

## **Methods for Testing and Specification (MTS); UMTS Testing Methodology**

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Reference

DTR/MTS-00082

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Keywords

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## Foreword

This Technical Report (TR) has been produced by ETSI Technical Committee Methods for Testing and Specification (MTS).

TRs are informative documents resulting from ETSI studies which are not appropriate for European Norms (ENs).

A TR may be used to publish material which is either of an informative nature or which is immature and not yet suitable for formal adoption as EN.

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# 1 Scope

The present document describes UMTS Network Integration Testing (NIT) methodology and TSS&TP.

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# 2 References

For the purposes of this Technical Report (TR), the following references apply:

- [1] ETSI TS 124 008 (V3.14.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Mobile radio interface Layer 3 specification; Core network protocols; Stage 3 (3GPP TS 24.008 version 3.14.0 Release 1999)".
- [2] ETSI TS 123 121 (V3.6.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Architecture Requirements for release 99 (3GPP TS 23.121 version 3.6.0 Release 1999)".
- [3] ETSI TS 123 060 (V3.14.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); General Packet Radio Service (GPRS) Service description; Stage 2 (3GPP TS 23.060 version 3.14.0 Release 1999)".
- [4] ETSI TS 129 002 (V3.15.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Mobile Application Part (MAP) specification (3GPP TS 29.002 version 3.15.0 Release 1999)".
- [5] ETSI TS 133 102 (V3.13.0): "Universal Mobile Telecommunications System (UMTS); 3G security; Security architecture (3GPP TS 33.102 version 3.13.0 Release 1999)".
- [6] ETSI TS 123 009 (V3.12.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Handover procedures (3GPP TS 23.009 version 3.12.0 Release 1999)".
- [7] ETSI TS 129 060 (V3.15.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); General Packet Radio Service (GPRS); GPRS Tunnelling Protocol (GTP) across the Gn and Gp interface (3GPP TS 29.060 version 3.15.0 Release 1999)".
- [8] ETSI TS 129 061 (V3.11.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Interworking between the Public Land Mobile Network (PLMN) supporting Packet Based services and Packet Data Networks (PDN) (3GPP TS 29.061 version 3.11.0 Release 1999)".
- [9] ETSI TS 124 081 (V3.1.0): "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Line identification supplementary services - Stage 3 (3G TS 24.081 version 3.1.0 Release 1999)".
- [10] ETSI TS 123 081: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Line Identification supplementary services; Stage 2 (3GPP TS 23.081 version 3.2.0 Release 1999)".
- [11] ETSI TS 123 082 (V3.7.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Call Forwarding (CF) Supplementary Services; Stage 2 (3GPP TS 23.082 version 3.7.0 Release 1999)".
- [12] ETSI TS 123 083 (V3.2.0): "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 2 (3GPP TS 23.083 version 3.2.0 Release 1999)".
- [13] ETSI TS 123 084 (V3.2.0): "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Multi Party (MPTY) supplementary services - Stage 2 (3GPP TS 23.084 version 3.2.0 Release 1999)".

- [14] ETSI TS 100 941 (V7.0.1): "Digital cellular telecommunications system (Phase 2+) (GSM); Mobile radio interface layer 3 Supplementary services specification; General aspects (GSM 04.10 version 7.0.1 Release 1998)".
- [15] ETSI TS 123 088 (V3.2.0): "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Call Barring (CB) Supplementary Services - Stage 2 (3GPP TS 23.088 version 3.2.0 Release 1999)".
- [16] ETSI TS 123 040 (V3.9.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Technical realization of Short Message Service (SMS) (3GPP TS 23.040 version 3.9.0 Release 1999)".
- [17] ETSI TS 132 015 (V3.10.0): "Universal Mobile Telecommunications System (UMTS); Telecommunications Management; Charging and billing; 3G call and event data for the Packet Switched (PS) domain (3GPP TS 32.015 version 3.10.0 Release 1999)".
- [18] ETSI TS 129 007 (V3.11.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); General requirements on interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN) (3GPP TS 29.007 version 3.11.0 Release 1999)".
- [19] ETSI TS 123 018 (V3.11.0): "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Basic call handling; Technical realization (3GPP TS 23.018 version 3.11.0 Release 1999)".
- [20] ITU-T Recommendation Q.763 (1999): "Signalling System No.7 - ISDN user part format and codes".
- [21] ETSI ETS 300 102-1: "Integrated Services Digital Network (ISDN); User-network interface layer 3; Specifications for basic call control".
- [22] ETSI TS 124 087 (V3.0.0): "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); User-to-User Signalling (UUS) Supplementary Service - Stage3 (3G TS 24.087 version 3.0.0 Release 1999)".
- [23] ETSI TS 123 087 (V3.1.0): "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); User-to-user signalling (UUS) Supplementary Service - Stage 2 (3GPP TS 23.087 version 3.1.0 Release 1999)".
- [24] ETSI TS 129 018 (V3.10.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); General Packet Radio Service (GPRS); Serving GPRS Support Node (SGSN) - Visitors Location Register (VLR); Gs interface layer 3 specification (3GPP TS 29.018 version 3.10.0 Release 1999)".
- [25] ETSI TS 125 413 (V3.12.0): "Universal Mobile Telecommunications System (UMTS); UTRAN Iu interface RANAP signalling (3GPP TS 25.413 version 3.12.0 Release 1999)".
- [26] ETSI ETR 193 (1995): "Methods for testing and Specification (MTS); Network Integration Testing (NIT); Methodology aspects; Test Co-ordination Procedure (TCP) style guide".
- [27] ETSI TS 102 110-1 (V1.1.1): "Services and Protocols for Advanced Networks (SPAN); Network integration testing of Universal Mobile Telecommunications System (UMTS) with Global System for Mobile Communication (GSM) Phase 2+, Public Switched Telephone Network (PSTN) and Integrated Services Digital Network (ISDN); Part 1: Test Suite Structure and Test Purposes (TSS&TP)".
- [28] ETSI TS 102 110-2 (V1.1.1): "Services and Protocols for Advanced Networks (SPAN); Network integration testing of Universal Mobile Telecommunications System (UMTS) with Global System for Mobile Communication (GSM) Phase 2+, Public Switched Telephone Network (PSTN) and Integrated Services Digital Network (ISDN) Part 2: Abstract Test Suite (ATS) and Partial Implementation eXtra Information for Testing (PIXIT) proforma".
- [29] ETSI EN 300 356-1 (V4.2.1): "Integrated Services Digital Network (ISDN); Signalling System No.7 (SS7); ISDN User Part (ISUP) version 4 for the international interface; Part 1: Basic services [ITU-T Recommendations Q.761 to Q.764 (1999) modified]".

- [30] G. Maggiore, G. Brusasco, M. Vecchiato, "Network integration testing: concepts, test specifications and tools for automatic Telecommunication services verification", Computer Networks 34 (2000) pp 799 - 819.
- [31] ETSI TS 123 002: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Network architecture (3GPP TS 23.002 version 3.5.0 Release 1999)".

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## 3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

APN	Access Point Name
ATP	Access Transport Parameter
BC	Bearer Capability
BSC	Base Station Controller
BSS	Base Station Sub-system
CB	Call Barring
CDR	Call Data Record
CF	Call Forwarding
CFB	Call Forwarding on Busy subscriber
CFNRc	Call Forwarding on No Reachable
CFNRy	Call Forwarding on No Replay
CFU	Call Forwarding Unconditional
CLIP	Calling Line Identification Presentation
CLIR	Calling Line Identification Restriction
COLP	Connected Line Identification Presentation
COLR	Connected Line Identification Restriction
CoNC	Cause of No Cli
CS	Circuit Switched
CW	Call Waiting
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name Server/System
ETSI	European Telecommunications Standards Institute
FAX G3	Facsimile Group 3
FTP	File Transfer Protocol
3G-GGSN	Third Generation-Gateway GPRS Support Node
GMM	GPRS Mobility Management
GMSC	Gateway Mobile Switching Centre
3G-GMSC	Third Generation-Gateway Mobile Switching Centre
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications
3G-GSN	Third Generation-GPRS Support Node
GTP	GPRS Tunnelling Protocol
HLC	High Layer Capability
HLR	Home Location Register
HTTP	HyperText Transport Protocol
ID	Identity or Identifier
IMSI	International Mobile Subscriber Identity
ISDN	Integrated Services Digital Network
L2TP	Layer Two Tunnelling Protocol
LA	Location Area
LAI	Location Area Identity
LLC	Logical Link Control
LLC	Low Layer Capability
LM-CDR	Land Mobile Call Data Record
ME	Mobile Equipment
ML-CDR	Mobile Land Call Data Record
MM	Mobility Management
MO	Mobile Originated

MOS	Mean Opinion Score
MPTY	Multy Party
MS	Mobile Station
MSC	Mobile Switching Centre
3G-MSC	Third Generation-Mobile Switching Centre
MT	Mobile Terminated
NDUB	Network Determined User Busy
NIT	Network Integration Testing
PAMS	Perceptual Analysis Measurement System
PDN	Packet Data Network
PDP	Packet Data Protocol
PDPC	PDP Context
PDU	Protocol Data Unit
PESQ	Perceptual Evaluation of Speech Quality
PLMN	Public Land Mobile Network
PTMSI	Packet Temporary Mobile Subscriber Identity
PS	Packet Switched
PSQM	Perceptual Speech Quality Measurement
PSTN	Public Switched Telephone Network
QoS	Quality of Service
RA	Routing Area
RAI	Routing Area Identity
SGSN	Serving GPRS Support Node
3G-SGSN	Third Generation-Serving GPRS Support Node
SM	Session Management
SMS	Short Message Service
SMS-IW MSC	SMS-InterWorking Mobile Switching Centre
SUB	SUB-addressing
TE	Terminal Equipment
TEID	Tunnel Endpoint Identifier
TCP	Transmission Control Protocol
TMSI	Temporary Mobile Subscriber Identity
TOL	Test Object List
TSS&TP	Test Suite Structure and Test Purposes
UDI	Unrestricted Digital Information
UDUB	User Determined User Busy
UE	User Equipment
UUS1	User to User Signalling service 1
UMTS	Universal Mobile Telecommunications System
UTRAN	UMTS Terrestrial Radio Access Network
USIM	UMTS Subscriber Identity Module
WAP	Wireless Application Protocol



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## 4 General description

Nowadays UMTS is becoming a reality in Mobile TLC world. Suppliers are going to deliver, or have just delivered their first UMTS release more or less compliant to UMTS R99. Network operators today are facing with a number of challenges concerning new products and services, with a time to market always shorter than before.

The emerging technologies are characterized by ever-shortening time to market so urgency is high, both in terms of delivery of products and services.

UMTS represent a really big chance for Mobile operators which has to be carried on in a short time to satisfy market rather than regulatory needs.

### 4.1 Reasons for a UMTS testing methodology

NIT is a "grey box" testing technique that is aimed at verifying the correct behaviour of interconnected networks (operated by different Operators) in provisioning services to end users, or the behaviour of a complex network operated by a unique Operator. So the need to use the NIT methodology in order to shorten the time to market as much as possible, leaving the conformance testing of the various interfaces to the suppliers' integration phase.

The NIT test cases verify the system's functionality described in the present document from an end-to-end point of view. The verification phase result essentially consists in analysing the messages exchanged on the relevant interfaces involved after having checked the effects on the service. NIT test cases include the QoS measurement like Round Trip Delay Throughput and Jitter - and for the Quality of Voice.

### 4.2 Why should be used NIT technique

NIT is a testing technique aimed at verifying the correct behaviour of a complex network, in other terms, that a network works as it is expected. The term Network Integration Testing denotes the testing activities, test suites, administrative procedures, etc., that are performed and used by an operator that wish to ensure that all network elements, old and new, are interoperating correctly.

When discussing NIT, a recurrent issue is "who should be the main user of NIT, who should benefit from NIT, who should pay for NIT", whether the Suppliers or the Operators. The simple answer is that NIT is mainly a technique for the Operator, since it is up to the Operator to verify and guarantee that his network is working globally in spite of its complexity. Other types of testing (conformance, standalone testing), which are more focused on the behaviour/performance of a single system or sub-system (e.g. a software block) are definitely in the domain of the Supplier. However, also Suppliers may be willing to use NIT tools in order to be able to verify globally their offer and demonstrate to Operators (their clients) the Quality of their products, and allowing Operators to focus testing only on multi-supplier's network - or NEs- integration (NIT applied in multi-vendor configurations). A new complex network is coming and this event represents a good opportunity to focus on new interfaces and interconnection between new and old network elements with an end-to-end approach.

In ETSI (specifically in the MTS "Methods for Testing and Specification" Technical Committee) some activities have been performed in order to get to more accurate definitions of Network Integration Testing (NIT). In particular in ETR 193 [26] was defined as "the set of all the checking necessary to verify that a given network works as it is expected, and to verify the compatibility of the single network components (NEs). Conformance Testing of each network component is assumed as a pre-requisite". The chosen formal method for NIT is MPTM (Multy-Party Test Method). In the case of End-to-End testing, an applicable method is MPTM without Upper Tester (UT). In the case of the Node-to-Node testing, it may be necessary to influence the SUT creating events/changes that are relevant to the test purposes (e.g. block/unblocking bearer circuits).

Moreover in TS 102 110 Parts 1 [27] and 2 [28] was defined a Test Suite Structure and Test Purposes (TSS&TP) covering NIT between ISDN-UMTS, UMTS-PSTN, UMTS-GSM, and UMTS-UMTS networks. The objective is to verify the level of international or national end-to-end support of ISDN and PLMN services. All bearer services (and associated teleservices) and supplementary services are checked for interworking capability and compatibility, in the European ISDN and PLMN.

A complete overview of Network Integration Testing has been provided in [30].

## 4.3 Standard network configuration

The network configuration considered is TS 123 002 [31]. The 3GPP task is to develop a 3G mobile system specifications, based on:

UTRAN FDD (W-CDMA) e TDD (TD-CDMA) - Enhanced Core Network GSM/GPRS

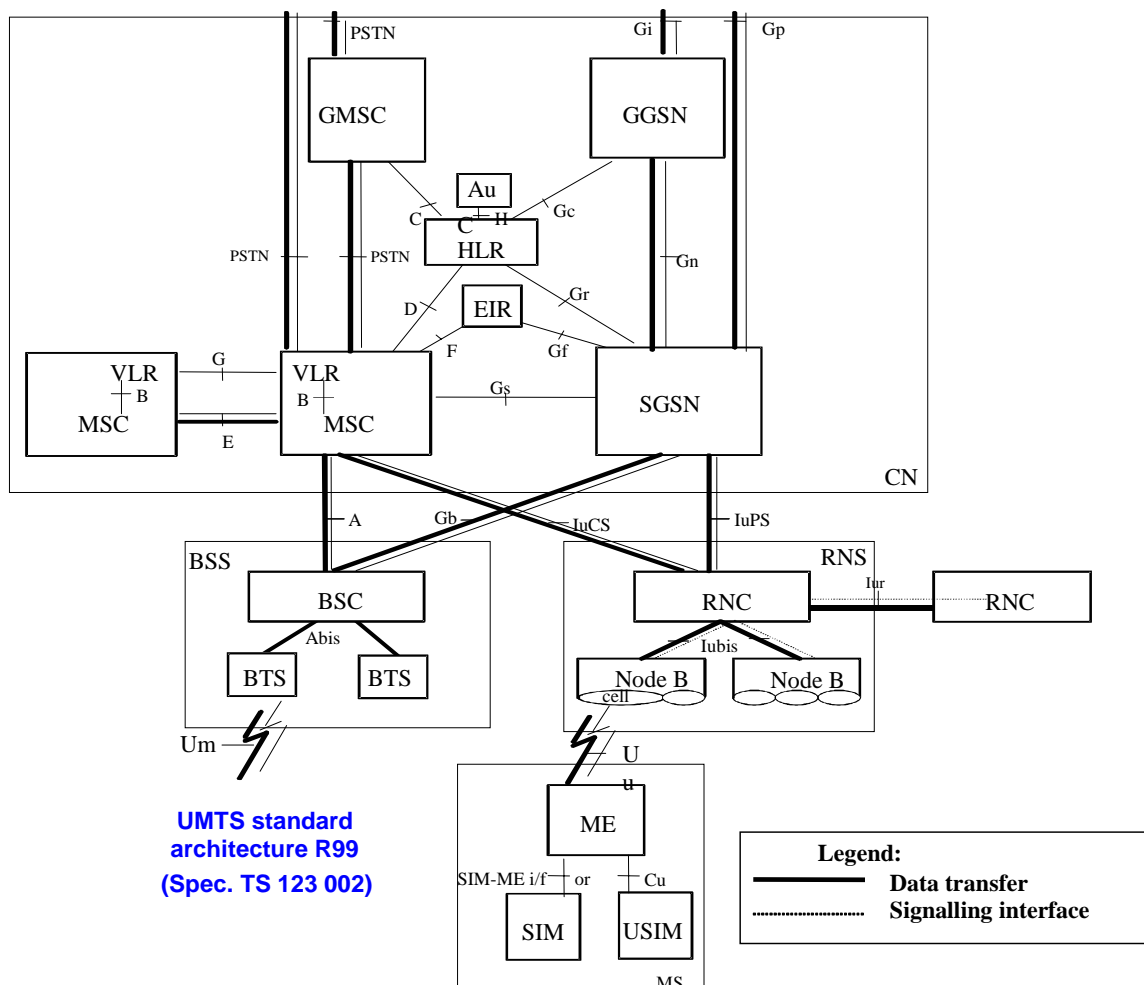


Figure 1: UMTS standard architecture R99

## 5 UMTS network suppliers contribution

This section shows the results of contributions provided by UMTS networks elements Suppliers about testing methodologies used in the internal integration phase. The reference Network architecture is 3GPP R99 compliant (figure 1). The information has been provided covering the following areas:

### Conformance testing

The interfaces considered are the following: Iub, Iu CS, Iu PS, E, Gn, Iur. All the interfaces considered have been tested and real network elements have been used. Particular emphasis has been given to some interfaces (i.e., IuPS and Gn) that were explained in great detail and useful information was also provided about testing tool equipment and simulators. Regarding UMTS network integration aspects, suppliers provided information about the protocol stack used when the Technical Specifications allowed several choices (i.e. IuPS, Iur). For all the interfaces conformance test cases have been executed to check the compliance to the relevant standards.

## End-to-end

In general end-to-end methodology has been applied by the UMTS network suppliers, in the end of the integration phase. Anyway the lack of mobile terminals makes this type of testing the most important part to be applied in the UMTS Network delivery phase, when more mobile terminals will be available.

Particularly the testing area covered are the following: Mobility Management, CS Voice Call, Session Management, Gi/Gn Interface interoperability, HLR interoperability, Supplementary services and SMS, Applications, Billing, System Stability. In general real network elements have been used. Simulators have been used only in case of lack o. This part was not detailed as the previous one due to the expected supplier's testing approach oriented to the conformance testing.

## QoS

Test cases related to quality of voice, throughput and round trip delay have been performed.

# 6 UMTS Testing Methodology

## 6.1 End-to-end approach

The functional verification of the UMTS core-network will be performed through use of a series of reference scenarios and analysis of the corresponding signal messages regarding the internal interfaces of the UMTS nodes: **IuCS, IuPS, D, Gr, Gi, Gn**. The qualification of the other network elements and radio interface is beyond the scope of the present document. The UMTS system under test is essentially made up of the **3G-MSC, 3G-SGSN** and the **3G-GGSN**. In addition to their internal functions these elements will be tested for interoperability with UTRAN, HLR equipment, PSTN, ISDN, PLMN networks and IP backbone devices. The verification also envisages the production of traffic documentation. Some tests refer also to Gs interface (i.e. combined procedures), so these have to be considered only if the network can operate in "mode I".

### Network Configuration

The following is a diagram of the UMTS R99 network architecture essential for the service. It is kept the logical distinction between the TE and the MS, even if in most cases the two elements will be physically integrated.

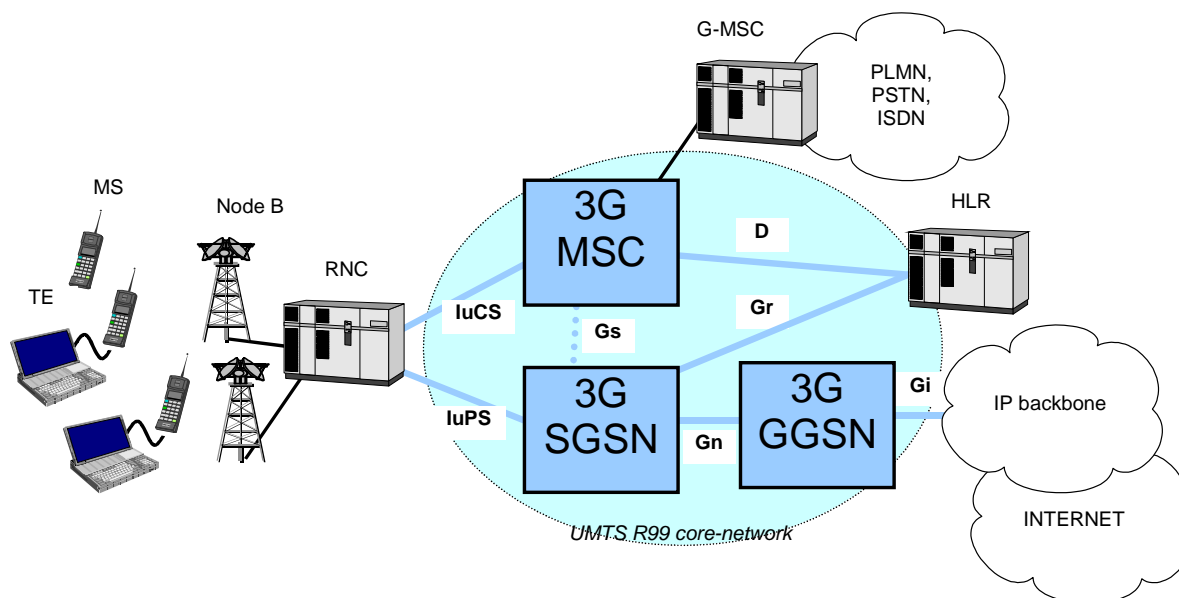


Figure 2: UMTS R99 core network

All the tests presume that the initial configuration of the interfaces is correct. Special attention is given to the configuration of the Iu interface.

## Methodology

The test list is made up of various test sections separated according to function and interface involved. The tests cover the following areas: Mobility Management, CS Voice calls, Session Management, Gi/Gn interface interoperability, HLR interoperability, Supplementary services and SMS, Applications, Billing, System Stability, Quality of Service.

The tests are carried out end-to-end, through the following phases:

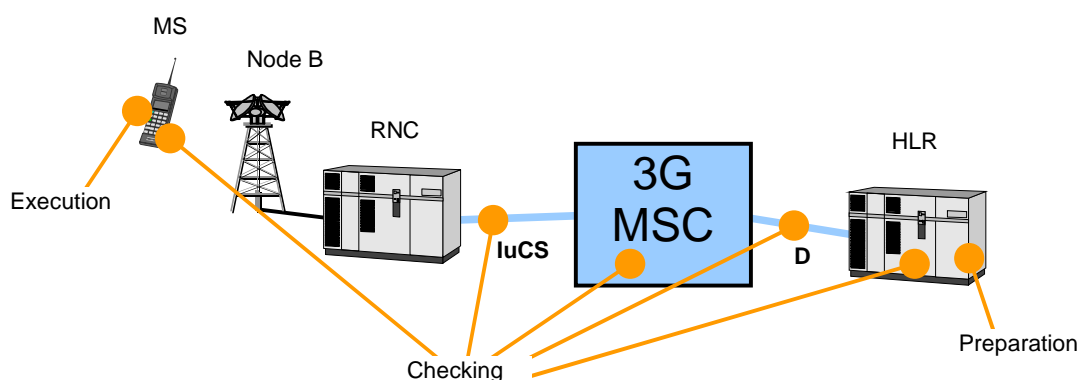
- preparation of prerequisites: phase in which the various elements of the network must be suitably configured and brought to the envisaged test start condition. This phase may require work on the HLR and RNC, as well as on the core-network nodes. It may also require insertion of suitable external equipment (e.g. Radius, DHCP) and measuring instruments (e.g. protocol analyser). The special requirements of each test will be specified through a minimal configuration given in the appendix;
- execution of procedure: phase in which the procedure to test the various functions is carried out by operating on the terminal and MS, as well as on the network elements;
- result verification: phase (overlapping with the previous one) to verify procedural correctness by monitoring the interfaces with appropriate instruments and logging network elements.

## Functional tests

Except for the last group, the tests in the present document are functional, that is to say aimed at verifying the system's functionality described in the present document. The result verification phase essentially consists in analysing the messages exchanged on the interfaces involved and checking the effects obtained on the elements concerned. Each test is passed if they give the desired effects and if the messages exchanged are compliant with the service specifications. For failed tests, the severity of the problem should be assessed in relation to the consequences for both the user and the network.

For example, a basic Mobility Management test includes:

- 1) preparation: HLR configuration of a UMTS subscription for the user whose USIM is inserted in the terminal;
- 2) execution: switching on the MS;
- 3) verification: checking messages exchanged on IuCS and D with protocol analyser, checking variations to MS, 3G-MSC and HLR status.



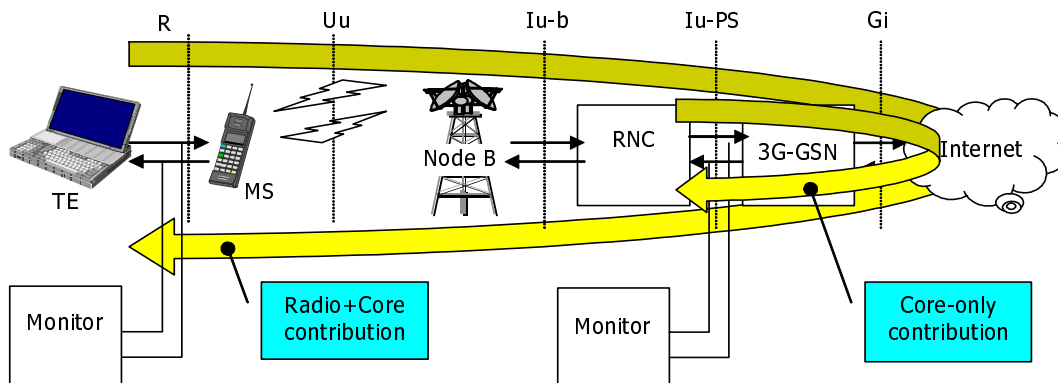
**Figure 3: Example of Mobility Management test case**

## Quality of Service Test Cases

This Test list is intended mainly in a functional sense, however a number of tests have been included to acquire a measurement of some parameters of interest for the packet domain (e.g. Round Trip Delay, Throughput, Jitter) and for the circuit-switched domain (Quality of Voice).

## Round Trip Delay

Round-trip delay can be measured as the time taken between the sending of an echo packet (either ICMP or UDP port 7) and reception of the relative acknowledgement. Then, to attribute this time to the radio access or core-network parts it is advisable to carry out this analysis both directly on the TE and on the IuPS interface as indicated in the following example.



**Figure 4: Example of round trip delay measurement**

When performing this test, make sure that the traffic transits on a server that is both easily accessible and not congested (the ideal would be a specific PC connected directly to the Gi) to avoid including significant external delay factors external to the network under test in the measurement.

## Throughput

Throughput can be measured by recording a trace of traffic over the IuPS interface or on the TE itself, and analysing it with a suitable application that summarizes the quantity of bytes transmitted per unit of time in the form of a graph, (see note). Obviously the throughput measurement obtained in this way is related to the end-to-end system and so may be affected by any bottlenecks in the radio section. To measure only the effective throughput of the core-network would require a traffic simulator directly connected IuPS interface. Moreover, to avoid inserting further bottlenecks external to the network under test, make sure traffic transits on a server that is both easily accessible and not congested (the ideal would be a specific PC directly connected to the Gi).

Note that these measurements are accurate as regards average throughput, whereas the margin of error due to buffering effects in the MS, the UTRAN and 3G-SGSN has to be taken into account for peak throughput. It is therefore advisable to take several measurements and then use the average.

NOTE: Some applications work on traces recorded with *monitor instruments*.

## Jitter

Jitter is the component of delay that varies over time. Network jitter is primarily due to queuing delays. Jitter can be measured in a variety of ways, including:

- using an external source of IP packets (e.g. downlink streaming from a server) and measuring the packet inter-arrival timing at the destination (i.e. at the receiving device);
- injection of time-stamped measurement frames into a source data stream and reading of such data by the receiving device which can then be used to both report the absolute delay as well as the time gap between received frames.

## Methodology for "quality of voice" tests

The first technique used to measure speech clarity is Mean Opinion Score (MOS). With this method we can obtain statistically valid subjective scores.

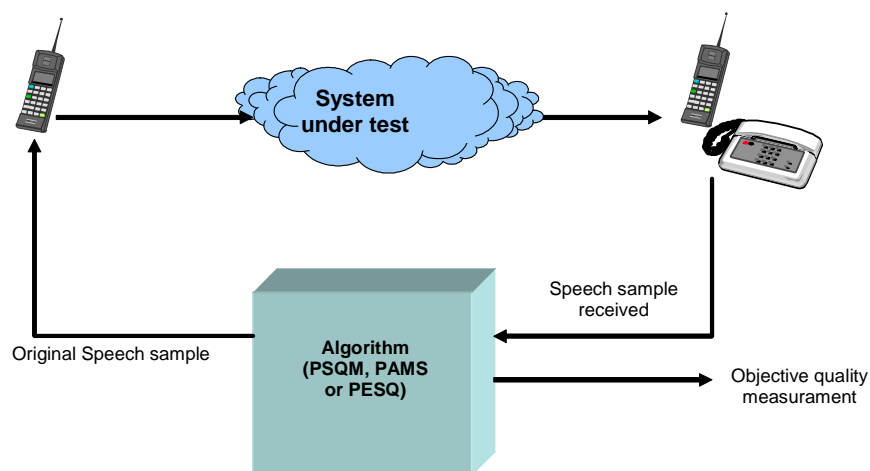
MOS testing usually are based on one-way listening tests that use standardized speech samples. Human listeners hear the samples transmitted over the network, and rate the overall quality of the sample, based opinion scales. The type of subjective testing usually used is "Absolute Category Rating Test" with reference to the following scale:

SCORE	QUALITY OF SPEECH
5	Excellent
4	Good
3	Fair
2	Poor
1	Bad

MOS tests are expensive and unsuitable so we can obtain the same results with an algorithm (PAMS or PESQ) that run on a measurement instrument; in this way the scores that we'll get will be absolute but objective.

The second technique used to measure speech clarity is Perceptual Speech Quality Measurement (PSQM), it is an algorithm that like PAMS and PESQ runs on an instrument. The objective of PSQM is to produce scores that reliably predict the result of subjective tests on a different scale. In fact, resulting PSQM scores range from 0 (perfect clarity) to infinity, representing the perceptual distance between the input and output signals.

The configuration used for the measurement is shown in figure 5.



**Figure 5: QoS test configuration**

All the algorithms perform a comparative analysis between a reference signal (speech sample) and the elaborate signal that is received from the network under test, and provide an objective quality measurement.

## 7 Methodology Validation

In the annex A is shown a Test Object List that is an application of the UMTS testing methodology, described in the previous clause, used to validate UMTS CN R99.

The TOL contains a series of end-to-end tests for the functional verification of the UMTS core-network. The series of tests is divided into areas, with each area being subdivided into groups. The areas covered by the TOL are: Mobility Management, CS Voice calls, Session Management, Gi/Gn interface interoperability, HLR interoperability, Supplementary services and SMS, Applications, Billing, System Stability and Quality of Service. The groups refer to some procedure like Attach, Detach, Security functions, PDP context activation and so on.

Each functional test is described in a forms that envisages different fields regarding: the function to be checked and its priority with reference to the other tests in the TOL; the network interfaces involved in the test; the conditions necessary for performing the test; the sequence of actions to take for performing the test and the expected results. Moreover, are included other fields like the references to some specifications concerning to the tested functionality and if necessary some comments.

## Annex A: TSS&TP - End-to-end approach

This annex contains an example of Test Object List obtained applying the testing methodology proposed in the present document.

### A.1 Test Summary

The following is a summary table.

<b>Mobility Management</b>	CS Location Updating	LOCATION UPDATING - IMSI ATTACH	MM_CS_101	A	
		LOCATION UPDATING	MM_CS_102	A	
	CS Detach	IMSI DETACH	MM_CS_201	A	
	PS Attach		SUCCESSFUL PS ATTACH	MM_PS_301	A
			SUCCESSFUL PTMSI ATTACH, MS KNOWN IN THE NETWORK	MM_PS_302	A
			SUCCESSFUL PTMSI ATTACH, MS UNKNOWN IN THE NETWORK	MM_PS_303	B
	PS Location Management		NORMAL ROUTING AREA UPDATE	MM_LM_401	A
			PERIODIC RA UPDATE TIMER FUNCTION	MM_LM_402	A
	PS Detach		MS SWITCH OFF WITH NO PDP CONTEXT	MM_PS_501	A
			HLR INITIATED PS DETACH WITH NO ACTIVE PDP CONTEXT	MM_PS_502	A
			IMPLICIT DETACH UPON MOBILE REACHABLE TIMER EXPIRY	MM_PS_503	A
	Security Functions		AUTHENTICATION OF UMTS SUBSCRIBER	MM_SEC_601	A
			IMSI ATTACH FAILURE	MM_SEC_602	A
		PS ATTACH FAILURE REJECTED BY HLR	MM_SEC_603	A	
<b>Gs Interface interoperability</b>	Combined procedures	COMBINED ATTACH	Gs_IOT_101	A	
		COMBINED DETACH	Gs_IOT_102	A	
		IMPLICIT COMBINED DETACH	Gs_IOT_103	A	
		INTRA 3G-SGSN COMBINED RA/LA UPDATE	Gs_IOT_104	A	
		INTER 3G-SGSN COMBINED RA/LA UPDATE	Gs_IOT_105	A	
		HLR INITIATED COMBINED DETACH	Gs_IOT_106	A	
	Coordination		PS ATTACH WHILE IMSI ATTACHED	Gs_IOT_201	A
			IMSI ATTACH WHILE PS ATTACHED	Gs_IOT_202	A
			IMSI ONLY DETACH	Gs_IOT_203	A
			PS ONLY DETACH	Gs_IOT_204	A
			3G-SGSN INITIATED PS DETACH	Gs_IOT_205	A
			HLR INITIATED PS DETACH	Gs_IOT_206	A
	Inter-NOM	INTER-NOM RA/LA UPDATE	Gs_IOT_301	A	
	Paging	CS PAGING VIA 3G-SGSN	Gs_IOT_401	A	

<b>CS Voice calls</b>	Basic Calls	SPEECH CALL FROM UMTS TO PSTN	CS_VC_101	A	
		3,1 kHz AUDIO CALL FROM UMTS TO PSTN	CS_VC_102	A	
		FAX G3 CALL FROM UMTS TO PSTN	CS_VC_103	A	
		UNSUCCESSFUL UDI CALL FROM UMTS TO PSTN	CS_VC_104	A	
		SUCCESSFUL CALL FROM PSTN TO UMTS	CS_VC_111	A	
		UNSUCCESSFUL CALL FROM PSTN TO UMTS - REJECTED BY CALLED PARTY	CS_VC_112	A	
		SPEECH CALL FROM UMTS TO ISDN	CS_VC_201	A	
		3,1 kHz CALL FROM UMTS TO ISDN	CS_VC_202	A	
		FAX G3 CALL FROM UMTS TO ISDN	CS_VC_203	A	
		UDI CALL FROM UMTS TO ISDN	CS_VC_204	A	
		SPEECH CALL FROM ISDN TO UMTS	CS_VC_211	A	
		3,1 kHz AUDIO CALL FROM ISDN TO UMTS	CS_VC_212	A	
		UDI CALL FROM ISDN TO UMTS	CS_VC_213	A	
		SPEECH CALL BETWEEN UMTS USERS	CS_VC_301	A	
		3,1 kHz AUDIO CALL BETWEEN UMTS USERS	CS_VC_302	A	
		UDI CALL BETWEEN UMTS USERS	CS_VC_303	A	
		FAX G3 CALL BETWEEN UMTS USERS	CS_VC_304	A	
		UNSUCCESSFUL CALL BETWEEN UMTS USERS - CALLED PARTY BUSY	CS_VC_305	A	
		UNSUCCESSFUL CALL BETWEEN UMTS USERS - REJECTED BY CALLED PARTY	CS_VC_306	A	
		UNSUCCESSFUL CALL TO UNASSIGNED NUMBER	CS_VC_307	A	
		SPEECH CALL FROM UMTS TO GSM	CS_VC_401	A	
		3,1 kHz AUDIO CALL FROM UMTS TO GSM	CS_VC_402	A	
		UDI CALL FROM UMTS TO GSM	CS_VC_403	A	
		FAX G3 CALL FROM UMTS TO GSM	CS_VC_404	A	
		SPEECH CALL FROM GSM TO UMTS	CS_VC_411	A	
		3,1 kHz AUDIO CALL FROM GSM TO UMTS	CS_VC_412	A	
		UDI CALL FROM GSM TO UMTS	CS_VC_413	A	
		FAX G3 CALL FROM GSM TO UMTS	CS_VC_414	A	
		Emergency Calls	EMERGENCY CALL WITH USIM	CS_EC_501	A
			EMERGENCY CALL WITHOUT USIM	CS_EC_502	A
		Handover	SRNS RELOCATION PROCEDURE	CS_HO_601	A
			INTERSYSTEM HANDOVER FROM UMTS TO GSM	CS_HO_602	A
		<b>Session Management</b>	PDP Context Activation	MS INITIATED PDPC ACTIVATION, DYNAMIC PDP ADDRESS	SM_PDP_101
	MS INITIATED PDPC ACTIVATION, STATIC PDP ADDRESS			SM_PDP_102	A
	QoS NEGOTIATION			SM_PDP_103	B
	APN SELECTION RULES, DYNAMIC PDP ADDRESS			SM_PDP_201	A
	APN SELECTION RULES, STATIC PDP ADDRESS			SM_PDP_202	B
	APN SELECTION RULES, TWO PDPC SUBSCRIBED			SM_PDP_203	B
	APN SELECTION RULES, WILDCARD SUBSCRIBED			SM_PDP_204	A
	PDP Context Deactivation			MS INITIATED DEACTIVATION	SM_PDP_301
			MS SWITCH OFF	SM_PDP_302	B
			MOBILE REACHABLE TIMER EXPIRY	SM_PDP_303	A
			3G-GGSN OR 3G-SGSN INITIATED	SM_PDP_304	B
			DELETE ACTICE PDP CONTEXT IN THE HLR	SM_PDP_305	A
Data Transfer Security	PACKET DATA TRANSFER BETWEEN 2 MS		SM_SEC_401	B	
Data Paging	DOWNLINK PAGING PROCEDURE		SM_PAG_501	A	
PDP Context Handover	PDP CONTEXT HANDOVER FROM UMTS TO GPRS NETWORK		SM_HO_601	B	



<b>Gi/Gn Interface interoperability</b>	Transparent Connection Mode	NO AUTHENTICATION, IP ADDRESS ASSIGNED BY 3G-GGSN	Gi/Gn_IOT_101	A	
		NO AUTHENTICATION, IP ADDRESS ASSIGNED BY LOCAL DHCP	Gi/Gn_IOT_102	B	
		NO AUTHENTICATION, STATIC IP ADDRESS	Gi/Gn_IOT_103	A	
	Non Transparent Connection Mode	UNTUNNELLED WITH RADIUS/DHCP SERVER AUTHENTICATION	Gi/Gn_IOT_201	B	
		UNTUNNELLED WITH RADIUS SERVER AUTHENTICATION	Gi/Gn_IOT_202	B	
		L2TP/IPSEC/GRE TUNNELS	Gi/Gn_IOT_203	B	
	GTP IP Support	IP FRAGMENTATION	Gi/Gn_IOT_301	B	
<b>HLR interoperability</b>	Insert subscriber data	ADD PDP CONTEXT IN THE HLR WITH ACTIVE PDP CONTEXT	HLR_IOT_101	A	
		ADD OTHER SERVICES IN THE HLR WITH AN ACTIVE PDP CONTEXT	HLR_IOT_102	A	
		UNSUCCESSFUL INSERT SUBSCRIBER DATA	HLR_IOT_103	B	
		MULTIPLE INSERT SUBSCRIBER DATA MESSAGES	HLR_IOT_104	B	
		MASSIVE CHANGE OF SUBSCRIBER DATA	HLR_IOT_105	B	
	Delete subscriber data	DELETE PDP CONTEXT IN THE HLR WITH ACTIVE PDP CONTEXT	HLR_IOT_201	A	
		DELETE OTHER SERVICES IN THE HLR WITH AN ACTIVE PDP CONTEXT	HLR_IOT_202	A	
		WITHDRAW OF A LIST OF PDP CONTEXTS	HLR_IOT_203	B	
	PS detach	HLR INITIATED PS DETACH WITH ACTIVE PDPC	HLR_IOT_301	A	
		SGSN INITIATED PURGE	HLR_IOT_302	A	
		HOLDING DATA IN THE 3G-SGSN AFTER SUBS IS DETACHED - MS DETACH	HLR_IOT_303	B	
		HOLDING DATA IN THE 3G-SGSN AFTER SUBS IS DETACHED - REMOVE A BATTERY	HLR_IOT_304	A	
	Reset HLR	COMMAND INITIATED RESET FROM HLR TO 3G-SGSN	HLR_IOT_401	A	
	<b>Supplementary services and SMS</b>	Line Identification	INTERROGATION PROCEDURE FOR CLI SUPPLEMENTARY SERVICES	SS_LI_101	A
			CLIP IN A CALL BETWEEN UMTS USERS	SS_LI_111	A
			CLIP IN A ISDN TO UMTS CALL	SS_LI_112	A
CLIP IN A GSM TO UMTS CALL			SS_LI_113	A	
CLIR IN A CALL BETWEEN UMTS USERS			SS_LI_114	A	
CLIR IN A UMTS TO ISDN CALL			SS_LI_115	A	
CLIR IN A UMTS TO GSM CALL			SS_LI_116	A	
COLP IN A CALL BETWEEN UMTS USERS			SS_LI_121	A	
COLP IN A UMTS TO ISDN CALL			SS_LI_122	A	
COLP IN A UMTS TO GSM CALL			SS_LI_123	A	
COLR IN A CALL BETWEEN UMTS USERS			SS_LI_124	A	
COLR IN A ISDN TO UMTS CALL			SS_LI_125	A	
COLR IN A GSM TO UMTS CALL		SS_LI_126	A		
Call Forwarding		PROCEDURE FOR CF SUPPLEMENTARY SERVICES	SS_CF_201	A	
		CFU IN A CALL BETWEEN UMTS USERS	SS_CF_211	A	
		CFU IN A GSM TO UMTS CALL	SS_CF_212	A	
		CFU IN A ISDN TO UMTS CALL	SS_CF_213	A	
		CFU IN A UMTS TO GSM CALL	SS_CF_214	A	
		CFB WITH NDUB IN A CALL BETWEEN UMTS USERS	SS_CF_221	A	
		CFB WITH NDUB IN A GSM TO UMTS CALL	SS_CF_222	A	
		CFB WITH NDUB IN A ISDN TO UMTS CALL	SS_CF_223	A	
		CFB IN A UMTS TO GSM CALL	SS_CF_224	A	
		CFNRy IN A CALL BETWEEN UMTS USERS	SS_CF_231	A	
		CFNRy IN A GSM TO UMTS CALL	SS_CF_232	A	
		CFNRy IN A ISDN TO UMTS CALL	SS_CF_233	A	
		CFNRy IN A UMTS TO GSM CALL	SS_CF_234	A	
		CFNRc IN A CALL BETWEEN UMTS USERS	SS_CF_241	A	

		CFNRc IN A GSM TO UMTS CALL	SS_CF_242	A
		CFNRc IN A ISDN TO UMTS CALL	SS_CF_243	A
		CFNRc IN A UMTS TO GSM CALL	SS_CF_244	A
	Call Waiting and Call Hold	PROCEDURE FOR CW SUPPLEMENTARY SERVICE	SS_CWH_301	A
		CW AND HOLD IN A CALL BETWEEN UMTS USERS	SS_CWH_311	A
		CW AND HOLD IN A GSM TO UMTS CALL	SS_CWH_312	A
		CW AND HOLD IN A ISDN TO UMTS CALL	SS_CWH_313	A
		CW AND HOLD IN A UMTS TO GSM CALL	SS_CWH_314	A
	Multy Party	MPTY CALL BETWEEN UMTS USERS	SS_MPTY_401	A
		MPTY CALL BETWEEN UMTS AND GSM USERS	SS_MPTY_402	A
		MPTY CALL BETWEEN UMTS AND ISDN USERS	SS_MPTY_403	A
	Call Barring	PROCEDURE FOR CB SUPPLEMENTARY SERVICES	SS_CB_501	A
		BAOC BY UMTS USER	SS_CB_511	A
		BAIC BY UMTS USER	SS_CB_512	A
	User to User Signalling	UUS1 BETWEEN UMTS USERS	SS_UUS_601	A
		UUS1 BETWEEN GSM AND UMTS USERS	SS_UUS_602	A
	Sub-address	SUBADDRESSING IN A CALL BETWEEN UMTS USERS	SS_SUB_701	A
		SUBADDRESSING IN A GSM TO UMTS CALL	SS_SUB_702	A
		SUBADDRESSING IN A ISDN TO UMTS CALL	SS_SUB_703	A
	Interaction between Supplementary Services	CFU-CLIP-COLP IN A CALL BETWEEN UMTS USERS	SS_INT_801	A
		CFB-CLIP-COLP IN A CALL BETWEEN UMTS USERS	SS_INT_802	A
		CFNRy-CLIP-COLP IN A CALL BETWEEN UMTS USERS	SS_INT_803	A
		CFNRc-CLIP-COLP IN A CALL BETWEEN UMTS USERS	SS_INT_804	A
		CFU-CLIR-COLR IN A CALL BETWEEN UMTS USERS	SS_INT_805	A
		CFB-CLIR-CLRL IN A CALL BETWEEN UMTS USERS	SS_INT_806	A
		CFNRy-CLIR-COLR IN A CALL BETWEEN UMTS USERS	SS_INT_807	A
		CFNRc-CLIR-COLR IN A CALL BETWEEN UMTS USERS	SS_INT_808	A
		CFB(UDUB)-CW IN A CALL BETWEEN UMTS USERS	SS_INT_809	A
	Short Message Service	SMS BETWEEN UMTS USERS	SS_SMS_901	A
		SMS FROM UMTS TO GSM	SS_SMS9602	A
		SMS FROM GSM TO UMTS	SS_SMS_903	A
<b>Applications</b>	Standard application	FTP FILE TRANSFER	APP_STD_101	A
		WEB BROWSING	APP_STD_102	A
		E-MAIL APPLICATION	APP_STD_103	A
		WAP SERVICE	APP_STD_104	A
<b>Billing</b>	3G-GSNs accounting	ACTIVATION, DEACTIVATION OF PDP CONTEXT	BILL_PS_101	A
		QoS NEGOTIATION	BILL_PS_102	A
		QoS UPDATE	BILL_PS_103	A
		DATA VOLUME LIMIT	BILL_PS_104	A
		TIME LIMIT	BILL_PS_105	A
		TARIFF CHANGE	BILL_PS_106	A
		INTER SGSN RA UPDATE	BILL_PS_107	A
		ACCURACY OF CDRs	BILL_PS_108	A
		CDR FORMAT VERIFICATION	BILL_PS_109	A
	MSC accounting	PSTN-UMTS VOICE CALL	BILL_CS_201	A
		UMTS-PSTN VOICE CALL	BILL_CS_202	A
		UMTS-UMTS VOICE CALL	BILL_CS_203	A

<b>System Stability</b>	Endurance	USER CONNECTION / DECONNECTION	STAB_END_101	B
		MULTI-USER TRAFFIC	STAB_END_102	B
		LARGE DATA FILE TRANSFER	STAB_END_103	B
<b>Quality of Service</b>	Round Trip Delay	ACCESS AND CORE NETWORK ROUND TRIP DELAY MEASUREMENT	QoS_DEL_101	A
	Throughput	THROUGHPUT MEASUREMENT	QoS_THR_201	A
	Jitter	JITTER MEASUREMENT	QoS_JIT_301	A
	Packet errors	PACKET LOSS, PACKET OUT OF SEQUENCE, DUPLICATE PACKETS	QoS_ERR_401	A
	Quality of Voice	CLARITY END-TO-END	QoS_CS_501	A
		CLARITY CORE NETWORK	QoS_CS_502	A
		ONE WAY DELAY	QoS_CS_503	A
ROUND TRIP DELAY		QoS_CS_504	A	

## A.2 Test Forms

This clause introduces all of the test forms envisaged. Each form consists of various fields that are briefly defined below:

**OBJECTIVE:** this field indicates the aim of the test, in other words, the function to be checked.

**INTERFACES:** this is a list of the interfaces involved in the test, the ones in bold type require analysis with a monitoring instrument during the test.

**PRECONDITIONS:** this describes the phases of preparation that have to be carried out to bring all elements of the system to the initial conditions necessary for performing the test.

