearer Context Accept.
24. SS sends Deactivate EPS Bearer Context Request (QCI 2). The UE shall respond with Deactivate EPS Bearer Context Accept.
25. SS initiates an MT Detach procedure.
26. The SS releases the RRC connection by sending the RRC Connection Release message to the UE.

27. Deactivate E-UTRAN Cell A and GSM Cell B.

Table 9.1.3a.5-1: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1			Connect power consumption tester to UE		
2	←	RRC	Activate E-UTRAN Cell A		
3	UE		Switch On UE	AT Command (switch ON)	
4	→ ←	RRC NAS	UE attach procedure with Default EPS bearer establishment for Data PDN (QCI 9)		
5	→ ←	RRC NAS	UE initiates a PDN Connectivity Request for IMS PDN		
6	→ ←	NAS RRC	SS initiates the Default EPS bearer(QCI 5) on E-UTRAN cell A for SIP establishment by sending the RRC Connection Reconfiguration message		
7	→ ←	SIP	UE successfully registers to IMS Simulator; IMS Registration message flow: SIP Register -> 401 Unauthorized -> SIP Register -> 200 OK	according to steps 1- 6 of test procedure 5.1.3.5	PASS
8			In parallel with step4-7, UE performs CS attach in GSM Cell B according to Step7-12 defined in TS 51.010 26.2.2.3 procedure 3		
9	→	RRC SIP	UE initiates a MO Call on E-UTRAN cell A. UE initiates INVITE request		
10	→ ←	SIP	SIP session establishment with preconditions: INVITE -> 183 Session Progress		
11	→	SIP	SS waits for UE to send PRACK		
12	→ ←	RRC NAS	SS establishes a MT Dedicated EPS bearer (QCI 1) with the UE for video call. DRX parameters and RoHC are configured		
13	→ ←	RRC NAS	SS establishes a MT Dedicated EPS bearer (QCI 2) with the UE for video call. DRX parameters and RoHC are configured		
14	→ ←	SIP	SS initiates answer call procedure.		

15	←	PHY	Verify UE support DRX		PASS
16	→ ←	PDCP	Verify UE support RoHC		PASS
17			Verify UE transmit power is 0dBm		PASS
18	→ ←	RTP	Keep the video call for 5 minute		
19			Get the value of the power consumption tester during step 16 and calculate the power consumption		
20	→ ←	SIP	SS initiates CLEAR call procedure. Session release: BYE -> 200 OK		
21			Repeat step 9-21 once		
22			Average the value of power consumption		PASS
23	← →	NAS RRC	SS releases the MT Dedicated EPS bearer (QCI 1)		
24	← →	NAS RRC	SS releases the MT Dedicated EPS bearer (QCI 3)		
25	← →	NAS	Mobile Terminated Detach procedure initiated by SS		
26	←	RRC	RRC connection release		
27	SS		Deactivate Cell A and Cell B		

Specific Message Contents Refer to 9.1.1.5

9.1.3a.5 Expected Result

The current should be less than [TBD] mA

9.1.4 Video Call Power Consumption, Cell Edge

9.1.4.1 Test Purpose

To measure the average current of VoLTE over CSFB UE when video call is ongoing in a poor coverage area, RoHC and DRX are enabled.

9.1.4.2 Reference specification

3GPP 24.229 clause5.1.3

9.1.4.3 Applicability

This test applies to VoLTE over CSFB UE..

The UE shall support configuration 1.

9.1.4.4 Test conditions

[SS configuration]
E-UTRAN Cell A is a TD-LTE cell.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC = 460 MNC = 00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -80 dBm/15kHz
ReferenceSignalPower = 18
DL Modulation / Coding = Dynamic (based on UE reporting)
RB Allocation UL= Dynamic
RB Allocation DL = Dynamic

[UE configuration]
The test USIM should be inserted
The UE is in AUTOMATIC network selection mode.

[Initial conditions]
SS
E-UTRAN Cell A is not active
The test shall be performed under ideal radio conditions.