**PRIORITY:** the importance given to performing the test compared to others.

**PROCEDURE DESCRIPTION:** this describes the sequence of actions to perform to solicit the function under test.

**EXPECTED RESULTS:** this describes the messages to check on the interfaces with the protocol analyser and the system element states to check.

**NOTES:** comments, explanations or suggestions about the test.

**REFERENCES:** the specifications and documents offering more information on problems with the test.

Remarks:

- In some test forms the signalling on the Uu interface can be missing, that is however out of the scope of the present document. For example at the beginning and at the end of the Iu procedures the "RRC connection" establishment and the Uu interface release (if there is not already present a signalling connection between CN and UE) can take place. Moreover, after having established an Iu signalling connection, the CN shall send a Common ID message to the UTRAN; so the RNC shall associate the RRC connection to the user for the duration of the RRC connection.
- In some test forms can be missed the "Service request" procedure. For example if an user want to activate a PDP context when it has not a signalling connection on the IuPS interface, before starting the "PDP activate" procedure, it should perform the "service request" procedure.
- An indication that the security mode control procedure is completed or reception of a CM\_Service\_Accept message shall be treated as a service acceptance indication by the MS; so when the network does not invoke the security functions then the CM\_Service\_Accept message can occur.
- In the CS tests the "Call Clearing Procedure" consists of the call control release procedure and all the necessary procedures for the release of the allocated radio bearer.

## A.3 Test Description

### A.3.1 Mobility Management

<b>Mobility Management - CS Location Updating</b>
MM_CS_101: LOCATION UPDATING - IMSI ATTACH
OBJECTIVE: This test aims to demonstrate completion of the IMSI attach procedure when the MS does not have a valid TMSI.
INTERFACES: IuCS, D.
PRECONDITIONS: Requires at least configuration n°1. The user must be registered in the HLR with UMTS subscription. The user must not have a valid TMSI stored in the USIM.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Check that the user is not already registered in 3G-MSC. 2. Carry out an IMSI attach with the MS.
EXPECTED RESULTS: 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant MSC as 3G-MSC     participant HLR      MS-&gt;&gt;MSC: Location Updating Request     MSC-&gt;&gt;MS: Security Functions     MSC-&gt;&gt;HLR: Update Location     HLR-&gt;&gt;MSC: Insert Subscriber Data     MSC-&gt;&gt;HLR: Insert Subscriber Data Ack     HLR-&gt;&gt;MSC: Update Location Ack     MSC-&gt;&gt;MS: Location Updating Accept     MSC-&gt;&gt;MS: TMSI Reallocation Complete     MSC-&gt;&gt;UTRAN: Release           </pre>
2. Check the following fields in the messages: <b>Location Updating Request:</b> Location Updating type = IMSI Attach; Mobile Identity=<IMSI>; <b>Update location:</b> Mobile Identity =<IMSI>; <b>Insert Subscriber Data:</b> subscription data; <b>Location Updating Accept:</b> Mobile Identity =<TMSI>;
3. Check that the user is registered in the 3G-MSC and that the data stored in the 3G-MSC faithfully reproduces the HLR settings.
4. Check that the MS indicates attached status.
5. Check that the 3G-MSC address is stored in the HLR.
NOTE: Switching on most MS initiates the attach procedure.
REFERENCES: [1] clauses 4.4.3 and 4.4.4, [2] clause 4.3.13, [4] clause B.1.

<b>Mobility Management - CS Location Updating</b>
MM_CS_102: LOCATION UPDATING
OBJECTIVE: This test aims to demonstrate completion of the Location Updating procedure when the MS changes 3G-MSC area.
INTERFACES: <b>IuCS, D.</b>
PRECONDITIONS: Requires at least configuration n°1, (see note). The user must be registered in the HLR with UMTS subscription.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Check that the user is not already registered in the new 3G-MSC. 2. Carry out a Location Updating procedure forcing the MS into a new LA.
EXPECTED RESULTS: 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant UE     participant UTRAN     participant Iu-CS     participant new_3G_MSC as new 3G-MSC     participant HLR     participant old_3G_MSC as old 3G-MSC      UE-&gt;&gt;new_3G_MSC: Location Updating Request     new_3G_MSC-&gt;&gt;old_3G_MSC: Send Identification Request     old_3G_MSC--&gt;&gt;new_3G_MSC: Send Identification Request Ack     new_3G_MSC-&gt;&gt;UE: Security Functions     new_3G_MSC-&gt;&gt;HLR: Update Location     HLR-&gt;&gt;old_3G_MSC: Cancel Location     old_3G_MSC--&gt;&gt;HLR: Cancel Location Ack     HLR-&gt;&gt;new_3G_MSC: Insert Subscriber Data     new_3G_MSC-&gt;&gt;HLR: Insert Subscriber Data Ack     HLR-&gt;&gt;new_3G_MSC: Update Location Ack     new_3G_MSC-&gt;&gt;UE: Location Updating Accept     new_3G_MSC-&gt;&gt;UTRAN: TMSI Reallocation Complete     UTRAN-&gt;&gt;new_3G_MSC: Release           </pre>
2. Check the following fields in the messages: <b>Location Updating Request:</b> Mobile identity=old TMSI; Location Area Identification=old LAI; <b>Location Updating Accept:</b> Mobile identity=new TMSI; Location Area Identification=new LAI;
3. Check that the user is registered in the new 3G-MSC and that the data stored in new 3G-MSC faithfully reproduces the HLR settings;
4. Check that the MS is not registered in the old 3G-MSC;
5. Check that the MS still indicates attached status.
NOTE: In this test the configuration n°1 have to be completed with another 3G-MSC.
REFERENCES: [1] clauses 4.4.4 and 9.2, [2] clause 4.3.13.

<b>Mobility Management - CS Detach</b>
MM_CS_201: IMSI DETACH
OBJECTIVE: This test aims to demonstrate completion of the detach procedure in case of MS switch off and in the absence of an active PDPC.
INTERFACES: <b>IuCS</b> .
PRECONDITIONS: Requires at least configuration n°1. The user must be registered in the HLR with UMTS subscription and must be IMSI attached.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Carry out a detach by switching off the MS.
EXPECTED RESULTS: 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant 3G-MSC     MS-&gt;&gt;3G-MSC: IMSI Detach Indication     3G-MSC-&gt;&gt;UTRAN: Release   </pre>
2. Check that the MS is deregistered in the 3G-MSC.
REFERENCES: [1] clause 4.3.4.

<b>Mobility Management - PS Attach</b>
MM_PS_301: SUCCESSFUL PS ATTACH
OBJECTIVE: This test aims to demonstrate completion of the attach procedure in the case where the MS does not have a valid PTMSI.
INTERFACES: <b>IuPS, Gr</b> .
PRECONDITIONS: Requires at least configuration n°2. The user must be registered in the HLR with UMTS subscription. The user must not have a valid PTMSI stored in the USIM.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Check that the user is not already registered in 3G-SGSN and that the MS does not have a valid PTMSI in memory. 2. Carry out a PS attach with the MS.
EXPECTED RESULTS: 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant 3G-SGSN     participant HLR     MS-&gt;&gt;3G-SGSN: Attach Request     3G-SGSN-&gt;&gt;HLR: Update Location     HLR-&gt;&gt;3G-SGSN: Insert Subscriber Data     3G-SGSN-&gt;&gt;HLR: Insert Subscriber Data Ack     HLR-&gt;&gt;3G-SGSN: Update Location Ack     3G-SGSN-&gt;&gt;MS: Attach Accept     MS-&gt;&gt;3G-SGSN: Attach Complete     3G-SGSN-&gt;&gt;UTRAN: Release   </pre>
2. Check the following fields in the messages: <b>Attach Request:</b> MS Identity = IMSI; <b>Update Location:</b> Mobile Identity=<IMSI>; <b>Insert Subscriber Data:</b> subscriber data; <b>Attach Accept:</b> Allocated P-TMSI=<P-TMSI>.
3. Check that the user is registered in 3G-SGSN and that the data stored in 3G-SGSN faithfully reproduces the HLR settings.
4. Check that the MS indicates attached status.
5. Check that the 3G-SGSN address is stored in the HLR.
NOTE: The message "Attach Request" is carried by an "Initial UE" ranap message. The possible authentication and security functions are left out because dealt in successive tests.
REFERENCES: [1] clause 4.7.3.1, clause 9.4, [3] clause 6.5, [4] clause B.1.

<b>Mobility Management - PS Attach</b>
<b>MM_PS_302: SUCCESSFUL PTMSI ATTACH, MS KNOWN IN THE NETWORK</b>
<b>OBJECTIVE:</b> This test aims to demonstrate completion of the PS attach procedure when the MS has a valid PTMSI, known in the network.
<b>INTERFACES:</b> <b>IuPS, Gr.</b>
<b>PRECONDITIONS:</b> Requires at least configuration n°2. The user must be registered in the HLR with UMTS subscription. The user must have a valid PTMSI stored in the USIM.
<b>PRIORITY:</b> A
<b>DESCRIPTION/PROCEDURE:</b> 1. Check that the user is already registered in 3G-SGSN and that the MS has a valid PTMSI in the memory. 2. Carry out a PS attach with the MS.
<b>EXPECTED RESULTS:</b> 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant 3G_SGSN as 3G-SGSN     participant HLR      UTRAN-&gt;&gt;3G_SGSN: Attach Request     3G_SGSN-&gt;&gt;MS: Attach Accept     3G_SGSN-&gt;&gt;UTRAN: Attach Complete     UTRAN-&gt;&gt;3G_SGSN: Release     </pre>
2. Check the following fields in the messages: <b>Attach Request:</b> MS Identity = P-TMSI; <b>Attach Accept:</b> Allocated P-TMSI=<reallocated P-TMSI>, (see note 2).
3. Check that there are no messages on the Gr interface.
4. Check that the user is registered in 3G-SGSN and that the data stored in 3G-SGSN faithfully reproduces the HLR settings.
5. Check that the MS indicates attached status.
<b>NOTE 1:</b> The message "Attach Request" is carry by an "Initial UE" ranap message.
<b>NOTE 2:</b> Check the field in the message Attach Accept only in case of PTMSI reallocation.
<b>REFERENCES:</b> [1] clauses 4.7.3.1, 9.4, [3] clause 6.5

<b>Mobility Management - PS Attach</b>
<b>MM_PS_303: SUCCESSFUL PTMSI ATTACH, MS UNKNOWN IN THE NETWORK</b>
<b>OBJECTIVE:</b> This test aims to demonstrate completion of the PS attach procedure when the MS has a PTMSI unknown in the network.
<b>INTERFACES:</b> IuPS, Gr.
<b>PRECONDITIONS:</b> Requires at least configuration n°2. The user must be registered in the HLR with UMTS subscription. The user must have a valid PTMSI stored in the USIM.
<b>PRIORITY:</b> B
<b>DESCRIPTION/PROCEDURE:</b> 1. Check that the user is not already registered in 3G-SGSN and that the MS has a valid PTMSI in the memory. 2. Carry out a PS attach with the MS.
<b>EXPECTED RESULTS:</b> 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant 3G_SGSN as 3G-SGSN     participant HLR      MS-&gt;&gt;3G_SGSN: Attach Request     3G_SGSN-&gt;&gt;MS: Identity Request     3G_SGSN-&gt;&gt;MS: Identity Response     3G_SGSN-&gt;&gt;HLR: Update Location     HLR-&gt;&gt;3G_SGSN: Insert Subscriber Data     3G_SGSN-&gt;&gt;HLR: Insert Subscriber Data Ack     HLR-&gt;&gt;3G_SGSN: Update Location Ack     3G_SGSN-&gt;&gt;MS: Attach Accept     MS-&gt;&gt;3G_SGSN: Attach Complete     3G_SGSN-&gt;&gt;UTRAN: Release   </pre>
2. Check the following fields in the messages: <b>Attach Request:</b> MS Identity = P-TMSI; <b>Identity Request:</b> Identity type= IMSI; <b>Identity Response:</b> Mobile Identity=<IMSI>; <b>UpdateLocation:</b> Mobile Identity=<IMSI>; <b>Insert Subscriber Data:</b> GPRS Subscription Data; <b>Attach Accept:</b> Allocated P-TMSI=<reallocated P-TMSI>.
3. Check that the user is registered in 3G-SGSN and that the data stored in 3G-SGSN faithfully reproduces the HLR settings.
4. Check that the MS indicates attached status.
<b>NOTE:</b> The message "Attach Request" is carried by an "Initial UE" ranap message.
<b>REFERENCES:</b> [1] clauses 4.7.3.1 and 9.4; [3] clause 6.5, [4] clause B.1.



<b>Mobility Management - PS Location Management</b>
MM_LM_401: NORMAL ROUTING AREA UPDATE
OBJECTIVE: This test aims to demonstrate completion of the Routing Area Update procedure.
INTERFACES: <b>IuPS.</b>
PRECONDITIONS: Requires at least configuration n°2. The user must be registered in the HLR with UMTS subscription and must be PS attached.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Carry out an Intra-SGSN Routing Area Update forcing the MS into a new RA. 2. Check that the new RAI is contained in the 3G-SGSN.
EXPECTED RESULTS: 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant SGSN as 3G-SGSN     MS-&gt;&gt;SGSN: RA Update Request     SGSN--&gt;&gt;UTRAN: Security Functions     UTRAN--&gt;&gt;MS: RA Update Accept     MS-&gt;&gt;SGSN: RA Update Complete     UTRAN--&gt;&gt;SGSN: Release     </pre>
2. Check the following fields in the messages: <b>RA Update Request:</b> Old RAI; Update type= RA updating; <b>RA Update Accept:</b> Allocated P-TMSI=<re-allocated P-TMSI>.
3. Check that the MM context of the MS is updated with the new RAI.
REFERENCES: [3] clause 6.9.2.1; [1] clause 9.4.

<b>Mobility Management -PS Location Management</b>
MM_LM_402: PERIODIC RA UPDATE TIMER FUNCTION
OBJECTIVE: This test aims to demonstrate completion of the Periodic RA Update procedure.
INTERFACES: <b>IuPS.</b>
PRECONDITIONS: Requires at least configuration n°2. The user must be registered in the HLR with UMTS subscription. Set the periodic RA update timer approximately at 15 min.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Check that the state of the MS in the 3G-SGSN is attached. 2. Wait for the expiry of the periodic RA update timer.
EXPECTED RESULTS: 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant SGSN as 3G-SGSN     Note over UTRAN, SGSN: Iu-PS     MS-&gt;&gt;SGSN: RA Update Request     SGSN--&gt;&gt;MS: RA Update Accept     UTRAN-&gt;&gt;SGSN: Release     MS-&gt;&gt;SGSN: RA Update Request     SGSN--&gt;&gt;MS: RA Update Accept     UTRAN-&gt;&gt;SGSN: Release     </pre>
2. Check the following field in the message: <b>RA Update Request:</b> Update type=periodic updating.
REFERENCES: [3] clause 6.2.2, [1] clause 9.4, clause 4.7.2, clause 4.7.5.

<b>Mobility Management - PS Detach</b>
MM_PS_501: MS SWITCH OFF WITH NO PDP CONTEXT
OBJECTIVE: This test aims to demonstrate completion of the detach procedure in the case of MS switch off and in the absence of an active PDPC.
INTERFACES: <b>IuPS.</b>
PRECONDITIONS: Requires at least configuration n°2. The user must be registered in the HLR with UMTS subscription and must be PS attached.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Carry out a detach by switching off the MS.
EXPECTED RESULTS: 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant SGSN as 3G-SGSN     Note over UTRAN, SGSN: Iu-PS     MS-&gt;&gt;SGSN: Detach Request     UTRAN-&gt;&gt;SGSN: Release     </pre>
2. Check the following fields in the messages: <b>Detach Request:</b> Detach Type=GPRS detach.
3. Check that the MS is deregistered in the 3G-SGSN.
NOTE: The message "Detach Request" is carry by an "Initial UE" ranap message.
REFERENCES: [3] clause 6.6.1; [1] clause 9.4.5.

<b>Mobility Management - PS Detach</b>
MM_PS_502: HLR INITIATED PS DETACH WITH NO ACTIVE PDP CONTEXT
OBJECTIVE: This test aims to demonstrate completion of the detach procedure of the MS initiated by the HLR.
INTERFACES: <b>IuPS, Gr.</b>
PRECONDITIONS: Requires at least configuration n°2. The user must be registered in the HLR with UMTS subscription and must be PS attached with no active PDP.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Provoke the detach of the MS cancelling the user's PS subscription in the HLR (explicit detach).
EXPECTED RESULTS: 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant SGSN as 3G-SGSN     participant HLR      HLR-&gt;&gt;SGSN: Cancel Location     SGSN-&gt;&gt;MS: Detach Request     MS-&gt;&gt;SGSN: Detach Accept     SGSN-&gt;&gt;HLR: Cancel Location Ack     SGSN-&gt;&gt;UTRAN: Release     </pre>
2. Check the following fields in the messages: <b>Cancel Location:</b> Cancellation type=subscription withdrawn; IMSI; <b>Detach Request:</b> Detach type=re-attach not required.
3. Check that the MS is deregistered in the 3G-SGSN.
REFERENCES: [3] clause 6.6.2; [1] clause 9.4.5, [4] clause B.1.

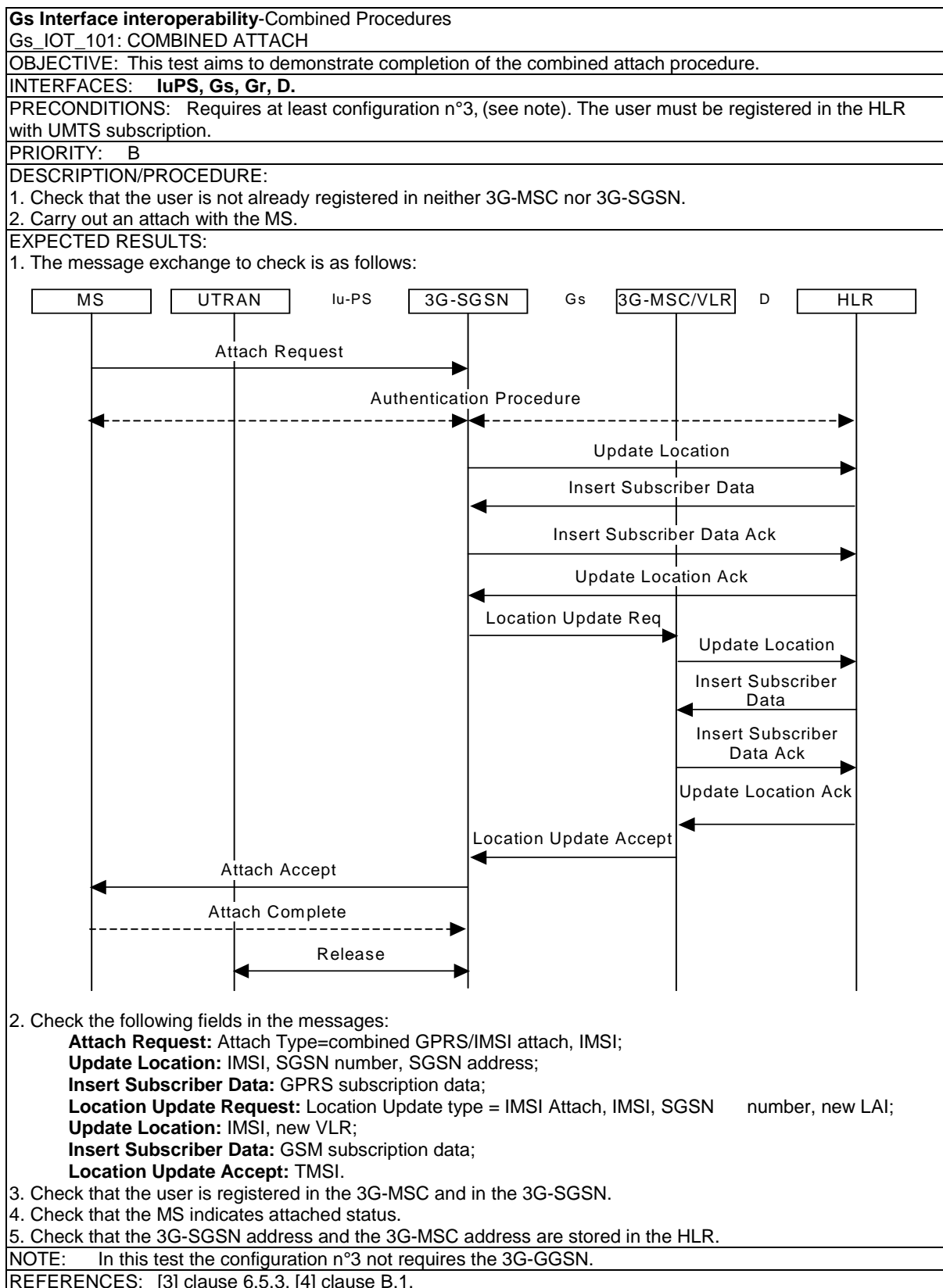
<b>Mobility Management - PS Detach</b>
MM_PS_503: IMPLICIT DETACH UPON MOBILE REACHABLE TIMER EXPIRY
OBJECTIVE: This test aims to demonstrate completion of the implicit detach procedure for the MS on expiry of the mobile reachable timer.
INTERFACES: <b>IuPS.</b>
PRECONDITIONS: Requires at least configuration n°2. The user must be registered in the HLR with UMTS subscription.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Set a mobile reachable timer value in the 3G-SGSN of around 15 min. 2. Carry out an attach with the MS and check that the state of the MS in the 3G-SGSN is attached. 3. Avoid the Periodic RA Update function taking the MS out of cover or removing the battery (so that no detach request is sent). 4. Wait for the expiry of the mobile reachable timer.
EXPECTED RESULTS: 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant SGSN as 3G-SGSN      MS-&gt;&gt;SGSN: Attach Request     SGSN-&gt;&gt;MS: Attach Accept     SGSN-&gt;&gt;UTRAN: Release     </pre>
2. Check the following fields in the messages: <b>Attach Accept:</b> Periodic RA Update timer.
3. Check that the MS is considered detached in the 3G-SGSN.
4. Check the absence of signals on the IuPS interface after the detach.
REFERENCES: [1] clause 6.2.3, clause 6.6, [3] clause 9.4

<b>Mobility Management - Security Functions</b>
MM_SEC_601: AUTHENTICATION OF UMTS SUBSCRIBER
OBJECTIVE: This test aims to demonstrate completion of the user authentication procedure.
INTERFACES: <b>IuPS, Gr.</b>
PRECONDITIONS: Requires at least configuration n°2. The user must be registered in the HLR with UMTS subscription. The 3G-SGSN has not stored the user authentication quintuplet.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Carry out an attach with the MS.
EXPECTED RESULTS: 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant 3G_SGSN as 3G-SGSN     participant HLR     MS-&gt;&gt;3G_SGSN: Attach Request     3G_SGSN-&gt;&gt;HLR: Send Authentication Info     HLR--&gt;&gt;3G_SGSN: Send Authentication Info Ack     3G_SGSN-&gt;&gt;MS: Authentication and Cipherying Request     MS-&gt;&gt;3G_SGSN: Authentication and Cipherying Response     3G_SGSN-&gt;&gt;MS: Security Mode Control Command     MS-&gt;&gt;3G_SGSN: Security Mode Control Complete     3G_SGSN-&gt;&gt;MS: Attach Accept     MS-&gt;&gt;3G_SGSN: Attach Complete     3G_SGSN-&gt;&gt;UTRAN: Release     </pre>
2. Check the following fields in the messages: <b>AttachRequest:</b> MS Identity=IMSI; IMSI=<IMSI>; <b>Send Authentication Info:</b> IMSI; <b>Send Authentication Info Ack:</b> array of quintuplets; <b>Authentication and Cipherying Request:</b> RAND, AUTN, CKSN; <b>Attach Accept:</b> Allocated P-TMSI=<New P-TMSI>.
3. Check that the user is registered in 3G-SGSN and that the data stored in 3G-SGSN faithfully reproduces the HLR settings.
4. Check that the MS indicates attached state.
5. Check that the 3G-SGSN address is stored in the HLR.
REFERENCES: [4] clause B.1, [5] clause 6.4.5.

<b>Mobility Management - Security Function</b> MM_SEC_602: IMSI ATTACH FAILURE
OBJECTIVE: This test aims to demonstrate completion of the Security Function during an IMSI attach procedure when the MS is not authorized by the network.
INTERFACES: <b>IuCS, D.</b>
PRECONDITIONS: Requires at least configuration n°1. The user must not be registered in the HLR with UMTS subscription. The user must not have a valid TMSI stored in the USIM.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Check that the user is not already registered in 3G-MSC. 2. Carry out an IMSI attach with the MS.
EXPECTED RESULTS: 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant 3G_MSC as 3G-MSC     participant HLR     UTRAN-&gt;&gt;3G_MSC: Location Updating Request     3G_MSC-&gt;&gt;HLR: Update Location     HLR--&gt;&gt;3G_MSC: Update Location Ack     3G_MSC--&gt;&gt;MS: Location Updating Reject     3G_MSC--&gt;&gt;UTRAN: Release   </pre>
2. Check the following fields in the messages: <b>Location Updating Request:</b> Location Updating type = IMSI Attach; Mobile Identity=IMSI; <b>Location Updating Reject:</b> Reject Cause=IMSI unknown in HLR.
3. Check that the MS is not registered in the 3G-MSC.
REFERENCES: [2] clause 4.3.14; [1] clauses 4.4.3 and 9.2

<b>Mobility Management - Security Functions</b> MM_SEC_603: PS ATTACH FAILURE, REJECTED BY HLR
OBJECTIVE: This test aims to demonstrate the correct security function during a PS attach procedure when the MS is not authorized by the network.
INTERFACES: <b>IuPS, Gr.</b>
PRECONDITIONS: Requires at least configuration n°2. The user must be registered in the HLR with no subscription.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Carry out an attach with the MS.
EXPECTED RESULTS: 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant 3G_SGSN as 3G-SGSN     participant HLR     UTRAN-&gt;&gt;3G_SGSN: Attach Request     3G_SGSN-&gt;&gt;HLR: Update Location     HLR--&gt;&gt;3G_SGSN: Update Location Ack     3G_SGSN--&gt;&gt;MS: Attach Reject     3G_SGSN--&gt;&gt;UTRAN: Release   </pre>
2. Check the following fields in the messages: <b>Attach Request:</b> MS identity=IMSI; IMSI=<IMSI>; <b>Attach Reject:</b> GMM Cause='IMSI unknown in HLR'.
REFERENCES: [3] clause 6.5; [1] clause 9.4.

## A.3.2 Gs Interface Interoperability

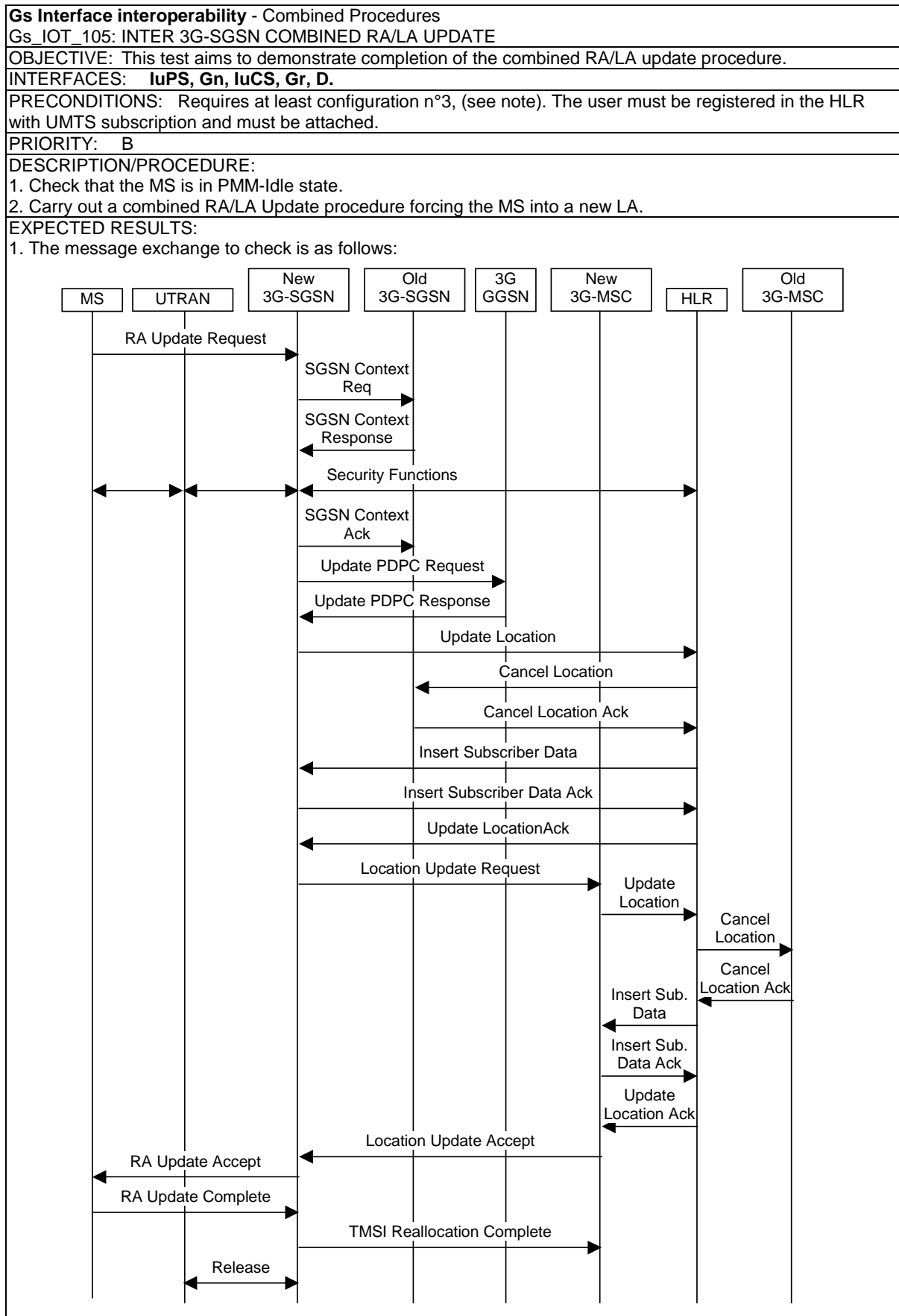


<b>Gs Interface interoperability - Combined Procedures</b>
Gs_IOT_102: COMBINED DETACH
OBJECTIVE: This test aims to demonstrate completion of the combined detach procedure.
INTERFACES: <b>IuCS, Gs, Gn.</b>
PRECONDITIONS: Requires at least configuration n°3. The user must be registered in the HLR with UMTS subscription and must have an active PDPC.
PRIORITY: B
DESCRIPTION/PROCEDURE: 1. Carry out a detach by switching off the MS.
EXPECTED RESULTS: 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant SGSN as 3G-SGSN     participant GGSN as 3G-GGSN     participant MSC as 3G-MSC/VLR      MS-&gt;&gt;SGSN: Detach Request     SGSN-&gt;&gt;GGSN: Delete PDPC Req     GGSN--&gt;&gt;SGSN: Delete PDPC Response     SGSN-&gt;&gt;MSC: IMSI Detach Indication     SGSN-&gt;&gt;UTRAN: Release   </pre>
2. Check the following fields in the messages: <b>Detach Request:</b> Detach Type=combined GPRS/IMSI detach; <b>Delete PDPC Request:</b> TEID; <b>Delete PDPC Response:</b> TEID.
3. Check that the MS is deregistered in both the 3G-MSC and 3G-SGSN.
REFERENCES: [3] clause 6.6

<b>Gs Interface interoperability - Detach Procedures</b>
Gs_IOT_103: IMPLICIT COMBINED DETACH
OBJECTIVE: This test aims to demonstrate completion of the 3G-SGSN initiated combined detach procedure.
INTERFACES: <b>IuPS, Gs, Gn.</b>
PRECONDITIONS: Requires at least configuration n°3. The user must be registered in the HLR with UMTS subscription; the MS must be IMSI and PS attached and must have an active PDPC.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Wait for reachable timer expiry, while make the MS unable to send Periodic RAU or make the 3G-SGSN unable to receive it.
EXPECTED RESULTS: 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant SGSN as 3G-SGSN     participant GGSN as 3G-GGSN     participant MSC as 3G-MSC/VLR      Note over SGSN: Timer expired     SGSN-&gt;&gt;GGSN: Delete PDPC Req     GGSN--&gt;&gt;SGSN: Delete PDPC Response     SGSN-&gt;&gt;MSC: IMSI Detach Indication     MSC--&gt;&gt;SGSN: IMSI Detach Indication Ack     SGSN-&gt;&gt;UTRAN: Release   </pre>
2. Check the following fields in the messages: <b>IMSI Detach Indication:</b> Detach type="Implicit SGSN initiated IMSI detach from non-GPRS service".
3. Check that there is not signalling on the IuPS interface.
4. Check that the MS is deregistered in both the 3G-SGSN and the 3G-MSC.
REFERENCES: [1] clause 9.4, [3] clause 6.6, [24] clause 10 clause 17.1.

<b>Gs Interface interoperability</b> - Location Management
Gs_IOT_104: INTRA 3G-SGSN COMBINED RA/LA UPDATE
OBJECTIVE: This test aims to demonstrate completion of the combined Intra 3G-SGSN Routing Area Update procedure.
INTERFACES: <b>IuPS, Gs.</b>
PRECONDITIONS: Requires at least configuration no. 3, (see note 1). The user must be registered in the HLR with UMTS subscription, must be PS and IMSI attached.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Check the mobile is located in the first RA (belonging to first LA). 2. Force the mobile in the second RA (belonging to the second LA).
EXPECTED RESULTS: 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant 3G_SGSN as 3G-SGSN     participant 3G_MSC_VLR as 3G-MSC/VLR      MS-&gt;&gt;3G_SGSN: RA Update Request     3G_SGSN-&gt;&gt;3G_MSC_VLR: Location Update Req     3G_MSC_VLR--&gt;&gt;3G_SGSN: Location Update Acc     3G_SGSN--&gt;&gt;MS: RA Update Accept     MS--&gt;&gt;3G_SGSN: RA Update Complete (see note 2)     3G_SGSN--&gt;&gt;3G_MSC_VLR: TMSI Realloc. Com (see note 3)     UTRAN--&gt;&gt;3G_SGSN: Release   </pre>
2. Check the following fields in the messages: <b>RA Update Request:</b> Old RAI; Update type= Combined RA/LA update; <b>Location Update Request:</b> new LAI; Update type= Normal location update.
3. Check that the mobility context of the MS is updated with the new RAI and LAI.
4. Check that a data transfer after the procedure is successful.
NOTE 1: In this test the configuration n°3 not requires the 3G-GGSN.
NOTE 2: The RA Update Complete message is present only in the event of the P-TMSI and/or TMSI is reallocated (in the RA Update Accept message).
NOTE 3: The TMSI reallocation Complete message is displayed only in the event the TMSI is reallocated (in the Location Update Accept message).
REFERENCES: [3] clause 6.9, [24] clause 6, clause 17.1.





<p>2. Check the following fields in the messages:</p> <p><b>RA Update Request:</b> Old RAI; Update type= Combined RA/LA updating.  <b>SGSN Context Request:</b> old P-TMSI, old RAI, old P-TMSI signature;  <b>SGSN Context Response:</b> MM context, PDP context;  <b>Update PDP Context Request:</b> new SGSN address, QoS negotiated, TEID;  <b>Update PDP Context Response:</b> TEID;  <b>Location Update Request:</b> Location Update type=normal location update;  <b>Location Update Accept:</b> new TMSI;  <b>RA Update Accept:</b> new RAI.</p> <p>3. Check that the MM context of the MS is updated with the new identification area and check that the GGSN and HLR are updated with new SGSN and MSC addresses.</p> <p>NOTE: In this test the configuration n°3 requires another RNC, 3G-MSC and 3G-SGSN.</p> <p>REFERENCES: [3] clause 6.9.2.</p>
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<p><b>Gs Interface interoperability - Detach Procedures</b>  Gs_IOT_106: HLR INITIATED COMBINED DETACH</p> <p>OBJECTIVE: This test aims to demonstrate completion of the HLR initiated combined detach procedure.</p> <p>INTERFACES: <b>IuPS, Gs, Gn, Gr.</b></p> <p>PRECONDITIONS: Requires at least configuration n°3. The user must be registered in the HLR with UMTS subscription; the MS must be IMSI and PS attached and must have an active PDPC.</p> <p>PRIORITY: A</p> <p>DESCRIPTION/PROCEDURE:  1. Carry out a combined detach procedure by the HLR.</p> <p>EXPECTED RESULTS:  1. The message exchange to check is as follows:</p> <pre> sequenceDiagram     participant MS     participant UTRAN     participant SGSN as 3G-SGSN     participant GGSN as 3G-GGSN     participant HLR     participant MSC as 3G-MSC/VLR      GGSN-&gt;&gt;HLR: Cancel Location     HLR-&gt;&gt;SGSN: Cancel Location     SGSN-&gt;&gt;GGSN: Delete PDPC Req     GGSN-&gt;&gt;SGSN: Delete PDPC Res     HLR-&gt;&gt;MSC: IMSI Detach Indication     MSC--&gt;&gt;HLR: IMSI Detach Indication Ack     HLR-&gt;&gt;SGSN: Cancel Location Ack     SGSN-&gt;&gt;MS: Detach Request     MS-&gt;&gt;SGSN: Detach Accept     SGSN-&gt;&gt;UTRAN: Release     </pre> <p>2. Check the following fields in the messages:</p> <p><b>Cancel Location:</b> Cancellation Type="Subscription Withdrawn", IMSI;  <b>Detach Request:</b> Detach Type="re-attach not required";  <b>IMSI Detach Indication:</b> Detach type="Combined explicit MS initiated IMSI detach from GPRS and non-GPRS services".</p> <p>3. Check that the MS is deregistered in both the 3G-SGSN and the 3G-MSC/VLR.</p> <p>REFERENCES: [1] clause 9.4, [3] clause 6.6.2, [24] clause 17.1.</p>
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<b>Gs Interface interoperability - Coordination</b>							
Gs_IOT_201: PS ATTACH WHILE IMSI ATTACHED							
OBJECTIVE: This test aims to demonstrate completion of the PS attach procedure when the MS is already IMSI attached.							
INTERFACES: <b>IuPS, Gs, Gr, D.</b>							
PRECONDITIONS: Requires at least configuration n°3, (see note 1). The user must be registered in the HLR with UMTS subscription.							
PRIORITY: A							
DESCRIPTION/PROCEDURE: 1. Check that the user is only IMSI attached. 2. Carry out a PS attach by the MS.							
EXPECTED RESULTS: 1. The message exchange to check is as follows:							
MS	UTRAN	IuPS	3G-SGSN	Gs	3G-MSC/VLR	D	HLR
<pre> sequenceDiagram     participant MS     participant UTRAN     participant SGSN as 3G-SGSN     participant MSC as 3G-MSC/VLR     participant HLR      MS-&gt;&gt;SGSN: Attach Request     UTRAN-&gt;&gt;SGSN:      UTRAN--&gt;&gt;MS:      SGSN--&gt;&gt;HLR: Update Location     HLR--&gt;&gt;SGSN: Insert Subscriber Data     HLR--&gt;&gt;SGSN: Insert Subscriber Data Ack     HLR--&gt;&gt;SGSN: Update Location Ack     SGSN-&gt;&gt;MSC: Location Update Req     MSC--&gt;&gt;SGSN: Location Update Accept     SGSN--&gt;&gt;MS: Attach Accept     MS-&gt;&gt;SGSN: Attach Complete     UTRAN-&gt;&gt;SGSN: Release     SGSN--&gt;&gt;MSC: TMSI Reallocation Complete (see note 2)     </pre>							
2. Check the following fields in the messages: <b>Attach Request:</b> Attach Type=GPRS attach while already IMSI attach, IMSI; <b>Update Location:</b> IMSI, SGSN number, SGSN address; <b>Insert Subscriber Data:</b> GPRS subscription data; <b>Location Update Request:</b> Update type = Normal Location Update, IMSI, SGSN number, new Cell.							
3. Check that the user is registered in the 3G-SGSN.							
4. Check that the MS is PS and IMSI attached.							
5. Check that the SGSN number is stored in the HLR.							
NOTE 1: In this test the configuration n°3 not requires the 3G-GGSN.							
NOTE 2: The TMSI reallocation Complete message is displayed only in the event the TMSI is reallocated (in the Location Update Accept message).							
REFERENCES: [1] clause 9.2; [3] clause 6.5.3, [24] clause 6.1, clause 17.1.							

<b>Gs Interface interoperability - Coordination</b>							
Gs_IOT_202: IMSI ATTACH WHILE PS ATTACHED							
OBJECTIVE: This test aims to demonstrate completion of the IMSI attach procedure when the MS is already PS attached.							
INTERFACES: <b>IuPS, Gs, Gr, D.</b>							
PRECONDITIONS: Requires at least configuration n°3, (see note). The user must be registered in the HLR with UMTS subscription.							
PRIORITY: A							
DESCRIPTION/PROCEDURE: 1. Check that the user is only PS attached. 2. Carry out an IMSI attach by the MS.							
EXPECTED RESULTS: 1. The message exchange to check is as follows:							
MS	UTRAN	IuPS	3G-SGSN	Gs	3G-MSC/VLR	D	HLR
<pre> sequenceDiagram     participant MS     participant UTRAN     participant SGSN as 3G-SGSN     participant MSC as 3G-MSC/VLR     participant HLR      MS-&gt;&gt;SGSN: Routing Area Update Request     SGSN--&gt;&gt;HLR: Security Functions     SGSN-&gt;&gt;HLR: Location Update Request     HLR--&gt;&gt;SGSN: Location Update Accept     SGSN--&gt;&gt;MS: Routing Area Update Accept     SGSN--&gt;&gt;MS: Routing Area Update Complete     SGSN-&gt;&gt;MSC: TMSI Reallocation Complete     SGSN--&gt;&gt;UTRAN: Release           </pre>							
2. Check the following fields in the messages: <b>Routing Area Update Request:</b> Update Type="Combined RALA Update with IMSI attach", old RAI; <b>Location Update Request:</b> Update type = IMSI Attach, IMSI, SGSN number, new Cell; <b>Location Update Accept:</b> TMSI.							
3. Check that the user is registered in the 3G-MSC.							
4. Check that the MS is PS and IMSI attached.							
5. Check that the SGSN number is stored in the VLR.							
NOTE: In this test the configuration n°3 not requires the 3G-GGSN.							
REFERENCES: [1] clause 9.2, [3] clause 6.9.1.3, [24] clause 17.1.							

<b>Gs Interface interoperability - Coordination</b>
Gs_IOT_203: IMSI ONLY DETACH
OBJECTIVE: This test aims to demonstrate completion of the only IMSI detach when the MS is still PS attached.
INTERFACES: <b>IuPS, Gs, Gn.</b>
PRECONDITIONS: Requires at least configuration n°3. The user must be registered in the HLR with UMTS subscription; the MS must be IMSI and PS attached and must have an active PDPC.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Carry out an IMSI only detach.
EXPECTED RESULTS: 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant SGSN as 3G-SGSN     participant GGSN as 3G-GGSN     participant MSC as 3G-MSC/VLR      UTRAN-&gt;&gt;SGSN: Detach Request (IuPS)     SGSN-&gt;&gt;MSC: IMSI Detach Indication (Gn)     MSC--&gt;&gt;SGSN: IMSI Detach Indication Ack     SGSN-&gt;&gt;MS: Detach Accept     SGSN-&gt;&gt;UTRAN: Release     </pre>
2. Check the following fields in the messages: <b>Detach Request:</b> Detach Type="IMSI detach"; <b>IMSI Detach Indication:</b> Detach type="Explicit MS initiated IMSI detach from non-GPRS service".
3. Check that the MS is deregistered in the 3G-SGSN.
REFERENCES: [1] clause 9.4, [3] clause 6.6.1, [24] clause 9, clause 17.1.

<b>Gs Interface interoperability - Coordination</b>
Gs_IOT_204: PS ONLY DETACH
OBJECTIVE: This test aims to demonstrate completion of the PS only detach procedure when the MS is still IMSI attached.
INTERFACES: <b>IuPS, Gs, Gn.</b>
PRECONDITIONS: Requires at least configuration n°3. The user must be registered in the HLR with UMTS subscription; the MS must be IMSI and PS attached and must have an active PDPC.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Carry out a PS only detach.
EXPECTED RESULTS: 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant SGSN as 3G-SGSN     participant GGSN as 3G-GGSN     participant MSC as 3G-MSC/VLR      UTRAN-&gt;&gt;SGSN: Detach Request (IuPS)     SGSN-&gt;&gt;GGSN: Delete PDPC Req     GGSN--&gt;&gt;SGSN: Delete PDPC Response     SGSN-&gt;&gt;MSC: GPRS Detach Indication     MSC--&gt;&gt;SGSN: GPRS Detach Indication Ack     SGSN-&gt;&gt;MS: Detach Accept     SGSN-&gt;&gt;UTRAN: Release     </pre>
2. Check the following fields in the messages: <b>Detach Request:</b> Detach Type="GPRS Detach"; <b>GPRS Detach Indication:</b> IMSI Detach from GPRS service type="MS initiated IMSI detach from GPRS service".
3. Check that the MS is deregistered in the 3G-SGSN and that it is still IMSI attached.
REFERENCES: [1] clause 9.4, [3] clause 6.6.1, [24] clause 8, clause 17.1.

<b>Gs Interface interoperability - Coordination</b>
Gs_IOT_205: 3G-SGSN INITIATED PS DETACH
OBJECTIVE: This test aims to demonstrate completion of the 3G-SGSN initiated PS detach procedure.
INTERFACES: <b>IuPS, Gs, Gn.</b>
PRECONDITIONS: Requires at least configuration n°3. The user must be registered in the HLR with UMTS subscription; the MS must be IMSI and PS attached and must have an active PDPC.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Carry out a PS detach procedure by the 3G-SGSN.
EXPECTED RESULTS: 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant SGSN as 3G-SGSN     participant GGSN as 3G-GGSN     participant MSC as 3G-MSC/VLR      UTRAN-&gt;&gt;MS: Detach Request     SGSN-&gt;&gt;GGSN: Delete PDPC Req     GGSN--&gt;&gt;SGSN: Delete PDPC Response     SGSN-&gt;&gt;MSC: GPRS Detach Indication     MSC--&gt;&gt;SGSN: GPRS Detach Indication Ack     SGSN-&gt;&gt;MS: Detach Accept     SGSN-&gt;&gt;UTRAN: Release     </pre>
2. Check the following fields in the messages: <b>Detach Request:</b> Detach Type="re-attach not required"; <b>GPRS Detach Indication:</b> Detach type="Network initiated IMSI detach from GPRS service".
3. Check that the MS is deregistered in the 3G-SGSN, and that it is still IMSI attached.
REFERENCES: [1] clause 9.4; [3] clause 6.6.2; [24] clause 17.1.