UE
UE is powered off (State 1)

9.1.4.5 Test procedure

Table 9.1.4.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A	Remark
T0	Reference Signal EPRE	dBm/15kHz	-110	

PREAMBLE
1. Connect the power consumption tester to UE.
2. Activate E-UTRAN Cell A
3. Power on the UE.
4. The UE performs registration procedure followed by activation of the initial default EPS bearer for data PDN (QCI 9) (see 36.508, 4.5.2).

MAIN BODY
5. UE initiates the PDN connectivity request for IMS PDN.

6. SS establishes a MT SIP Default EPS bearer (QCI 5) with the UE.
7. Verify that the UE has successfully registered with the IMS PDN according to steps 1- 6 of test procedure 5.1.3.5.
8. UE initiates INVITE request over SIP using IMS PDN to establish video call.
9. SS responds to INVITE with 100 Trying and 183 Session Progress.
10. SS waits for UE to send PRACK.
11. SS establishes a MT Dedicated EPS bearer (QCI 1) with the UE for video call. SS ransmits RRCConnectionReconfiguration to configure specific DRX parameters, RoHC profile 0x0001 and profile 0x0002
12. SS establishes a MT Dedicated EPS bearer (QCI 2) with the UE for video call. SS transmits RRCConnectionReconfiguration to configure specific DRX parameters, RoHC profile 0x0001 and profile 0x0002
13. SS initiates answer call procedure.
14. Verify UE support DRX (refer to TC 5.2.6)
15. Verify UE support RoHC (refer to TC **错误!未找到引用源。**)
16. Verify UE transmit power is maximum
17. Keep medium screen intensity and medium voice volume. Keep the IMS video call for 5 minutes.
18. Get the value of the power consumption tester during step 16 and calculate the power consumption
19. The UE initiates the IMS video call release procedure.
20. Repeat step 8-19 once.
21. Average the value of power consumption

POSTAMBLE

22. SS sends Deactivate EPS Bearer Context Request (QCI 1). The UE shall respond with Deactivate EPS Bearer Context Accept.
23. SS sends Deactivate EPS Bearer Context Request (QCI 2). The UE shall respond with Deactivate EPS Bearer Context Accept.
24. SS initiates an MT Detach procedure.
25. The SS releases the RRC connection by sending the RRC Connection Release message to the UE.
26. Deactivate E-UTRAN Cell A.

Table 9.1.4.5-2: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1			Connect power consumption tester to UE		
2	←	RRC	Activate E-UTRAN Cell A		
3	UE		Switch On UE	AT Command (switch ON)	
4	→ ←	RRC NAS	UE attach procedure with Default EPS bearer establishment for Data PDN		

			(QCI 9) (see 36.508, 4.5.2 (steps 1-16))		
5	→ ←	RRC NAS	UE initiates a PDN Connectivity Request for IMS PDN		
6	→ ←	NAS RRC	SS initiates the Default EPS bearer(QCI 5) on E-UTRAN cell A for SIP establishment by sending the RRC Connection Reconfiguration message		
7	→ ←	SIP	UE successfully registers to IMS Simulator; IMS Registration message flow: SIP Register -> 401 Unauthorized -> SIP Register -> 200 OK	according to steps 1- 6 of test procedure 5.1.3.5	PASS
8	→	RRC SIP	UE initiates a MO Call on E-UTRAN cell A. UE initiates INVITE request		
9	→ ←	SIP	SIP session establishment with preconditions: INVITE -> 183 Session Progress		
10	→	SIP	SS waits for UE to send PRACK		
11	→ ←	RRC NAS	SS establishes a MT Dedicated EPS bearer (QCI 1) with the UE for video call. DRX parameters and RoHC are configured		
12	→ ←	RRC NAS	SS establishes a MT Dedicated EPS bearer (QCI 2) with the UE for video call. DRX parameters and RoHC are configured		
13	→ ←	SIP	SS initiates answer call procedure.		
14	←	PHY	Verify UE support DRX		PASS
15	→ ←	PDCP	Verify UE support RoHC		PASS
16			Verify UE transmit power is maximum		PASS
17	→ ←	RTP	Keep the video call for 5 minute		
18			Get the value of the power consumption tester during step 16 and calculate the power consumption		
19	→ ←	SIP	SS initiates CLEAR call procedure. Session release: BYE -> 200 OK		
20			Repeat step 8-19 once		
21			Average the value of power consumption		PASS
22	← →	NAS RRC	SS releases the MT Dedicated EPS bearer (QCI 1)		