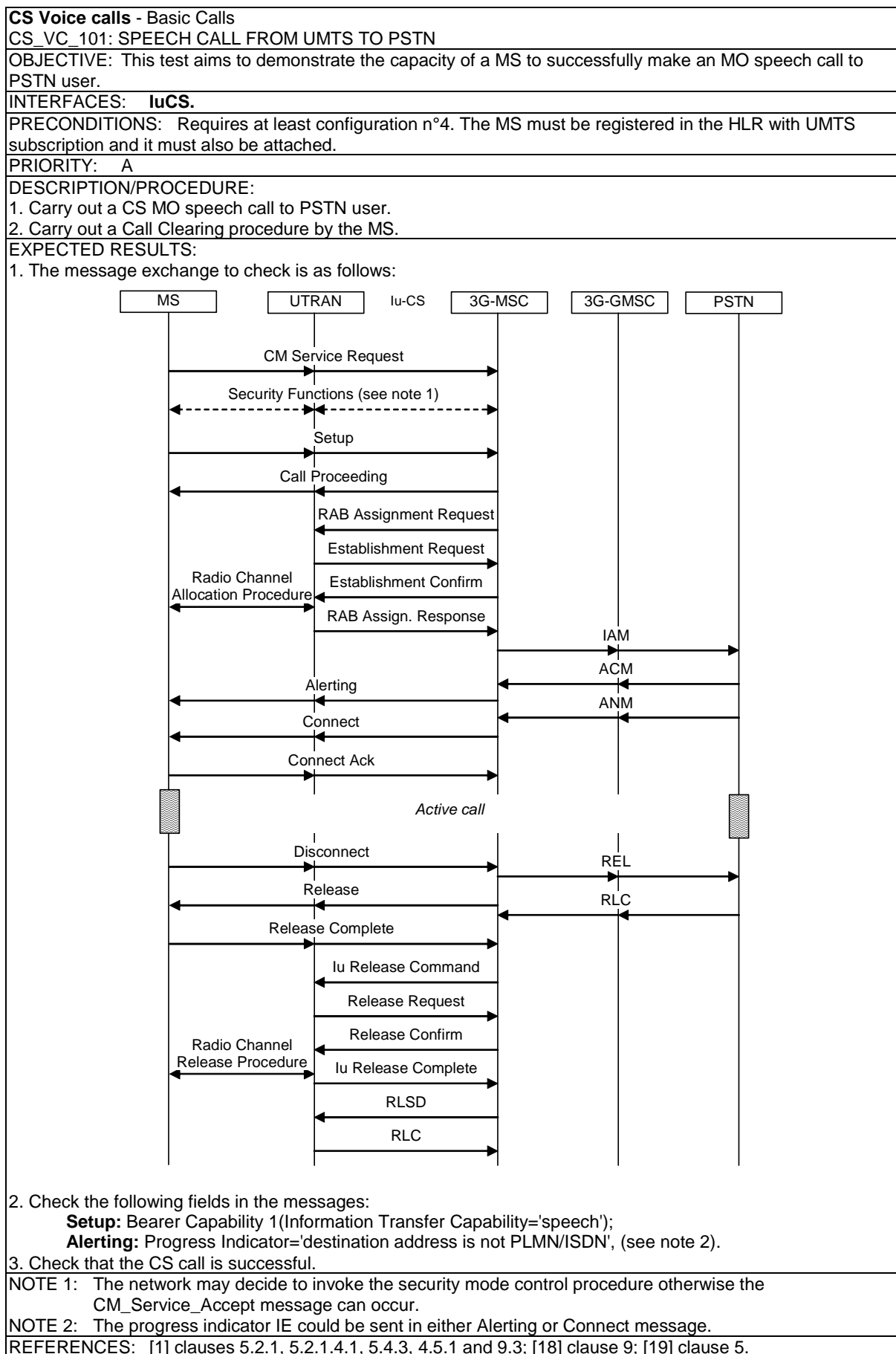
<b>Gs Interface interoperability - Coordination</b>
Gs_IOT_206: HLR INITIATED PS DETACH
OBJECTIVE: This test aims to demonstrate completion of the HLR initiated combined detach procedure.
INTERFACES: <b>IuPS, Gs, Gn, Gr.</b>
PRECONDITIONS: Requires at least configuration n°3. The user must be registered in the HLR with UMTS subscription; the MS must be IMSI and PS attached and must have an active PDPC.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Carry out a PS detach procedure by the HLR.
EXPECTED RESULTS: 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant SGSN as 3G-SGSN     participant GGSN as 3G-GGSN     participant HLR     participant MSC as 3G-MSC/VLR      HLR-&gt;&gt;SGSN: Cancel Location     SGSN-&gt;&gt;MS: Detach Request     SGSN-&gt;&gt;GGSN: Delete PDPC Req     GGSN--&gt;&gt;SGSN: Delete PDPC Res     SGSN-&gt;&gt;MSC: GPRS Detach Indication     MSC--&gt;&gt;SGSN: GPRS Detach Indication Ack     SGSN-&gt;&gt;HLR: Cancel Location Ack     SGSN-&gt;&gt;MS: Detach Accept     SGSN-&gt;&gt;UTRAN: Release     </pre>
2. Check the following fields in the messages: <b>Cancel Location:</b> Cancellation Type="Subscription Withdrawn", IMSI; <b>Detach Request:</b> Detach Type="re-attach not required"; <b>GPRS Detach Indication:</b> Detach type="Network initiated IMSI detach from GPRS service".
3. Check that the MS is deregistered in the 3G-SGSN, and that it is still IMSI attached.
REFERENCES: [1] clause 9.4; [3] clause 6.6.2; [24] clause 17.1.

<b>Gs Interface interoperability - Inter NOM</b>
<b>Gs_IOT_301: INTER-NOM RA/LA UPDATE</b>
<b>OBJECTIVE:</b> This test aims to demonstrate completion of the combined Routing Area Update procedure when a mobile change a RA switching the NOM.
<b>INTERFACES:</b> <b>IuPS, IuCS, Gs.</b>
<b>PRECONDITIONS:</b> Requires at least configuration no. 3, (see note). The user must be registered in the HLR with UMTS subscription, must be PS and IMSI attached and must have an active PDPC.
<b>PRIORITY:</b> A
<b>DESCRIPTION/PROCEDURE:</b> 1. Check the mobile is located in the first RA (belonging to first LA) under the first pair of 3G-SGSN/3G-MSC working in the NOM I (combined procedures allowed). 2. Force the mobile in the second RA (belonging to the second LA) under the second pair of 3G-SGSN/3G-MSC working in the NOM II (combined procedures not allowed).
<b>EXPECTED RESULTS:</b> 1. The message exchange to check is as follows:
2. Check the following fields in the messages: <b>Location Updating Request:</b> new LAI; Update type= Normal location update; <b>RA Update Request:</b> Old RAI; Update type= Normal location update; <b>SGSN Context Req.:</b> new RAI; TLL; <b>SGSN Context Res.:</b> Cause=Req. Accepted; MM & PDP contex; <b>Update PDPC Res.:</b> Charging ID.
3. Check that the mobility context of the MS is updated with the new RAI and LAI. 4. Check that a data transfer after the procedure is successful. 5. Check also that, in the case of RA update in the opposite direction, the message exchange is the same as the previous test case.
<b>NOTE:</b> In this test the configuration n°3 requires another RNC, 3G-MSC and 3G-SGSN.
<b>REFERENCES:</b> [3] clause 6.9, [7] clause 7.7

<b>Gs Interface interoperability - Paging</b>
Gs_IOT_401: CS PAGING VIA 3G-SGSN
OBJECTIVE: This test aims to demonstrate completion of the CS paging procedure via the 3G-SGSN.
INTERFACES: <b>IuCS, Gs.</b>
PRECONDITIONS: Requires at least configuration n°3, (see note 1). The user must be registered in the HLR with UMTS subscription; the MS must be IMSI and GPRS attached.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Carry out a CS paging procedure by the 3G-MSC/VLR, (see note 2).
EXPECTED RESULTS: 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant SGSN as 3G-SGSN     participant VLR as 3G-MSC/VLR     VLR-&gt;&gt;SGSN: Paging Request (Gs)     SGSN-&gt;&gt;UTRAN: Paging (IuPS)     UTRAN-&gt;&gt;MS: Paging Request     MS-&gt;&gt;UTRAN: Initial Direct Transfer (Paging Response)     UTRAN-&gt;&gt;VLR: Initial UE (Paging Response)   </pre>
2. Check the following fields in the messages: <b>Paging Request:</b> IMSI, VLR number; <b>Paging:</b> CN Domain Indicator=CS Domain, Permanent NAS UE Identity=IMSI.
NOTE 1: In this test the configuration n°3 does not require the 3G-GGSN.
NOTE 2: The test has to be executed in all the following cases: MS in standby state, MS in ready state, MS in packet transfer mode.
REFERENCES: [1] clause 9.1, [3] clause 6.3.3, [24] clause 5 clause 17.1, [25] clause 8.15 clause 9.1.23.



## A.3.3 CS voice calls



**CS Voice calls - Basic Calls****CS\_VC\_102: 3,1 kHz AUDIO CALL FROM UMTS TO PSTN**

**OBJECTIVE:** This test aims to demonstrate the capacity of a MS to successfully make a 3,1 kHz audio call to a PSTN user.

**INTERFACES:** **IuCS.**

**PRECONDITIONS:** Requires at least configuration n°4. The MS must be registered in the HLR with UMTS subscription and it must also be attached. The PSTN user must be equipped with voice band data modem.

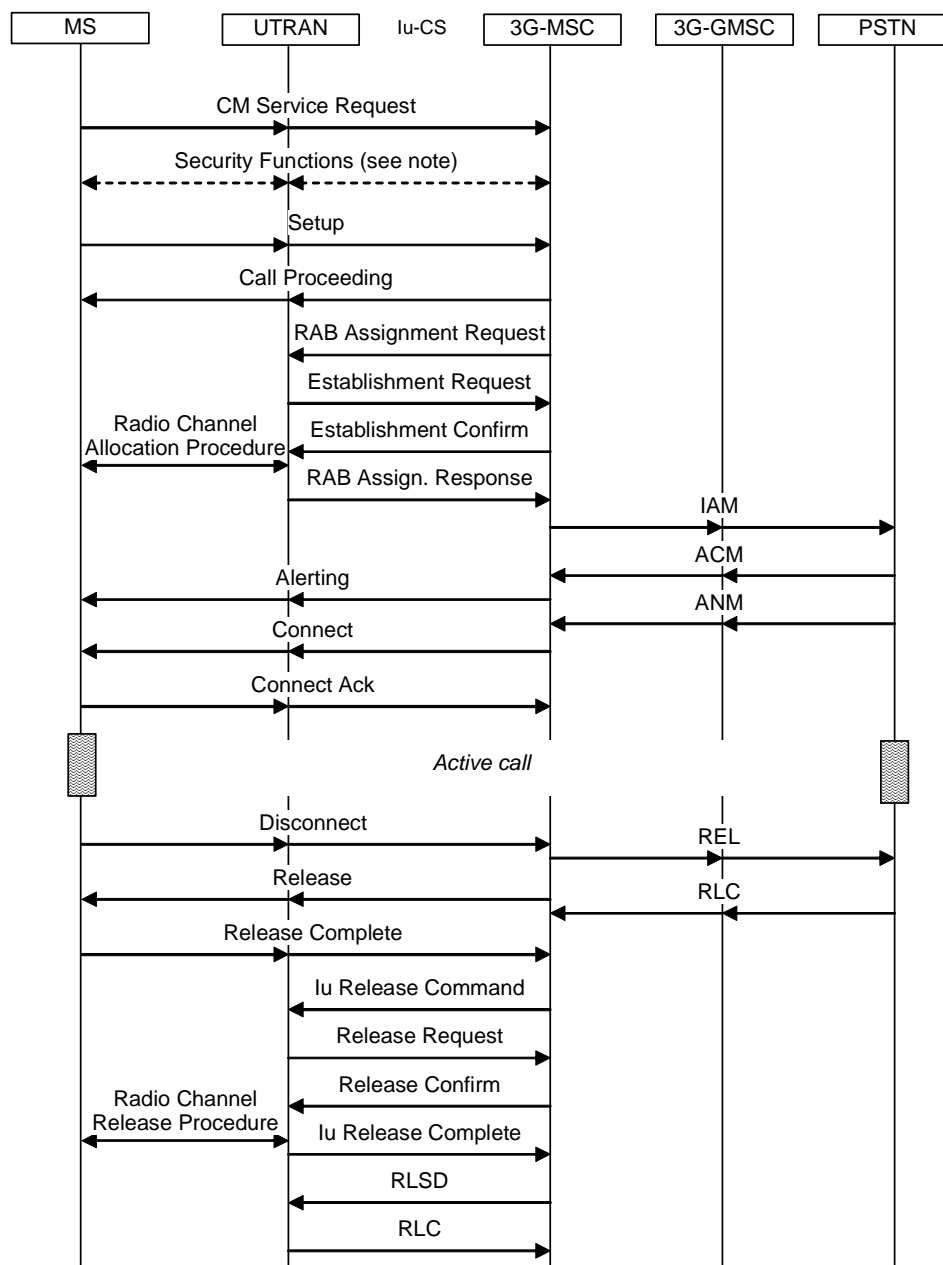
**PRIORITY:** A

**DESCRIPTION/PROCEDURE:**

1. Carry out a 3,1 kHz audio call to PSTN user.
2. Carry out a Call Clearing procedure by the MS.

**EXPECTED RESULTS:**

1. The message exchange to check is as follows:



2. Check the following fields in the messages:

**Setup:** Bearer Capability 1 (Information Transfer Capability='3,1 kHz audio ex PLMN');

**Alerting:** Progress Indicator='destination address is not PLMN/ISDN', (see note).

3. In the active call state ensure that the data transfer on the traffic channel is performed correctly.

4. Check that the CS call is successful.

**NOTE:** The progress indicator IE could be sent in either Alerting or Connect message.

**REFERENCES:** [1] clauses 5.2.1, 5.2.1.4.1, 5.4.3, 4.5.1 and 9.3; [18] clause 9.2; [19] clause 5.

**CS Voice calls - Basic Calls****CS\_VC\_103: FAX G3 CALL FROM UMTS TO PSTN**

**OBJECTIVE:** This test aims to demonstrate the capacity of a MS to successfully make a facsimile group 3 call to a PSTN user.

**INTERFACES:** **IuCS.**

**PRECONDITIONS:** Requires at least configuration n°4. The MS must be registered in the HLR with UMTS subscription and it must also be attached. The PSTN user must be equipped with fax G3.

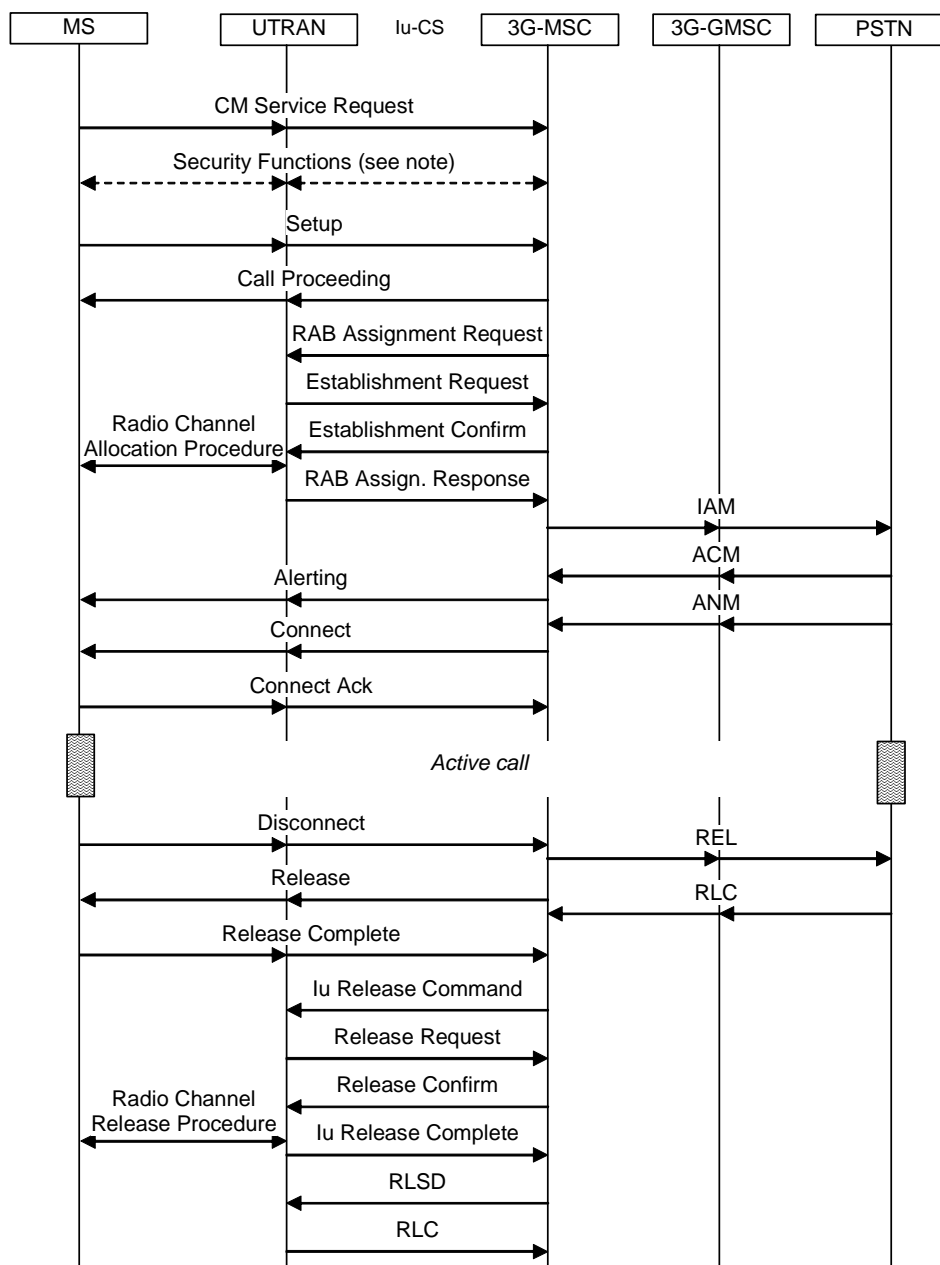
**PRIORITY:** A

**DESCRIPTION/PROCEDURE:**

1. Carry out a facsimile G3 call to PSTN user.
2. Carry out a Call Clearing procedure by the MS.

**EXPECTED RESULTS:**

1. The message exchange to check is as follows:



2. Check the following field in the message:

**Setup:** Bearer Capability 1 (Information Transfer Capability='facsimile G3'), HLC (High Layer characteristics identifier='facsimile group 2/3');

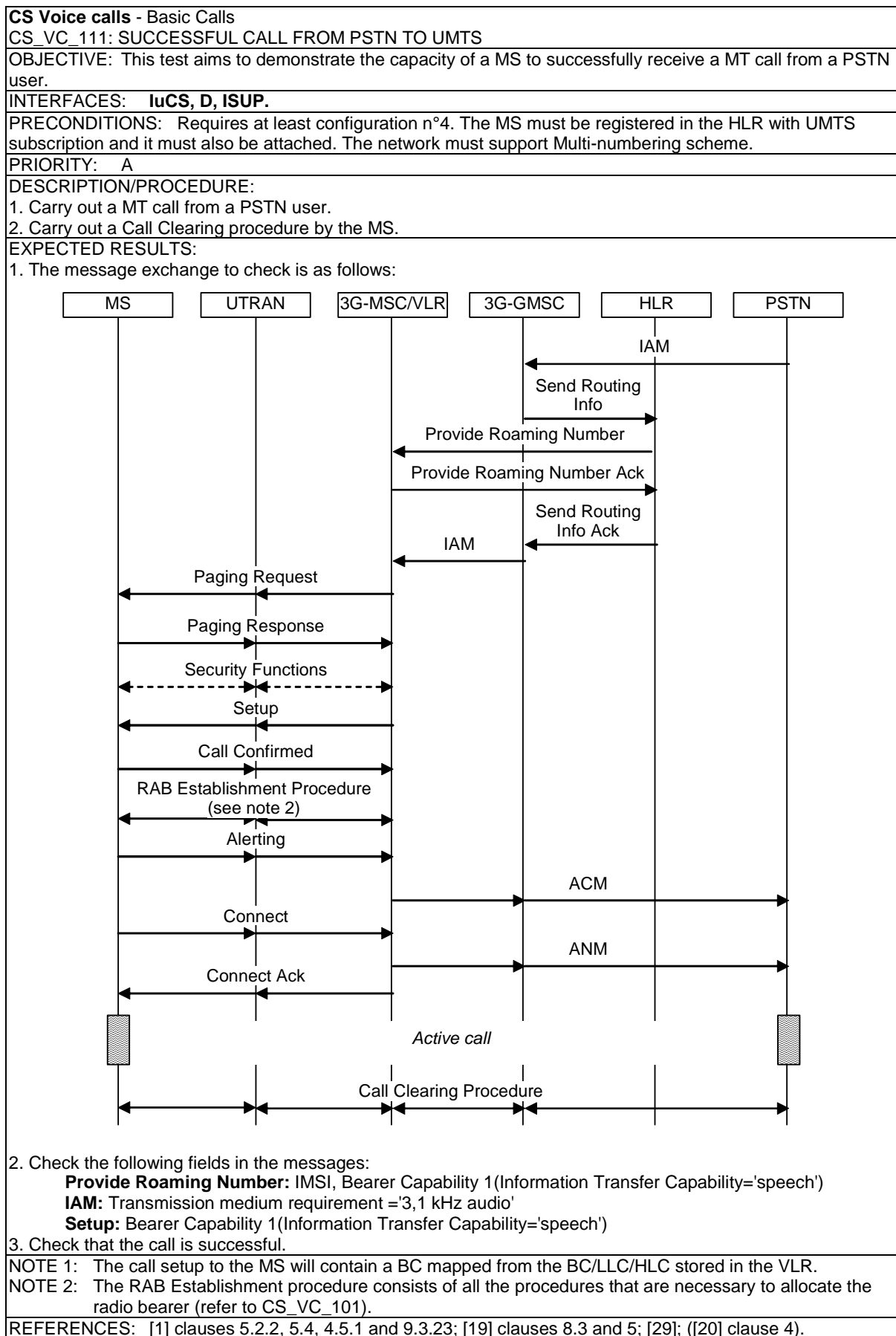
**Alerting:** Progress Indicator='destination address is not PLMN/ISDN', (see note).

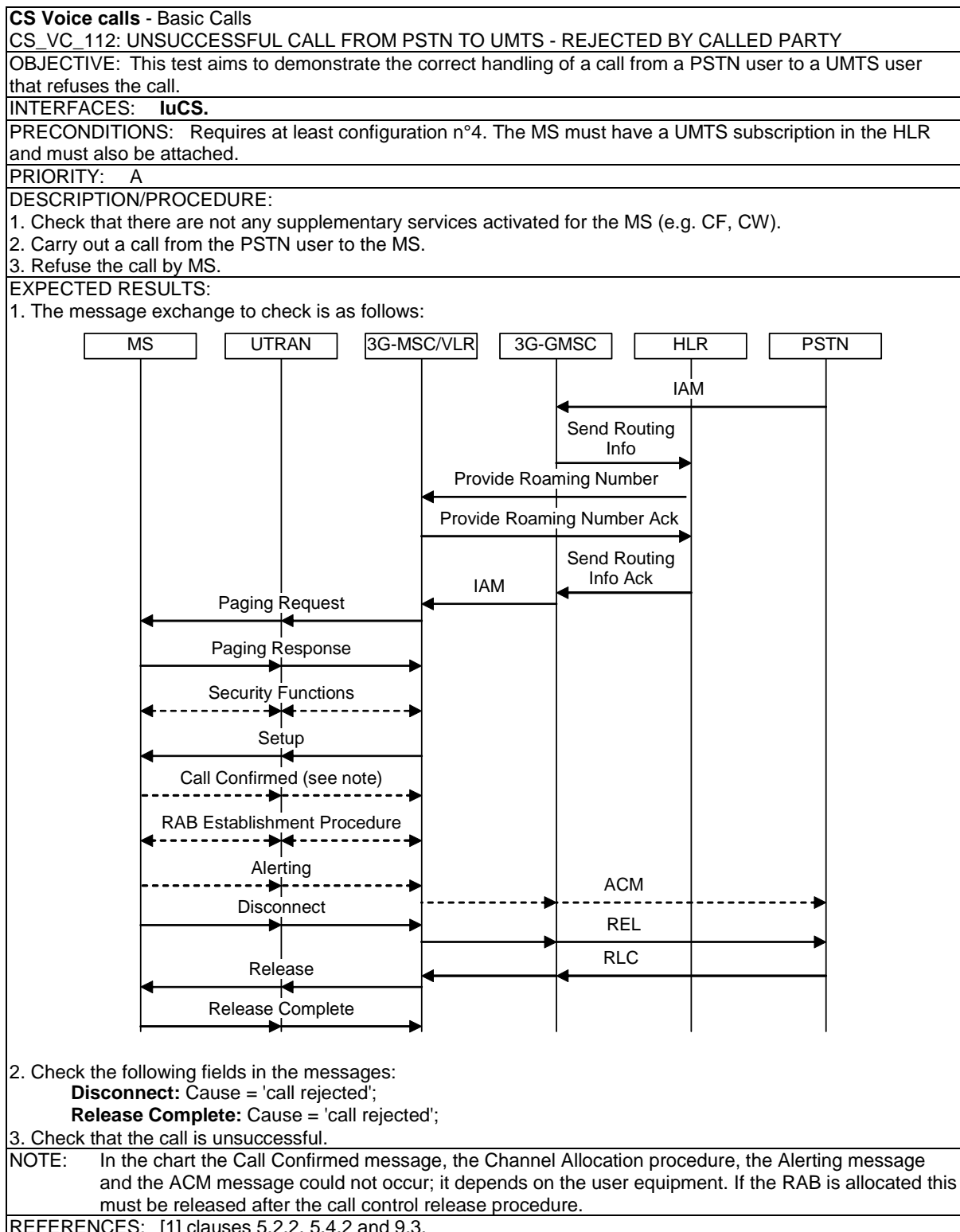
3. In the active call state ensure that the data transfer on the traffic channel is performed correctly.
4. Check that the CS call is successful.

**NOTE:** The progress indicator IE could be sent in either on Alerting or on Connect message.

**REFERENCES:** [1] clauses 5.2.1, 5.2.1.4.1, 5.4.3, 4.5.1 and 9.3; [18] clause 9.2; [19] clause 5.

<b>CS Voice calls</b> - Basic Calls
<b>CS_VC_104: UNSUCCESSFUL UDI CALL FROM UMTS TO PSTN</b>
<b>OBJECTIVE:</b> This test aims to demonstrate the correct handling of a UDI call from a UMTS subscriber to a PSTN user.
<b>INTERFACES:</b> <b>IuCS.</b>
<b>PRECONDITIONS:</b> Requires at least configuration n°4. The MS must be registered in the HLR with UMTS subscription and it must also be attached.
<b>PRIORITY:</b> A
<b>DESCRIPTION/PROCEDURE:</b> 1. Carry out an UDI call from the MS to the PSTN user.
<b>EXPECTED RESULTS:</b> 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant MSC as 3G-MSC     MS-&gt;&gt;MSC: CM Service request     MSC-&gt;&gt;UTRAN: Security Functions     UTRAN--&gt;&gt;MS: Security Functions     MS-&gt;&gt;MSC: Setup     MSC-&gt;&gt;MS: Disconnect     MS-&gt;&gt;MSC: Release     MSC-&gt;&gt;MS: Release Complete     </pre>
2. Check the following field in the message: <b>Setup:</b> Bearer Capability 1 (Information Transfer Capability='UDI');
<b>Disconnect:</b> Cause='service or option not available' or 'bearer service not implemented' or 'incompatible destination'.
3. Check that when the MS requests digital connectivity for a call to a PSTN user, the network initiates a successful call clearing procedure to the calling user.
<b>REFERENCES:</b> [1] clauses 5.4.4, 9.3 and 10.5.4.11; [18] clause 9.2.





**CS Voice calls - Basic Calls****CS\_VC\_201: SPEECH CALL FROM UMTS TO ISDN**

**OBJECTIVE:** This test aims to demonstrate the capacity of a UMTS user to successfully make a speech call to an ISDN user.

**INTERFACES:** **IuCS, ISUP.**

**PRECONDITIONS:** Requires at least configuration n°4. The MS must be registered in the HLR with UMTS subscription and it must also be attached.

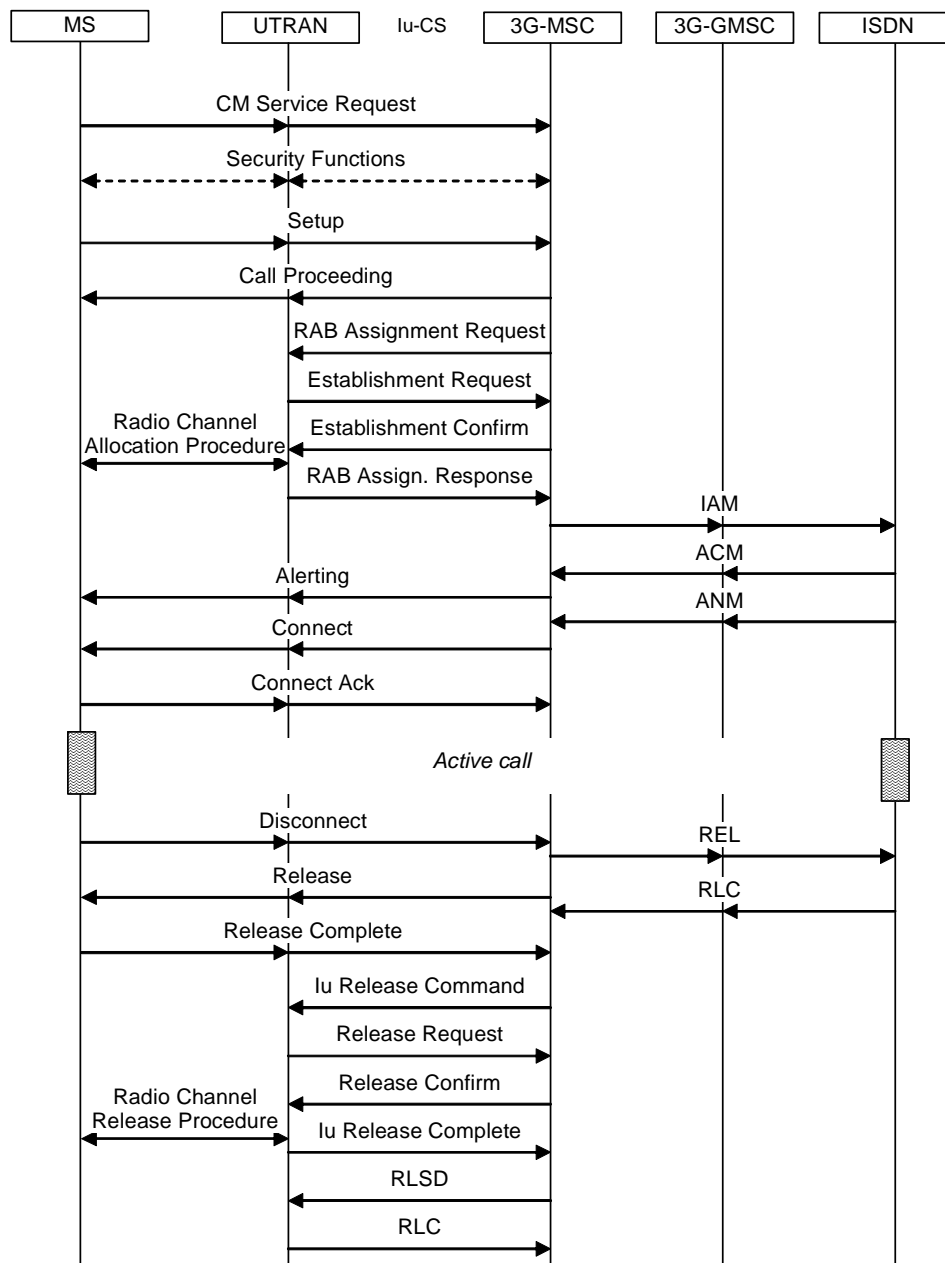
**PRIORITY:** A

**DESCRIPTION/PROCEDURE:**

1. Carry out by the MS a speech call to ISDN user.
2. Carry out a Call Clearing procedure by the MS.

**EXPECTED RESULTS:**

1. The message exchange to check is as follows:



2. Check the following field in the message:

**Setup:** Bearer Capability 1(Information Transfer Capability='speech')

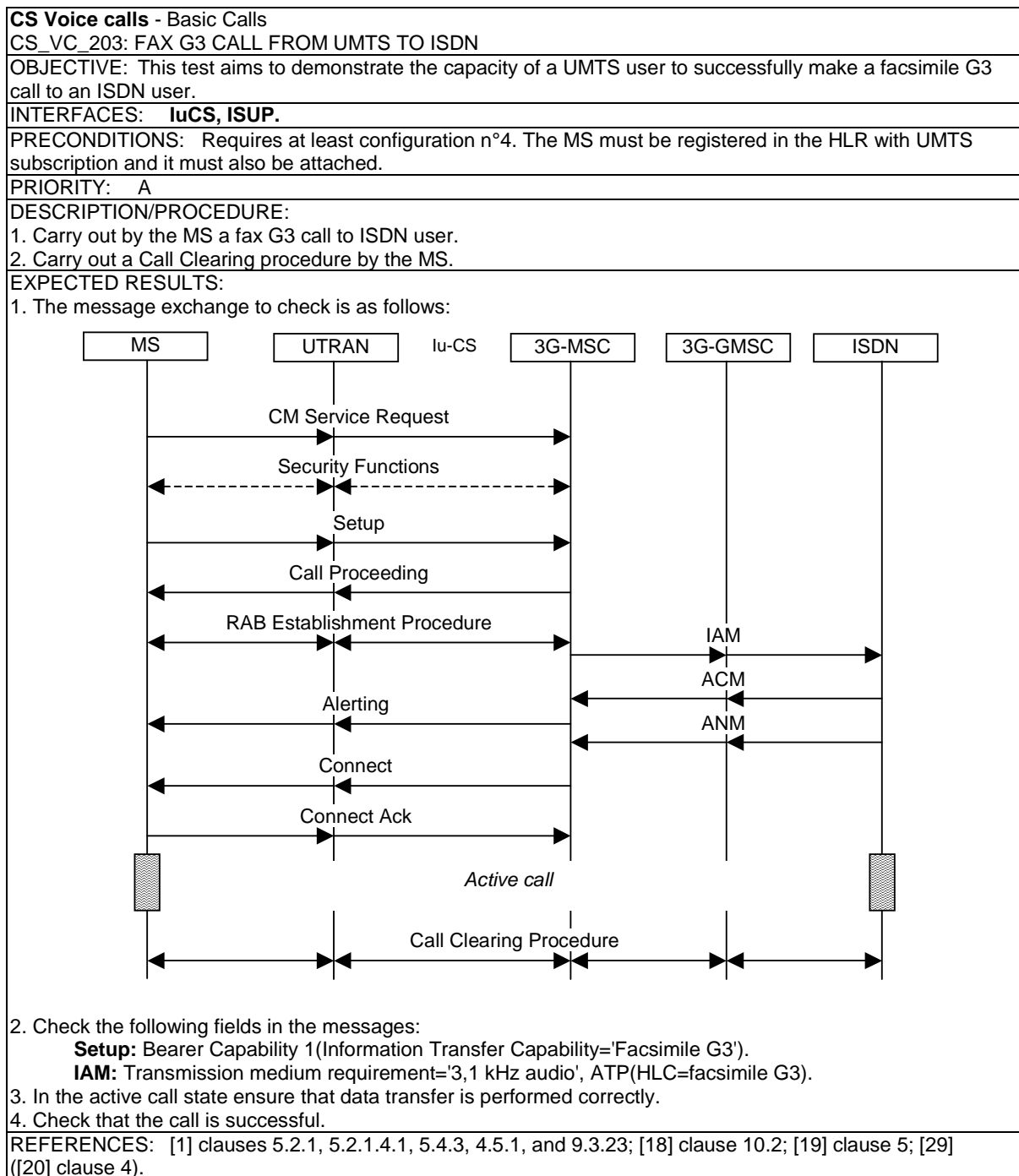
**IAM:** Transmission medium requirement='speech'.

3. In the active call state ensure that speech transfer is performed correctly.
4. Check that the CS call is successful.

**REFERENCES:** [1] clauses 5.2.1, 5.2.1.4.1, 5.4.3, 4.5.1 and 9.3.23; [18] clause 10; [19] clause 5; [29] ([20] clause 4).

<b>CS Voice calls</b> - Basic Calls
<b>CS_VC_202: 3,1 kHz AUDIO CALL FROM UMTS TO ISDN</b>
<b>OBJECTIVE:</b> This test aims to demonstrate the capacity of a UMTS user to successfully make a 3,1 kHz audio call to an ISDN user.
<b>INTERFACES:</b> <b>IuCS, ISUP.</b>
<b>PRECONDITIONS:</b> Requires at least configuration n°4. The MS must be registered in the HLR with UMTS subscription and it must also be attached.
<b>PRIORITY:</b> A
<b>DESCRIPTION/PROCEDURE:</b> 1. Carry out by the MS a 3,1 kHz audio call to ISDN user. 2. Carry out a Call Clearing procedure by the MS.
<b>EXPECTED RESULTS:</b> 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant 3G_MSC as 3G-MSC     participant 3G_GMSC as 3G-GMSC     participant ISDN      MS-&gt;&gt;3G_MSC: CM Service Request     3G_MSC--&gt;&gt;MS: Security Functions     MS-&gt;&gt;3G_MSC: Setup     3G_MSC--&gt;&gt;MS: Call Proceeding     MS-&gt;&gt;3G_MSC: RAB Establishment Procedure     3G_MSC-&gt;&gt;3G_GMSC: IAM     3G_GMSC--&gt;&gt;3G_MSC: ACM     3G_GMSC-&gt;&gt;3G_MSC: ANM     3G_MSC--&gt;&gt;MS: Connect     MS-&gt;&gt;3G_MSC: Connect Ack     Note over MS, 3G_MSC: Active call     MS-&gt;&gt;3G_MSC: Call Clearing Procedure     3G_MSC--&gt;&gt;3G_GMSC: Call Clearing Procedure     3G_GMSC--&gt;&gt;3G_MSC: Call Clearing Procedure     3G_MSC--&gt;&gt;MS: Call Clearing Procedure     </pre>
2. Check the following fields in the messages: <b>Setup:</b> Bearer Capability 1(Information Transfer Capability='speech'); <b>IAM:</b> Transmission medium requirement='3,1 kHz audio'.
3. In the active call state ensure that data transfer is performed correctly.
4. Check that the CS call is successful.
<b>REFERENCES:</b> [1] clauses 5.2.1, 5.2.1.4.1, 5.4.3, 4.5.1 and 9.3.23; [18] clause 10.2; [19] clause 5; [29] ([20] clause 4).





**CS Voice calls - Basic Calls****CS\_VC\_204: UDI CALL FROM UMTS TO ISDN**

**OBJECTIVE:** This test aims to demonstrate the capacity of a UMTS user to successfully make an UDI call to an ISDN user.

**INTERFACES:** **IuCS, ISUP.**

**PRECONDITIONS:** Requires at least configuration n°4. The MS must be registered in the HLR with UMTS subscription and it must also be attached.

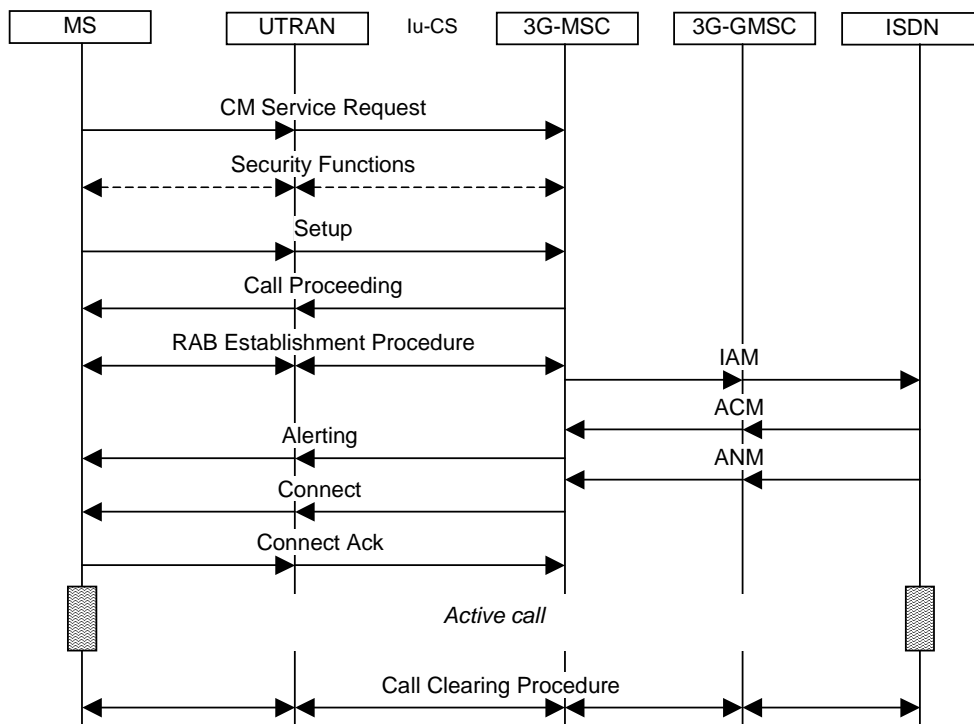
**PRIORITY:** A

**DESCRIPTION/PROCEDURE:**

1. Carry out by the MS an UDI call to an ISDN user.
2. Carry out a Call Clearing procedure by the MS.

**EXPECTED RESULTS:**

1. The message exchange to check is as follows:



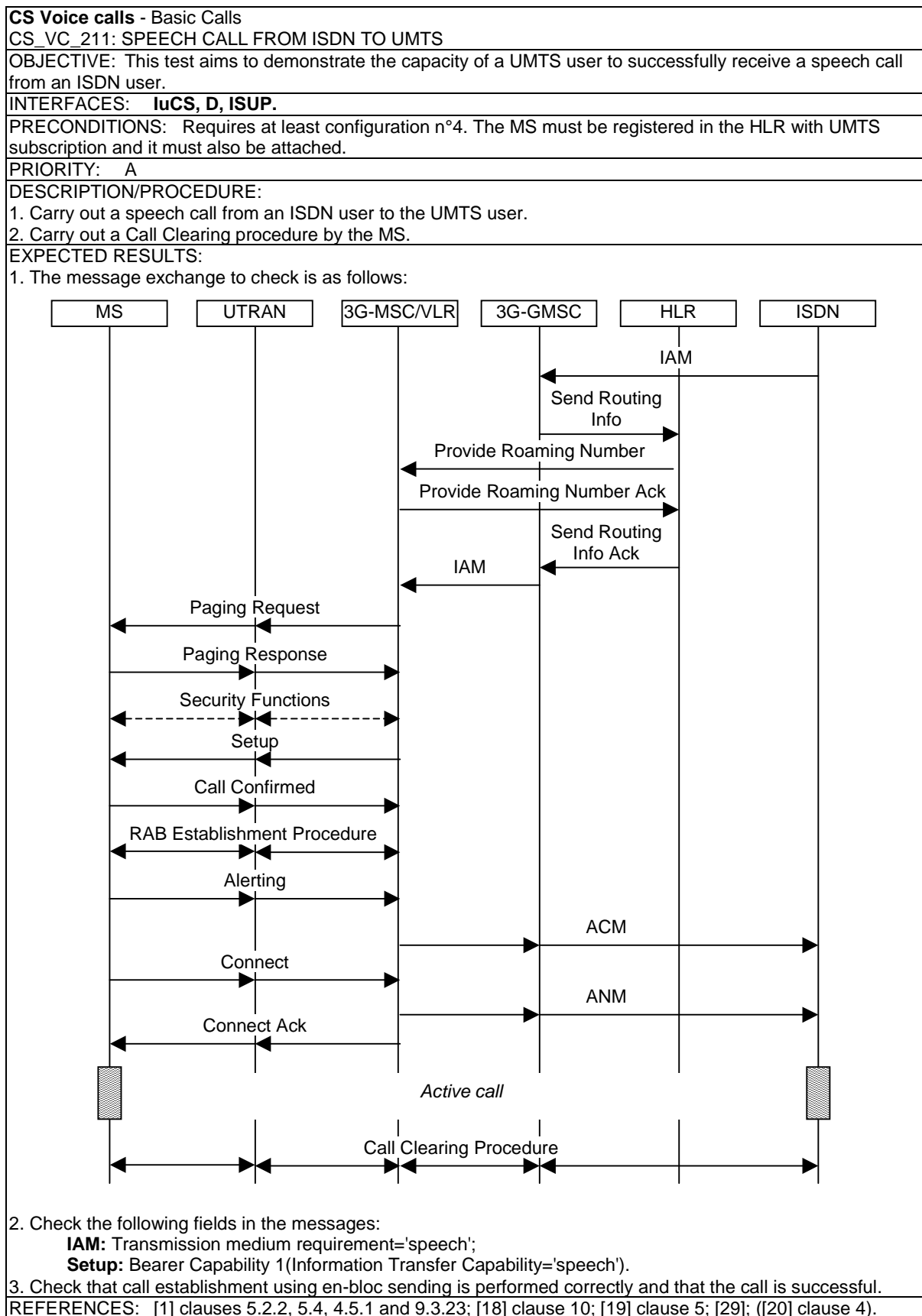
2. Check the following fields in the messages:

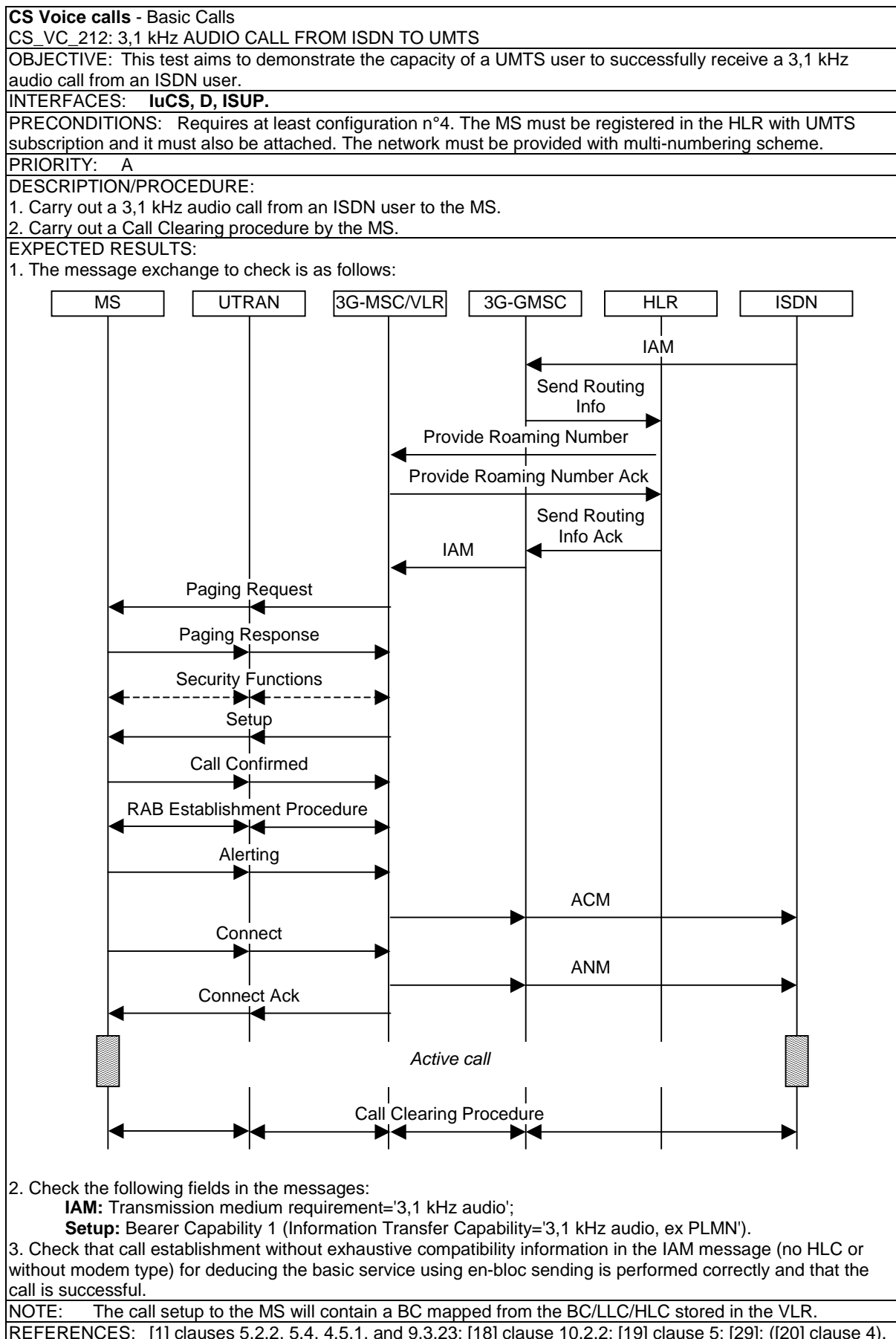
**Setup:** Bearer Capability 1(Information Transfer Capability='UDI'), LLC(Information Transfer Capability='UDI');

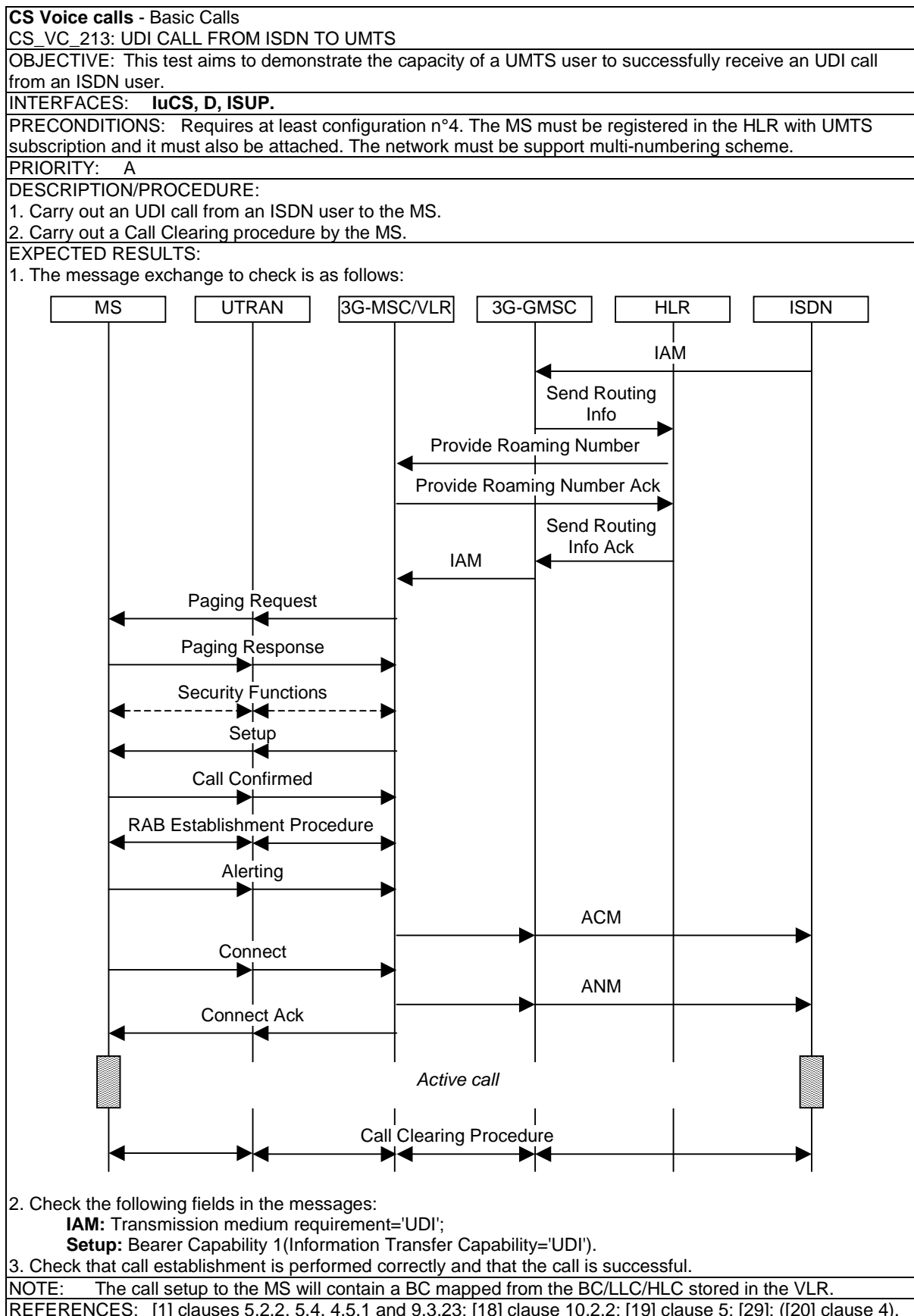
**IAM:** Transmission medium requirement='UDI'.

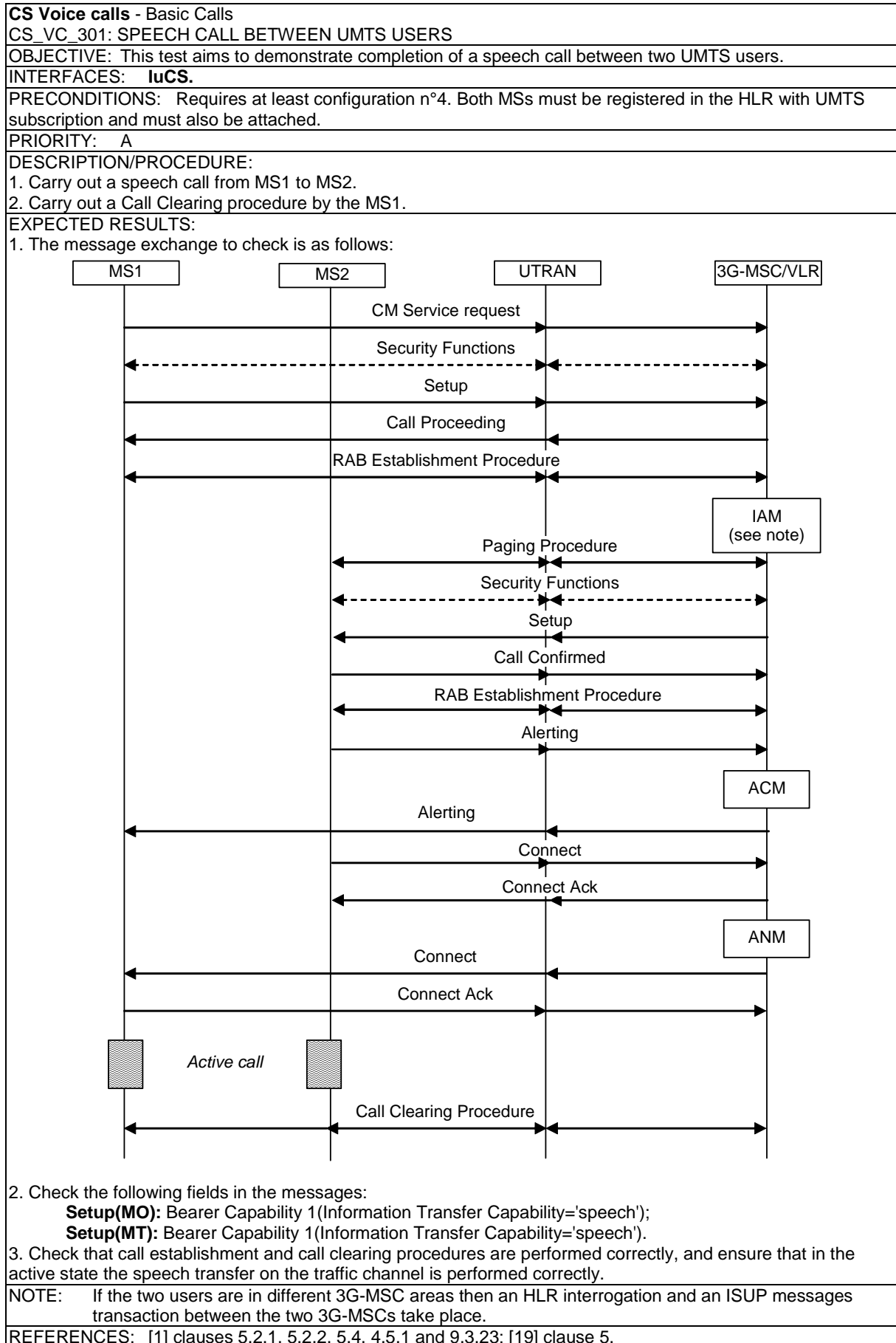
3. In the active call state ensure that data transfer is performed correctly.
4. Check that the call is successful.

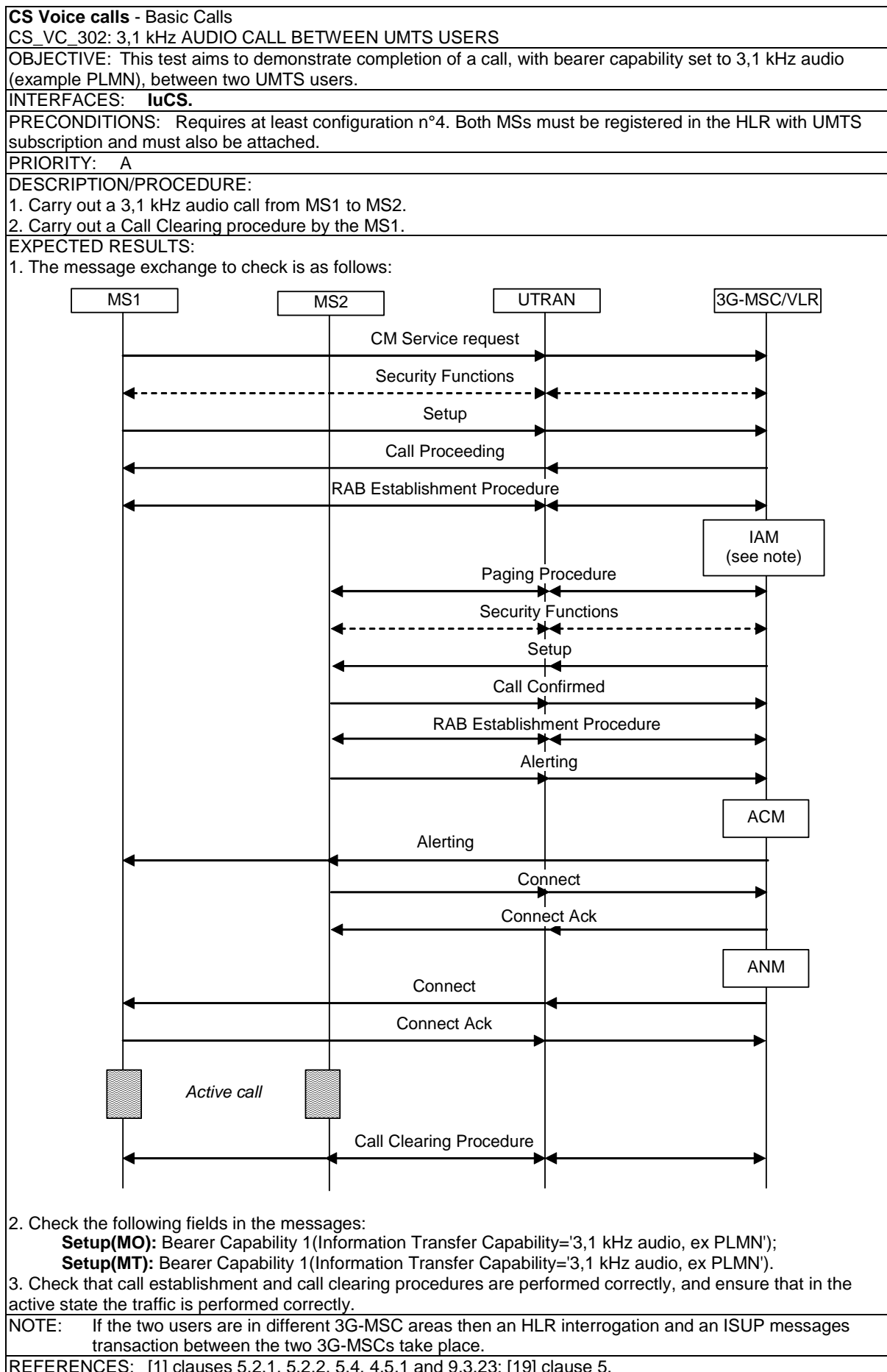
**REFERENCES:** [1] clauses 5.2.1, 5.2.1.4.1, 5.4.3, 4.5.1 and 9.3.23; [18] clause 10.2; [19] clause 5; [29] ([20] clause 4); [21] clause 4.5.18.

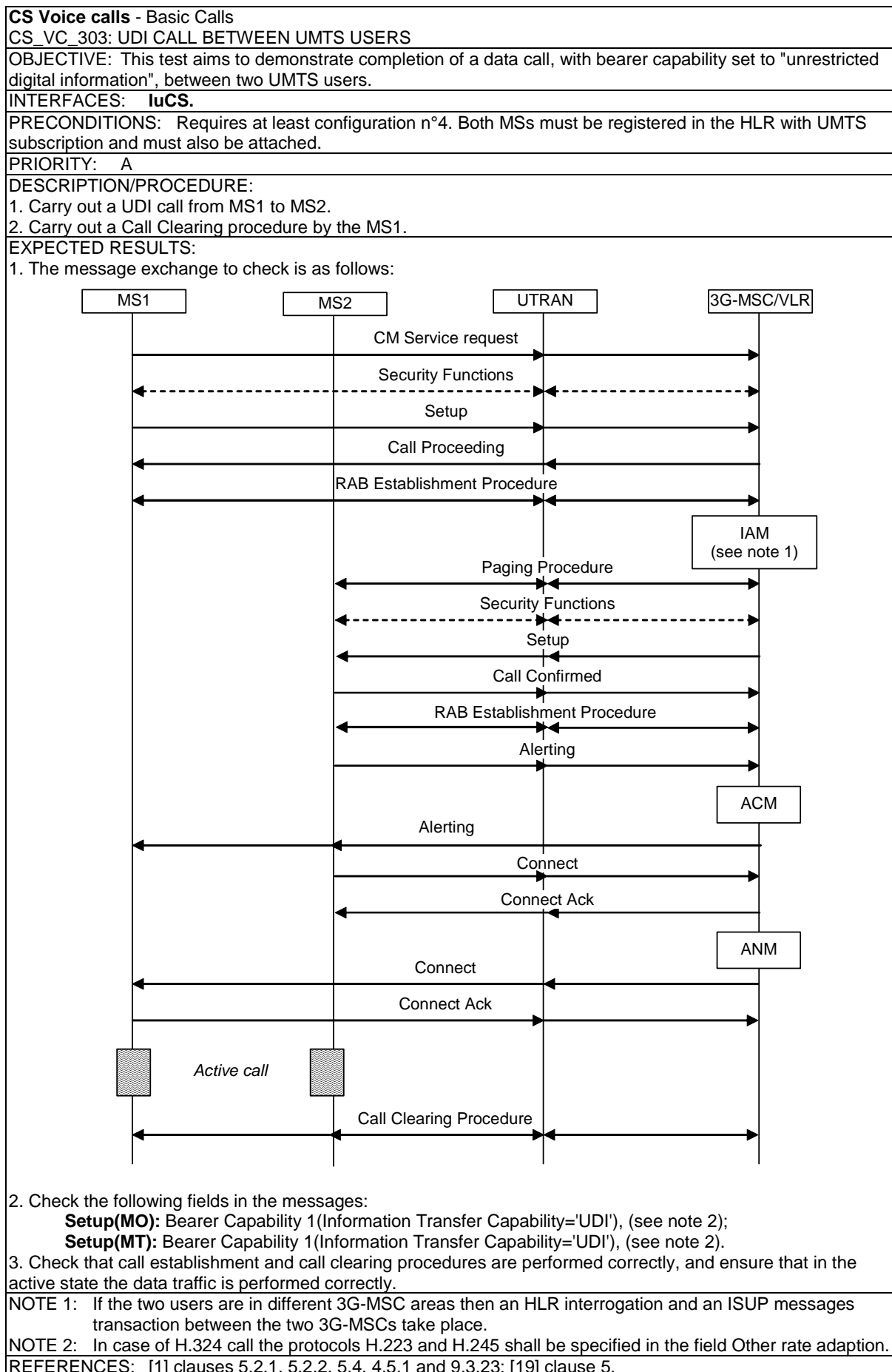














**CS Voice calls - Basic Calls****CS\_VC\_304: FAX G3 CALL BETWEEN UMTS USERS**

**OBJECTIVE:** This test aims to demonstrate completion of a fax call, with bearer capability set to 3,1 kHz audio (example PLMN), between two UMTS users.

**INTERFACES:** **IuCS.**

**PRECONDITIONS:** Requires at least configuration n°4. Both MSs must be registered in the HLR with UMTS subscription and must also be attached.

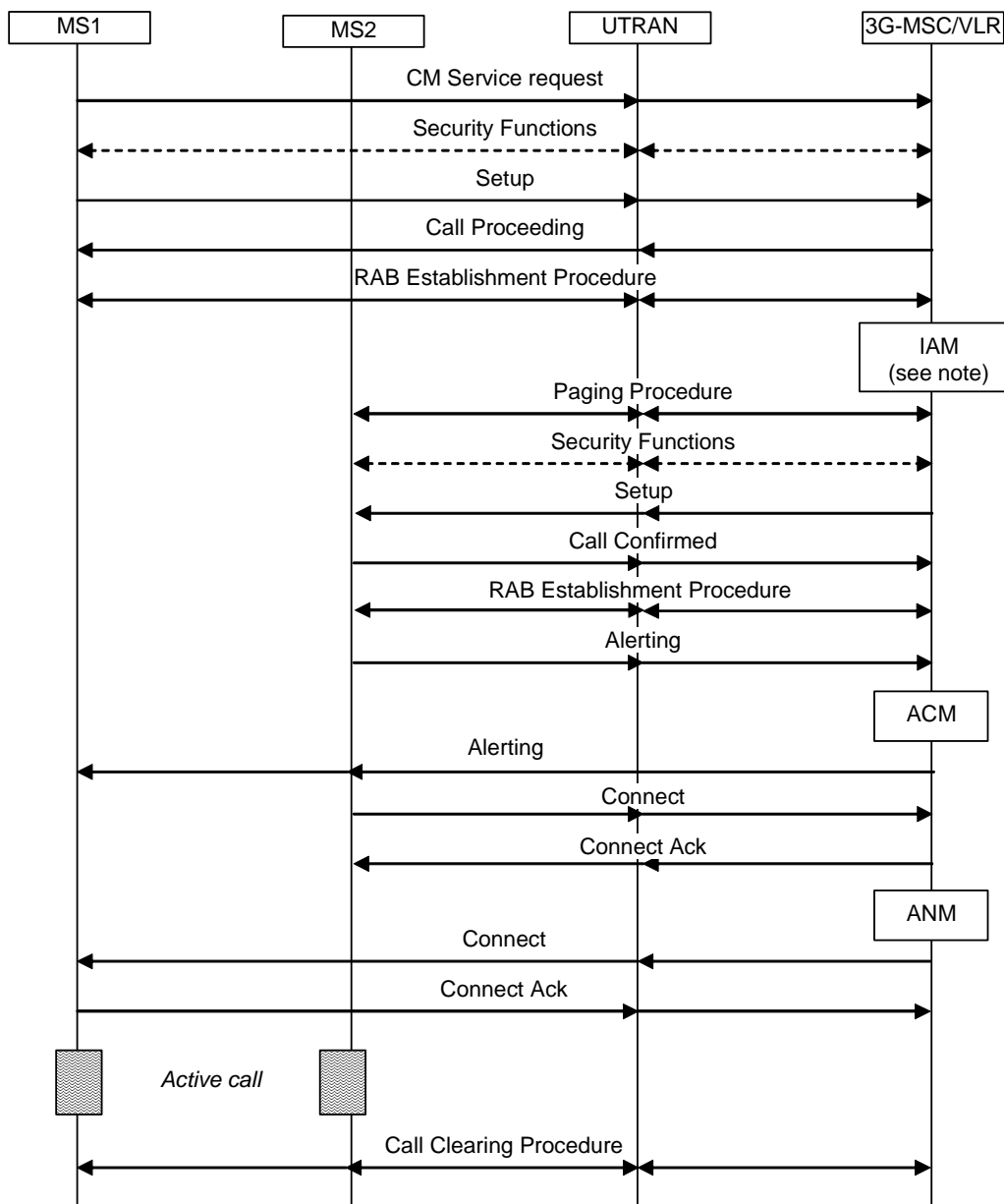
**PRIORITY:** A

**DESCRIPTION/PROCEDURE:**

1. Carry out a fax G3 call from MS1 to MS2.
2. Carry out a Call Clearing procedure by the MS1.

**EXPECTED RESULTS:**

1. The message exchange to check is as follows:



2. Check the following fields in the messages:

**Setup(MO):** Bearer Capability 1(Information Transfer Capability='facsimile G3');

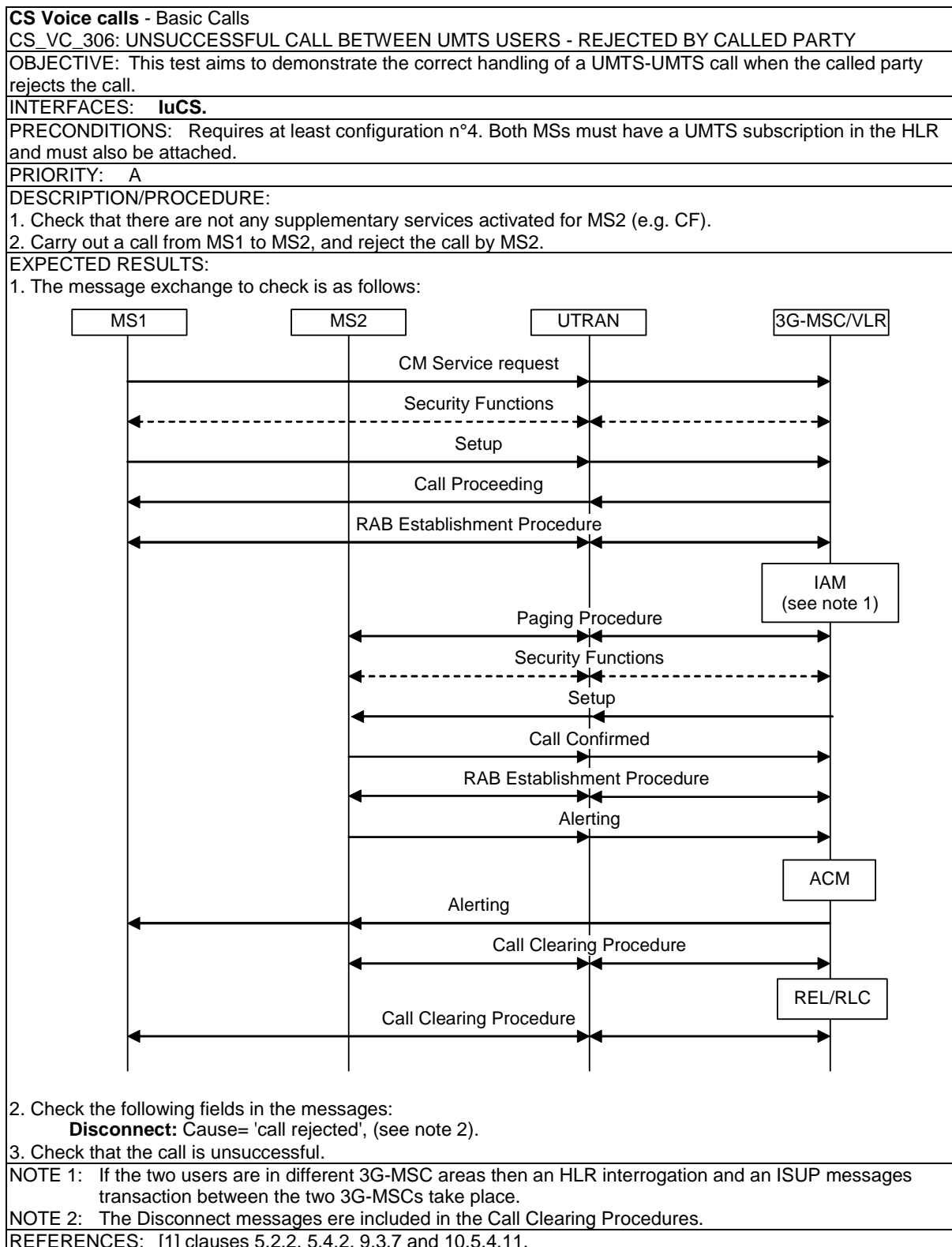
**Setup(MT):** Bearer Capability 1(Information Transfer Capability='facsimile G3'), HLC(High layer characteristics identifier='Facsimile group 2/3');

4. Check that call establishment and the call clearing procedure are performed correctly.

**NOTE:** If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSCs take place.

**REFERENCES:** [1] clauses 5.2.1, 5.2.2, 5.4, 4.5.1 and 9.3.23; [19] clause 5.

<b>CS Voice calls</b> - Basic Calls			
<b>CS_VC_305: UNSUCCESSFUL CALL BETWEEN UMTS USERS - CALLED PARTY BUSY</b>			
OBJECTIVE: This test aims to demonstrate the correct handling of a UMTS-UMTS call in case of user busy.			
INTERFACES: <b>IuCS</b> .			
PRECONDITIONS: Requires at least configuration n°4. Both MSs must have a UMTS subscription in the HLR and must also be attached.			
PRIORITY: A			
DESCRIPTION/PROCEDURE:			
1. Check that there are not any supplementary services activated for MS2 (e.g. CF, CW).			
2. Ensure that MS2 has an active call.			
3. Carry out a MO call from MS1 to MS2.			
EXPECTED RESULTS:			
1. The message exchange to check is as follows:			
MS1	MS2	UTRAN	3G-MSC/VLR
<pre> sequenceDiagram     participant MS1     participant MS2     participant UTRAN     participant MSC as 3G-MSC/VLR     MS1-&gt;&gt;MSC: CM Service request     MSC--&gt;&gt;MS1: Security Functions     MSC-&gt;&gt;MSC: Setup     MSC-&gt;&gt;MS1: Call Proceeding     MSC-&gt;&gt;MSC: RAB Establishment Procedure     MSC-&gt;&gt;MSC: IAM (see note 1)     MSC-&gt;&gt;MSC: REL/RLC     MSC-&gt;&gt;MS1: Call Clearing Procedure           </pre>			
2. Check the following fields in the messages:			
<b>Disconnect:</b> Cause='User busy', (see note 2).			
3. Check that the call is unsuccessful.			
NOTE 1: If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSCs take place.			
NOTE 2: The Disconnect message is included in the Call Clearing Procedure.			
REFERENCES: [1] clause 5.2.2, 5.4.2, 9.3.7 and 10.5.4.11.			



<b>CS Voice calls</b> - Basic Calls
<b>CS_VC_307: UNSUCCESSFUL CALL TO UNASSIGNED NUMBER</b>
<b>OBJECTIVE:</b> This test aims to demonstrate the correct handling of a call to an unassigned number.
<b>INTERFACES:</b> <b>IuCS.</b>
<b>PRECONDITIONS:</b> Requires at least configuration n°4. The MS must have a UMTS subscription in the HLR and must also be attached.
<b>PRIORITY:</b> A
<b>DESCRIPTION/PROCEDURE:</b> 1. Carry out a MO call from the MS to unassigned number, (see note 1).
<b>EXPECTED RESULTS:</b> 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS1     participant UTRAN     participant MSC as 3G-MSC/VLR     Note over UTRAN, MSC: Iu-CS     MS1-&gt;&gt;UTRAN: CM Service request     UTRAN-&gt;&gt;MSC: Security Functions     MSC--&gt;&gt;UTRAN: Setup     UTRAN--&gt;&gt;MS1: Disconnect     UTRAN-&gt;&gt;MSC: Release     MSC--&gt;&gt;UTRAN: Release Complete     </pre>
2. Check the following fields in the messages: <b>Disconnect:</b> Cause='unassigned (unallocated) number'.
3. Check that the call is unsuccessful.
<b>NOTE 1:</b> This test can be performed for all basic calls changing the bearer capability in the setup message from the MS.
<b>NOTE 2:</b> Some PLMNs provide announcements instead of sending cause value 'unassigned number'.
<b>REFERENCES:</b> [1] clauses 5.2.1.2, 5.4.4, 9.3.7 and 10.5.4.11.

**CS Voice calls - Basic Calls****CS\_VC\_401: SPEECH CALL FROM UMTS TO GSM**

**OBJECTIVE:** This test aims to demonstrate completion of a speech call from a UMTS user to a GSM user.

**INTERFACES:** **IuCS, D.**

**PRECONDITIONS:** Requires at least configuration n°5. The MS1 must have a UMTS subscription in the HLR, instead MS2 must have a GSM subscription. Both MSs must be attached.

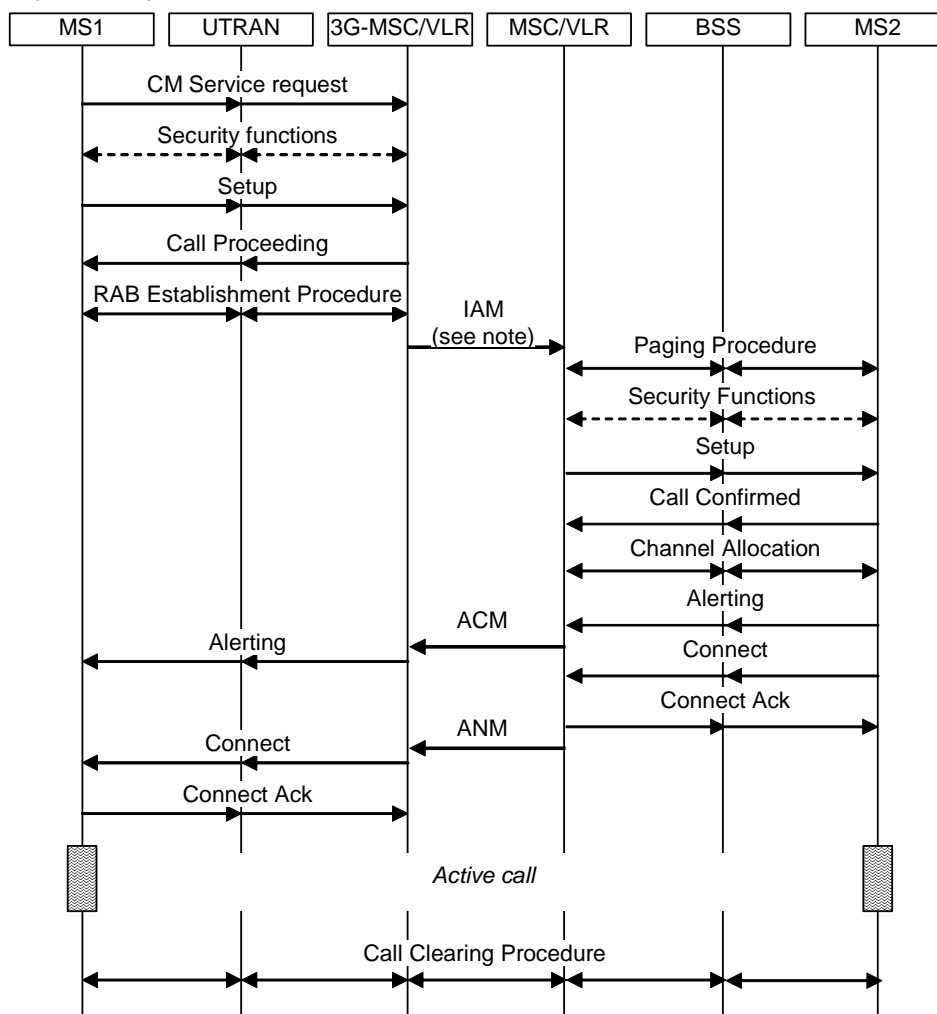
**PRIORITY:** A

**DESCRIPTION/PROCEDURE:**

1. Carry out a speech call from MS1 to MS2.
2. Carry out a Call Clearing procedure by MS1.

**EXPECTED RESULTS:**

1. The message exchange to check is as follows:



2. Check the following fields in the messages:

**Setup(MO):** Bearer Capability 1 (Information Transfer Capability='speech');

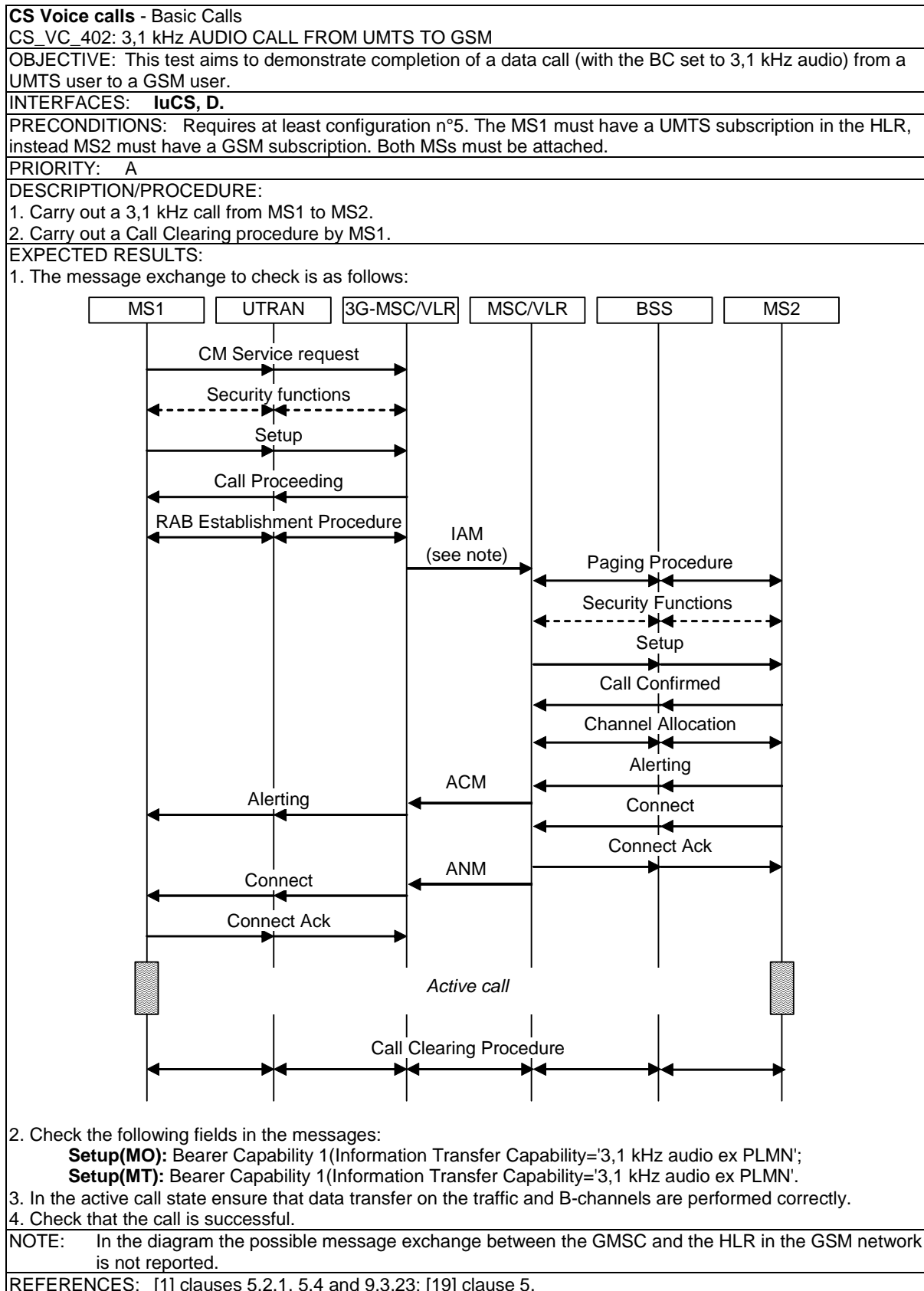
**Setup(MT):** Bearer Capability 1 (Information Transfer Capability='speech').

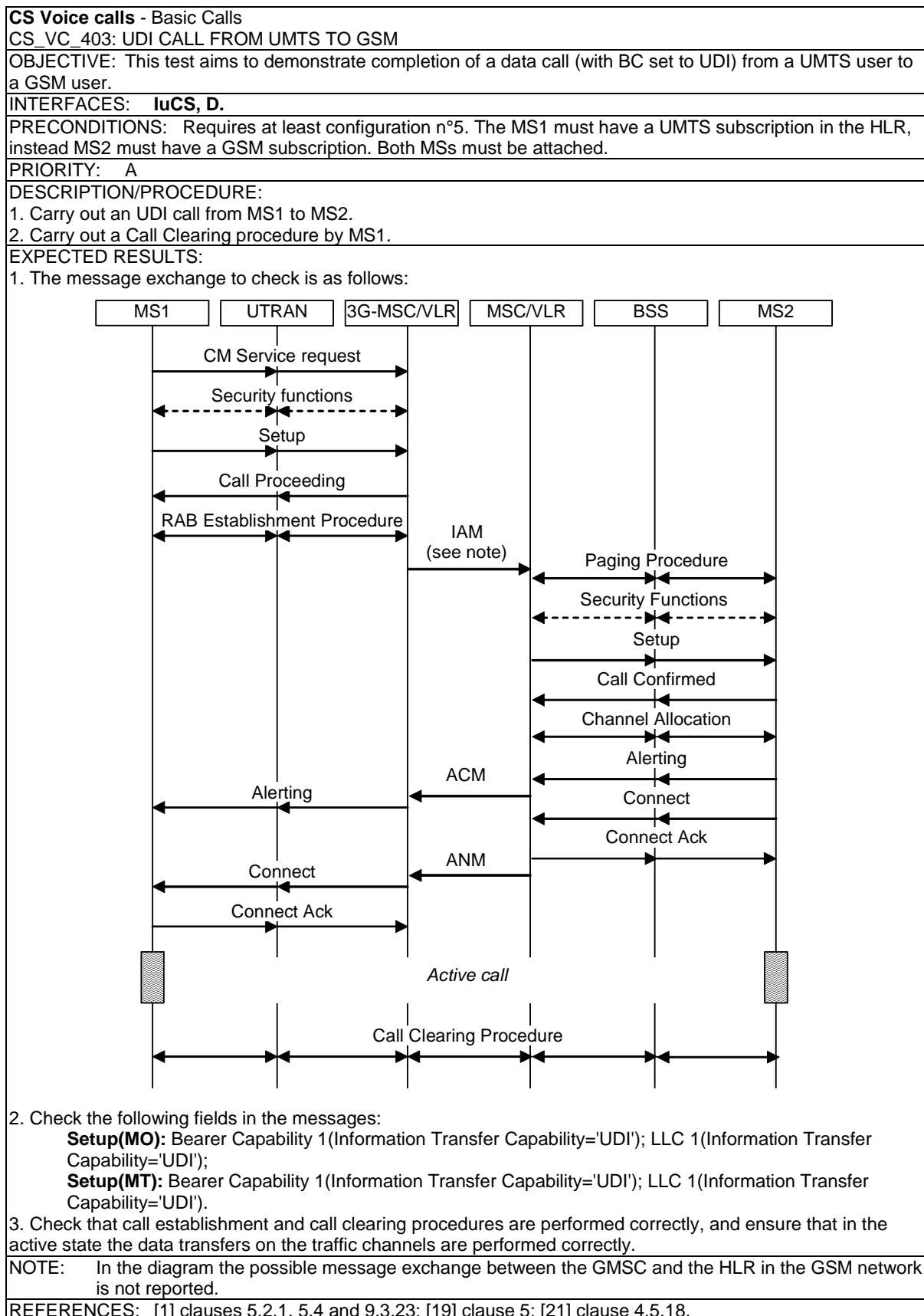
3. In the active call state ensure that speech transfer on the traffic and B-channels are performed correctly.

4. Check that the call is successful.

**NOTE:** In the diagram the possible message exchange between the GMSC and the HLR in the GSM network is not reported.

**REFERENCES:** [1] clauses 5.2.1, 5.4 and 9.3.23; [19] clause 5.





**CS Voice calls - Basic Calls****CS\_Vc\_404: FAX G3 CALL FROM UMTS TO GSM**

**OBJECTIVE:** This test aims to demonstrate completion of a facsimile G3 call from a UMTS user to a GSM user.

**INTERFACES:** **IuCS, D.**

**PRECONDITIONS:** Requires at least configuration n°5. The MS1 must have a UMTS subscription in the HLR, instead MS2 must have a GSM subscription. Both MSs must be attached.

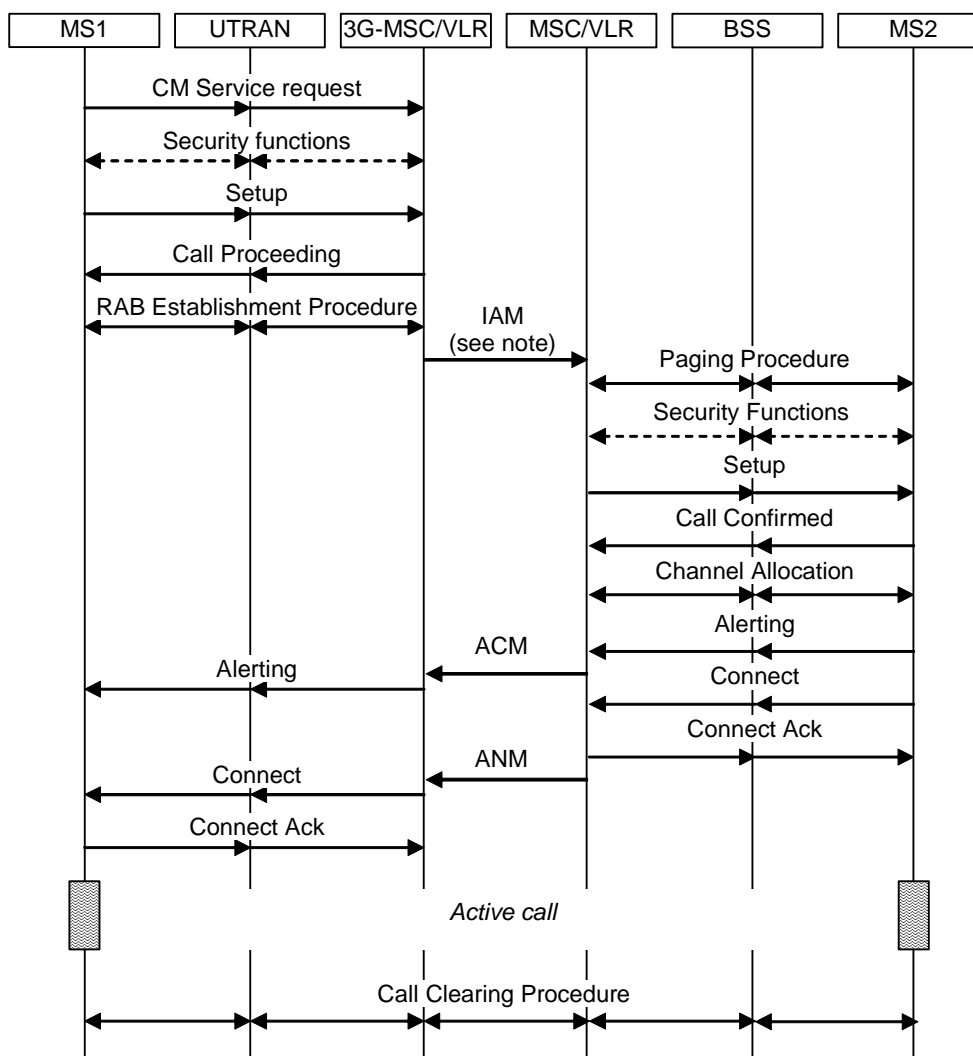
**PRIORITY:** A

**DESCRIPTION/PROCEDURE:**

1. Carry out a fax G3 call from MS1 to MS2.
2. Carry out a Call Clearing procedure by MS1.

**EXPECTED RESULTS:**

1. The message exchange to check is as follows:



2. Check the following fields in the messages:

**Setup(MO):** Bearer Capability 1 (Information Transfer Capability='Facsimile G3');

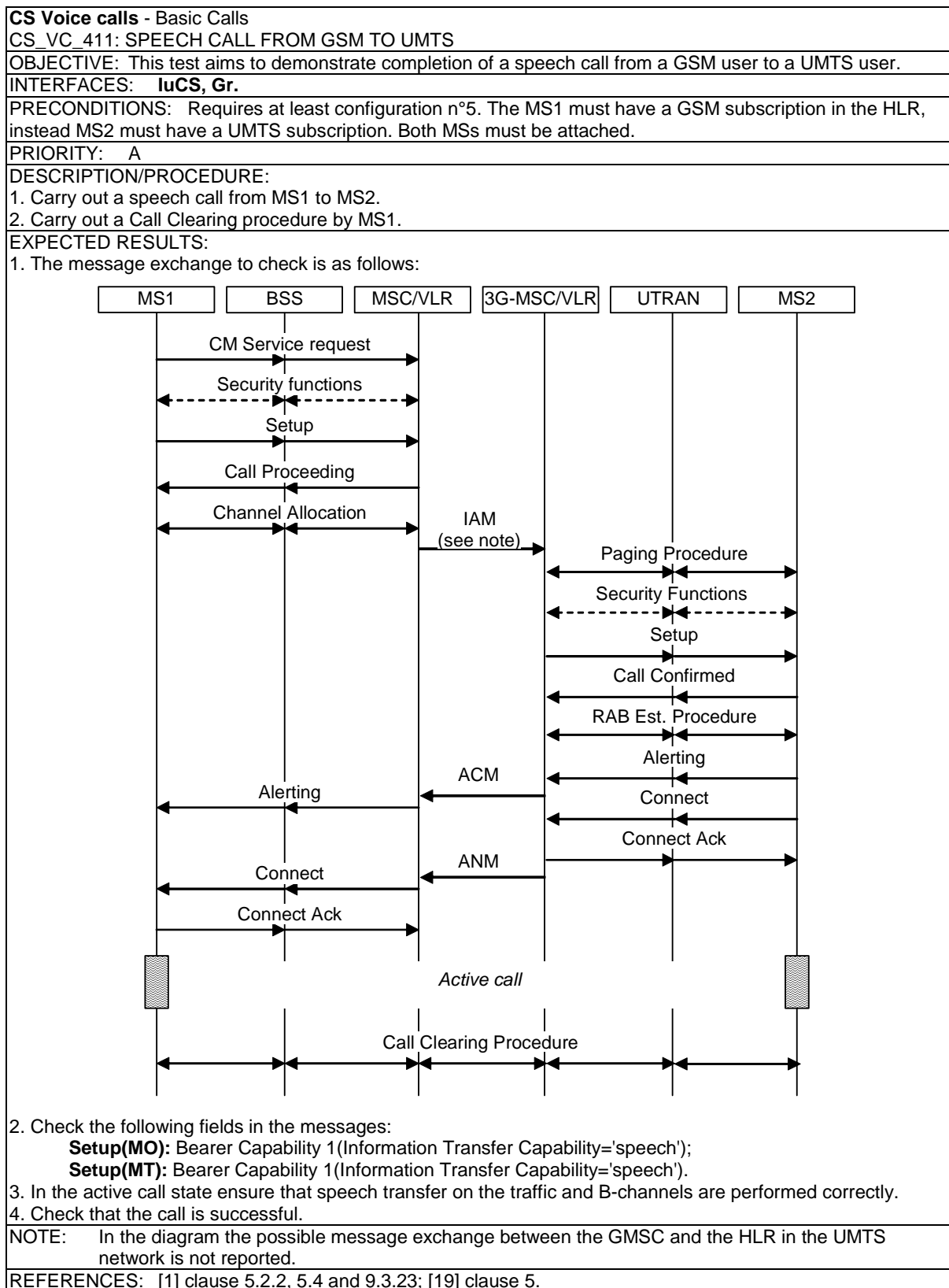
**Setup(MT):** Bearer Capability 1 (Information Transfer Capability='Facsimile G2/G3').

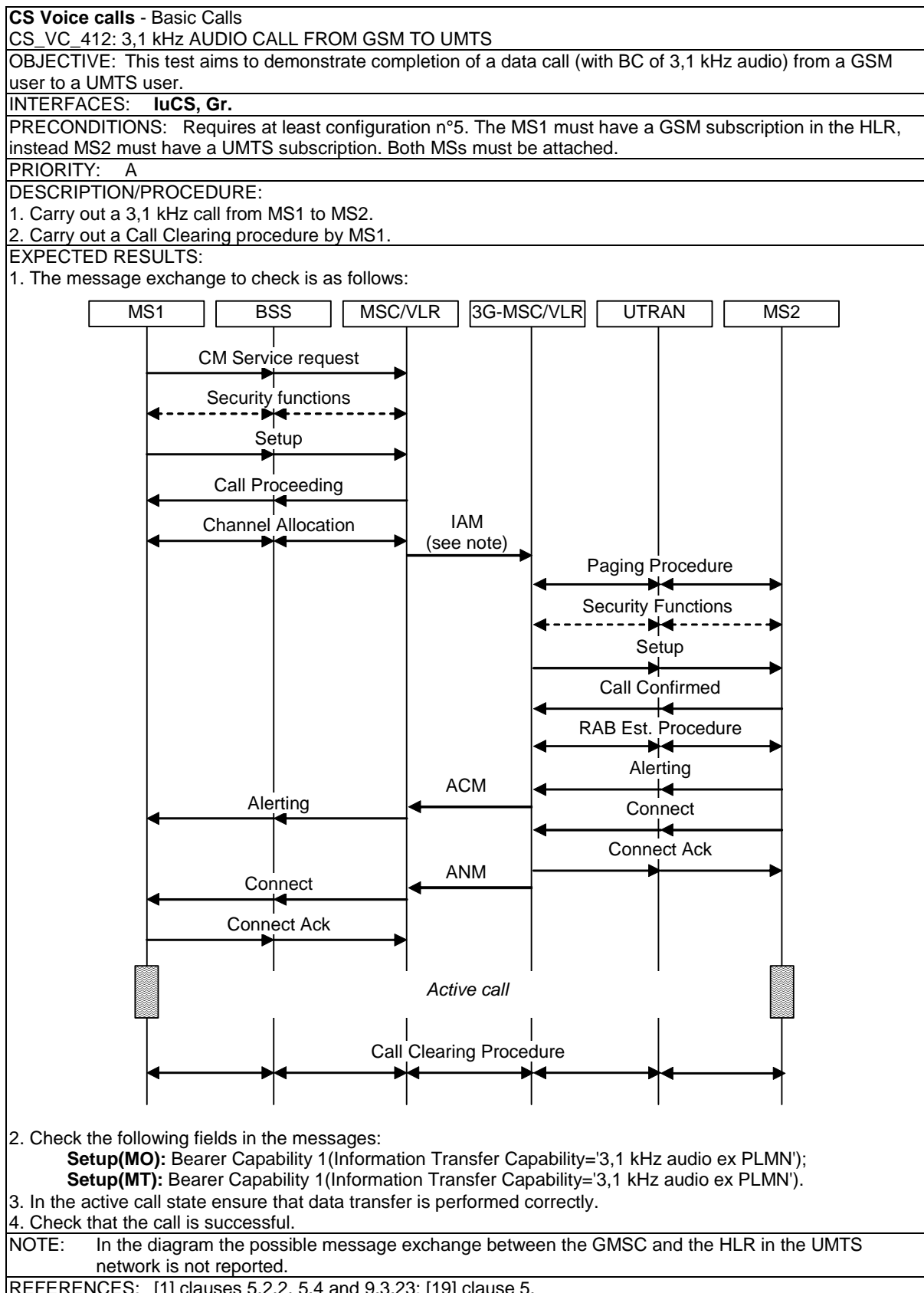
3. Check that the call is successful.