23	← →	NAS RRC	SS releases the MT Dedicated EPS bearer (QCI 3)		
24	← →	NAS	Mobile Terminated Detach procedure initiated by SS		
25	←	RRC	RRC connection release		
26	SS		Deactivate Cell A		

Specific Message Contents Refer to 9.1.1.5

9.1.4.6 Expected Result

The current should be less than [TBD] mA

9.1.4a Voice Call Power Consumption, Cell Edge, Dual Standby

9.1.4a.1 Test Purpose

To measure the average current of VoLTE over Dual Standby UE when voice call is ongoing in a good coverage area, RoHC and DRX are enabled.

9.1.4a.2 Reference specification

3GPP 24.229 clause5.1.3

9.1.4a.3 Applicability

This test applies to VoLTE over Dual Standby UE..

The UE shall support configuration 4.

9.1.4a.4 Test conditions

[SS configuration]
E-UTRAN Cell A is a TD-LTE cell.

E-UTRAN Cell A
Cell Id=01 TAC = 01
MCC = 460 MNC = 00
EARFCN= f1
Bandwidth = 20 MHz
rootSequenceIndex TDD = 0
Reference Signal EPRE= -80 dBm/15kHz
ReferenceSignalPower = 18
DL Modulation / Coding = Dynamic (based on UE reporting)

RB Allocation UL= Dynamic
RB Allocation DL = Dynamic

GSM Cell B
Cell Id=02 LAC = 02
MCC-MNC = 460-00
ARFCN = f1
RF Signal Level = -65dBm

[UE configuration]
The test USIM should be inserted
The UE is in AUTOMATIC network selection mode.

[Initial conditions]
SS

E-UTRAN Cell A is not active
The test shall be performed under ideal radio conditions.

UE

UE is powered off (State 1)

9.1.4a.5 Test Procedure

Table 9.1.1a.5-1: Time of cell power level and parameter changes

Time	Parameter	Unit	Cell A	Cell B	Remark
T0	Reference Signal EPRE	dBm/15kHz	-110	-	
	RSSI	dBm	-	-65	

PREAMBLE

1. Connect the power consumption tester to UE.
2. Activate E-UTRAN Cell A
3. Power on the UE.
4. The UE performs registration procedure followed by activation of the initial default EPS bearer for data PDN (QCI 9) (see 36.508, 4.5.2).

MAIN BODY

5. UE initiates the PDN connectivity request for IMS PDN.
6. SS establishes a MT SIP Default EPS bearer (QCI 5) with the UE.
7. Verify that the UE has successfully registered with the IMS PDN according to steps 1- 6 of test procedure 5.1.3.5.
8. In parallel with step4-7, UE performs CS attach in GSM Cell B according to Step7-12 defined in TS 51.010 26.2.2.3 procedure 3. UE is in GSM idle.
9. UE initiates INVITE request over SIP using IMS PDN to establish video call.

10. SS responds to INVITE with 100 Trying and 183 Session Progress.
11. SS waits for UE to send PRACK.
12. SS establishes a MT Dedicated EPS bearer (QCI 1) with the UE for video call. SS ransmits RRCConnectionReconfiguration to configure specific DRX parameters, RoHC profile 0x0001 and profile 0x0002
13. SS establishes a MT Dedicated EPS bearer (QCI 2) with the UE for video call. SS transmits RRCConnectionReconfiguration to configure specific DRX parameters, RoHC profile 0x0001 and profile 0x0002
14. SS initiates answer call procedure.
15. Verify UE support DRX (refer to TC 5.2.6)
16. Verify UE support RoHC (refer to TC **错误!未找到引用源。**)
17. Verify UE transmit power is 0dBm
18. Keep medium screen intensity and medium voice volume. Keep the IMS video call for 5 minutes.
19. Get the value of the power consumption tester during step 16 and calculate the power consumption
20. The UE initiates the IMS video call release procedure.
21. Repeat step 9-20 once.
22. Average the value of power consumption