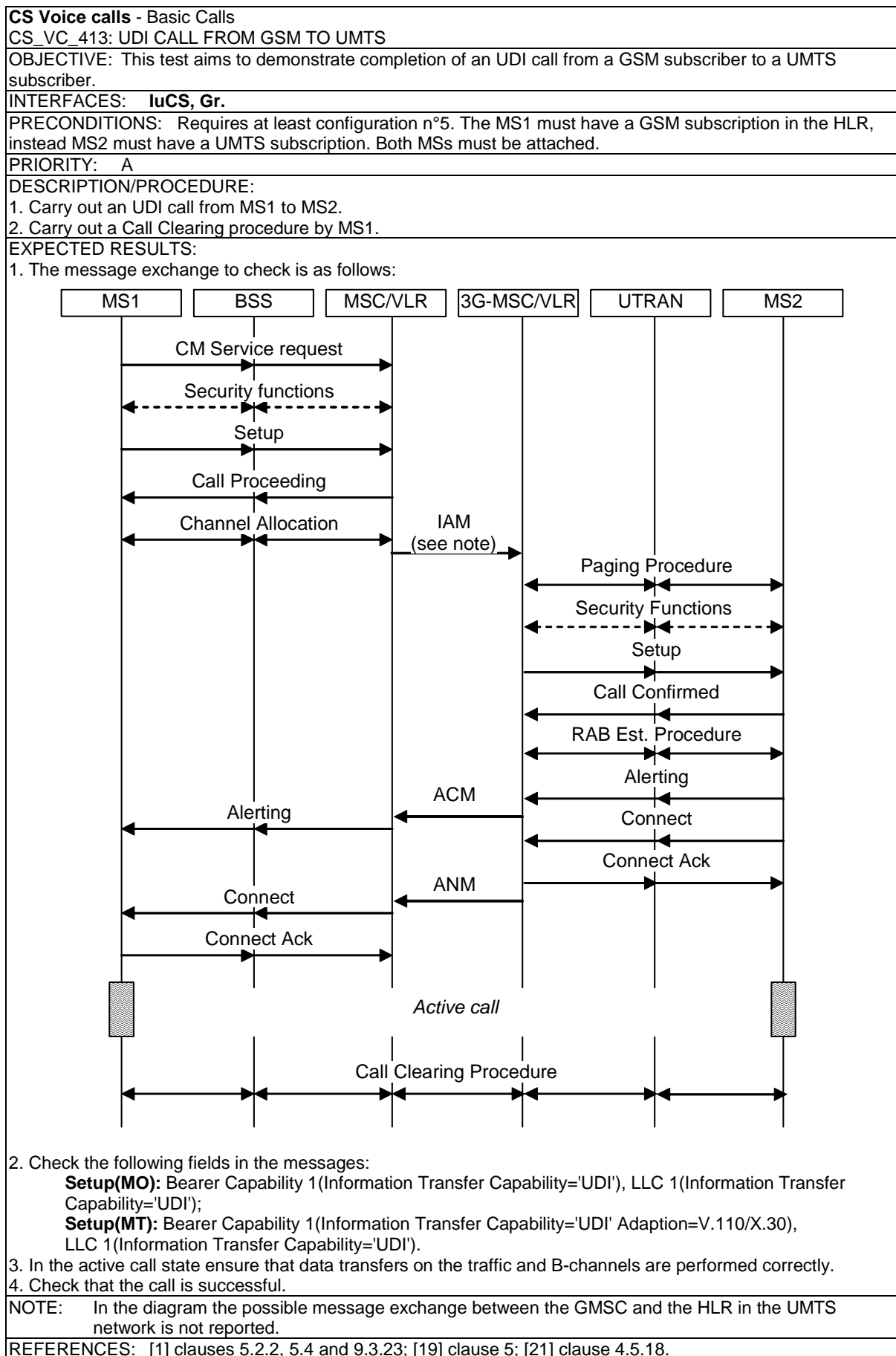
**NOTE:** In the diagram the possible message exchange between the GMSC and the HLR in the GSM network is not reported.

**REFERENCES:** [1] clauses 5.2.1, 5.4 and 9.3.23; [19] clause 5.









**CS Voice calls - Basic Calls****CS\_Vc\_414: FAX G3 CALL FROM GSM TO UMTS**

**OBJECTIVE:** This test aims to demonstrate completion of a facsimile G3 call from a GSM user to a UMTS user.

**INTERFACES:** **IuCS, Gr.**

**PRECONDITIONS:** Requires at least configuration n°5. The MS1 must have a GSM subscription in the HLR, instead MS2 must have a UMTS subscription. Both MSs must be attached.

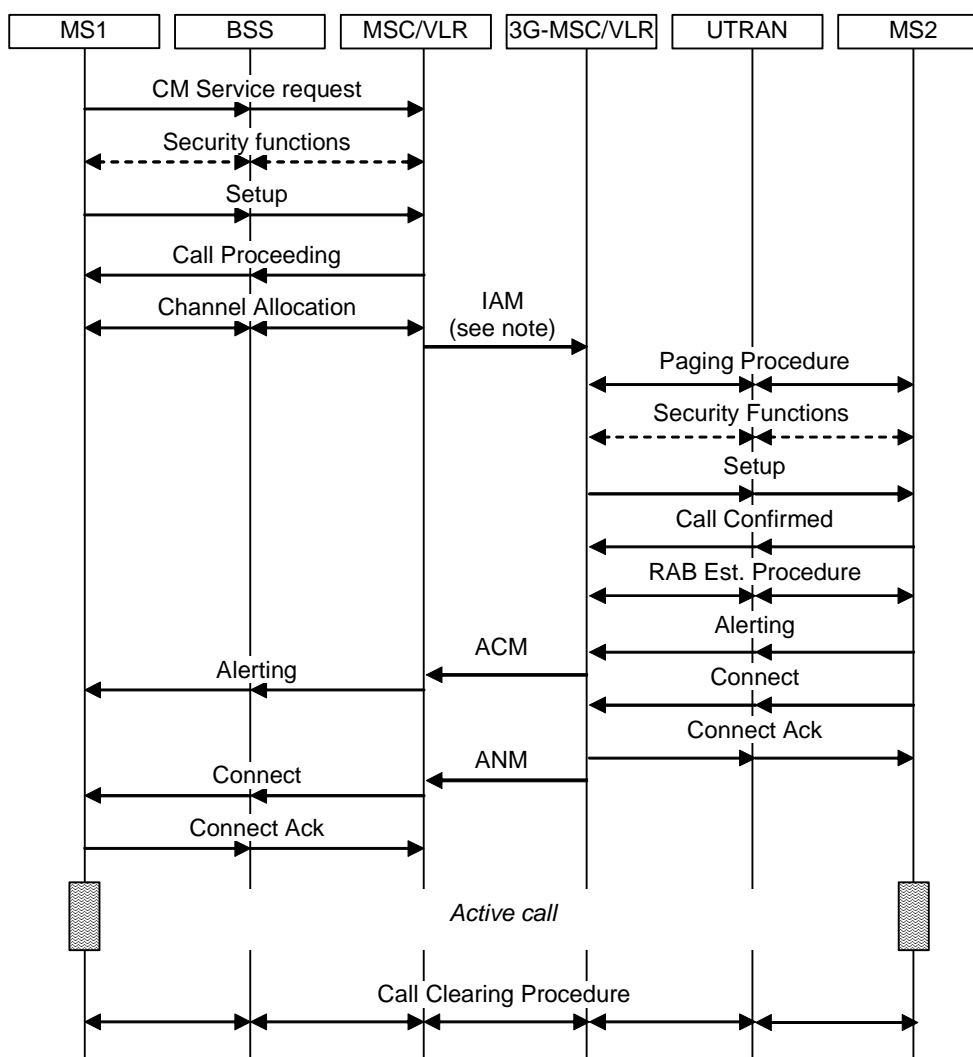
**PRIORITY:** A

**DESCRIPTION/PROCEDURE:**

1. Carry out a fax G3 call from MS1 to MS2.
2. Carry out a Call Clearing procedure by MS1.

**EXPECTED RESULTS:**

1. The message exchange to check is as follows:



2. Check the following fields in the messages:

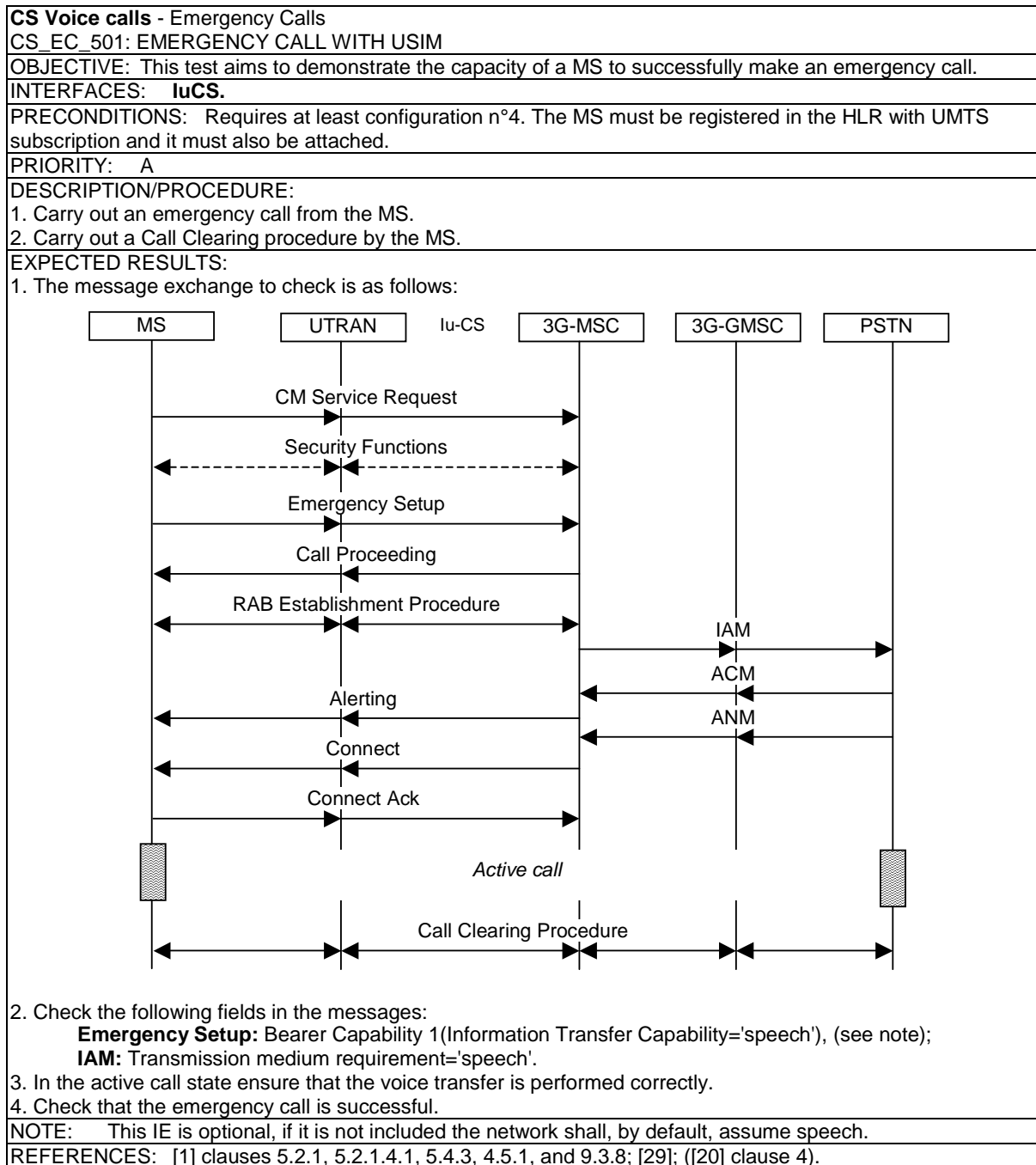
**Setup(MO):** Bearer Capability 1 (Information Transfer Capability='Facsimile G2/G3');

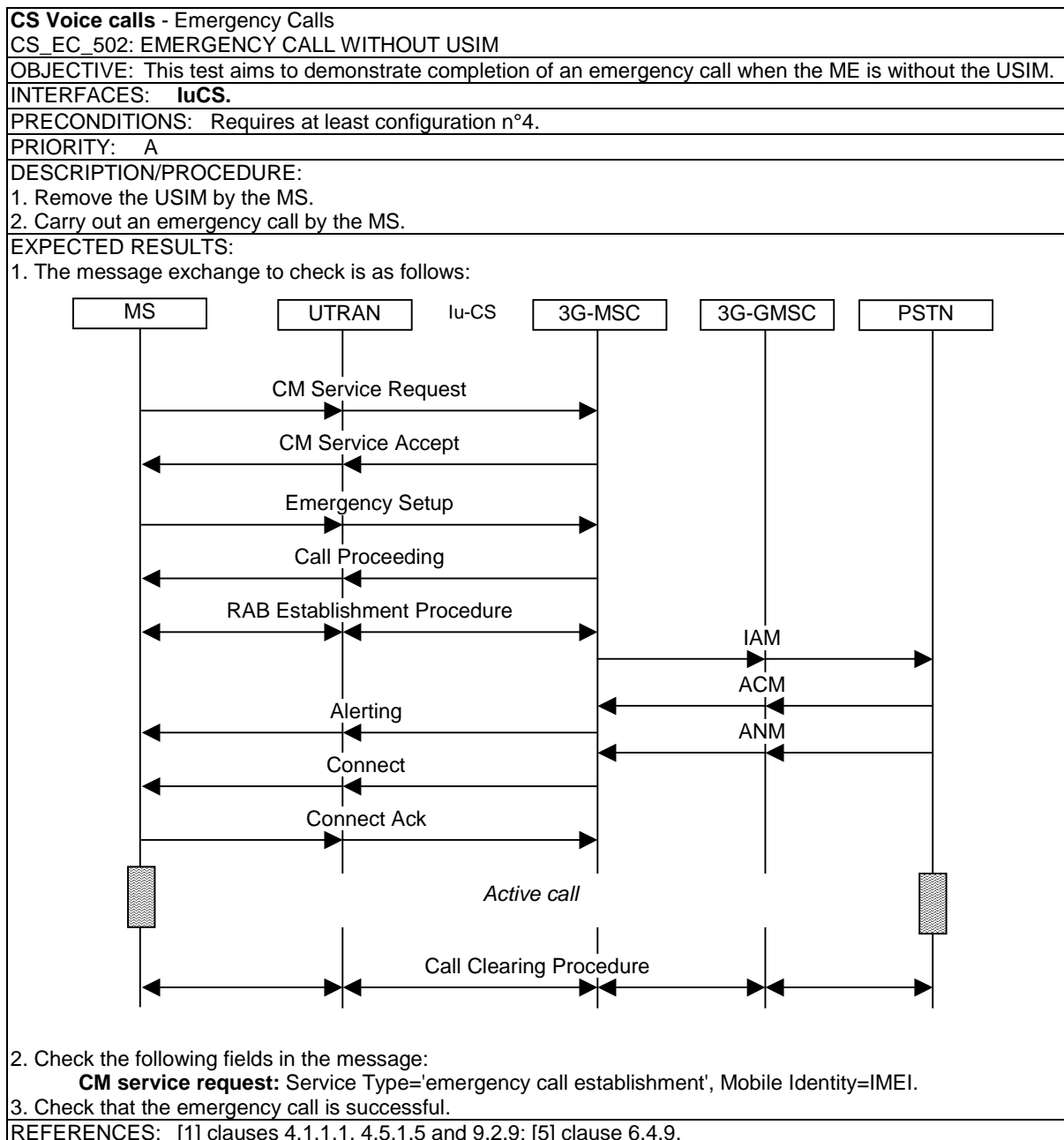
**Setup(MT):** Bearer Capability 1 (Information Transfer Capability='Facsimile G3').

3. Check that the call is successful.

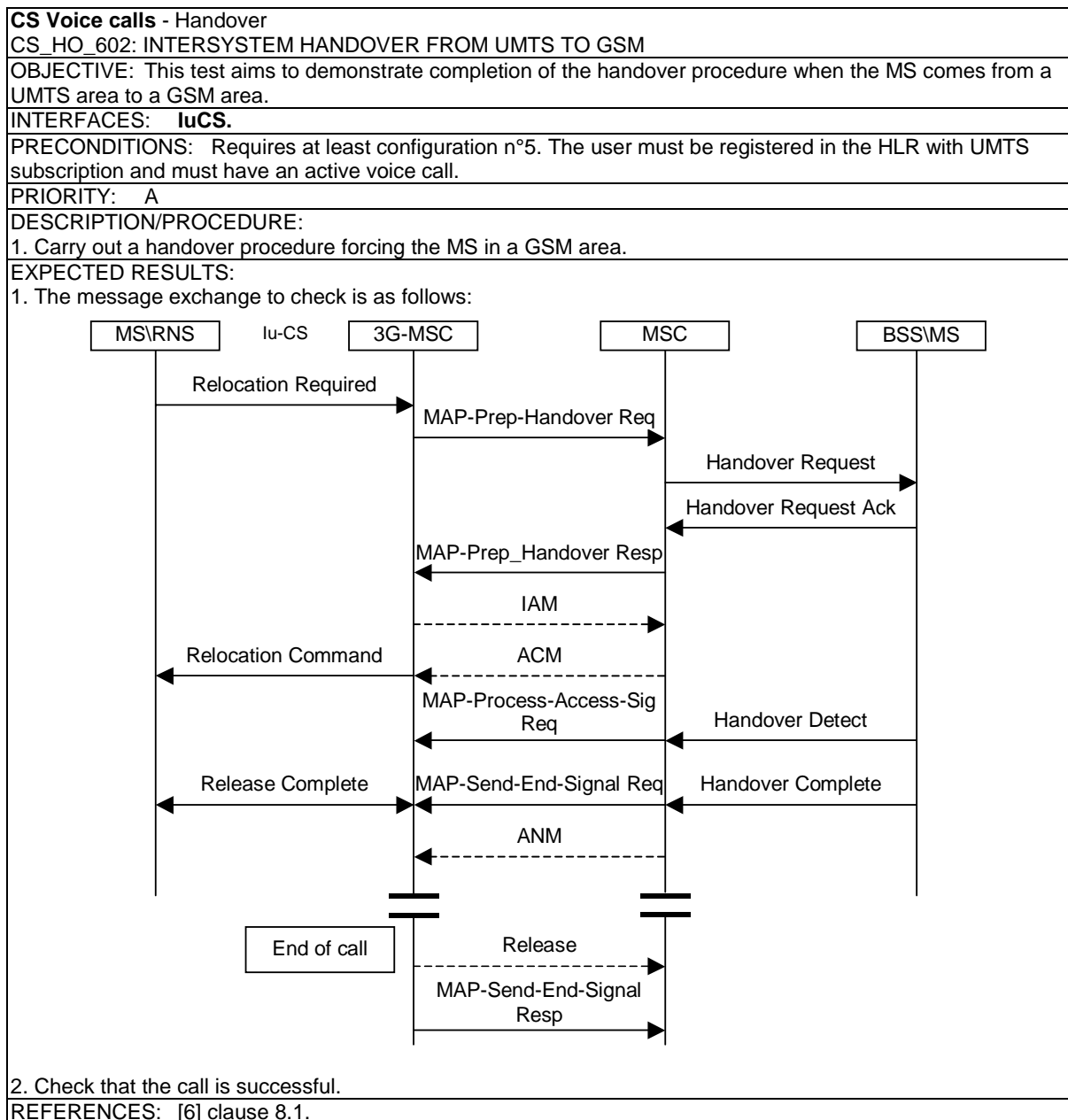
**NOTE:** In the diagram the possible message exchange between the GMSC and the HLR in the UMTS network is not reported.

**REFERENCES:** [1] clauses 5.2.2, 5.4 and 9.3.23; [19] clause 5.





<b>CS Voice calls - Handover</b>
<b>CS_HO_601: SRNS RELOCATION PROCEDURE</b>
<b>OBJECTIVE:</b> This test aims to demonstrate completion of the Intra 3G-MSC SRNS Relocation procedure.
<b>INTERFACES:</b> <b>IuCS, Iur.</b>
<b>PRECONDITIONS:</b> Requires at least configuration n°6. The user must be registered in the HLR with UMTS subscription and must have an active voice call.
<b>PRIORITY:</b> A
<b>DESCRIPTION/PROCEDURE:</b> 1. Carry out a SRNS relocation procedure forcing the MS in a new RNS area.
<b>EXPECTED RESULTS:</b> <b>Case A:</b> Interface Iur utilized 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant RNS1     participant MSC as 3G-MSC     participant RNS2     RNS1-&gt;&gt;MSC: Relocation Required     MSC-&gt;&gt;RNS2: Relocation Request     RNS2--&gt;&gt;MSC: Relocation Request Ack     MSC--&gt;&gt;RNS1: Relocation Command     MSC-&gt;&gt;RNS2: Iur SRNC Relocation Commit     RNS2--&gt;&gt;MSC: Relocation Detect     RNS2--&gt;&gt;MSC: Relocation Complete     MSC--&gt;&gt;RNS1: Release Command     RNS1--&gt;&gt;MSC: Release Complete     </pre>
2. Check that the connection with the UE is still established and that the radio resources are not changed.
<b>Case B:</b> Interface Iur not utilized 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant UE     participant RNS1     participant MSC as 3G-MSC     participant RNS2     RNS1-&gt;&gt;MSC: Relocation Required     MSC-&gt;&gt;RNS2: Relocation Request     RNS2--&gt;&gt;MSC: Relocation Request Ack     MSC--&gt;&gt;RNS1: Relocation Command     RNS1--&gt;&gt;UE: RR-HO-Command     RNS1-&gt;&gt;MSC: RR-HO-Complete     RNS2--&gt;&gt;MSC: Relocation Detect     RNS2--&gt;&gt;MSC: Relocation Complete     MSC--&gt;&gt;RNS1: Release Command     RNS1--&gt;&gt;MSC: Release Complete     </pre>
2. Check that the connection with the UE is still established, and that the radio resources are changed.
<b>REFERENCES:</b> [6] clause 6.2.3.





## A.3.4 Session Management

<b>Session Management - PDP Context Activation</b>					
SM_PDP_101: MS INITIATED PDPC ACTIVATION, DYNAMIC PDP ADDRESS					
OBJECTIVE: This test aims to demonstrate completion of the PDP Context Activation procedure with dynamic allocation of the IP address.					
INTERFACES: <b>IuPS, Gn, Gi.</b>					
PRECONDITIONS: Requires at least configuration n°7. The user must be registered in the HLR with a UMTS subscription that contains a PDP record with dynamic IP address, moreover it must be PS attached.					
PRIORITY: A					
DESCRIPTION/PROCEDURE:					
1. Carry out a PDPC activation procedure sending explicitly only the APN.					
EXPECTED RESULTS:					
1. The message exchange to check is as follows:					
MS	UTRAN	IuPS	3G SGSN	Gn	3G-GGSN
<pre> sequenceDiagram     participant UTRAN     participant MS     participant SGSN as 3G SGSN     participant GGSN as 3G-GGSN      UTRAN-&gt;&gt;SGSN: Service request     SGSN--&gt;&gt;MS: Common ID     SGSN--&gt;&gt;MS: Security mode procedure     MS-&gt;&gt;SGSN: Activate PDP Context Request     SGSN-&gt;&gt;UTRAN: RAB Assignment procedure     SGSN-&gt;&gt;GGSN: Create PDP Context Request     GGSN--&gt;&gt;SGSN: Create PDP Context Response     SGSN--&gt;&gt;MS: Activate PDP Context Accept   </pre>					
2. Check the following fields in the messages:					
<b>Activate PDP Context Request:</b> Requested PDP Address=< >, APN=<APN>;					
<b>Create PDP Context Request:</b> Selection Mode=<subscribed verified>;					
<b>Activate PDP Context Accept:</b> PDP Address=<Allocated PDP Address>.					
3. Check that the PDP context is activated in the GSNs.					
NOTE: The "service request" procedure is performed only if no PS signalling connection is already present.					
REFERENCES: [1] clause 9.5, [3] clause 9.2, [7] clause 7.3.1.					

<b>Session Management - PDP Context Activation</b>
<b>SM_PDP_102: MS INITIATED PDPC ACTIVATION, STATIC PDP ADDRESS</b>
<b>OBJECTIVE:</b> This test aims to demonstrate completion of the PDP Context Activation procedure with static assignment of the IP address.
<b>INTERFACES:</b> <b>IuPS, Gn, Gi.</b>
<b>PRECONDITIONS:</b> Requires at least configuration n°7. The user must be registered in the HLR with a UMTS subscription that contains a PDP record with static IP address, moreover it must be PS attached.
<b>PRIORITY:</b> A
<b>DESCRIPTION/PROCEDURE:</b> 1. Activate a PDPC sending explicitly the IP address subscribed by the user and the APN.
<b>EXPECTED RESULTS:</b> 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant SGSN as 3G SGSN     participant GGSN as 3G-GGSN      MS-&gt;&gt;SGSN: Activate PDP Context Request     MS&lt;-&gt;UTRAN: RAB Assignment procedure     SGSN-&gt;&gt;GGSN: Create PDP Context Request     GGSN--&gt;&gt;SGSN: Create PDP Context Response     SGSN--&gt;&gt;MS: Activate PDP Context Accept   </pre>
2. Check the following fields in the messages: <b>Activate PDP Context Request:</b> Requested PDP Address=<IP Address>, APN=<APN>; <b>Create PDP Context Request:</b> Selection Mode=<subscribed verified>; <b>Activate PDP Context Accept:</b> PDP Address=<IP Address>.
3. Check that the PDP context of the MS is activated in the GSNs.
<b>REFERENCES:</b> [1] clause 9.5, [3] clause 9.2, [7] clause 7.3.1.

<p><b>Session Management - PDP Context Activation</b>  <b>SM_PDP_103: QoS NEGOTIATION</b></p>
<p><b>OBJECTIVE:</b> This test aims to demonstrate the capacity of the 3G-SGSN to negotiate the QoS during a PDP Context Activation procedure.</p>
<p><b>INTERFACES:</b> <b>IuPS, Gn, Gi.</b></p>
<p><b>PRECONDITIONS:</b> Requires at least configuration n°7. The user must be registered in the HLR with a UMTS subscription that envisages a record of the appropriate QoS parameters; moreover, the MS must be PS attached.</p>
<p><b>PRIORITY:</b> B</p>
<p><b>DESCRIPTION/PROCEDURE:</b></p> <p><b>Case A: QoS_req=0 &amp; QoS_min≤QoS_sub</b>  1. Carry out a PDPC activation procedure without indicating the QoS parameters required in the Activate PDP Context Request message.</p> <p><b>Case B: QoS_min≤QoS_sub&lt;QoS_req</b>  1. Set the QoS_min of the MS so it is worse than the QoS_sub.  2. Carry out a PDPC procedure requesting a better QoS than that subscribed by the user in the Activate PDP Context Request message (e.g. a higher peak Throughput value).</p> <p><b>Case C: QoS_sub&lt;QoS_min≤QoS_req</b>  1. Set the QoS_min so it is better than the QoS_sub.  2. Carry out a PDPC procedure requesting a better QoS than that subscribed by the user in the Activate PDP Context Request message (e.g. a higher peak Throughput value).</p> <p><b>Case D: QoS_min≤QoS_req&lt;QoS_sub</b>  1. Carry out a PDPC activation procedure requesting a worse QoS than that subscribed by the user (e.g. lower peak throughput value).</p> <p><b>Case E: QoS_req not supported by SGSN (QoS_req&lt;QoS_sub)</b>  1. In the user PDPC contained in the HLR set a reliability class higher than the one supported by the 3G-SGSN.  2. Carry out a PDPC activation procedure with the QoS parameters subscribed in the HLR.</p>
<p><b>EXPECTED RESULTS:</b></p> <p>1. The message exchange to check is as follows:</p> <pre> sequenceDiagram     participant MS     participant UTRAN     participant SGSN as 3G SGSN     participant GGSN as 3G-GGSN      MS-&gt;&gt;SGSN: Activate PDP Context Request     UTRAN-&gt;&gt;SGSN: RAB Assignment procedure     SGSN-&gt;&gt;GGSN: Create PDP Context Request     GGSN--&gt;&gt;SGSN: Create PDP Context Response     SGSN--&gt;&gt;MS: Activate PDP Context Accept     SGSN--&gt;&gt;GGSN: Deactivation PDP Context Procedure   </pre>
<p>2. Check the following fields in the messages:</p> <p><b>Case A:</b>  <b>Activate PDP Context Request:</b> QoS Requested='0'  <b>Create PDP Context Request:</b> QoS Negotiated=QoS subscribed  <b>Create PDP Context Response:</b> QoS Negotiated=QoS subscribed  <b>Activate PDP Context Accept:</b> QoS Negotiated=QoS subscribed</p> <p><b>Case B:</b>  <b>Activate PDP Context Request:</b> QoS Requested=&lt;QoS&gt;  <b>Create PDP Context Request:</b> QoS Negotiated=QoS subscribed  <b>Create PDP Context Response:</b> QoS Negotiated=QoS subscribed  <b>Activate PDP Context Accept:</b> QoS Negotiated=QoS subscribed</p> <p><b>Case C:</b>  <b>Activate PDP Context Request:</b> QoS Requested=&lt;QoS&gt;  <b>Create PDP Context Request:</b> QoS Negotiated=QoS subscribed  <b>Create PDP Context Response:</b> QoS Negotiated=QoS subscribed  <b>Activate PDP Context Accept:</b> QoS Negotiated=QoS subscribed</p>

Check the success of the Deactivation PDP Context procedure initiated by the MS.

**Case D:**

**Activate PDP Context Request:** QoS Requested=<QoS>

**Create PDP Context Request:** QoS Negotiated=QoS Requested

**Create PDP Context Response:** QoS Negotiated=QoS Requested

**Activate PDP Context Accept:** QoS Negotiated=QoS Requested

**Case E:**

**Activate PDP Context Request:** QoS Requested=QoS Subscribed

**Create PDP Context Request:** QoS Negotiated=QoS Supported by SGSN

**Create PDP Context Response:** QoS Negotiated=QoS Supported by SGSN

**Activate PDP Context Accept:** QoS Negotiated=QoS Supported by SGSN

NOTE: **QoS\_req**: is the QoS set in the MS that is sent in the Activate PDP Context Request message.

**QoS\_min**: is the QoS set in the MS that is compared with the one received from the 3G-SGSN to decide whether to accept the negotiation or not.

**QoS\_sub**: is the QoS set in the HLR for the PDPC being activated.

REFERENCES: [1] clause 9.5.

**Session Management - PDP Context Activation**

**SM\_PDP\_201: APN SELECTION RULES, DYNAMIC PDP ADDRESS**

OBJECTIVE: This test aims to demonstrate the correct selection of the APN by the 3G-SGSN according to user subscription and the request sent by it.

INTERFACES: **IuPS, Gn, Gi.**

PRECONDITIONS: Requires at least configuration n°7. The user must be registered in the HLR with a UMTS subscription that envisages a single PDPC with APN data and dynamic assignment of IP address; moreover, the MS must be PS attached.

PRIORITY: A

DESCRIPTION/PROCEDURE:

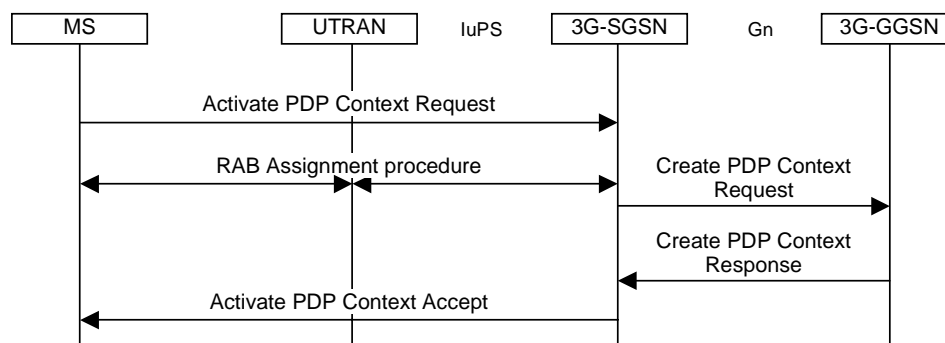
**Case A:** Carry out a PDPC activation procedure not sending the APN.

**Case B:** Carry out a PDPC activation procedure sending an APN different to the subscriber.

EXPECTED RESULTS:

**Case A:**

1. The message exchange to check is as follows:



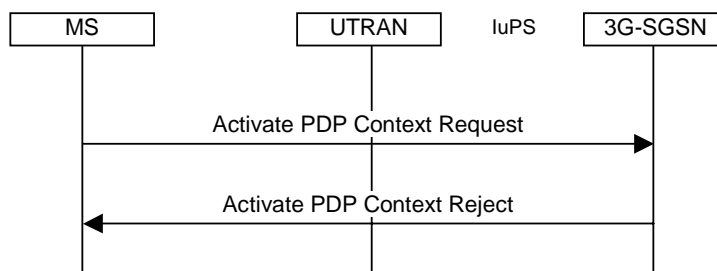
2. Check the following field in the message:

**Create PDP context Request:** Selection Mode=<subscribed verified>.

3. Check that the PDPC is successfully activated.

**Case B:**

1. The message exchange to check is as follows:

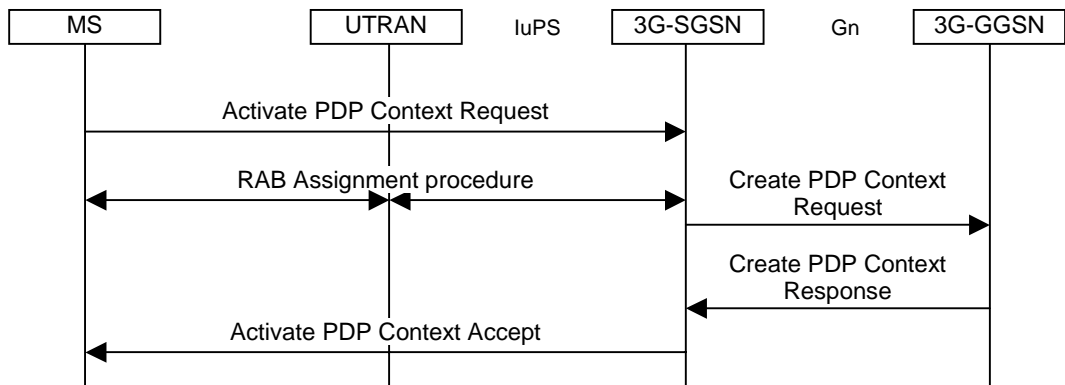
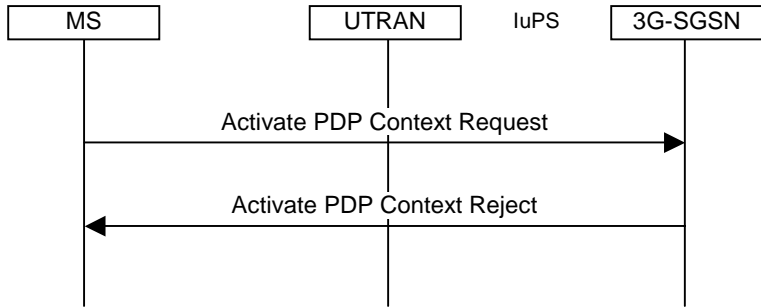


2. Check the following field in the message:

**Activate PDP Context Reject:** Cause='requested service option not subscribed'

3. Check the failure of the PDPC activation procedure.

REFERENCES: [1] clause 9.2, clause 9.5.3, [7] clause 7.3.1.

<p><b>Session Management - PDP Context Activation</b>  <b>SM_PDP_202: APN SELECTION RULES, STATIC PDP ADDRESS</b></p>
<p><b>OBJECTIVE:</b> This test aims to demonstrate the correct selection of the APN by the 3G-SGSN according to the user subscription and the request sent by it.</p>
<p><b>INTERFACES:</b> <b>IuPS, Gn, Gi.</b></p>
<p><b>PRECONDITIONS:</b> Requires at least configuration n°7. The user must be registered in the HLR with a UMTS subscription that envisages a single PDPC with APN data and a static IP address; moreover, the MS must be PS attached.</p>
<p><b>PRIORITY:</b> B</p>
<p><b>DESCRIPTION/PROCEDURE:</b>  <b>Case A:</b> Carry out a PDPC activation procedure sending the same APN and PDP address as the subscribed one.  <b>Case B:</b> Carry out a PDPC activation procedure sending a subscriber APN and a PDP address different to the subscribed one.</p>
<p><b>EXPECTED RESULTS:</b>  <b>Case A:</b>  1. The message exchange to check is as follows:</p>  <pre> sequenceDiagram     participant MS     participant UTRAN     participant 3G_SGSN as 3G-SGSN     participant 3G_GGSN as 3G-GGSN     MS-&gt;&gt;UTRAN: Activate PDP Context Request     UTRAN-&gt;&gt;MS: RAB Assignment procedure     3G_SGSN-&gt;&gt;3G_GGSN: Create PDP Context Request     3G_GGSN--&gt;&gt;3G_SGSN: Create PDP Context Response     3G_SGSN-&gt;&gt;MS: Activate PDP Context Accept     </pre> <p>2. Check the following field in the message:  <b>Create PDP context Request:</b> Selection Mode=&lt;subscribed verified&gt;.</p> <p>3. Check that the PDPC is successfully activated.</p> <p><b>Case B:</b>  1. The message exchange to check is as follows:</p>  <pre> sequenceDiagram     participant MS     participant UTRAN     participant 3G_SGSN as 3G-SGSN     MS-&gt;&gt;UTRAN: Activate PDP Context Request     3G_SGSN-&gt;&gt;MS: Activate PDP Context Reject     </pre> <p>2. Check the following field in the message:  <b>Activate PDP Context Reject:</b> Cause='Unknown PDP address or PDP type'.</p> <p>3. Check the failure of the PDPC activation procedure.</p>
<p><b>REFERENCES:</b> [3] clause 9.2, [1] clauses 9.5 and 10.5.6.6, [7] clause 7.3.1.</p>

<b>Session Management - PDP Context Activation</b> <b>SM_PDP_203: APN SELECTION RULES, TWO PDPC SUBSCRIBED</b>
<b>OBJECTIVE:</b> This test aims to demonstrate the correct selection of the APN by the 3G-SGSN according to the user subscription and request.
<b>INTERFACES:</b> IuPS, Gn, Gi.
<b>PRECONDITIONS:</b> Requires at least configuration n°7. The user must be registered in the HLR with a UMTS subscription that envisages two PDPC, both with APN data and dynamic IP address assignment; moreover, the MS must be PS attached.
<b>PRIORITY:</b> B
<b>DESCRIPTION/PROCEDURE:</b> 1. Carry out a PDPC activation procedure not sending the APN.
<b>EXPECTED RESULTS:</b> 1. The message exchange to check is as follows: <div style="text-align: center; margin: 10px 0;"> <pre> sequenceDiagram     participant MS     participant UTRAN     participant 3G_SGSN as 3G-SGSN     UTRAN-&gt;&gt;3G_SGSN: Activate PDP Context Request     3G_SGSN-&gt;&gt;MS: Activate PDP Context Reject </pre> </div>
2. Check the following field in the message: <b>Activate PDP Context Reject:</b> Cause='Missing or unknown APN'.
3. Check the failure of the PDPC activation procedure.
<b>REFERENCES:</b> [3] clause 9.2, [1] clauses 9.5 and 10.5.6.6.

<b>Session Management - PDP Context Activation</b>
SM_PDP_204: APN SELECTION RULES, WILDCARD SUBSCRIBED
OBJECTIVE: This test aims to demonstrate the correct selection of the APN by the 3G-SGSN according to the user subscription and request.
INTERFACES: <b>IuPS, Gn, Gi.</b>
PRECONDITIONS: Requires at least configuration n°7. The user must be registered in the HLR with a UMTS subscription that envisages a single PDPC with an APN wildcard; moreover, the MS must be PS attached.
PRIORITY: A
DESCRIPTION/PROCEDURE: <b>Case A:</b> Carry out a PDPC activation procedure not sending the APN. <b>Case B:</b> Carry out a PDPC activation procedure sending an APN known to the 3G-SGSN. <b>Case C:</b> Carry out a PDPC activation procedure sending an APN unknown to the 3G-SGSN, (see note 1). <b>Case D:</b> Carry out a PDPC activation procedure sending an APN unknown to the 3G-SGSN, (see note 2).
EXPECTED RESULTS: 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant SGSN as 3G-SGSN     participant GGSN as 3G-GGSN      MS-&gt;&gt;SGSN: Activate PDP Context Request     MS&lt;-&gt;UTRAN: RAB Assignment procedure     SGSN-&gt;&gt;GGSN: Create PDP Context Request     GGSN--&gt;&gt;SGSN: Create PDP Context Response     SGSN--&gt;&gt;MS: Activate PDP Context Accept/Reject     </pre>
<b>Case A:</b> 2. Check the following field in the message: <b>Create PDP context Request:</b> Selection Mode=<Network provided APN, subscription not verified>.
3. Check that the PDPC is successfully activated.
<b>Case B:</b> 2. Check the following field in the message: <b>Create PDP context Request:</b> Selection Mode=<subscription verified>.
3. Check that the PDPC is successfully activated.
<b>Case C:</b> 2. Check the following fields in the messages: <b>Create PDP Context Response:</b> Cause='service not supported' <b>Activate PDP Context Reject:</b> Cause='activation rejected by GGSN'
3. Check the failure of the PDPC activation procedure.
<b>Case D:</b> 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant SGSN as 3G-SGSN      MS-&gt;&gt;SGSN: Activate PDP Context Request     SGSN--&gt;&gt;MS: Activate PDP Context Reject     </pre>
2. Check the following field in the message: <b>Activate PDP Context Reject:</b> Cause='missing or unknown APN'
3. Check the failure of the PDPC activation procedure.
NOTE 1: The 3G-SGSN resolves the APN sent to a given 3G-GGSN in which the APN is not configured.
NOTE 2: The 3G-SGSN does not find an item corresponding to the APN requested in the DNS (internal or external).
REFERENCES: [3] clause 9.2.2, [1] clauses 9.5 and 10.5.6.6, [7] clauses 7.3.2, 7.7.1 and 7.7.12.

<b>Session Management - PDP Context Deactivation</b> SM_PDP_301: MS INITIATED DEACTIVATION
OBJECTIVE: This test aims to demonstrate the completion of the PDP Context Deactivation procedure requested by the MS.
INTERFACES: <b>IuPS, Gn, Gi.</b>
PRECONDITIONS: Requires at least configuration n°7. The user must be registered in the HLR with UMTS subscription, must be PS attached and must have an active PDPC.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Carry out the PDPC deactivation procedure.
EXPECTED RESULTS: 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant SGSN as 3G-SGSN     participant GGSN as 3G-GGSN      MS-&gt;&gt;SGSN: Deactivate PDP Context Request     SGSN-&gt;&gt;GGSN: Delete PDP Context Request     GGSN--&gt;&gt;SGSN: Delete PDP Context Response     SGSN--&gt;&gt;MS: Deactivate PDP Context Accept     UTRAN-&gt;&gt;MS: RAB Release procedure     UTRAN-&gt;&gt;SGSN: Release   </pre>
2. Check the following field in the message: <b>Deactivate PDP Context Request:</b> Cause='regular deactivation'.
3. Check that the GTP tunnel has been cancelled in the 3G-GSNs.
4. Check the success of a subsequent activation procedure for the same PDPC.
REFERENCES: [3] clause 9.2.4.1, [1] clauses 9.5.14 and 10.5.6.6.

<b>Session Management - PDP Context Deactivation</b> SM_PDP_302: MS SWITCH OFF
OBJECTIVE: This test aims to demonstrate completion of the PDP Context Deactivation procedure caused switching off the MS.
INTERFACES: <b>IuPS, Gn, Gi.</b>
PRECONDITIONS: Requires at least configuration n°7. The user must be registered in the HLR with UMTS subscription, must also be PS attached and have an active PDPC.
PRIORITY: B
DESCRIPTION/PROCEDURE: 1. Carry out a PS detach switching off the MS.
EXPECTED RESULTS: 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant SGSN as 3G-SGSN     participant GGSN as 3G-GGSN      MS-&gt;&gt;SGSN: Detach Request     SGSN-&gt;&gt;GGSN: Delete PDP Context Request     GGSN--&gt;&gt;SGSN: Delete PDP Context Response     UTRAN-&gt;&gt;MS: RAB Release procedure     UTRAN-&gt;&gt;SGSN: Release   </pre>
2. Check the following fields in the messages: <b>Detach Request:</b> Detach Type: GPRS Detach; <b>Delete PDP Context Response:</b> Cause='request accepted'.
3. Check that the GTP tunnel has been cancelled in the 3G-GSNs.
4. Check that the MS is deregistered in the 3G-SGSN.
REFERENCES: [3] clause 9.2.4, [1] clause 9.4, [7] clause 7.7.1.



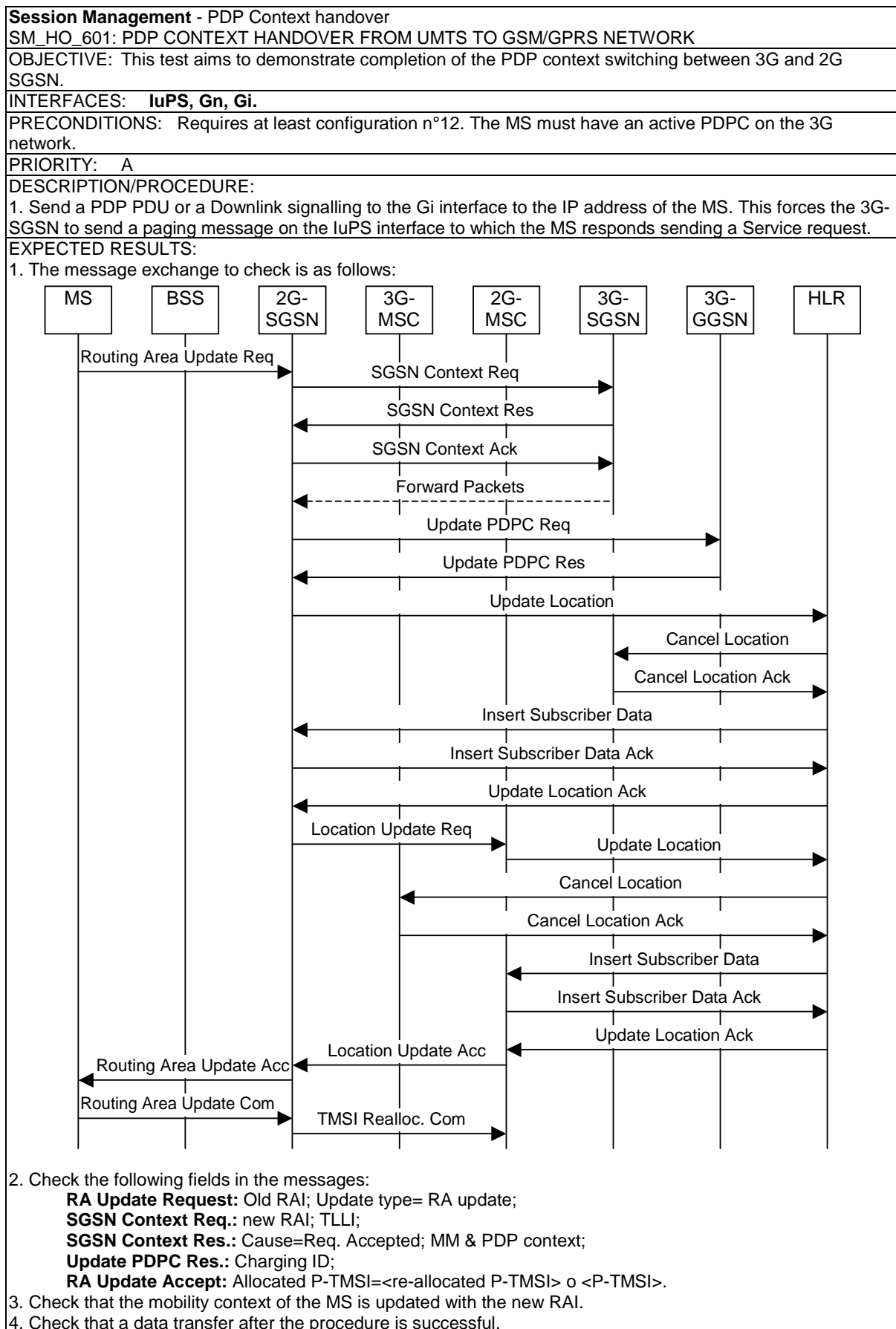
<b>Session Management - PDP Context Deactivation</b>					
SM_PDP_303: MOBILE REACHABLE TIMER EXPIRY					
OBJECTIVE: This test aims to demonstrate that upon expiry of the mobile reachable timer all PDPCs of the MS are automatically detached by the 3G-SGSN.					
INTERFACES: <b>IuPS, Gn, Gi.</b>					
PRECONDITIONS: Requires at least configuration n°7. The user must be registered in the HLR with UMTS subscription, it must also be PS attached and must have an active PDPC.					
PRIORITY: A					
DESCRIPTION/PROCEDURE:					
1. Wait for expiry of the mobile reachable timer; preventing the Periodic RA Update procedure by taking the MS out of cover or removing the battery (so that a detach request cannot be sent).					
EXPECTED RESULTS:					
1. The message exchange to check is as follows:					
MS	UTRAN	IuPS	3G-SGSN	Gn	3G-GGSN
			Timer expiry		
			Delete PDP Context Request	→	
		← Release	Delete PDP Context Response	←	
2. Check the following fields in the messages:					
<b>Delete PDP Context Response:</b> Cause='request accepted'.					
3. Check that the MS is considered deregistered in the 3G-SGSN.					
REFERENCES: [3] clause 6.2.3; [7] clause 7.3.6, clause 7.7.1.					

<b>Session Management - PDP Context Deactivation</b> SM_PDP_304: 3G-GGSN OR 3G-SGSN INITIATED
OBJECTIVE: This test aims to demonstrate completion of the PDP Context Deactivation procedure requested by the 3G-GGSN or 3G-SGSN.
INTERFACES: <b>IuPS, Gn, Gi.</b>
PRECONDITIONS: Requires at least configuration n°7. The user must be registered in the HLR with UMTS subscription, it must also be PS attached and must have an active PDPC.
PRIORITY: B
DESCRIPTION/PROCEDURE: <b>Case A:</b> Carry out the PDPC deactivation procedure initiated by the 3G-GGSN <b>Case B:</b> Carry out the PDPC deactivation initiated by the 3G-SGSN.
EXPECTED RESULTS: <b>Case A:</b> 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant SGSN as 3G-SGSN     participant GGSN as 3G-GGSN     GGSN-&gt;&gt;SGSN: Delete PDP Context Request     SGSN-&gt;&gt;MS: Deactivate PDP Context Request     MS-&gt;&gt;SGSN: Deactivate PDP Context Accept     SGSN-&gt;&gt;GGSN: Delete PDP Context Response     MS-&gt;&gt;UTRAN: RAB Release procedure     UTRAN-&gt;&gt;SGSN: Release     </pre>
<b>Case B:</b> 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant SGSN as 3G-SGSN     participant GGSN as 3G-GGSN     SGSN-&gt;&gt;GGSN: Delete PDP Context Request     GGSN-&gt;&gt;SGSN: Delete PDP Context Response     SGSN-&gt;&gt;MS: Deactivate PDP Context Request     MS-&gt;&gt;SGSN: Deactivate PDP Context Accept     MS-&gt;&gt;UTRAN: RAB Release procedure     UTRAN-&gt;&gt;SGSN: Release     </pre>
In both cases:
2. Check the following field in the message: <b>Deactivate PDP Context Request:</b> Cause='regular deactivation'.
3. Check that the GTP tunnel has been removed in the 3G-GSNs.
4. Check the success of a subsequent activation procedure for the same PDPC.
NOTES:
REFERENCES: [1] clause 9.4, [3] clause 9.2.4.

<b>Session Management - PDP context Deactivation</b>
SM_PDP_305: DELETE ACTIVE PDP CONTEXT IN THE HLR
OBJECTIVE: This test aims to demonstrate completion of the Delete Subscriber Data procedure in the event that the active PDPC is cancelled from the user profile in the HLR.
INTERFACES: <b>IuPS, Gr, Gn, Gi.</b>
PRECONDITIONS: Requires at least configuration n°7. The MS must be registered in the HLR with UMTS subscription; the MS must be PS attached.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Cancel the active PDPC from the user profile in the HLR.
EXPECTED RESULTS: 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant SGSN as 3G-SGSN     participant GGSN as 3G-GGSN     participant HLR      HLR-&gt;&gt;SGSN: Delete Subscriber Data     SGSN--&gt;&gt;HLR: Delete Subscriber Data Ack     SGSN-&gt;&gt;GGSN: Delete PDP Context Request     GGSN--&gt;&gt;SGSN: Delete PDP Context Response     SGSN-&gt;&gt;MS: Deactivate PDPC Request     MS--&gt;&gt;SGSN: Deactivate PDPC Request Accept     MS-&gt;&gt;SGSN: RAB Release procedure     SGSN--&gt;&gt;MS: Release     </pre>
2. Check that the MS PDPC concerned has been cancelled in the 3G-SGSN and has been disabled.
NOTE: The 3G-SGSN may not wait for the 3G-GGSN reply before sending the deactivate message to the MS.
REFERENCES: [1] clause 6.10.1.2

<b>Session Management - Data Transfer Security</b>
SM_SEC_401: PACKET DATA TRANSFER BETWEEN 2 MS
OBJECTIVE: This test aims to demonstrate the function of the 3G-GGSN related to routing and transfer of packet data between two MS.
INTERFACES: <b>IuPS, Gn, Gi.</b>
PRECONDITIONS: Requires at least configuration n°8. The two MSs must be registered in the HLR with UMTS subscription and must also be PS attached.
PRIORITY: B
DESCRIPTION/PROCEDURE: <b>Case A:</b> 1. Configure and activate the PDPC on both MSs using the same Transparent APN. 2. Carry out a ping from one MS to the other MS. <b>Case B:</b> 1. Configure and activate the PDPC on both MSs using different Non Transparent APN. 2. Carry out a ping from one MS to the other MS.
EXPECTED RESULTS: <b>Case A:</b> Check that the ping is successful and check that no packets have been sent via the Gi interface. <b>Case B:</b> Check that the ping is successful and check that a ping has been sent via the Gi interface.
REFERENCES: [3] clause 9.3.

<b>Session Management - Data Paging</b>
<b>SM_PAG_501: DOWNLINK PAGING PROCEDURE</b>
<b>OBJECTIVE:</b> This test aims to demonstrate completion of the paging procedure after sending data to an MS in idle state.
<b>INTERFACES:</b> <b>IuPS, Gn, Gi.</b>
<b>PRECONDITIONS:</b> Requires at least configuration n°7. The MS, PS attached, must be in PMM idle state and have an active PDPC.
<b>PRIORITY:</b> A
<b>DESCRIPTION/PROCEDURE:</b> 1. Send a PDP PDU or a Downlink signalling to the Gi interface to the IP address of the MS. This forces the 3G-SGSN to send a paging message on the IuPS interface to which the MS responds sending a Service request.
<b>EXPECTED RESULTS:</b> 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant 3G_SGSN as 3G-SGSN     3G_SGSN-&gt;&gt;3G_SGSN: PDP PDU/Downlink sign.     UTRAN-&gt;&gt;MS: Paging     MS-&gt;&gt;3G_SGSN: Service Request     MS-&gt;&gt;3G_SGSN: RAB Assignment procedure (see note)     3G_SGSN--&gt;&gt;MS: Security Function     3G_SGSN--&gt;&gt;MS: Security Function     3G_SGSN-&gt;&gt;MS: PDP PDU/Downlink sign. </pre>
2. Check the following fields in the messages: <b>Paging:</b> Permanent NAS UE identity, CN Domain Indicator=PS domain. <b>Service Request:</b> Service type=paging response.
<b>NOTE:</b> The RAB Assignment procedure is performed only in case of PDP PDU.
<b>REFERENCES:</b> [1] clause 8.4; [3] clause 9.1.22 and 10.5.1.4

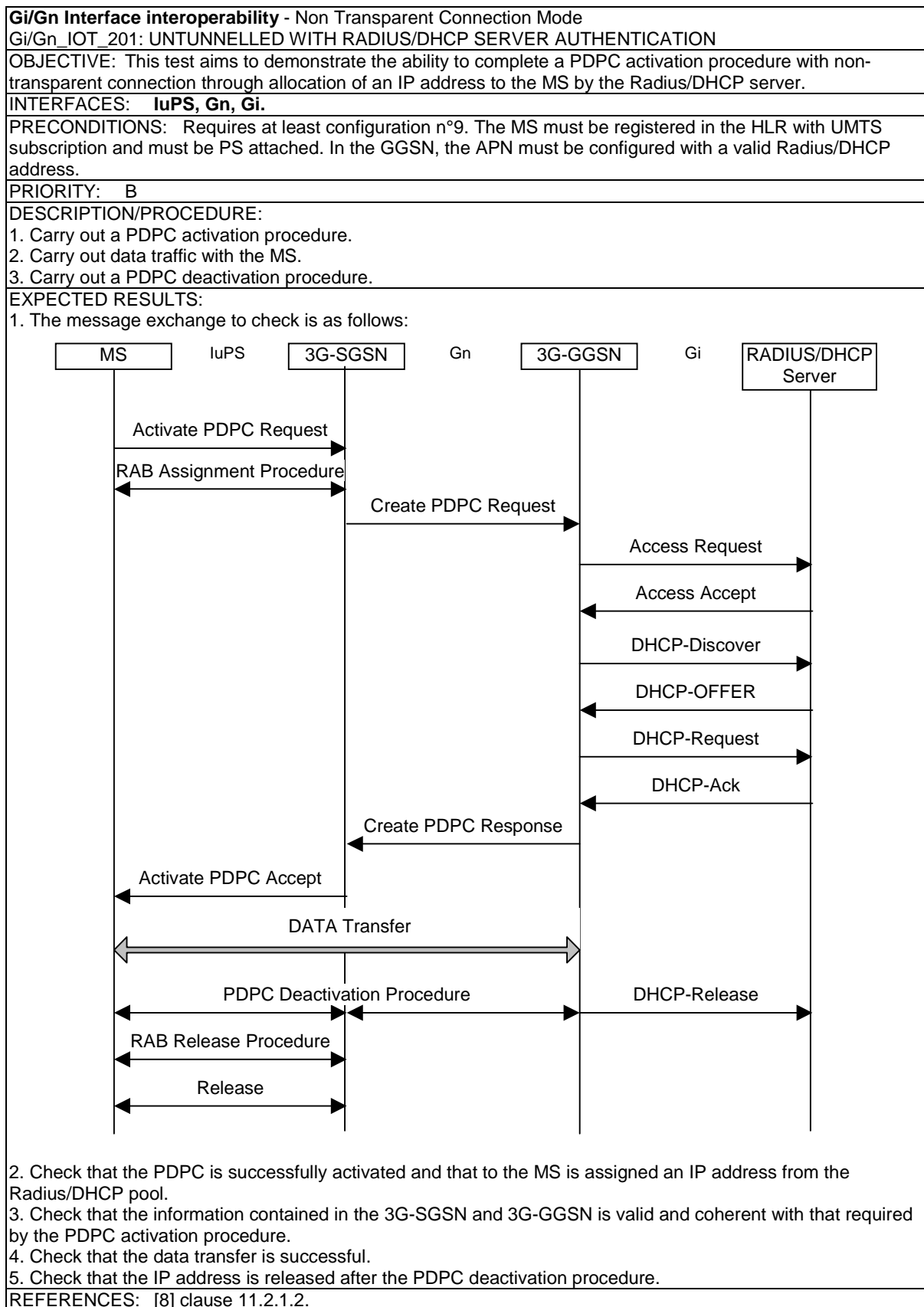


### A.3.5 Gi/Gn Interface Interoperability

<b>Gi/Gn Interface interoperability</b> - Transparent Connection Mode
Gi/Gn_IOT_101: NO AUTHENTICATION, IP ADDRESS ASSIGNED BY 3G-GGSN
OBJECTIVE: This test aims to demonstrate the possibility of completing a PDPC activation procedure with transparent connection through assignment of an IP address to the MS by the 3G-GGSN.
INTERFACES: <b>IuPS, Gn, Gi.</b>
PRECONDITIONS: Requires at least configuration n°7. The MS must be registered in the HLR with UMTS subscription and must be PS attached.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Carry out a PDPC activation procedure using a transparent connection in the 3G-GGSN. 2. Carry out data traffic with the MS. 3. Carry out a PDPC deactivation procedure.
EXPECTED RESULTS: 1. Check that the connection with the public network is established successfully and that to the MS is assigned an IP address from the operator pool. 2. Check that the IP address is released after the PDPC deactivation procedure.
REFERENCES: [8] clause 11.2.

<b>Gi/Gn Interface interoperability</b> - Transparent Connection Mode
Gi/Gn_IOT_102: NO AUTHENTICATION, IP ADDRESS ASSIGNED BY LOCAL DHCP
OBJECTIVE: This test aims to demonstrate the possibility of completing a PDPC activation procedure with transparent connection through assignment of an IP address to the MS by the local DHCP.
INTERFACES: <b>IuPS, Gn, Gi.</b>
PRECONDITIONS: Requires at least configuration n°9. The MS must be registered in the HLR with UMTS subscription and must be PS attached. In the 3G-GGSN, the APN must be configured with a valid DHCP server address.
PRIORITY: B
DESCRIPTION/PROCEDURE: 1. Carry out a PDPC activation procedure. 2. Carry out data traffic with the MS. 3. Carry out a PDPC deactivation procedure.
EXPECTED RESULTS: 1. Check that the PDPC is successfully activated and that the MS is assigned an IP address from the pool of APN in the 3G-GGSN. 2. Check that the information contained in the 3G-SGSN and 3G-GGSN is valid and coherent with that required by the PDPC activation procedure. 3. Check that data transfer is successful. 4. Check that the IP address is released after the PDPC activation procedure.
REFERENCES: [8] clause 11.2.1.1.

<b>Gi/Gn Interface interoperability -Transparent Connection Mode</b> Gi/Gn_IOT_103: NO AUTHENTICATION, STATIC IP ADDRESS
<b>OBJECTIVE:</b> This test aims to demonstrate the ability to complete a PDPC activation procedure, with transparent connection, through assignment of a static IP address to the MS.
<b>INTERFACES:</b> <b>IuPS, Gn, Gi.</b>
<b>PRECONDITIONS:</b> Requires at least configuration n°7. The MS must be registered in the HLR with UMTS subscription and must be PS attached.
<b>PRIORITY:</b> A
<b>DESCRIPTION/PROCEDURE:</b> 1. Carry out a PDPC activation procedure using the 3G-GGSN with transparent connection. 2. Carry out data traffic with the MS. 3. Carry out a PDPC deactivation procedure.
<b>EXPECTED RESULTS:</b> 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant SGSN as 3G-SGSN     participant GGSN as 3G-GGSN     MS-&gt;&gt;SGSN: Activate PDP Context Request     SGSN-&gt;&gt;UTRAN: RAB Assignment procedure     SGSN-&gt;&gt;GGSN: Create PDP Context Request     GGSN--&gt;&gt;SGSN: Create PDP Context Response     SGSN--&gt;&gt;MS: Activate PDP Context Accept   </pre>
2. Check the following fields in the messages: <b>Activate PDP Context Request:</b> Requested PDP Address=< >, APN=<APN>.
3. Check that the connection to the public network is established successfully and that the subscribed IP address is assigned to the MS.
4. Check that the IP address is released after the deactivation procedure.
<b>REFERENCES:</b> [8] clause 11.2.1.1.





<b>Gi/Gn Interface interoperability - Non Transparent Connection Mode</b>	
Gi/Gn_IOT_202: UNTUNNELLED WITH RADIUS SERVER AUTHENTICATION	
OBJECTIVE: This test aims to demonstrate the ability to complete a PDPC activation procedure by allocating a dynamic IP address to the MS.	
INTERFACES: <b>luPS, Gn, Gi.</b>	
PRECONDITIONS: Requires at least configuration n°9. The MS must be registered in the HLR with UMTS subscription and must be PS attached. In the 3G-GGSN the APN must be configured with a pool of IP addresses and a valid Radius server address.	
PRIORITY: B	
DESCRIPTION/PROCEDURE: 1. Carry out a PDPC activation procedure. 2. Carry out data traffic with the MS. 3. Carry out a PDPC deactivation procedure.	
EXPECTED RESULTS: 1. The message exchange to check is as follows:	
<pre> sequenceDiagram     participant MS     participant 3G_SGSN as 3G-SGSN     participant 3G_GGSN as 3G-GGSN     participant RADIUS_Server as RADIUS Server      MS-&gt;&gt;3G_SGSN: Activate PDPC Request     3G_SGSN-&gt;&gt;MS: RAB Assignment Procedure     3G_SGSN-&gt;&gt;3G_GGSN: Create PDPC Request     3G_GGSN-&gt;&gt;RADIUS_Server: Access Request     RADIUS_Server-&gt;&gt;3G_GGSN: Access Accept     3G_GGSN-&gt;&gt;3G_SGSN: Create PDPC Response     3G_SGSN-&gt;&gt;MS: Activate PDPC Accept     MS&lt;-&gt;&gt;3G_GGSN: DATA Transfer     MS-&gt;&gt;3G_SGSN: PDPC Deactivation Procedure     3G_SGSN-&gt;&gt;3G_GGSN: PDPC Deactivation Procedure     3G_SGSN-&gt;&gt;MS: RAB Release Procedure     MS-&gt;&gt;3G_SGSN: Release     </pre>	
2. Check that the PDPC is successfully activated and that at the MS is allocated an IP address from the APN pool in the 3G-GGSN.	
3. Check that the information contained in the 3G-SGSN and 3G-GGSN is valid and coherent with that required by the PDPC activation procedure.	
4. Check that the data transfer is successful.	
5. Check that the IP address is released after the PDPC deactivation procedure.	
REFERENCES: [8] clause 11.2.1.2.	

<b>Gi/Gn Interface interoperability - Non Transparent Connection Mode</b>
Gi/Gn_IOT_203: L2TP/IPSEC/GRE TUNNELS
OBJECTIVE: This test aims to demonstrate the ability to complete a PDPC activation procedure with non-transparent connection using L2TP, IPSEC or GRE tunnelling.
INTERFACES: <b>IuPS, Gn, Gi.</b>
PRECONDITIONS: Requires at least configuration n°10. The MS must be registered in the HLR with UMTS subscription and must be PS attached. The 3G-GGSN must realize an L2TP/IPSEC/GRE connection with the suitably configured external network.
PRIORITY: B
DESCRIPTION/PROCEDURE: 1. Carry out a PDPC activation procedure using a non-transparent connection in the 3G-GGSN and providing a correct UserID and password. 2. Carry out data traffic with the MS. 3. Carry out a PDPC procedure deactivation.
EXPECTED RESULTS: 1. Check that the connection to the private network is established successfully and that to the MS is allocated a private IP address (ISP/Corporate Network). 2. Check that the data transfer is successful. 3. Check that the IP address is released after the PDPC deactivation procedure.
REFERENCES: [8] clause 11.2.

<b>Gi/Gn Interface interoperability - GTP IP Support</b>
Gi/Gn_IOT_301: IP FRAGMENTATION
OBJECTIVE: This test aims to demonstrate the ability of the 3G-SGSN and 3G-GGSN to fragment and reassemble IP packets that exceed the maximum size allowed for lower levels.
INTERFACES: <b>IuPS, Gn, Gi.</b>
PRECONDITIONS: Requires at least configuration n°7. The MS must be registered in the HLR with UMTS subscription, it must also be PS attached and have an active PDPC.
PRIORITY: B
DESCRIPTION/PROCEDURE: 2. Carry out a 1500 byte ping from the Gi to the MS.
EXPECTED RESULTS: 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant SGSN as 3G-SGSN     participant GGSN as 3G-GGSN     participant Backbone as IP backbone      Backbone-&gt;&gt;GGSN: Echo req     GGSN-&gt;&gt;SGSN: Echo req. (fragm.1)     GGSN-&gt;&gt;SGSN: Echo req. (fragm.2)     SGSN-&gt;&gt;MS: Echo req. (fragm.1)     SGSN-&gt;&gt;MS: Echo req. (fragm.2)     MS-&gt;&gt;SGSN: Echo res. (fragm.1)     MS-&gt;&gt;SGSN: Echo res. (fragm.2)     SGSN-&gt;&gt;GGSN: Echo res. (fragm.1)     SGSN-&gt;&gt;GGSN: Echo res. (fragm.2)     GGSN-&gt;&gt;Backbone: Echo res     </pre>
2. Check that the 3G-GGSN fragments the packet that goes from the Gi to the Gn. 3. Check that the 3G-GGSN defragments the packets that go from the Gn to the Gi.
REFERENCES: [8] clause 12.

## A.3.6 HLR interoperability

<b>HLR Interoperability</b> - Insert subscriber data
HLR_IOT_101: ADD PDP CONTEXT IN THE HLR WITH ACTIVE PDP CONTEXT
OBJECTIVE: This test aims to demonstrate completion of the Insert Subscriber Data procedure with addition of a PDPC in the HLR user profile.
INTERFACES: <b>IuPS, Gr, Gn, Gi.</b>
PRECONDITIONS: Requires at least configuration n°8. The MS must be registered in the HLR with UMTS subscriptions; the MS must be PS attached with an active PDPC.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Add a PDP record in the HLR.
EXPECTED RESULTS: 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant 3G-SGSN     participant HLR     HLR-&gt;&gt;3G-SGSN: Insert Subscriber Data     3G-SGSN--&gt;&gt;HLR: Insert Subscriber Data Ack     </pre>
2. Check that the new PDPC has been added to the 3G-SGSN. 3. Check that the active PDPC has not been cancelled.
REFERENCES: [3] clause 6.11.1.1.

<b>HLR interoperability</b> - Insert subscriber data
HLR_IOT_102: ADD OTHER SERVICES IN THE HLR WITH AN ACTIVE PDP CONTEXT
OBJECTIVE: This test aims to demonstrate the ability to complete an Insert Subscriber Data procedure when the HLR user profile is changed and there is an active PDPC.
INTERFACES: <b>IuPS, Gr, Gn, Gi.</b>
PRECONDITIONS: Requires at least configuration n°8. The MS must be registered in the HLR with UMTS subscriptions; the MS must be PS attached with active PDPC.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Add a service (e.g. SMS) to the user subscription in the HLR.
EXPECTED RESULTS: 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant 3G-SGSN     participant HLR     HLR-&gt;&gt;3G-SGSN: Insert Subscriber Data     3G-SGSN--&gt;&gt;HLR: Insert Subscriber Data Ack     </pre>
2. Check the addition of the new service in the user subscription on the 3G-SGSN. 3. Check that the active PDPC has not been cancelled.
REFERENCES: [3] clause 6.11.1.1.

<b>HLR interoperability - Insert subscriber data</b>
<b>HLR_IOT_103: UNSUCCESSFUL INSERT SUBSCRIBER DATA</b>
<b>OBJECTIVE:</b> This test aims to demonstrate completion of the Insert Subscriber Data in the event a teleservice such as SMS is not supported.
<b>INTERFACES:</b> <b>IuPS, Gr.</b>
<b>PRECONDITIONS:</b> Requires at least configuration n°2. The MS must be PS attached and must have SMS services disabled.
<b>PRIORITY:</b> B
<b>DESCRIPTION/PROCEDURE:</b> 1. Check that the SMS service is disabled in the 3G-SGSN. 2. Enable SMS service for the user on the HLR.
<b>EXPECTED RESULTS:</b> 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant 3G-SGSN     participant HLR     3G-SGSN-&gt;&gt;HLR: Insert Subscriber Data     HLR--&gt;&gt;3G-SGSN: Insert Subscriber Data Ack     </pre>
2. Check the following field in the message: <b>Insert Subscriber Data Ack:</b> Cause='service not supported'
3. Check that the SMS service is not enabled in the user profile stored in the 3G-SGSN.

<b>HLR interoperability - Insert subscriber data</b>
<b>HLR_IOT_104: MULTIPLE INSERT SUBSCRIBER DATA MESSAGES</b>
<b>OBJECTIVE:</b> This test aims to demonstrate the possibility of the HLR to segment the Insert Subscriber Data message when the data to send to the 3G-SGSN does not fit into a single message.
<b>INTERFACES:</b> <b>IuPS, Gr.</b>
<b>PRECONDITIONS:</b> Requires at least configuration n°2. The MS must be registered with UMTS subscription and have 5 PDPC subscribed in the HLR with APN names at least 40 characters long.
<b>PRIORITY:</b> B
<b>DESCRIPTION/PROCEDURE:</b> 1. Carry out an attach with the MS.
<b>EXPECTED RESULTS:</b> 1. Check that the information relative to the various PDPC is subdivided into various "insert subscriber data" messages:
<pre> sequenceDiagram     participant HLR     participant 3G-SGSN     HLR-&gt;&gt;3G-SGSN: Insert Subscriber Data     HLR-&gt;&gt;3G-SGSN: ...     HLR-&gt;&gt;3G-SGSN: Insert Subscriber Data     3G-SGSN--&gt;&gt;HLR: Insert Subscriber Data Ack     </pre>
2. Check that all the PDPC are stored in the 3G-SGSN.

<b>HLR interoperability</b> - Insert subscriber data
HLR_IOT_105: MASSIVE CHANGE OF SUBSCRIBER DATA
OBJECTIVE: This test aims to demonstrate the ability to change the subscription data of a series of users.
INTERFACES: <b>luPS, Gr.</b>
PRECONDITIONS: Requires at least configuration n°2, (see note). The two MSs must be registered in the HLR with UMTS subscriptions and must also be PS attached.
PRIORITY: A
DESCRIPTION/PROCEDURE:
1. Change a service (e.g. SMS) for a series of users that also includes the two attached users.
EXPECTED RESULTS:
1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant 3G-SGSN     participant HLR     3G-SGSN-&gt;&gt;HLR: Insert Subscriber Data (MS1)     3G-SGSN-&gt;&gt;HLR: Insert Subscriber Data (MS2)     HLR--&gt;&gt;3G-SGSN: Insert Subscriber Data Ack (MS1)     HLR--&gt;&gt;3G-SGSN: Insert Subscriber Data Ack (MS2) </pre>
2. Check that the profiles of the two users are updated in the 3G-SGSN.
NOTE: The configuration must envisage at least two MS.

<b>HLR interoperability</b> - Delete subscriber data
HLR_IOT_201: DELETE PDP CONTEXT IN THE HLR WITH ACTIVE PDP CONTEXT
OBJECTIVE: This test aims to demonstrate completion of the Delete Subscriber Data procedure when a non-active PDPC is cancelled from the user profile in the HLR.
INTERFACES: <b>luPS, Gr, Gn, Gi.</b>
PRECONDITIONS: Requires at least configuration n°7. The MS must be registered in the HLR with UMTS subscription. The MS must also be PS attached with several PDPC, one of which active.
PRIORITY: A
DESCRIPTION/PROCEDURE:
1. Cancel a PDPC (not the active one) from the user profile in the HLR.
EXPECTED RESULTS:
1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant 3G-SGSN     participant HLR     3G-SGSN-&gt;&gt;HLR: Delete Subscriber Data     HLR--&gt;&gt;3G-SGSN: Delete Subscriber Data Ack </pre>
2. Check that the MS PDPC concerned has been cancelled from the 3G-SGSN.
3. Check that the active PDPC has not been cancelled.
REFERENCES: [3] clause 6.11.1.2.

<b>HLR interoperability - Delete subscriber data</b>
<b>HLR_IOT_202: DELETE OTHER SERVICES IN THE HLR WITH AN ACTIVE PDP CONTEXT</b>
<b>OBJECTIVE:</b> This test aims to demonstrate completion of the Delete Subscriber Data procedure when a service is cancelled from the user profile in the HLR with an active PDPC.
<b>INTERFACES:</b> <b>IuPS, Gr, Gn, Gi.</b>
<b>PRECONDITIONS:</b> Requires at least configuration n°7. The MS must be registered in the HLR with UMTS subscription and must be PS attached.
<b>PRIORITY:</b> A
<b>DESCRIPTION/PROCEDURE:</b> 1. Cancel a service (e.g. SMS) from the user profile in the HLR.
<b>EXPECTED RESULTS:</b> 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant 3G-SGSN     participant HLR     Note over 3G-SGSN, HLR: Gr     3G-SGSN-&gt;&gt;HLR: Delete Subscriber Data     HLR--&gt;&gt;3G-SGSN: Delete Subscriber Data Ack     </pre>
2. Check that the service has been cancelled from the user profile. 3. Check that the PDPC is still active.
<b>REFERENCES:</b> [3] clause 6.11.1.2.

<b>HLR interoperability - Delete subscriber data</b>
<b>HLR_IOT_203: WITHDRAW OF A LIST OF PDP CONTEXTS</b>
<b>OBJECTIVE:</b> This test aims to demonstrate the possibility of removing a list of PDPC from the 3G-SGSN through a single Delete Subscriber Data message.
<b>INTERFACES:</b> <b>IuPS, Gr, Gn, Gi.</b>
<b>PRECONDITIONS:</b> Requires at least configuration n°7 The MS must be registered with UMTS subscription, must be PS attached and have at least three subscriber PDPC of which one active.
<b>PRIORITY:</b> B
<b>DESCRIPTION/PROCEDURE:</b> 1. Eliminate at least two PDPC from the HLR with a single command, excluding the active one.
<b>EXPECTED RESULTS:</b> 1. Check the following messages:
<pre> sequenceDiagram     participant HLR     participant 3G-SGSN     Note over HLR, 3G-SGSN: Gr     HLR-&gt;&gt;3G-SGSN: Delete Subscriber Data     3G-SGSN--&gt;&gt;HLR: Delete Subscriber Data Ack     </pre>
2. Check that the same PDPC eliminated in the HLR have been eliminated in the 3G-SGSN. 3. Check that the PDPC is still active.
<b>REFERENCES:</b> [3] clause 6.11.1.2.

<b>HLR interoperability - PS detach</b>
HLR_IOT_301: HLR INITIATED PS DETACH WITH ACTIVE PDPC
OBJECTIVE: This test aims to demonstrate completion of the PDP Context Deactivation and PS Detach procedures when requested by the HLR.
INTERFACES: <b>IuPS, Gr, Gn, Gi.</b>
PRECONDITIONS: Requires at least configuration n°7. The user, with UMTS subscription, must be PS attached and have an active PDPC.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Forcing a Cancel Location from the HLR, (see note 2).
EXPECTED RESULTS: 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant SGSN as 3G-SGSN     participant GGSN as 3G-GGSN     participant HLR      HLR-&gt;&gt;SGSN: Cancel Location     SGSN-&gt;&gt;GGSN: Delete PDP Context Request     GGSN--&gt;&gt;SGSN: Delete PDP Context Response     SGSN-&gt;&gt;MS: Detach Request     MS--&gt;&gt;SGSN: Detach Accept     SGSN-&gt;&gt;HLR: Cancel Location Ack     MS-&gt;&gt;SGSN: RAB Release Procedure     SGSN--&gt;&gt;MS: Release     </pre>
2. Check the following field in the message: <b>Cancel Location:</b> Cancellation type=subscription withdrawn or update location.
3. Check that the PDPC has been cancelled in the 3G-SGSN.
4. Check that the previously assigned IP address is available again.
NOTE 1: The Delete PDP context and GPRS Detach procedures can be carried out together, not necessarily in the order indicated.
NOTE 2: This can be obtained by a subscription withdraw or deleting the location info.
REFERENCES: [3] clause 6.6.2.

<b>HLR interoperability - PS detach</b> HLR_IOT_302: 3G-SGSN INITIATED PURGE
OBJECTIVE: This test aims to demonstrate completion of the Purge procedure.
INTERFACES: <b>IuPS, Gr.</b>
PRECONDITIONS: Requires at least configuration n°2. The MS must be PS attached and the purge function must be active in the 3G-SGSN.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Carry out a detach switching off the MS. 2. Await expiry of the purge timer.
EXPECTED RESULTS: 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant SGSN as 3G-SGSN     participant HLR     UTRAN-&gt;&gt;SGSN: Detach Request (switch off)     SGSN-&gt;&gt;HLR: Purge MS     HLR--&gt;&gt;SGSN: Purge MS Ack   </pre>
2. Check the following field in the message: <b>Purge MS: IMSI=&lt;IMSI&gt;.</b>
3. Check the absence of user information in the 3G-SSN and successful delocation in the HLR.
NOTE: Some 3G-SGSN send the Purge to the HLR only once the memory is full and not on expiry of a timer. In these cases the test can be carried out by manually forcing the procedure on 3G-SGSN.
REFERENCES: [3] clause 6.7.

<b>HLR interoperability - PS detach</b> HLR_IOT_303: HOLDING OF THE DATA IN THE 3G-SGSN AFTER SUBSCRIBER IS DETACHED - MS DETACH
OBJECTIVE: This test aims to demonstrate a function of the 3G-SGSN that envisages holding of subscriber data in the 3G-SGSN even if the MS is detached, in order to prevent connection to the HLR when a new PS attach procedure is run for the MS.
INTERFACES: <b>IuPS, Gr.</b>
PRECONDITIONS: Requires at least configuration n°2. The MS must be registered with UMTS subscription and must be PS attached.
PRIORITY: B
DESCRIPTION/PROCEDURE: 1. Carry out a PS detach for the MS. 2. Check the user subscription data in the 3G-SGSN. 3. Carry out an attach with the MS.
EXPECTED RESULTS: 1. Check that there are no messages on the Gr interface.
NOTE: The subscription should be held in the 3G-SGSN until a timer expiry or until it is necessary to free memory space for new subscribers. At this point a Purge procedure is carried out.

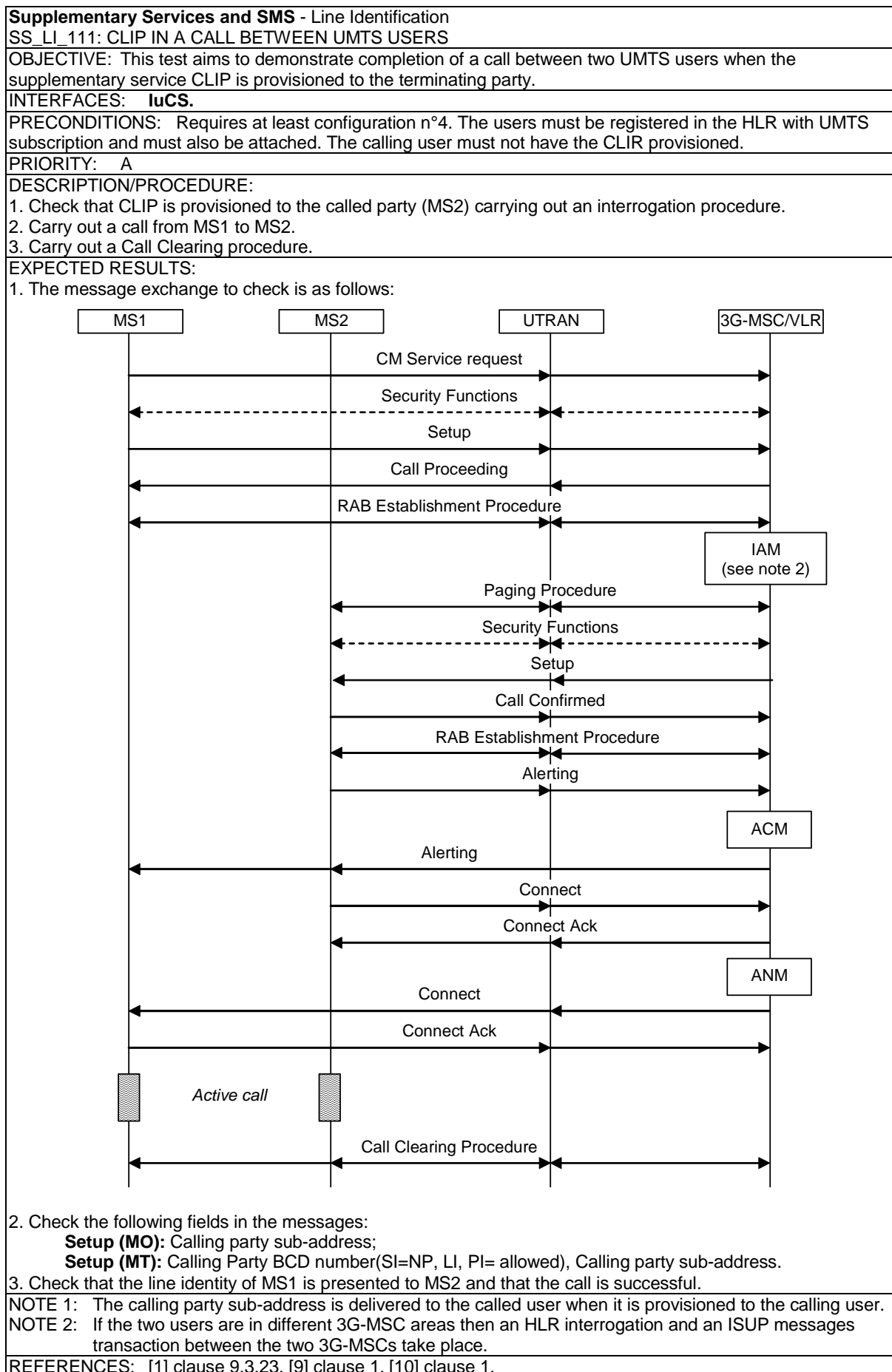


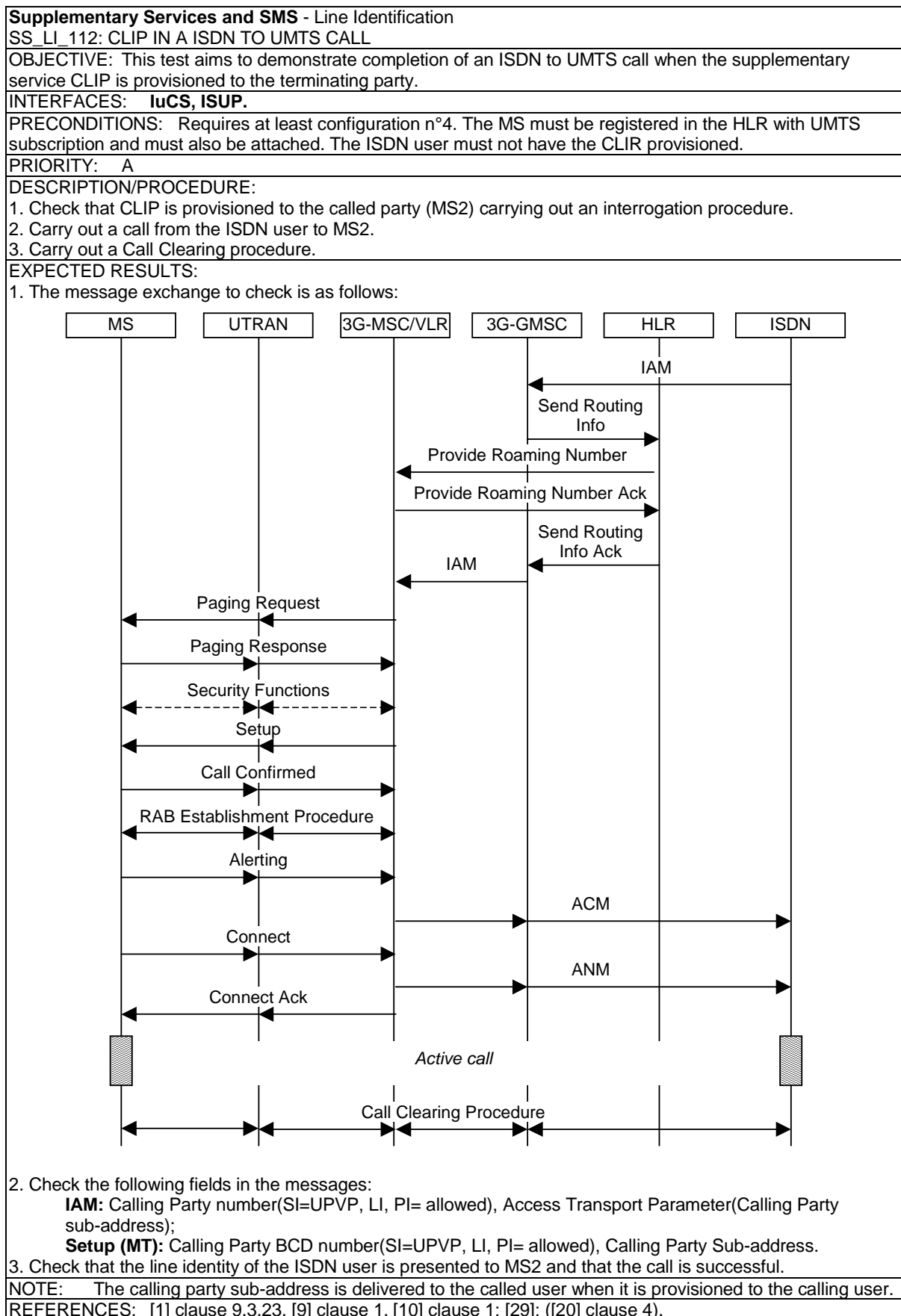
<b>HLR interoperability - PS Detach</b>
HLR_IOT_304: HOLDING OF THE DATA IN THE 3G-SGSN AFTER SUBSCRIBER IS DETACHED - REMOVE A BATTERY
OBJECTIVE: This test aims to demonstrate a function of the 3G-SGSN that envisages holding of subscriber data following a detach of the MS, caused by removing the battery, in order to prevent connection to the HLR when a new PS attach procedure is run for the MS.
INTERFACES: <b>IuPS, Gr.</b>
PRECONDITIONS: Requires at least configuration n°2. The MS must be registered with UMTS subscription and must be PS attached.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Remove the battery from the MS. 2. Check user subscription data in the 3G-SGSN. 3. Carry out a PS attach with the MS.
EXPECTED RESULTS: 1. Check that there are no messages on the Gr interface.
NOTE: The subscription should be held in the 3G-SGSN until a timer expiry or until it is necessary to free memory for new subscribers. At this point a Purge procedure is carried out.

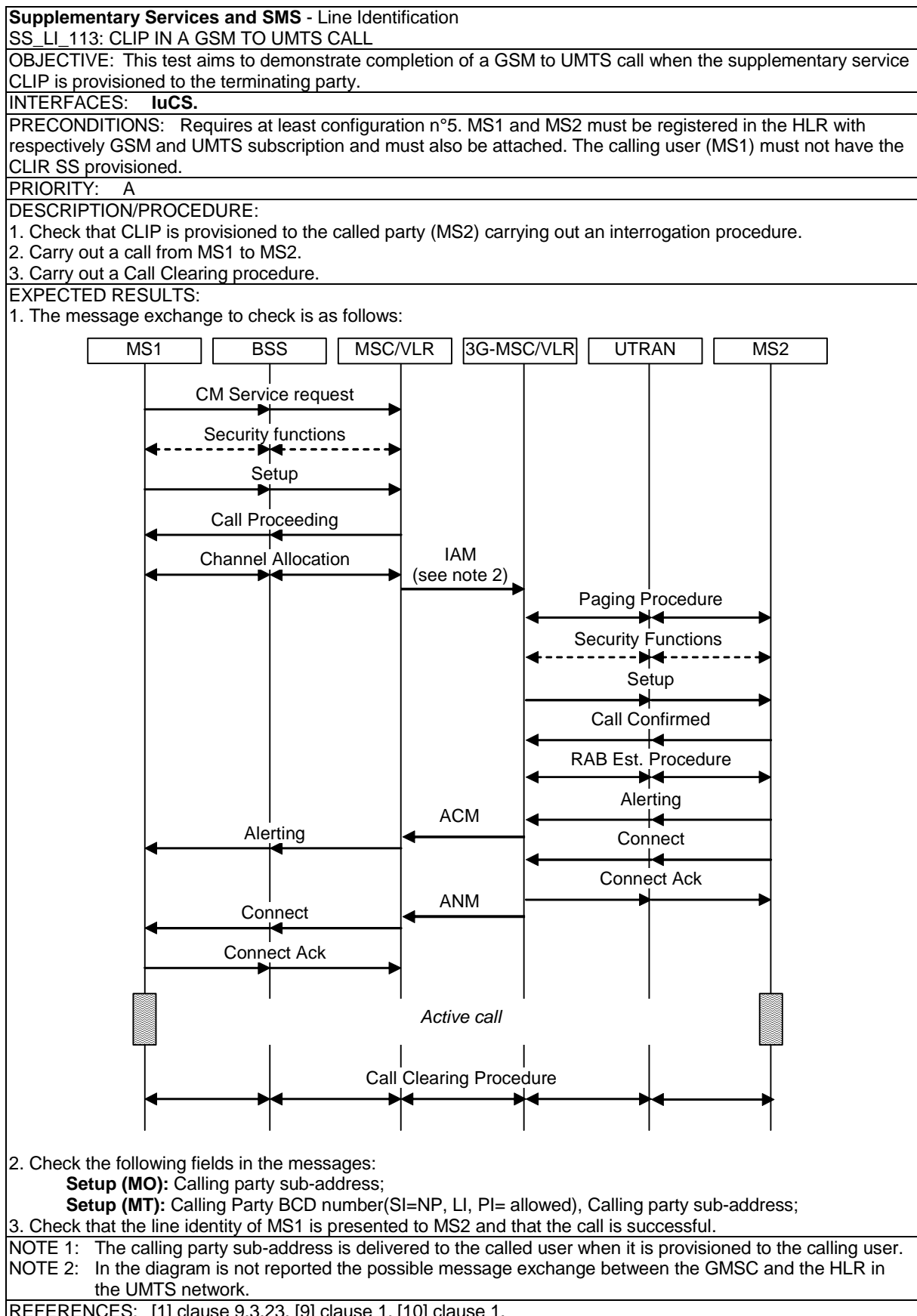
<b>HLR interoperability - Reset HLR</b>
HLR_IOT_401: COMMAND INITIATED RESET FROM HLR TO SGSN
OBJECTIVE: This test aims to demonstrate completion of Reset procedure from the HLR following a database reload.
INTERFACES: <b>IuPS, Gr.</b>
PRECONDITIONS: Requires at least configuration n°7. The MS must be registered with UMTS subscription, must be PS attached and have at least one active PDPC.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Initiate a Reset from HLR procedure. 2. When the HLR comes back in service add a PDPC to the user subscription 3. Await a Periodic RA Update procedure or force the sending of any valid frame from the MS.
EXPECTED RESULTS: 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant SGSN as 3G-SGSN     participant HLR     MS-&gt;&gt;SGSN: Periodic RAU or Any user frame     SGSN-&gt;&gt;HLR: Update Location     SGSN-&gt;&gt;HLR: Insert Sub. Data     HLR--&gt;&gt;SGSN: Insert Sub. Data Ack     HLR--&gt;&gt;SGSN: Update Location Ack     HLR-&gt;&gt;SGSN: Reset     HLR-&gt;&gt;HLR: Reload   </pre>
3. Check updating of the user profile in the 3G-SGSN, including the last PDPC added.
REFERENCES: [3] clause 13.8.1.

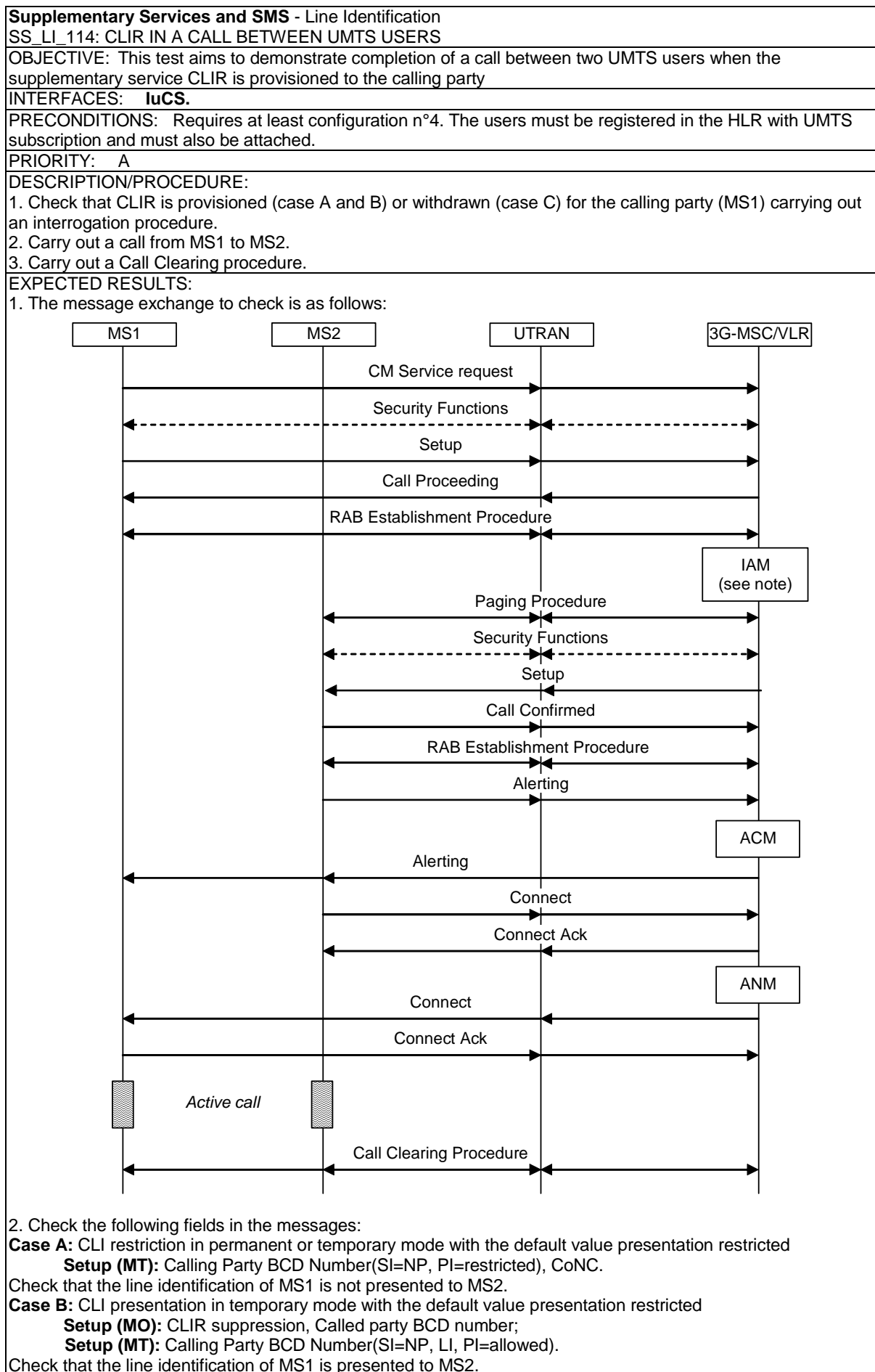
## A.3.7 Supplementary services and SMS

<b>Supplementary Services and SMS- Line Identification</b>
<b>SS_LI_101: INTERROGATION PROCEDURE FOR CLI SUPPLEMENTARY SERVICES</b>
<b>OBJECTIVE:</b> This test aims to demonstrate completion of interrogation procedure for CLI supplementary services.
<b>INTERFACES:</b> <b>IuCS.</b>
<b>PRECONDITIONS:</b> Requires at least configuration n°1. The user must be registered in the HLR with UMTS subscription.
<b>PRIORITY:</b> A
<b>DESCRIPTION/PROCEDURE:</b> 1. Check that the tested supplementary service is provisioned for the user, (see note 1). 2. Carry out by the MS an interrogation procedure for the supplementary service that will be tested.
<b>EXPECTED RESULTS:</b> 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant VLR as 3G-MSC/VLR     UTRAN-&gt;&gt;VLR: Register     VLR--&gt;&gt;UTRAN: Release Complete     </pre>
2. Check the following fields in the messages: <b>Register:</b> Facility(Invoke (InterrogateSS(SS-Code))), (see note 2); <b>Release Complete:</b> Facility(Return Result (InterrogateSS(SS-Status))).
<b>NOTE 1:</b> This test can be performed for CLIP, CLIR, COLP, COLR supplementary services.
<b>NOTE 2:</b> The field SS-Code depends to the supplementary service that has to be tested.
<b>REFERENCES:</b> [9]; [10].