POSTAMBLE

23. SS sends Deactivate EPS Bearer Context Request (QCI 1). The UE shall respond with Deactivate EPS Bearer Context Accept.
24. SS sends Deactivate EPS Bearer Context Request (QCI 2). The UE shall respond with Deactivate EPS Bearer Context Accept.
25. SS initiates an MT Detach procedure.
26. The SS releases the RRC connection by sending the RRC Connection Release message to the UE.
27. Deactivate E-UTRAN Cell A and GSM Cell B.

Table 9.1.4a.5-2: Message Sequence

Step	Message Sequence				Verdict
	U-S	Layer	Message	Specific Contents	
1			Connect power consumption tester to UE		
2	←	RRC	Activate E-UTRAN Cell A		
3	UE		Switch On UE	AT Command (switch ON)	
4	→ ←	RRC NAS	UE attach procedure with Default EPS bearer establishment for Data PDN (QCI 9)		
5	→ ←	RRC NAS	UE initiates a PDN Connectivity Request for IMS PDN		
6	→	NAS	SS initiates the Default EPS		

	←	RRC	bearer(QCI 5) on E-UTRAN cell A for SIP establishment by sending the RRC Connection Reconfiguration message		
7	→ ←	SIP	UE successfully registers to IMS Simulator; IMS Registration message flow: SIP Register -> 401 Unauthorized -> SIP Register -> 200 OK	according to steps 1- 6 of test procedure 5.1.3.5	PASS
8			In parallel with step4-7, UE performs CS attach in GSM Cell B according to Step7-12 defined in TS 51.010 26.2.2.3 procedure 3		
9	→	RRC SIP	UE initiates a MO Call on E-UTRAN cell A. UE initiates INVITE request		
10	→ ←	SIP	SIP session establishment with preconditions: INVITE -> 183 Session Progress		
11	→	SIP	SS waits for UE to send PRACK		
12	→ ←	RRC NAS	SS establishes a MT Dedicated EPS bearer (QCI 1) with the UE for video call. DRX parameters and RoHC are configured		
13	→ ←	RRC NAS	SS establishes a MT Dedicated EPS bearer (QCI 2) with the UE for video call. DRX parameters and RoHC are configured		
14	→ ←	SIP	SS initiates answer call procedure.		
15	←	PHY	Verify UE support DRX		PASS
16	→ ←	PDCP	Verify UE support RoHC		PASS
17			Verify UE transmit power is 0dBm		PASS
18	→ ←	RTP	Keep the video call for 5 minute		
19			Get the value of the power consumption tester during step 16 and calculate the power consumption		
20	→ ←	SIP	SS initiates CLEAR call procedure. Session release: BYE -> 200 OK		
21			Repeat step 9-20 once		
22			Average the value of power consumption		PASS
23	← →	NAS RRC	SS releases the MT Dedicated EPS bearer (QCI 1)		
24	←	NAS	SS releases the MT Dedicated EPS		

	→	RRC	bearer (QCI 3)		
25	← →	NAS	Mobile Terminated Detach procedure initiated by SS		
26	←	RRC	RRC connection release		
27	SS		Deactivate Cell A and Cell B		