**Case C:** CLI restriction in temporary mode with the default value presentation allowed

**Setup (MO):** CLIR invocation;

**Setup (MT):** Calling Party BCD Number(SI=NP, LI, PI=restricted), CoNC.

Check that the line identification of MS1 is not presented to MS2.

3. Check that the CS call is successful.

NOTE: If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSCs take place.

REFERENCES: [1] clause 9.3.23; [9] clause 2; [10] clause 2.

### Supplementary Services and SMS - Line Identification

SS\_LI\_115: CLIR IN A UMTS TO ISDN CALL

OBJECTIVE: This test aims to demonstrate completion of a call from a UMTS to an ISDN user when the supplementary service CLIR is provisioned to the calling party.

INTERFACES: **IuCS.**

PRECONDITIONS: Requires at least configuration n°4. The MS must be registered in the HLR with UMTS subscription and must also be attached; moreover the MS must have the CLIR provisioned.

PRIORITY: A

DESCRIPTION/PROCEDURE:

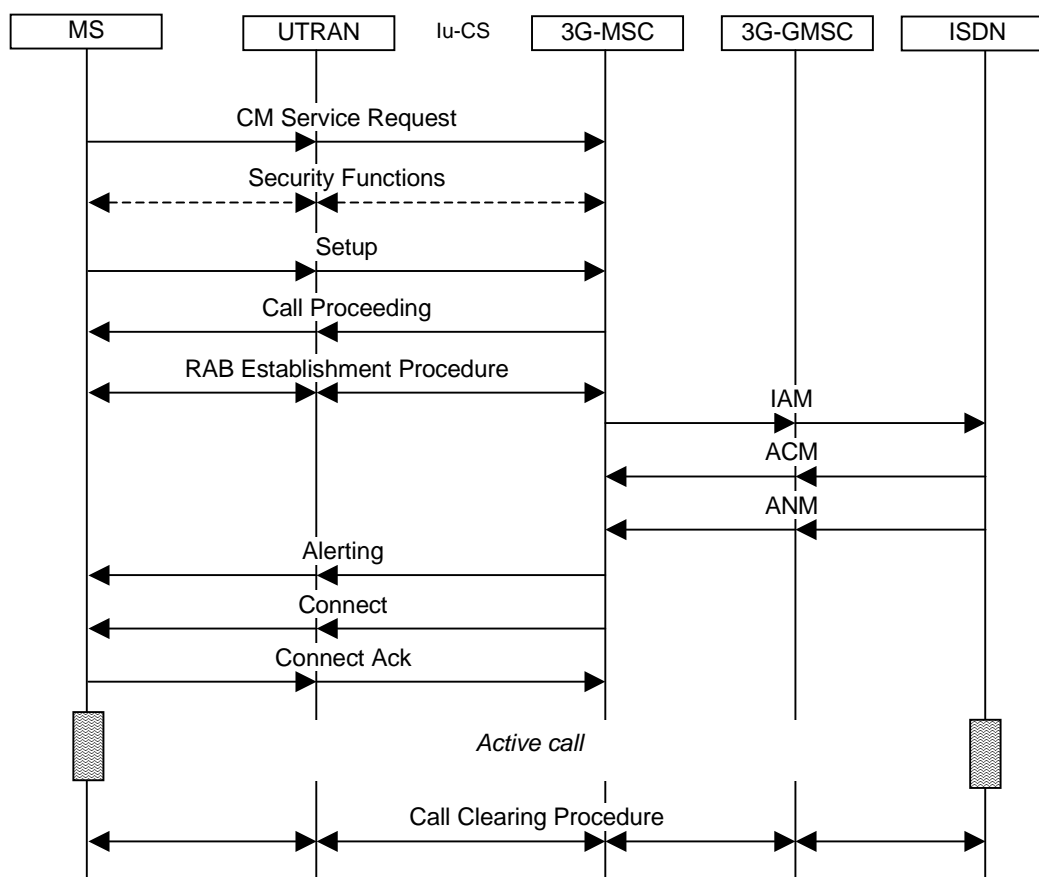
1. Check that CLIR is provisioned to the calling party (MS) carrying out an interrogation procedure.

2. Carry out a CS call from MS to the ISDN user.

3. Carry out a Call Clearing procedure by the MS.

EXPECTED RESULTS:

1. The message exchange to check is as follows:



2. Check the following fields in the message:

**IAM:** Calling Party Number(SI=NP, PI=restricted).

3. Check that the line identification of the MS is not presented to the ISDN user, and that the call is successful.

REFERENCES: [9] clause 2, [10] clause 2; [29]; ([20] clause 4).

**Supplementary Services and SMS - Line Identification**  
**SS\_LI\_116: CLIR IN A UMTS TO GSM CALL**

**OBJECTIVE:** This test aims to demonstrate completion of a call from a UMTS to a GSM user when the supplementary service CLIR is provisioned to the calling party.

**INTERFACES:** **IuCS, ISUP.**

**PRECONDITIONS:** Requires at least configuration n°5. The MS1 must be registered in the HLR with UMTS subscription and must also be attached; moreover the MS must have the CLIR provisioned. The MS2 must be registered in the HLR with GSM subscription and must also be attached.

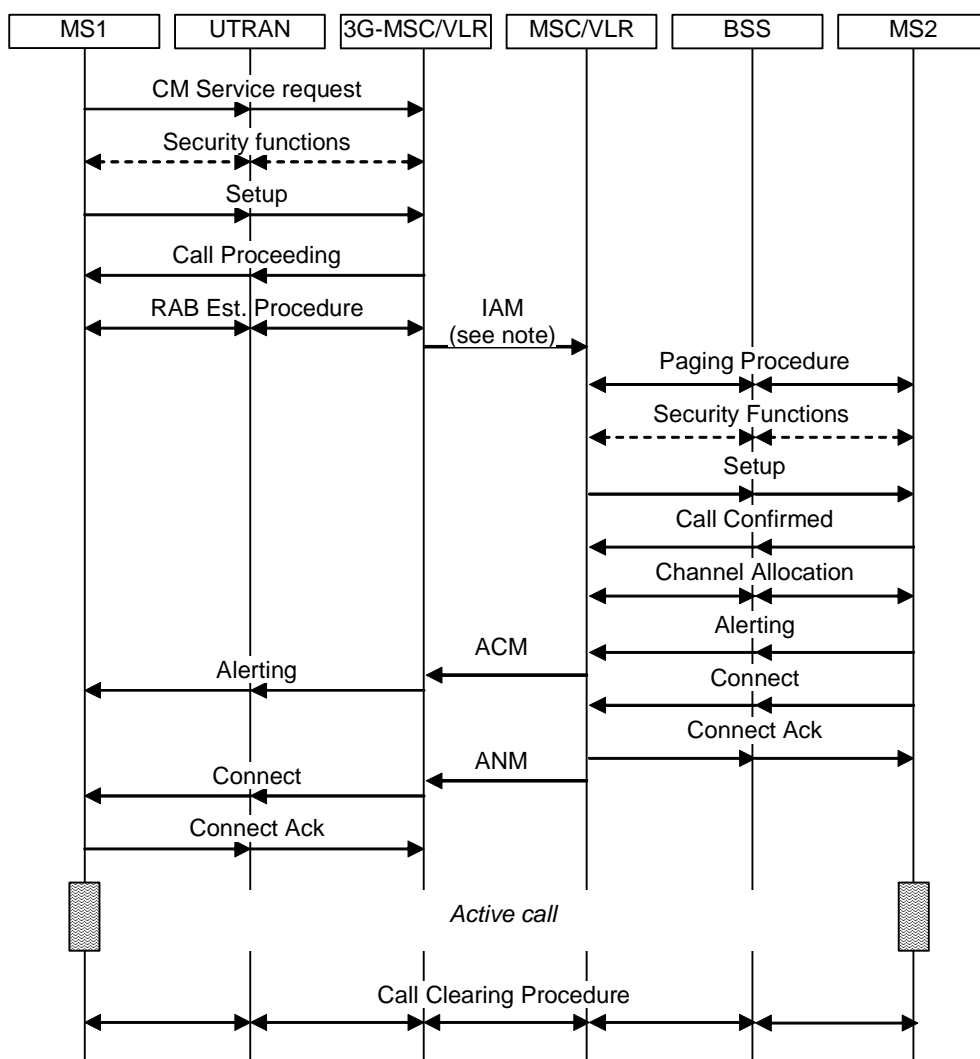
**PRIORITY:** A

**DESCRIPTION/PROCEDURE:**

1. Check that CLIR is provisioned to the calling party (MS1) carrying out an interrogation procedure.
2. Carry out a call from MS1 to MS2.
3. Carry out a Call Clearing procedure by the MS1.

**EXPECTED RESULTS:**

1. The message exchange to check is as follows:



2. Check the following fields in the messages:

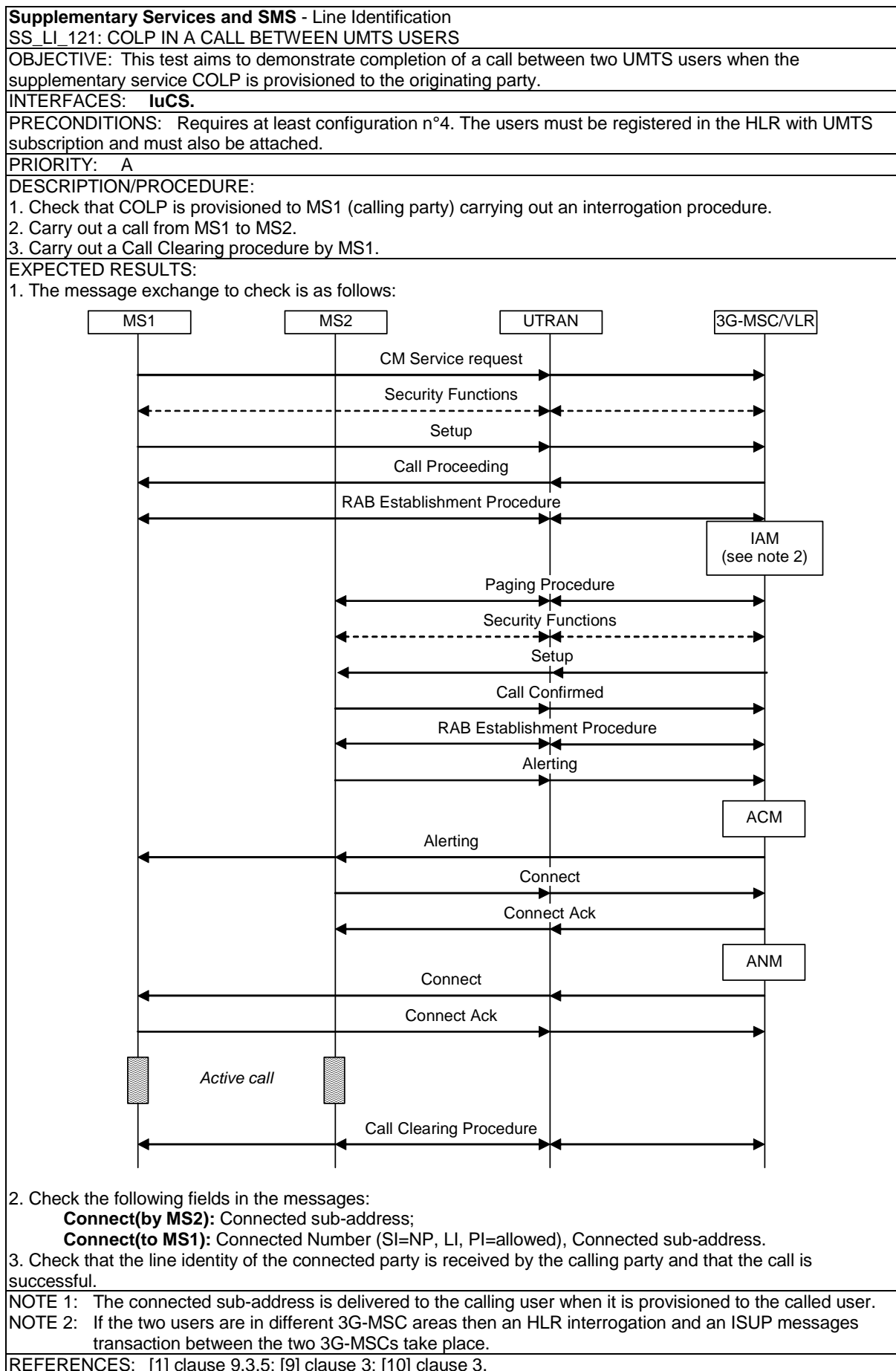
**IAM:** Calling Party Number(SI=NP, PI=restricted).

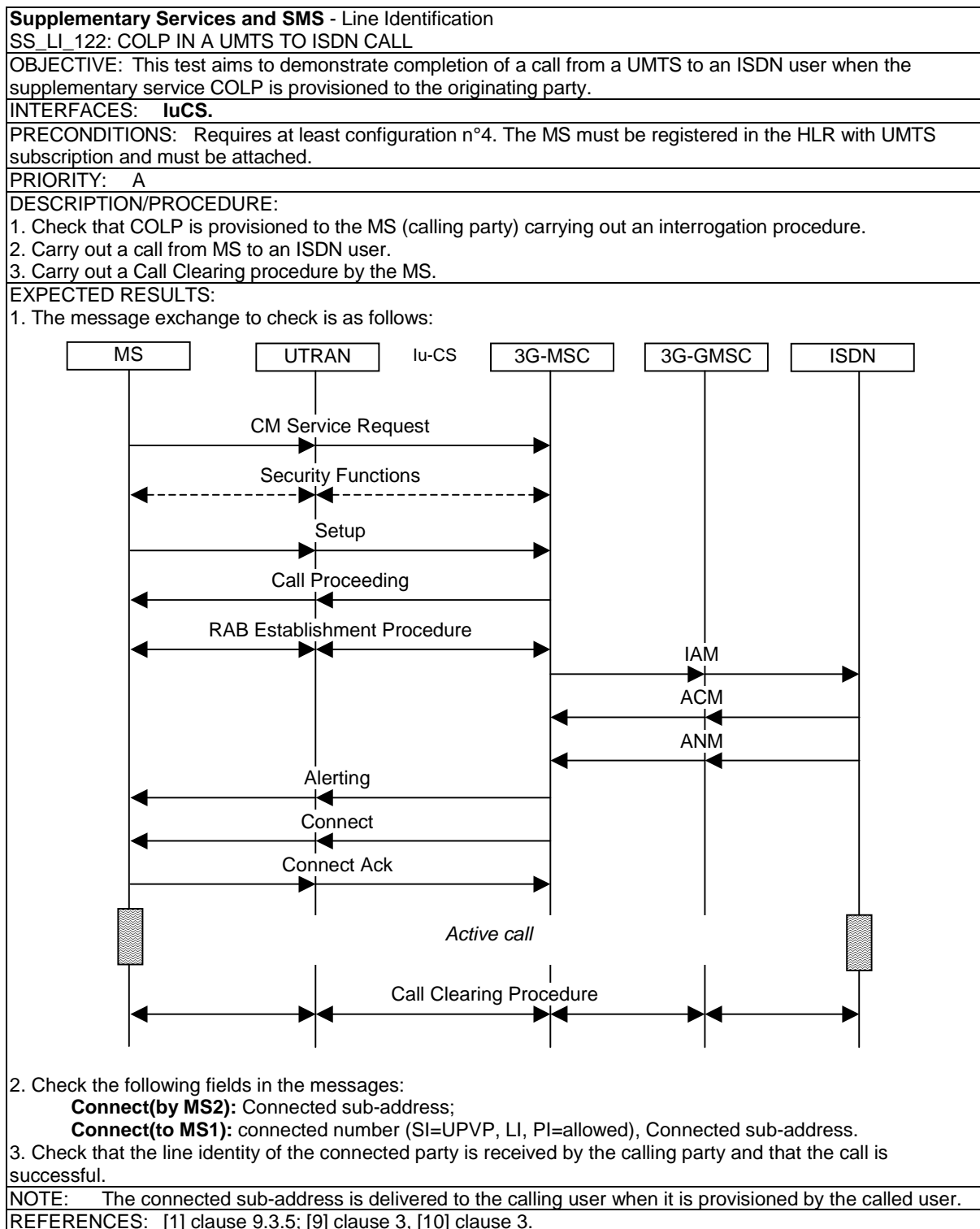
3. Check that the line identification of the MS is not presented to the GSM user, and that the call is successful.

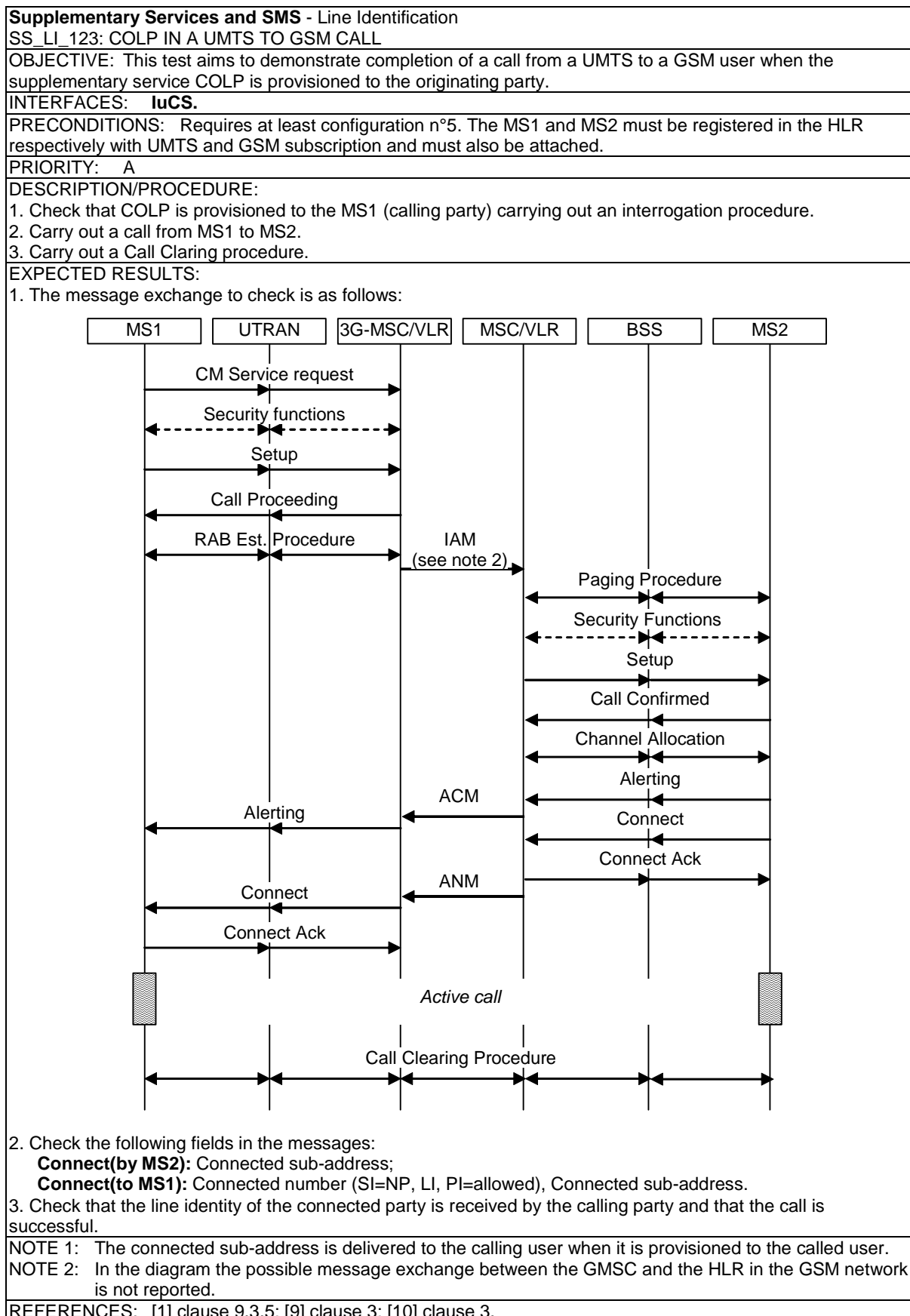
**NOTE:** In the diagram the possible message exchange between the GMSC and the HLR in the GSM network is not reported.

**REFERENCES:** [9] clause 2, [10] clause 2; [29]; ([20] clause 4).









<b>Supplementary Services and SMS - Line Identification</b> SS_LI_124: COLR IN A CALL BETWEEN UMTS USERS	
<b>OBJECTIVE:</b> This test aims to demonstrate completion of a call between two UMTS users when the supplementary service COLR is provisioned to the terminating party.	
<b>INTERFACES:</b> <b>IuCS.</b>	
<b>PRECONDITIONS:</b> Requires at least configuration n°4. The users must be registered in the HLR with UMTS subscription and must also be attached. The calling party must be provided with COLP.	
<b>PRIORITY:</b> A	
<b>DESCRIPTION/PROCEDURE:</b> 1. Check that COLR is provisioned to the MS2 (called party) carrying out an interrogation procedure. 2. Carry out a call from MS1 to MS2. 3. Carry out a Call Clearing procedure.	
<b>EXPECTED RESULTS:</b> 1. The message exchange to check is as follows:	
2. Check the following fields in the message: <b>Connect(to MS1):</b> Connected number (SI=NP, PI=restricted).	
3. Check that the line identity of the connected party is not received by the calling party and that the call is successful.	
<b>NOTE:</b> If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSCs take place.	
<b>REFERENCES:</b> [1] clause 9.3.5; [9] clause 4; [10] clause 4.	

**Supplementary Services and SMS - Line Identification**  
**SS\_LI\_125: COLR IN A ISDN TO UMTS CALL**

**OBJECTIVE:** This test aims to demonstrate completion of a call from an ISDN to a UMTS user when the supplementary service COLR is provided to the terminating party.

**INTERFACES:** **IuCS.**

**PRECONDITIONS:** Requires at least configuration n°4. The MS must be registered in the HLR UMTS subscription and must also be attached. The ISDN user must be provided with COLP.

**PRIORITY:** A

**DESCRIPTION/PROCEDURE:**

1. Check that COLR is provided to the MS (called party) carrying out an interrogation procedure.
2. Carry out a call from the ISDN user to the MS.
3. Carry out a Call Clearing procedure.

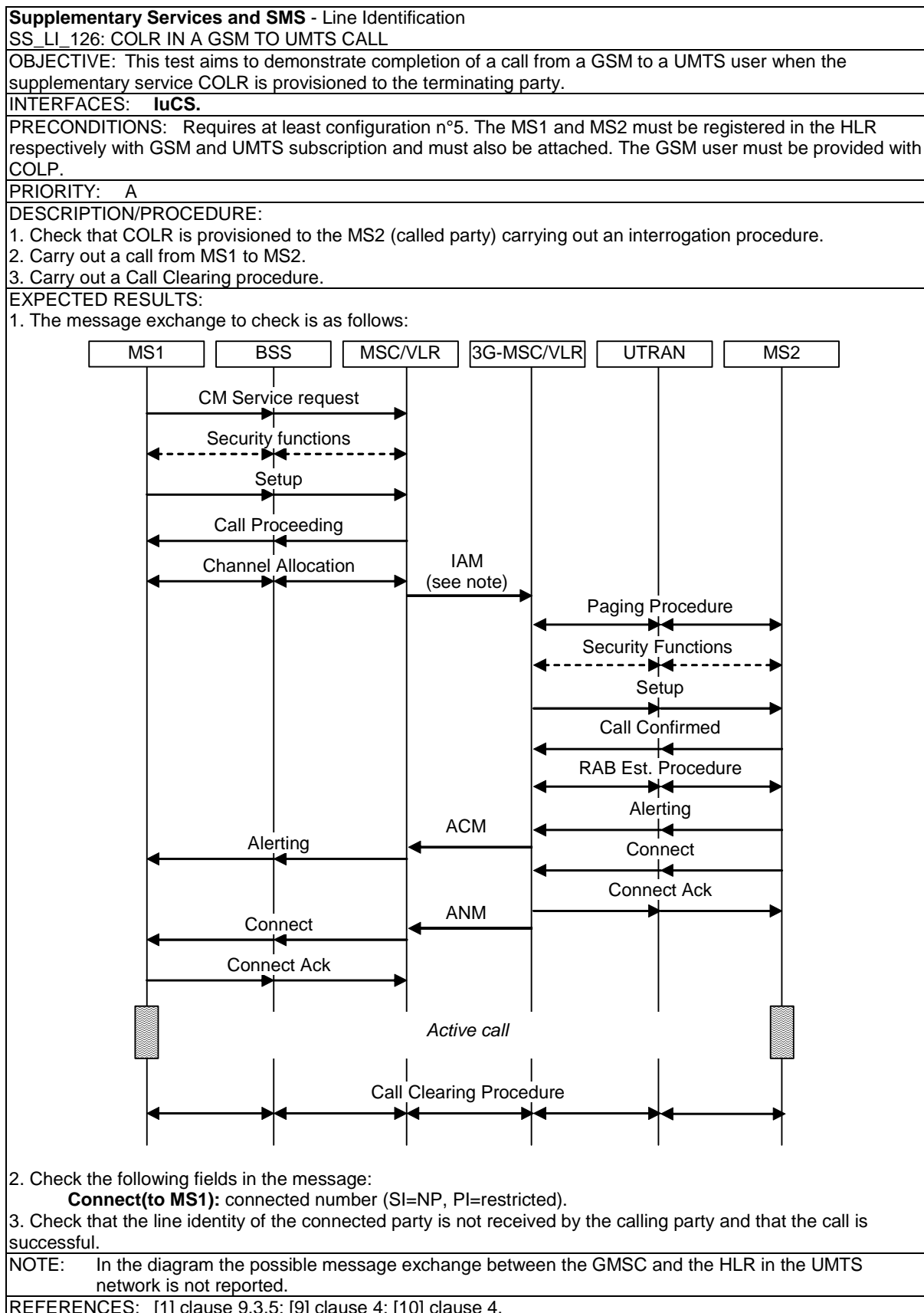
**EXPECTED RESULTS:**

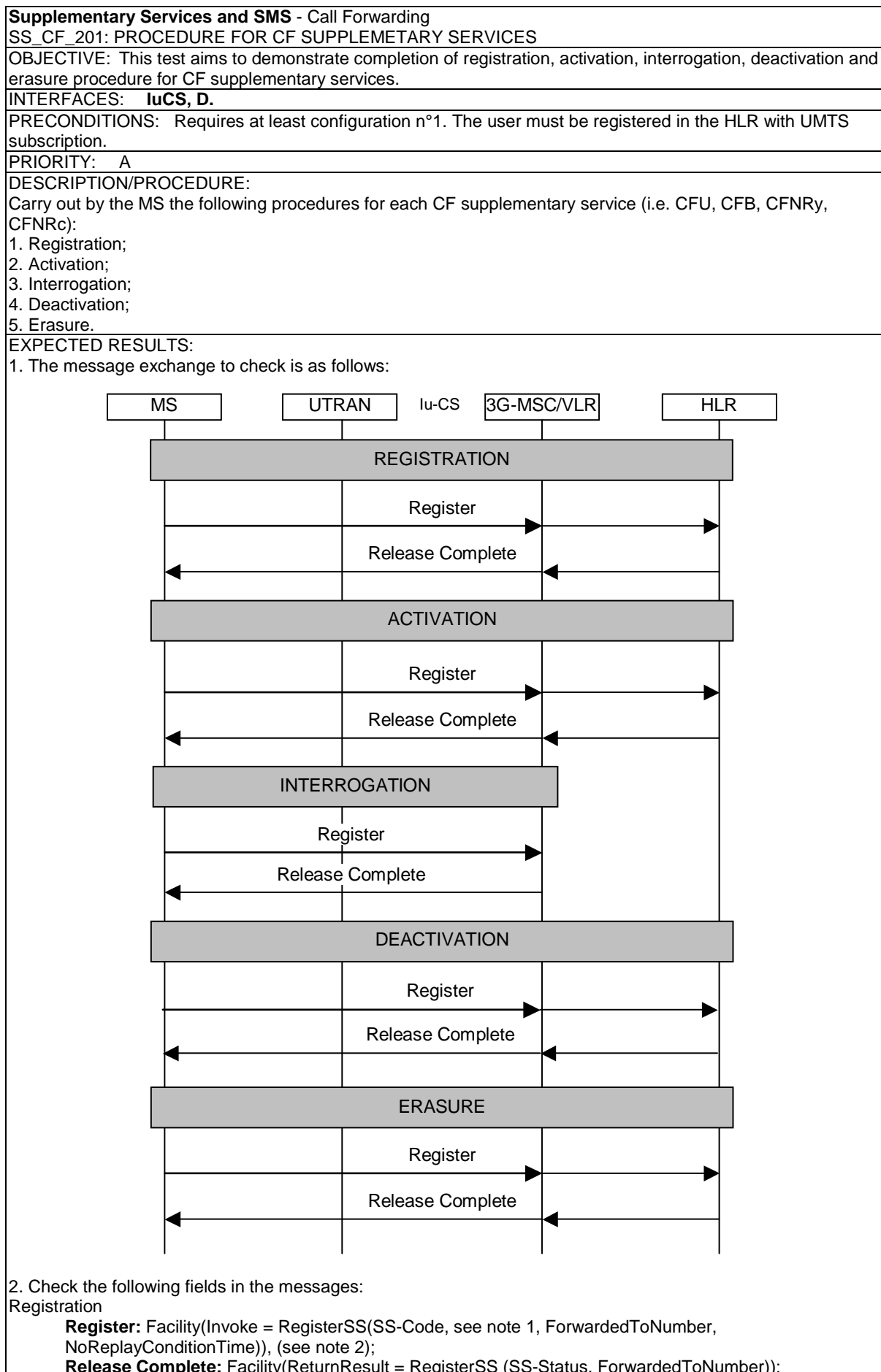
1. The message exchange to check is as follows:

2. Check the following fields in the message:  
**Connect(from MS):** connected number (SI=NP, PI=restricted).

3. Check that the line identity of the connected party is not received by the calling party and that the call is successful.

**REFERENCES:** [1] clause 9.3.5; [9] clause 4; [10] clause 4.





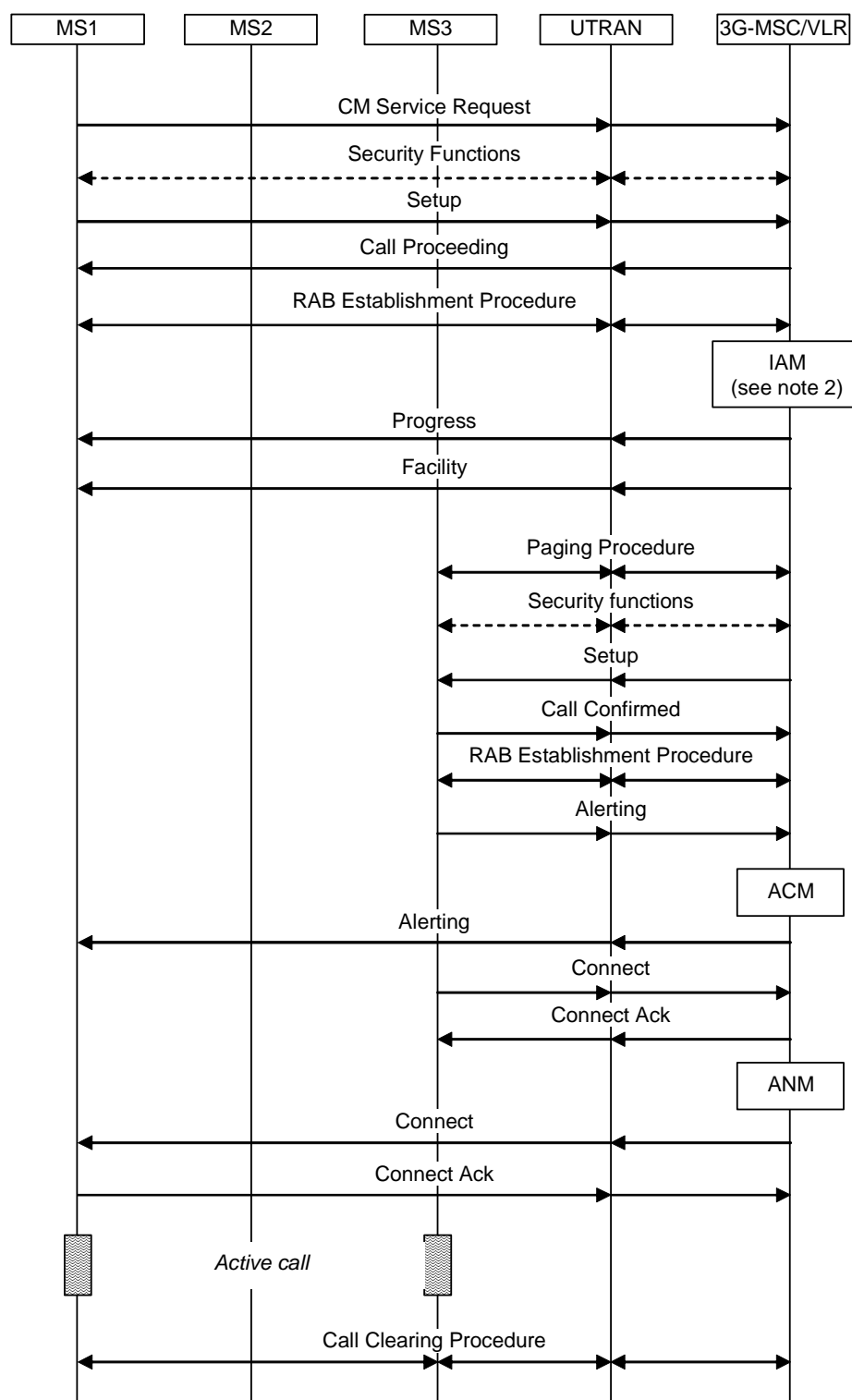
<p>After the registration procedure check that the following information are registered in the network:</p> <ul style="list-style-type: none"> <li>the forwarder to number;</li> <li>information about calls (basic service group) that should be forwarded;</li> </ul> <p>Activation</p> <p><b>Register:</b> Facility(Invoke = ActivateSS(SS-Code));</p> <p><b>Release Complete:</b> Facility(ReturnResult = ActivateSS(SS-Code, SS-Status));</p> <p>Interrogation</p> <p><b>Register:</b> Facility(Invoke=InterrogateSS(SS-Code, ForwardToNumber, NoReplayConditionTime)), (see note 1);</p> <p><b>Release Complete:</b> Facility(Return Result=InterrogateSS(SS-Status));</p> <p>Deactivation</p> <p><b>Register:</b> Facility(Invoke = DeactivateSS(SS-Code));</p> <p><b>Release Complete:</b> Facility(ReturnResult = DeactivateSS(SS-Code, SS-Status));</p> <p>Erasure</p> <p><b>Register:</b> Facility(Invoke = EraseSS(SS-Code));</p> <p><b>Release Complete:</b> Facility(ReturnResult = EraseSS(SS-Code, SS-Status)).</p> <p>3. Check that in the network the supplementary service is deactivated for the MS.</p> <p>NOTE 1: The field SS-Code depends to the CF supplementary service that has to be tested (i.e. CFU, CFB, CFNRy, CFNRc).</p> <p>NOTE 2: The field "NoReplayConditionTime" is required only in case of CFNRy.</p> <p>REFERENCES: [11], [12].</p>
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<p><b>Supplementary Services and SMS - Call Forwarding</b></p> <p><b>SS_CF_211: CFU IN A CALL BETWEEN UMTS USERS</b></p> <p>OBJECTIVE: This test aims to demonstrate completion of a call between UMTS users when supplementary service CFU is activated to the called party.</p> <p>INTERFACES: <b>luCS.</b></p> <p>PRECONDITIONS: Requires at least configuration n°4, (see note 1). The MS must be registered in the HLR with UMTS subscription and must also be attached.</p> <p>PRIORITY: A</p> <p>DESCRIPTION/PROCEDURE:</p> <ol style="list-style-type: none"> <li>Carry out a CFU registration/activation procedure by MS2 with MS3 as forwarded party.</li> <li>Carry out an interrogation procedure by MS2 for CFU supplementary service.</li> <li>Check that HLR shall store for MS2: <ul style="list-style-type: none"> <li>the subscription option "notification to the calling party" with the value ' notification';</li> <li>the registration parameter "forward-to number" (MS3) for each basic service group;</li> </ul> </li> <li>Carry out a CS call from MS1 to MS2.</li> <li>Carry out a Call clearing procedure.</li> <li>Carry out a CFU deactivation/erasure procedure by MS2.</li> </ol>
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## EXPECTED RESULTS:

1. The message exchange to check is as follows:



2. Check the following fields in the messages:

**Setup(MT):** Facility(Invoke=NotifySS(CFU, SS-Notification)), Redirecting party number(SI, PI, LI);

**Facility:** Facility(Invoke=NotifySS(CFU, SS-Notification)).

3. Check that the call is forwarded to MS3 and that it is successfully completed.

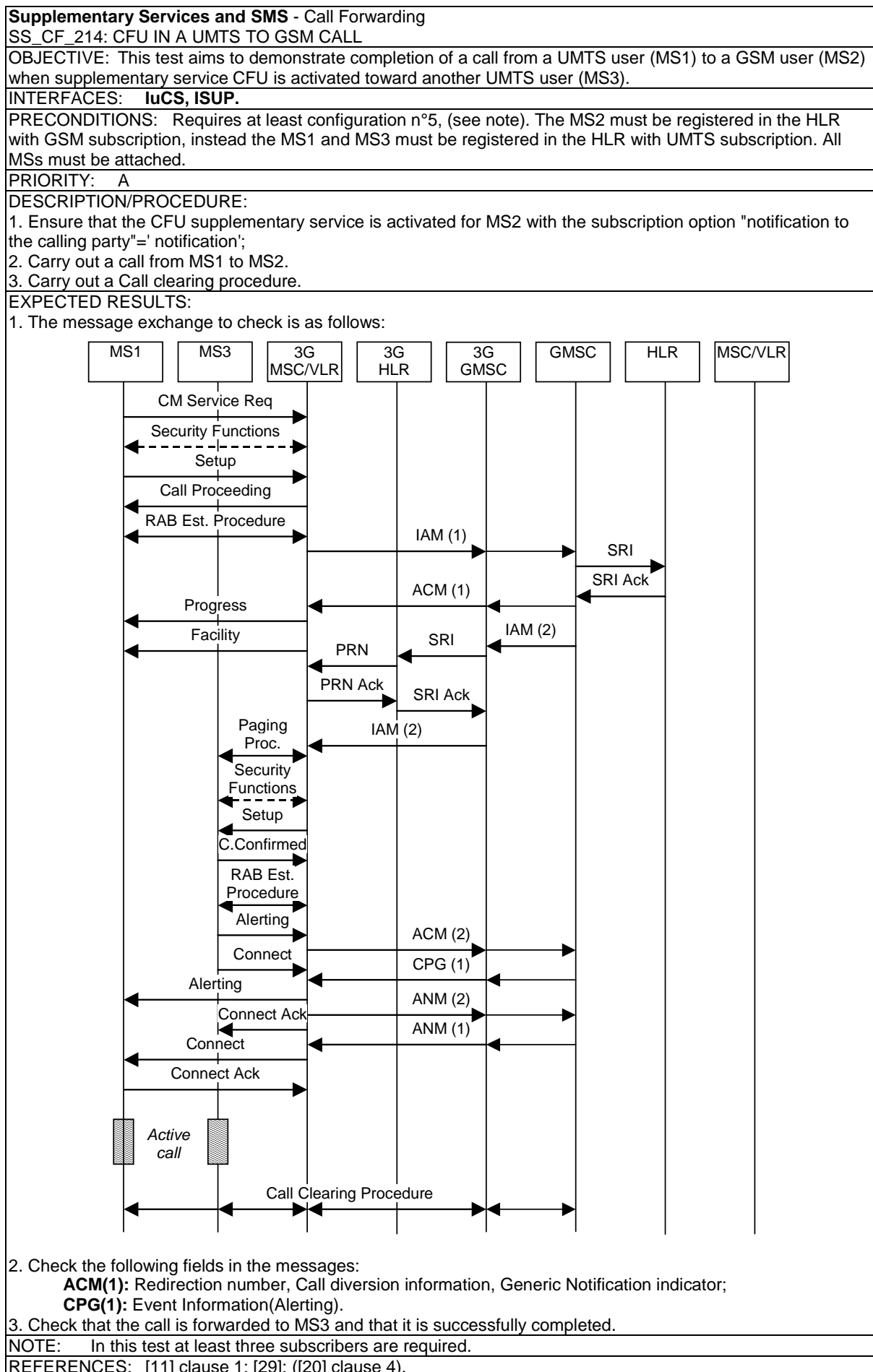
NOTE 1: In this test at least three subscribers are required.

NOTE 2: If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSCs take place.

REFERENCES: [1] clause 9.3; [11] clause 1.

<b>Supplementary Services and SMS - Call Forwarding</b> SS_CF_212: CFU IN A GSM TO UMTS CALL	
OBJECTIVE: This test aims to demonstrate completion of a call from a GSM to a UMTS user when supplementary service CFU is activated from UMTS to GSM network.	
INTERFACES: <b>IuCS, ISUP.</b>	
PRECONDITIONS: Requires at least configuration n°4, (see note). The MS2 must be registered in the HLR with UMTS subscription, instead the MS1 and MS2 must be registered in the HLR with a GSM subscription. All MSs must be attached.	
PRIORITY: A	
DESCRIPTION/PROCEDURE: 1. Carry out a CFU registration/activation procedure by MS2 with MS3 as forwarded party. 2. Carry out a CFU interrogation procedure by MS2. 3. Check that HLR shall store for MS2: <ul style="list-style-type: none"> <li>the subscription option "notification to the calling party" with the value 'notification';</li> <li>the registration parameter "forward-to number" (MS3) for each basic service group.</li> </ul> 4. Carry out a call from MS1 to MS2. 5. Carry out a Call clearing procedure. 6. Carry out a CFU deactivation/erasure procedure.	
EXPECTED RESULTS: 1. The message exchange to check is as follows:	
<pre> sequenceDiagram     participant MSC_VLR as MSC/VLR     participant HLR     participant GMSC     participant 3G_GMSC as 3G-GMSC     participant 3G_HLR as 3G-HLR     participant 3G_MSC_VLR as 3G-MSC/VLR      Note over MSC_VLR: Call from MS1 to MS2     MSC_VLR-&gt;&gt;HLR: IAM (1)     HLR-&gt;&gt;GMSC: IAM (1)     GMSC-&gt;&gt;3G_GMSC: SRI     3G_GMSC-&gt;&gt;3G_HLR: SRI     3G_HLR--&gt;&gt;3G_GMSC: SRI Ack     3G_GMSC--&gt;&gt;GMSC: SRI Ack     GMSC--&gt;&gt;HLR: ACM (1)     HLR--&gt;&gt;MSC_VLR: ACM (1)     Note over MSC_VLR: Notification to MS1     Note over MSC_VLR: Call to MS3     MSC_VLR-&gt;&gt;HLR: IAM(2)     HLR-&gt;&gt;GMSC: IAM(2)     GMSC-&gt;&gt;3G_GMSC: SRI     3G_GMSC-&gt;&gt;3G_HLR: SRI     3G_HLR--&gt;&gt;3G_GMSC: SRI Ack     3G_GMSC--&gt;&gt;GMSC: SRI Ack     GMSC--&gt;&gt;HLR: ACM (2)     HLR--&gt;&gt;MSC_VLR: ACM (2)     Note over MSC_VLR: Alerting to MS1     MSC_VLR-&gt;&gt;HLR: CPG (1)     HLR-&gt;&gt;GMSC: CPG (1)     GMSC-&gt;&gt;3G_GMSC: ANM (2)     3G_GMSC-&gt;&gt;3G_HLR: ANM (2)     3G_HLR--&gt;&gt;3G_GMSC: ANM (1)     3G_GMSC--&gt;&gt;GMSC: ANM (1)     GMSC--&gt;&gt;HLR: ANM (1)     HLR--&gt;&gt;MSC_VLR: ANM (1)     Note over MSC_VLR: Active call between MS1 and MS3     Note over MSC_VLR: MS1 initiated call clearing     MSC_VLR-&gt;&gt;HLR: Release (1)     HLR-&gt;&gt;GMSC: Release (1)     GMSC-&gt;&gt;3G_GMSC: RLC (1)     3G_GMSC-&gt;&gt;3G_HLR: RLC (1)     3G_HLR--&gt;&gt;3G_GMSC: RLC (2)     3G_GMSC--&gt;&gt;GMSC: RLC (2)     GMSC--&gt;&gt;HLR: Release (2)     HLR--&gt;&gt;MSC_VLR: Release (2)     </pre>	
2. Check the following fields in the messages: <b>ACM(1):</b> Redirection number, Call diversion information, Generic Notification indicator; <b>CPG(1):</b> Event Information(Alerting).	
3. Check that the call is forwarded to MS3 and that it is successfully completed.	
NOTE: In this test at least three subscribers are required.	
REFERENCES: [11] clause 1; [29]; ([20] clause 4).	