Specific Message Contents Refer to 9.1.1.5

9.1.4a.5 Expected Result

The current should be less than [TBD] mA

Annex A Test Parameters

Table A-1: Common Test Parameters

Parameter	Unit	Value	Comments
Channel bandwidth	MHz	20	
Uplink downlink configuration		2	As specified in Table 4.2-2 in TS 36.211
Special subframe configuration		7	As specified in Table 4.2-1 in TS 36.211
Inter-TTI Distance		1	
Number of HARQ processes	Processes	7	For TDD, 7 HARQ processes in the DL, as specified in TS 36.213 clause 7. All 7 HARQ processes are used.
Scheduling of retransmissions			1. Retransmissions use the same Transport Block Size (TBS) as the initial transmission. 2. DL HARQ re-transmissions shall prioritize over new transmissions based on the HARQ ACK/NACK feedback from the UE. 3. Bundling ACK/NACK mode be used in the first stage, Multiplexing ACK/NACK mode be used in the second stage.
Maximum number of HARQ transmission		4	It is always 4 for TDD, as specified in TS 36.213 clause 8
Redundancy version coding sequence		{0,1,2,3} for QPSK and 16QAM, {0,0,1,2} for 64QAM	
Number of OFDM symbols for PDCCH	OFDM symbols	3 for 20 MHz bandwidths	
Cyclic Prefix		Normal	CP consist of the following physical resource blocks (RBs) parameters: 12 consecutive subcarriers at a 15 kHz spacing and 7 OFDM symbols, as specified in TS 36.211 clause 6.2.3

Table A-2: Common IMS Test Parameters

Parameter	Value	Comments
IMS APN	ims.apn.epc.MNC000.MCC460.3gppnetwork.org	NI is IMS
Data APN	cmnet.MNC000.MCC460.gprs	NI is CMnet
USIM IMPI	IMSI@ims.mnc000.mcc460.3gppnetwork.org	
USIM IMPU	sip: IMSI@ims. mnc000.mcc460.3gppnetwork.org	Registration Only
USIM IMPU	sip: +86xxxxxxxxxx@ ims. mnc000.mcc460.3gppnetwork.org	SIP URI
USIM IMPU	tel: +86xxxxxxxxxx	TEL URI
ISIM IMPI	IMSI@ ims.bj.chinamobile.com	
ISIM IMPU	sip: IMSI@ ims.bj.chinamobile.com	Registration Only
ISIM IMPU	sip: +86xxxxxxxxxx@ ims.bj.chinamobile.com	SIP URI
ISIM IMPU	tel: +86xxxxxxxxxx	TEL URI

Annex B Generic Test Procedure

Table B-1: LTE Registartion and PDN establishment Procedure

Step	U-S	Message	Specific Contents
1	<--	RRC: SYSTEM INFORMATION (BCCH)	
2	-->	RRC: *RRCConnectionRequest*	
3	<--	RRC: *RRCConnectionSetup*	
4	-->	RRC: *RRCConnectionSetupComplete* NAS: ATTACH REQUEST NAS: PDN CONNECTIVITY REQUEST	ESM information transfer flag is absent
5	<--	RRC: *DLInformationTransfer* NAS: AUTHENTICATION REQUEST	
6	-->	RRC: *ULInformationTransfer* NAS: AUTHENTICATION RESPONSE	
7	<--	RRC: *DLInformationTransfer* NAS: SECURITY MODE COMMAND	
8	-->	RRC: *ULInformationTransfer* NAS: SECURITY MODE COMPLETE	
9	<--	RRC: *SecurityModeCommand*	.
10	-->	RRC: *SecurityModeComplete*	
11	<--	RRC: *UECapabilityEnquiry*	
12	-->	RRC: *UECapabilityInformation*	
13	<--	RRC: *RRCConnectionReconfiguration* NAS: ATTACH ACCEPT NAS: ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST	APN: CMNet QCI: 9

14	-->	RRC: *RRCConnectionReconfigurationComplete*	
15	-->	RRC: *ULInformationTransfer* NAS: ATTACH COMPLETE NAS: ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT	
16	-->	RRC: *ULInformationTransfer* NAS: PDN CONNECTIVITY REQUEST	APN: IMS
17	<--	RRC: *RRCConnectionReconfiguration* NAS:ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST	APN:IMS QCI:5
18	-->	RRC: *RRCConnectionReconfigurationComplete*	
19	-->	RRC: ULInformationTransfer NAS:ACTIVATE DEFAULT EPS BEARER CONTEXT ACCEPT	

Annex C The List of Test Cases

China Mobile
VoLTE Terminal NS

Annex D Document Change Record

Version	Updated Date	Record of changes made to previous released version
0.0.0	2013-11-07	Initial Version
0.0.1	2014-02-12	1.Add IPv6 test case 5.3.3 2.Modify IMPI/IMPU/HomeNetworkDomainName values to meet CMCC requirements 3.Correct several mistakes in test procedure
0.0.2	2014-05-26	1. Delete Supplymentary Service: TC 6.1.1 TIP, TC 6.2.1 TIR, TC 6.2.2 OIR, TC 6.3.5 Communication Forwarding , Unregister 2. Delete Barring of Outgoing Call TC 6.4.1, TC 6.4.2, TC 6.4.3 3. Delete TC 8.2.3 Back to TD-LTE after Call release via cell reselection 4. Delete Voice Quality TC 9.1.1 5. Re-edit the test case number. 6. Add Supplymentary Service TC 6.5.2 “Communication Waiting, Call Reject”, TC 6.2.5 “Communication Forwarding ,

		Specify a period” 7. Add TC 5.1.1.2 IMS PDN Connection Establishment as first PDN 8. Add TC 5.2.8 Voice Call, DRX and SPS 9. Add 9 New cases of Fast Returen and aSRVCC test cases in Chapter 8 10. TC 5.1.1: Clarify UE should not send an APN Name during the Attach procedure 11. TC 5.1.2/TC 5.1.3: Modify the check point of integrity algorithm and confidentiality algorithm of Step 2 in test procedure 12.TC 5.2.3: “486 Busy Here” is changed to “603 Decline” 13. Chapter 6: Re-edit the test procedure 14. Modify the Test case Priority
1.0.0	2014-07-01	1. Delete “CMCC China (460, 08, EUTRAN)” from USIM Parameter 2. Correct editoral error 3. TC 8.1.1/8.1.2/8.1.3/8.1.4 change from “inter-band” to “inter-frequency” 4. Correct the test procedure in TC 8.1.4 5. Change the video codec in TC 5.5.3 6. Correct the subframe offset and TDD configuration in TC 5.2.4 7. Correct the DRX subframe offset in TC 5.2.6 and TC 5.2.8 8. Correct the precondition signal sequence in TC 5.2.7 9. Add expected result in TC 9.1.1 10. Turn to official version.
1.1.0	2014-10-11	1. Incorporate CR-140001/CR-140002/CR-140003r1 /CR-140004r1 /CR-140005 into Spec 2. Modify the Applicability to distingush VoLTE over CSFB UE and VoLTE over dual standby UE 3. Clarify the case applicability: apply to VoLTE over CSFB UE or VoLTE over Dual Standby UE or Both. 4. Add common LTE attach and PDN establishment procedure in Annex B 5. Add cases only apply to VoLTE over Dual Standby UE: 5.1.1.1a, 5.1.1.2a, 8.2.1.1a, 8.2.1.2a, 8.2.2.5a, 9.1.1a, 9.1.2a, 9.1.3a, 9.1.4a 6.Update the reference steps of LTE attach procedure in cases which apply to both VoLTE over CSFB UE and VoLTE over Dual Standby UE 7. Incorporate CR-140006/CR-140007/CR-140008 into Spec 8.Delete test case ”5.1.4 IMS Registration Error”. Change TC No.: 5.1.5->5.1.4

		9.Delete test case “5.2.7 Voice Call, RoHC”. Change TC No.:5.2.8->5.2.7, 5.2.9->5.2.8 10. Add new case 5.1.5, 5.1.6, 5.2.9, 5.4.3, 5.4.3a, 8.1.5, 8.1.6, 8.1.7, 8.1.8, 8.2.1.4, 8.2.4 11. Add check points in TC 5.1.1.1, TC 5.1.1.2, TC 5.2.1, TC 5.2.2, TC 5.4.1 and TC 5.4.2 12. Add test steps in TC 6.5.2, TC 8.1.4, TC 8.2.2.3, TC 8.2.2.5, 13. Add the configuration of RoHC in TC 5.2.4, TC 5.2.5, TC 5.2.6, TC 5.2.7