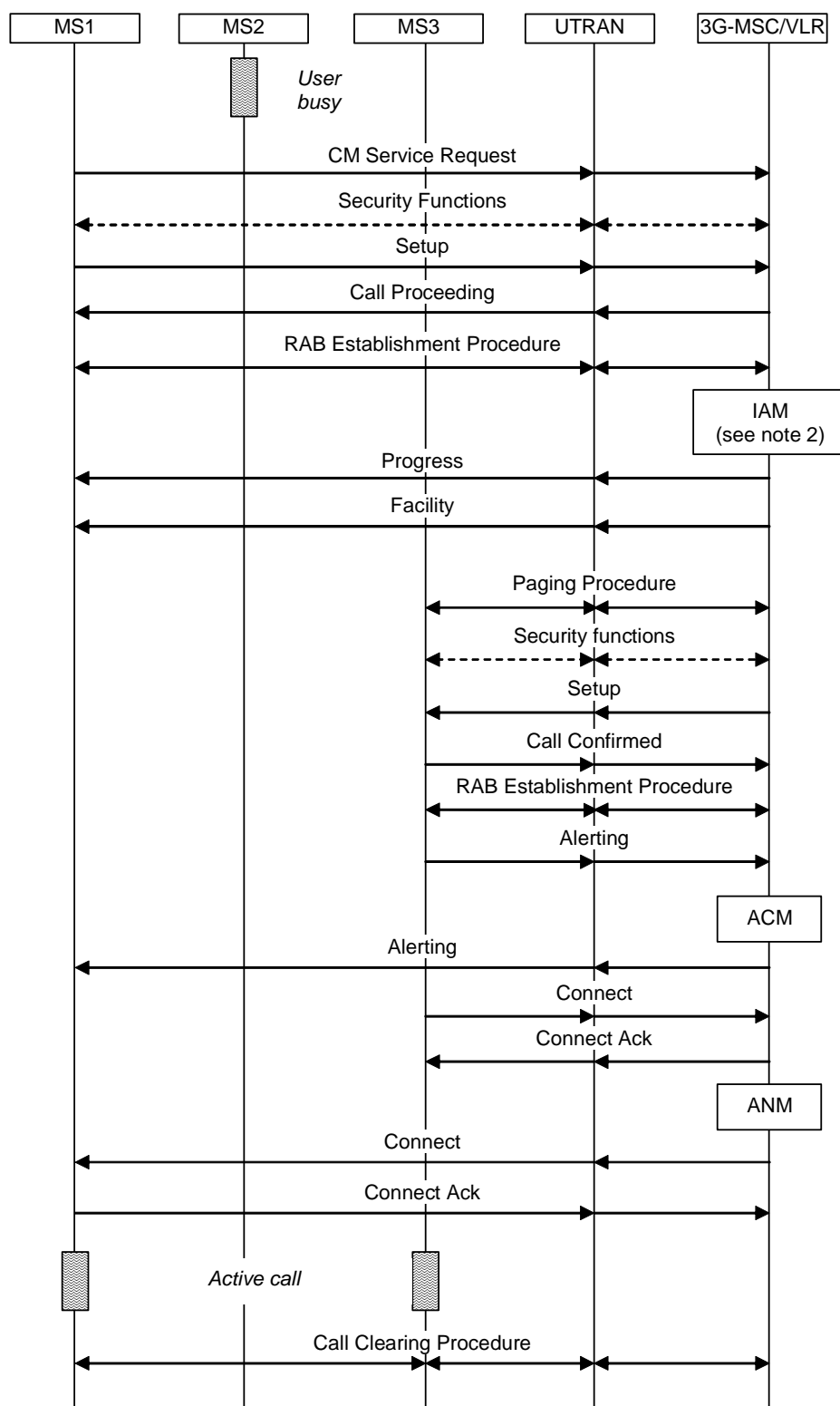
<b>Supplementary Services and SMS - Call Forwarding</b>
<b>SS_CF_213: CFU IN AN ISDN TO UMTS CALL</b>
<b>OBJECTIVE:</b> This test aims to demonstrate completion of a call from an ISDN to a UMTS user when supplementary service CFU is activated from UMTS to ISDN network.
<b>INTERFACES:</b> <b>IuCS, ISUP.</b>
<b>PRECONDITIONS:</b> Requires at least configuration n°4 (see note). The MS2 must be registered in the HLR with UMTS subscription and must also be attached.
<b>PRIORITY:</b> A
<b>DESCRIPTION/PROCEDURE:</b> 1. Carry out a CFU registration/activation procedure by MS2 with user3 as forwarded party. 2. Carry out a CFU interrogation procedure by MS2. 3. Check that HLR shall store for MS2: <ul style="list-style-type: none"> <li>the subscription option "notification to the calling party" with the value ' notification';</li> <li>the registration parameter "forward-to number" (user3) for each basic service group.</li> </ul> 4. Carry out a call from user1 (ISDN) to MS2. 5. Carry out a Call clearing procedure by user1. 6. Carry out a CFU deactivation/erasure procedure by MS2.
<b>EXPECTED RESULTS:</b> 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant VLR as 3G-MSC/VLR     participant GMSC as 3G-GMSC     participant HLR as 3G-HLR     participant ISDN as ISDN      Note over ISDN: Call from user1 to MS2     ISDN-&gt;&gt;GMSC: IAM(1)     GMSC-&gt;&gt;HLR: SRI     HLR-&gt;&gt;GMSC: SRI Ack     GMSC-&gt;&gt;ISDN: ACM (1)     Note over ISDN: Notification to user1     GMSC-&gt;&gt;ISDN: IAM (2)     Note over ISDN: Call to user3     GMSC-&gt;&gt;ISDN: ACM (2)     GMSC-&gt;&gt;ISDN: CPG (1)     Note over ISDN: Alerting to user1     GMSC-&gt;&gt;HLR: ANM (2)     HLR-&gt;&gt;GMSC: ANM (1)     GMSC-&gt;&gt;ISDN: ANM (1)     Note over ISDN: Active call between ISDN users     Note over GMSC, ISDN: Call Clearing Procedure     GMSC-&gt;&gt;ISDN: Call Clearing Procedure     </pre>
2. Check the following fields in the messages: <b>ACM(1):</b> Redirection Number, Call Diversion Information, Generic notification indicator; <b>CPG(1):</b> Event Information(Alerting).
3. Check that the call redirection is notified to the calling side (user1).
4. Check that the call is forwarded to user3 and that it is successfully completed.
<b>NOTE:</b> In this test at least three subscribers are required.
<b>REFERENCES:</b> [11] clause 1; [29]; ([20] clause 4).



<b>Supplementary Services and SMS - Call Forwarding</b>
<b>SS_CF_221: CFB WITH NDUB IN A CALL BETWEEN UMTS USERS</b>
<b>OBJECTIVE:</b> This test aims to demonstrate completion of a call between UMTS users when supplementary service CFB, with network determined user busy, is activated for the called party.
<b>INTERFACES:</b> <b>IuCS.</b>
<b>PRECONDITIONS:</b> Requires at least configuration n°4, (see note 1). The MS must be registered in the HLR with UMTS subscription and must also be attached.
<b>PRIORITY:</b> A
<b>DESCRIPTION/PROCEDURE:</b> <ol style="list-style-type: none"><li>1. Carry out a CFB registration/activation procedure by MS2 with MS3 as forwarded party.</li><li>2. Carry out a CFB interrogation procedure by MS2.</li><li>3. Check that HLR shall store for MS2 the subscription option "notification to the calling party" with the value 'notification'.</li><li>4. Involve MS2 in a CS call.</li><li>5. Carry out a call from MS1 to MS2(busy).</li><li>6. Carry out a Call clearing procedure by MS1.</li><li>7. Clearing the call in which MS2 is involved.</li><li>8. Carry out a CFB deactivation/erasure procedure by MS2.</li></ol>

EXPECTED RESULTS:

1. The message exchange to check is as follows:



2. Check the following fields in the messages:

**Facility (to MS1):** Facility(Invoke=NotifySS(CFB, SS-Notification));

**Setup (MT):** Facility(Invoke=NotifySS(CFB, SS-Notification)), Redirecting party BCD number(SI, PI, LI).

3. Check that the call is forwarded to MS3 and that it is successfully completed.

NOTE 1: In this test at least four subscribers are required.

NOTE 2: If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSCs take place.

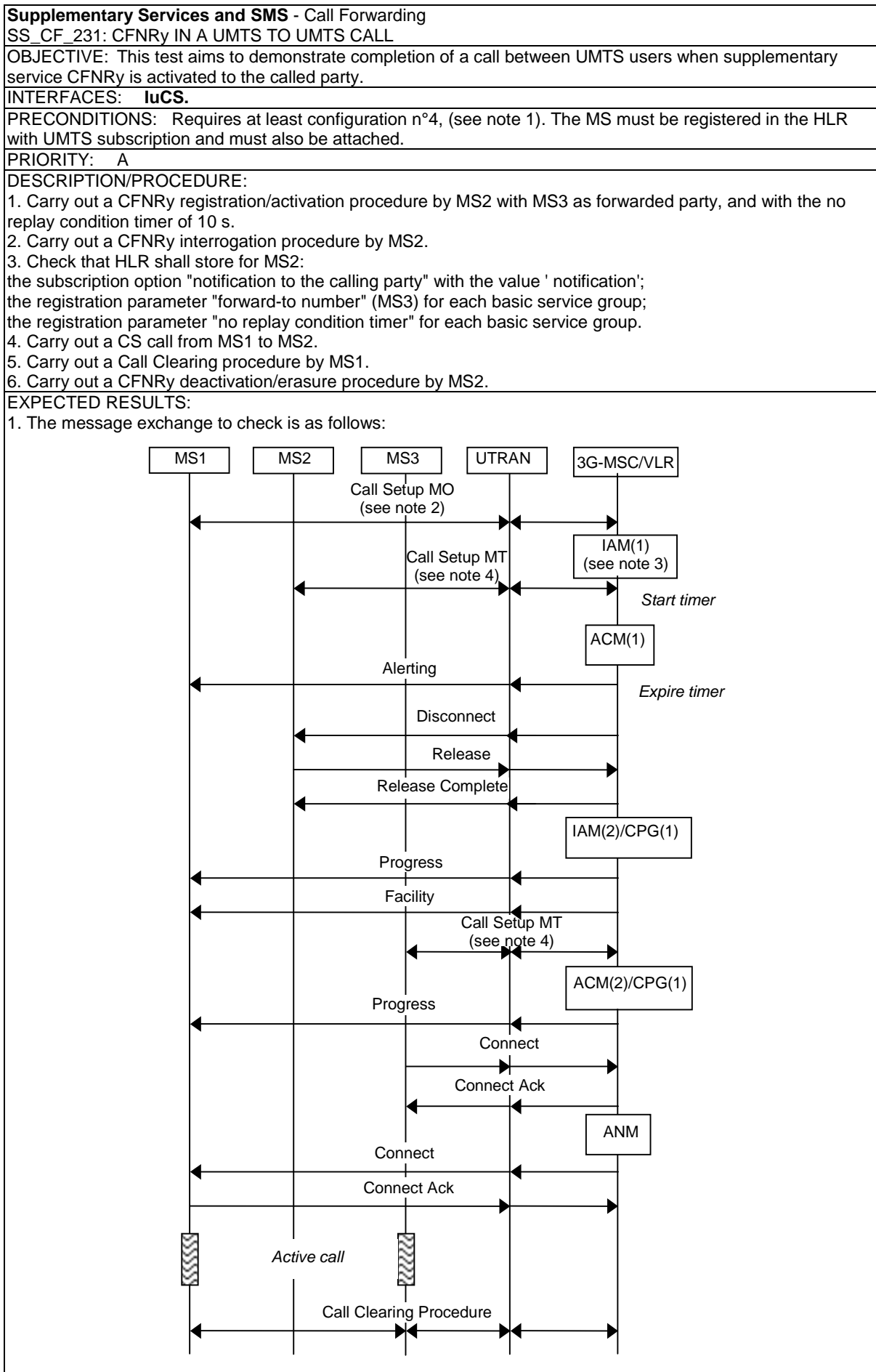
REFERENCES: [1] clause 9.3; [11] clause 2.

<b>Supplementary Services and SMS - Call Forwarding</b> SS_CF_222: CFB WITH NDUB IN A GSM TO UMTS CALL
<b>OBJECTIVE:</b> This test aims to demonstrate completion of a call from a GSM to a UMTS user when supplementary service CFB, with network determined user busy, is activated to the called party.
<b>INTERFACES:</b> <b>IuCS, ISUP.</b>
<b>PRECONDITIONS:</b> Requires at least configuration n°4, (see note). The MS1 and MS3 must be registered in the HLR with GSM subscription; instead the MS2 must be registered with UMTS subscription. All MSs must be attached.
<b>PRIORITY:</b> A
<b>DESCRIPTION/PROCEDURE:</b> 1. Carry out a CFB registration/activation procedure by MS2 with MS3 as forwarded party. 2. Carry out a CFB interrogation procedure by MS2. 3. Check that HLR shall store for MS2 the subscription option "notification to the calling party" with the value 'notification'. 4. Involve MS2 in a call. 5. Carry out a CS call from MS1 to MS2(busy). 6. Carry out a Call clearing procedure by MS1. 7. Clearing the call in which MS2 is involved. 8. Carry out a CFB deactivation/erasure procedure by MS2.
<b>EXPECTED RESULTS:</b> 1. The message exchange to check is as follows:
<p>The diagram shows the following sequence of events:</p> <ul style="list-style-type: none"> <li><b>Call from MS1 to MS2:</b> MSC/VLR sends IAM(1) to GMSC. GMSC sends SRI to 3G-GMSC. 3G-GMSC sends PRN to 3G-HLR. 3G-HLR sends PRN Ack to 3G-GMSC. 3G-GMSC sends SRI Ack to GMSC. GMSC sends IAM(1) to 3G-MSC/VLR. 3G-MSC/VLR sends NDUB to HLR. HLR sends ACM(1) to GMSC.</li> <li><b>Notification to MS1:</b> GMSC sends IAM(2) to MSC/VLR. MSC/VLR sends PRN to HLR. HLR sends SRI to GMSC. GMSC sends SRI Ack to MSC/VLR. MSC/VLR sends PRN Ack to HLR.</li> <li><b>Setup to MS3:</b> MSC/VLR sends IAM(2) to GMSC. GMSC sends ACM(2) to 3G-GMSC. 3G-GMSC sends CPG(1) to 3G-HLR. 3G-HLR sends ANM(1) to 3G-MSC/VLR. 3G-MSC/VLR sends ANM(2) to GMSC. GMSC sends ANM(1) to MSC/VLR.</li> <li><b>Alerting to MS1:</b> MSC/VLR sends ANM(1) to GMSC. GMSC sends ANM(2) to 3G-GMSC. 3G-GMSC sends CPG(1) to 3G-HLR. 3G-HLR sends ANM(1) to 3G-MSC/VLR. 3G-MSC/VLR sends ANM(2) to GMSC. GMSC sends ANM(1) to MSC/VLR.</li> <li><b>Active call:</b> A shaded box indicates an active call between MS1 and MS3.</li> <li><b>MS1 initiated call clearing:</b> MSC/VLR sends Release(1) to GMSC. GMSC sends RLC(1) to 3G-GMSC. 3G-GMSC sends Release(2) to 3G-HLR. 3G-HLR sends RLC(2) to 3G-MSC/VLR. 3G-MSC/VLR sends Release(2) to GMSC. GMSC sends RLC(1) to MSC/VLR.</li> </ul>
2. Check the following fields in the messages: <b>ACM(1):</b> Redirection number, Call diversion information, Generic Notification indicator; <b>CPG(1):</b> Event Information(Alerting).
3. Check that the call is forwarded to MS3 and that the call is successfully completed.
<b>NOTE:</b> In this test at least four subscribers are required.
<b>REFERENCES:</b> [11] clause 2, [29]; ([20] clause 4).

<b>Supplementary Services and SMS - Call Forwarding</b>
<b>SS_CF_223: CFB WITH NDUB IN A ISDN TO UMTS CALL</b>
<b>OBJECTIVE:</b> This test aims to demonstrate completion of an ISDN to UMTS call when the last one is provisioned with CFB supplementary service, with network determined user busy.
<b>INTERFACES:</b> <b>IuCS, ISUP.</b>
<b>PRECONDITIONS:</b> Requires at least configuration n°4, (see note). The MS2 must be registered in the HLR with UMTS subscription and must also be attached.
<b>PRIORITY:</b> A
<b>DESCRIPTION/PROCEDURE:</b>
<ol style="list-style-type: none"> <li>1. Carry out a CFB registration/activation procedure by MS2 with user3 as forwarded party.</li> <li>2. Carry out a CFB interrogation procedure by MS2.</li> <li>3. Check that HLR shall store for MS2: <ul style="list-style-type: none"> <li>• the subscription option "notification to the calling party" with the value ' notification';</li> <li>• the subscription option "notification to the forwarding party" with the value ' notification';</li> <li>• the registration parameter "forward-to number" (user3) for each basic service group.</li> </ul> </li> <li>4. Involve MS2 in a CS call.</li> <li>5. Carry out a CS call from user1 to MS2(busy).</li> <li>6. Carry out a Call clearing procedure.</li> <li>7. Clearing the call in which MS2 is involved.</li> <li>8. Carry out a CFB deactivation/erasure procedure by MS2.</li> </ol>
<b>EXPECTED RESULTS:</b>
1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant VLR as 3G-MSC/VLR     participant GMSC as 3G-GMSC     participant HLR as 3G-HLR     participant ISDN as ISDN      Note over ISDN: Call from user1 to MS2     ISDN-&gt;&gt;GMSC: IAM(1)     GMSC-&gt;&gt;HLR: SRI     HLR-&gt;&gt;GMSC: PRN     GMSC-&gt;&gt;VLR: PRN Ack     HLR-&gt;&gt;GMSC: SRI Ack     GMSC-&gt;&gt;VLR: IAM(1)     GMSC-&gt;&gt;ISDN: ACM(1)     Note over ISDN: Notification to user1     GMSC-&gt;&gt;ISDN: IAM(2)     Note over ISDN: Setup to user3     GMSC-&gt;&gt;ISDN: ACM(2)     GMSC-&gt;&gt;VLR: CPG(1)     Note over ISDN: Alerting to user1     GMSC-&gt;&gt;HLR: ANM(2)     HLR-&gt;&gt;GMSC: ANM(1)     GMSC-&gt;&gt;ISDN: ANM(1)     Note over ISDN: Active call between ISDN users     Note over VLR, GMSC, HLR, ISDN: Call Clearing Procedure   </pre>
2. Check the following fields in the messages:
<b>ACM(1):</b> Redirection Number, Call Diversion Information, Generic notification indicator;
<b>CPG(1):</b> Event Information(Alerting).
3. Check that the call redirection is notified to the calling side (user1).
4. Check that the call is forwarded to user3 and that the call is successfully completed.
<b>NOTE:</b> In this test at least four subscribers are required.
<b>REFERENCES:</b> [11] clause 2, [29]; ([20] clause 4).



Supplementary Services and SMS - Call Forwarding							
SS_CF_224: CFB WITH NDUB IN A UMTS TO GSM CALL							
OBJECTIVE: This test aims to demonstrate completion of a call from a UMTS user (MS1) to a GSM user (MS2) when the CFB supplementary service (with network determined user busy) is activated by the called party toward a UMTS user (MS3).							
INTERFACES: <b>IuCS, ISUP.</b>							
PRECONDITIONS: Requires at least configuration n°5, (see note). The MS1 and MS3 must be registered in the HLR with UMTS subscription; instead the MS2 must be registered with GSM subscription. All MSs must be attached.							
PRIORITY: A							
DESCRIPTION/PROCEDURE:							
1. Ensure that MS2 has activated the CFB supplementary service with MS3 as forwarded party and with the subscription option "notification to the calling party"='notification'.							
2. Involve MS2 in a call.							
3. Carry out a CS call from MS1 to MS2 (while it is busy).							
4. Carry out a Call clearing procedure by MS1.							
EXPECTED RESULTS:							
1. The message exchange to check is as follows:							
MS1	MS3	3G MSC/VLR	3G HLR	3G GMSC	GMSC	HLR	MSC/VLR
2. Check the following fields in the messages:							
<b>ACM(1):</b> Redirection number, Call diversion information, Generic Notification indicator;							
<b>CPG(1):</b> Event Information(Alerting).							
3. Check that the call is forwarded to MS3 and that it is successfully completed.							
NOTE: In this test at least four subscribers are required.							
REFERENCES: [11] clause 2; [29]; ([20] clause 4).							

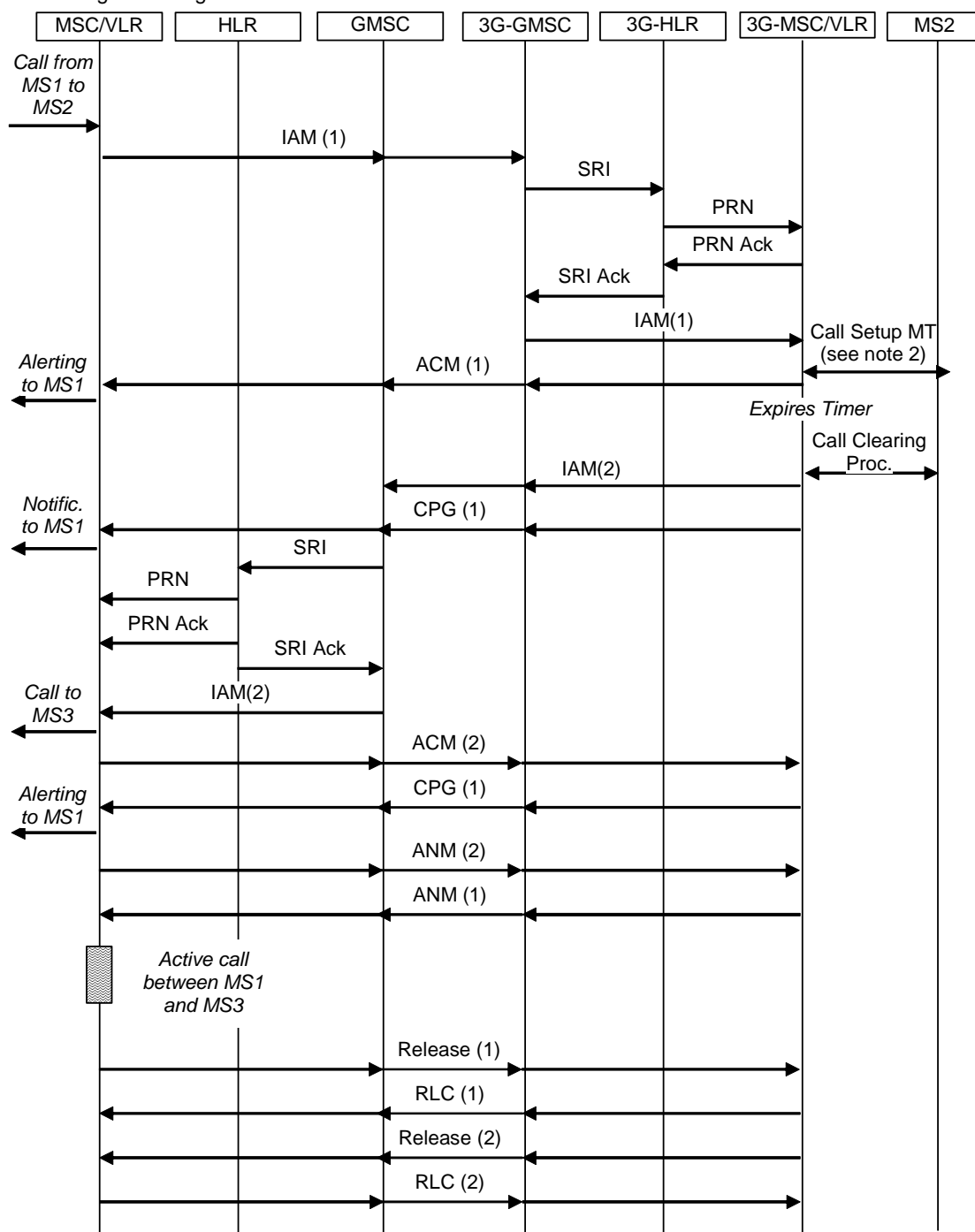


<p>2. Check the following fields in the messages:  <b>Setup (MT):</b> Facility(Invoke=NotifySS(CFNrY, SS-Notification)), Redirecting party BCD number (SI, PI, LI);  <b>Facility:</b> Facility(Invoke=NotifySS(CFNrY, SS-Notification)).</p> <p>3. Check that the call is forwarded to MS3 and that it is successfully completed.</p>
<p>NOTE 1: In this test at least three subscribers are required.</p> <p>NOTE 2: The following messages are included in the Call Setup MO: CM Service Request, Setup, Call Proceeding, RAB Establishment Procedure messages and Alerting.</p> <p>NOTE 3: If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSCs take place.</p> <p>NOTE 4: In the Call Setup MT are included the following messages: Paging Procedure messages, Setup, Call Confirmed, RAB Establishment Procedure messages and Alerting.</p>
<p>REFERENCES: [1] clause 9.3; [11] clause 3.</p>

<p><b>Supplementary Services and SMS - Call Forwarding</b>  SS_CF_232: CFNRy IN A GSM TO UMTS CALL</p>
<p>OBJECTIVE: This test aims to demonstrate completion of a GSM to UMTS call when CFNRy supplementary service is activated to the called party.</p>
<p>INTERFACES: <b>IuCS, ISUP.</b></p>
<p>PRECONDITIONS: Requires at least configuration n°4 (see note 1). The MS1 and MS3 must be registered in the HLR with GSM subscription, instead the MS2 must be registered with UMTS subscription. All MSs must be attached.</p>
<p>PRIORITY: A</p>
<p>DESCRIPTION/PROCEDURE:</p> <ol style="list-style-type: none"> <li>1. Carry out a CFNRy registration/activation procedure by MS2 with MS3 as forwarded party, and with a no replay condition timer of 10 s.</li> <li>2. Carry out a CFNRy interrogation procedure by MS2.</li> <li>3. Check that HLR shall store for MS2: <ul style="list-style-type: none"> <li>• the subscription option "notification to the calling party" with the value ' notification';</li> <li>• the registration parameter "forward-to number" (MS3) for each basic service group;</li> <li>• the registration parameter "no replay condition timer" for each basic service group.</li> </ul> </li> <li>4. Carry out a CS call from MS1 to MS2.</li> <li>5. Carry out a Call Clearing procedure by MS1.</li> <li>6. Carry out a deactivation/erasure procedure by MS2.</li> </ol>

EXPECTED RESULTS:

1. The message exchange to check is as follows:



2. Check the following fields in the messages:

**CPG(1):** Event Information(call forwarded on no replay), Generic Notification indicator;

**CPG(1):** Event Information(Alerting).

3. Check that the call is forwarded to MS3 and that it is successfully completed.

NOTE 1: In this test at least three subscribers are required.

NOTE 2: The following messages are included in the Call Setup MT: Paging Procedure messages, Security Functions messages, Setup, Call Confirmed, RAB Establishment messages and Alerting.

REFERENCES: [11] clause 3; [29]; ([20] clause 4).

**Supplementary Services and SMS - Call Forwarding****SS\_CF\_233: CFNRy IN AN ISDN TO UMTS CALL**

**OBJECTIVE:** This test aims to demonstrate completion of an ISDN to UMTS call when CFNRy supplementary service is activated to the called party.

**INTERFACES:** **IuCS, ISUP.**

**PRECONDITIONS:** Requires at least configuration n°4, (see note 1). The MS must be registered in the HLR with UMTS subscription, the MS must also be attached.

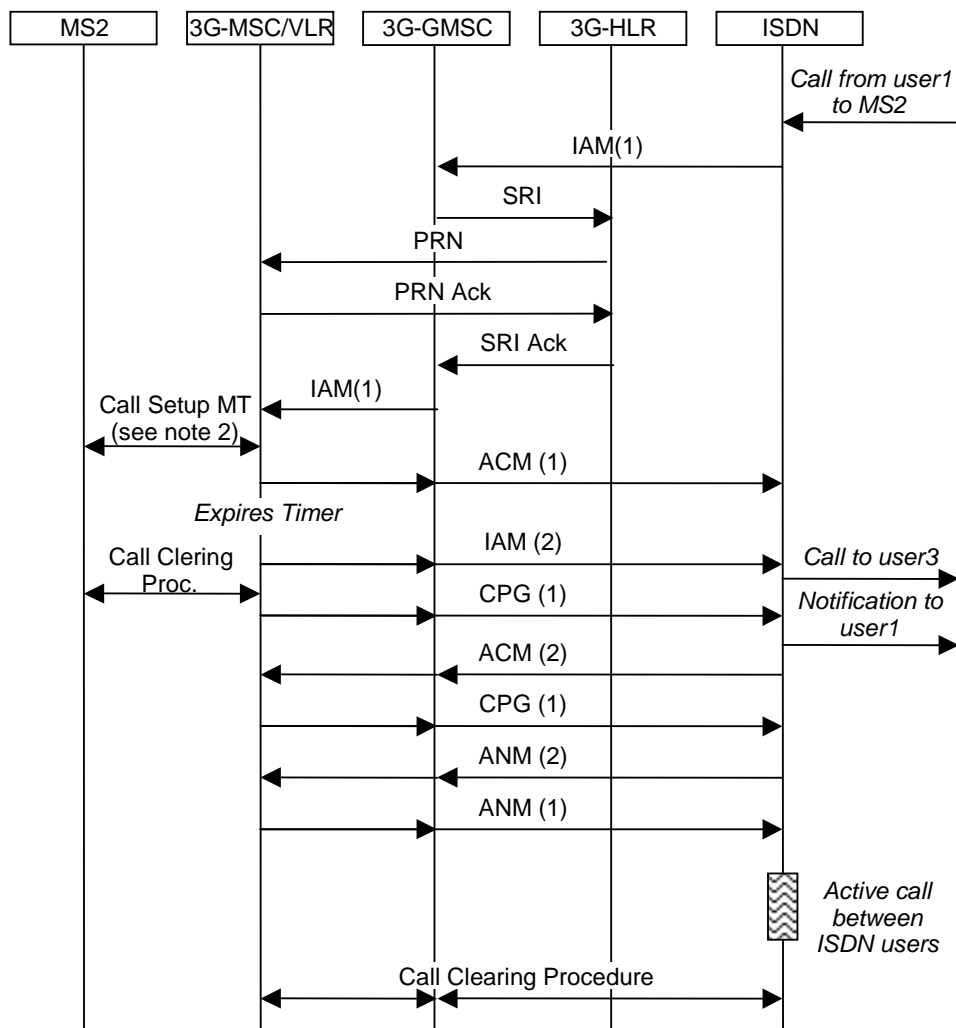
**PRIORITY:** A

**DESCRIPTION/PROCEDURE:**

1. Carry out a CFNRy registration/activation procedure by MS2 with user3 as forwarded party, and with a no replay condition timer of 10 s.
2. Carry out a CFNRy interrogation procedure by MS2.
3. Check that HLR shall store for MS2:
  - the subscription option "notification to the calling party" with the value 'notification';
  - the registration parameter "forward-to number" (user3) for each basic service group;
  - the registration parameter "no replay condition timer" for each basic service group.
4. Carry out a CS call from user1 to MS2.
5. Carry out a Call Clearing procedure by user1.
6. Carry out a CFNRy deactivation/erasure procedure by MS2.

**EXPECTED RESULTS:**

1. The message exchange to check is as follows:



2. Check the following fields in the messages:

**CPG(1):** Event Information(call forwarded on no replay), Generic Notification indicator;

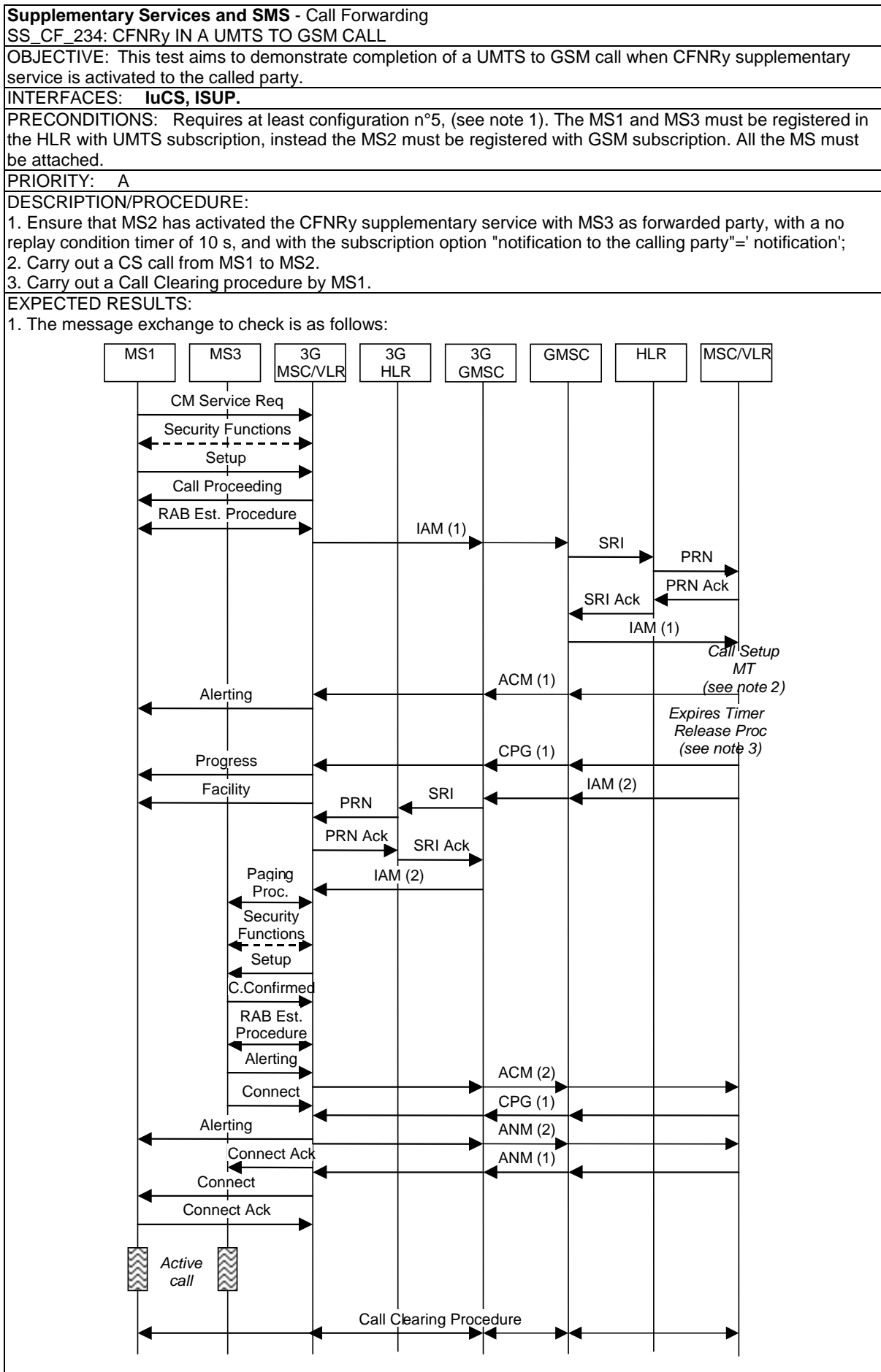
**CPG(1):** Event Information(Alerting).

3. Check that the call is forwarded to MS3 and that it is successfully completed.

**NOTE 1:** In this test at least three subscribers are required.

**NOTE 2:** The following messages are included in the Call Setup MT: Paging Procedure messages, Security Functions messages, Setup, Call Confirmed, RAB Establishment messages and Alerting.

**REFERENCES:** [11] clause 3; [29]; ([20] clause 4).

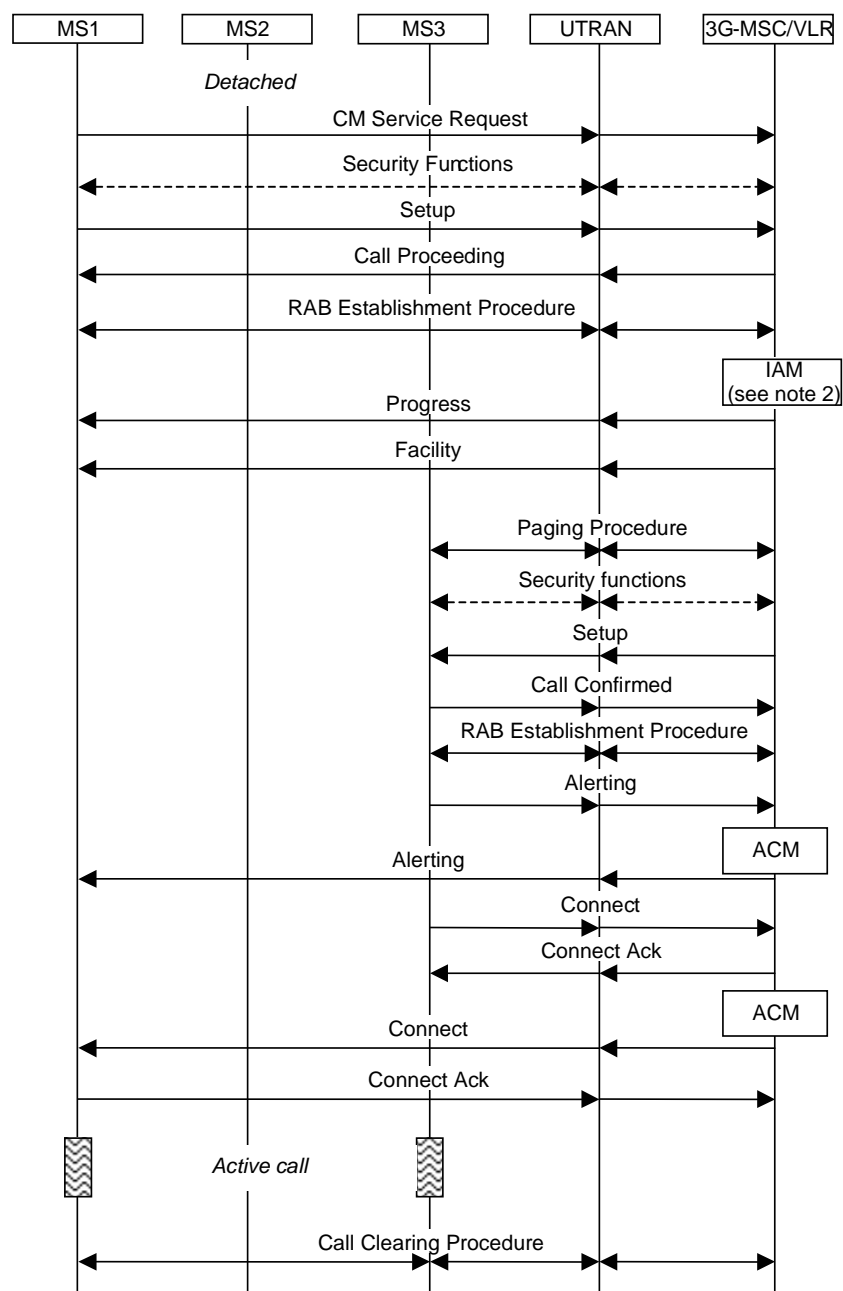


<p>2. Check the following fields in the messages:  <b>CPG(1):</b> Event Information(call forwarded on no replay), Generic Notification indicator;  <b>CPG(1):</b> Event Information(Alerting).</p>
<p>3. Check that the call is forwarded to MS3 and that it is successfully completed.</p>
<p>NOTE 1: In this test at least four subscribers are required.</p>
<p>NOTE 2: The following messages are included in the Call Setup MT: Paging Procedure messages, Security Functions messages, Setup, Call Confirmed, Channel Allocation messages and Alerting.</p>
<p>NOTE 3: The following messages are included in the Release Procedure: Disconnect, Release and Release Complete.</p>
<p>REFERENCES: [11] clause 3; [29]; ([20] clause 4).</p>

<p><b>Supplementary Services and SMS - Call Forwarding</b></p>
<p><b>SS_CF_241: CFNRc IN A CALL BETWEEN UMTS USERS</b></p>
<p><b>OBJECTIVE:</b> This test aims to demonstrate completion of a call between UMTS users when the CFNRc supplementary service is activated to the called party.</p>
<p><b>INTERFACES:</b> <b>IuCS.</b></p>
<p><b>PRECONDITIONS:</b> Requires at least configuration n°4, (see note 1). The user must be registered in the HLR with UMTS subscription and must also be attached.</p>
<p><b>PRIORITY:</b> A</p>
<p><b>DESCRIPTION/PROCEDURE:</b></p> <ol style="list-style-type: none"> <li>1. Carry out a CFNRc registration/activation procedure by MS2 with MS3 as forwarded party.</li> <li>2. Carry out a CFNRc interrogation procedure by MS2.</li> <li>3. Check that HLR shall store for MS2: <ul style="list-style-type: none"> <li>• the subscription option "notification to the calling party" with the value 'notification';</li> <li>• the registration parameter "forward-to number" (MS3) for each basic service group.</li> </ul> </li> <li>4. Carry out a detach procedure by MS2.</li> <li>5. Carry out a CS call from MS1 to MS2.</li> <li>6. Carry out a call clearing procedure.</li> <li>7. Carry out a CFNRc deactivation/erasure procedure by MS2.</li> </ol>

## EXPECTED RESULTS:

1. The message exchange to check is as follows:



1. Check the following fields in the messages:

**Setup (MT):** Facility(Invoke=NotifySS(CFNRC, SS-Notification)), Redirecting party BCD number (SI, PI, LI);

**Facility:** Facility(Invoke=NotifySS(CFNRC, SS-Notification)).

2. Check that the call is forwarded to user3 and that is successfully completed.

NOTE 1: In this test at least three subscribers are required.

NOTE 2: If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSCs take place.

REFERENCES: [1] clause 9.3; [11] clause 4.



**Supplementary Services and SMS - Call Forwarding****SS\_CF\_242: CFNRc IN A GSM TO UMTS CALL**

**OBJECTIVE:** This test aims to demonstrate completion of a GSM to UMTS call when CFNRc supplementary service is activated to the called party.

**INTERFACES:** **IuCS, ISUP.**

**PRECONDITIONS:** Requires at least configuration n°4, (see note 1). The MS1 and MS3 must be registered in the HLR with GSM subscription, instead, the MS2 must be registered with UMTS subscription.  
All MSs must be attached.

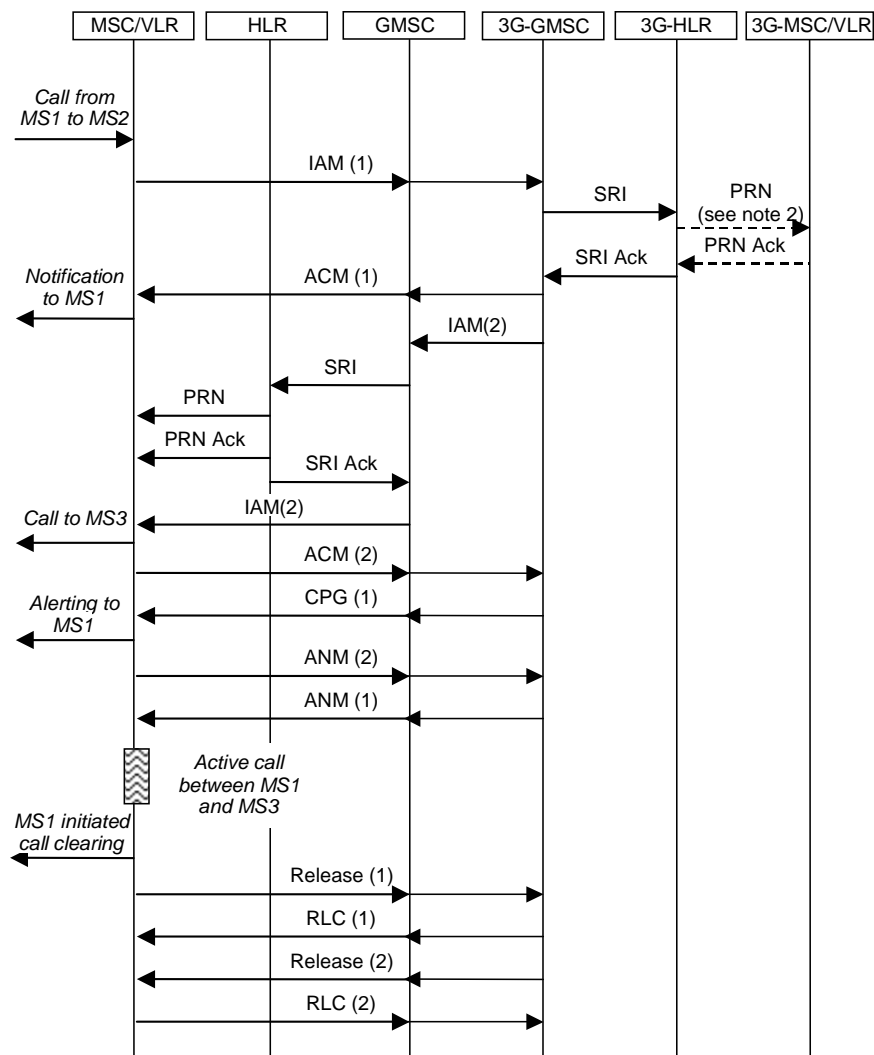
**PRIORITY:** A

**DESCRIPTION/PROCEDURE:**

1. Carry out a CFNRc registration/activation procedure by MS2 with MS3 as forwarded party.
2. Carry out a CFNRc interrogation procedure by MS2.
3. Check that HLR shall store for MS2:
  - the subscription option "notification to the calling party" with the value 'notification';
  - the registration parameter "forward-to number" (MS3) for each basic service group.
4. Carry out a detach procedure by MS2.
5. Carry out a CS call from MS1 to MS2.
6. Carry out a call clearing procedure.
7. Carry out a CFNRc deactivation/erasure procedure by MS2.

**EXPECTED RESULTS:**

1. The message exchange to check is as follows:



2. Check the following fields in the messages:

**ACM(1):** Optional Backward Call Indicator('call diversion may occur'); Generic notification indicator;

**CPG(1):** Event Information(Alerting).

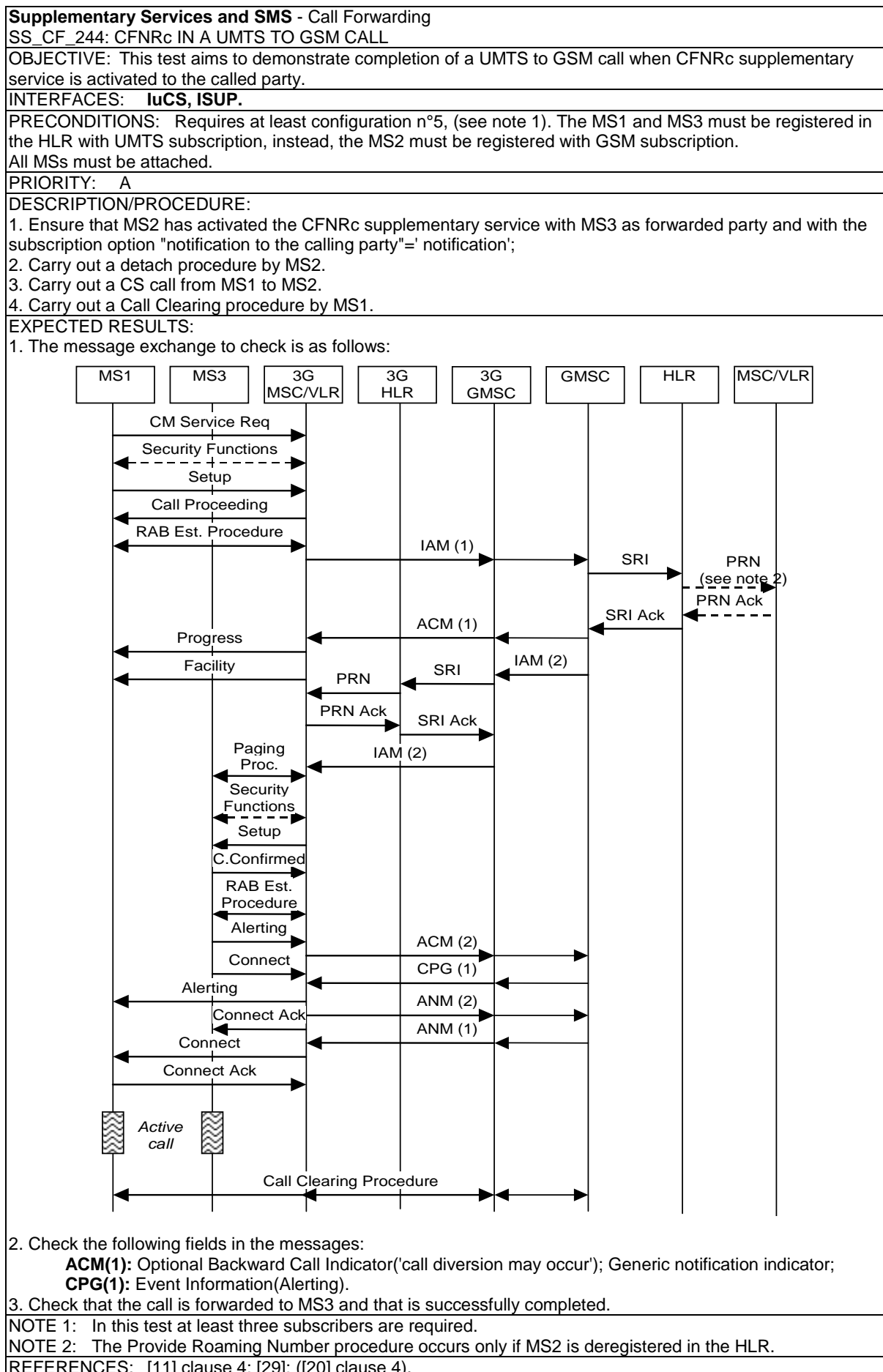
3. Check that the call is forwarded to MS3 and that is successfully completed.

**NOTE 1:** In this test are required at least three subscribers.

**NOTE 2:** IThe Provide Roaming Number procedure occurs only if MS2 is deregistered in the HLR.

**REFERENCES:** [11] clause 4; [29]; ([20] clause 4).

<b>Supplementary Services and SMS - Call Forwarding</b>
<b>SS_CF_243: CFNRc IN AN ISDN TO UMTS CALL</b>
<b>OBJECTIVE:</b> This test aims to demonstrate completion of an ISDN to UMTS call when CFNRc supplementary service is activated to the called party.
<b>INTERFACES:</b> <b>IuCS, ISUP.</b>
<b>PRECONDITIONS:</b> Requires at least configuration n°4, (see note 1). The MS must be registered in the HLR with UMTS subscription, and must also be attached.
<b>PRIORITY:</b> A
<b>DESCRIPTION/PROCEDURE:</b> <ol style="list-style-type: none"> <li>1. Carry out a CFNRc registration/activation procedure by MS2 with user3 as the forwarded party.</li> <li>2. Carry out a CFNRc interrogation procedure by MS2.</li> <li>3. Check that HLR shall store for MS2: <ul style="list-style-type: none"> <li>• the subscription option "notification to the calling party" with the value 'notification';</li> <li>• the registration parameter "forward-to number" (user3) for each basic service group.</li> </ul> </li> <li>4. Carry out a detach procedure by MS2.</li> <li>5. Carry out a CS call from user1 to MS2.</li> <li>6. Carry out a call clearing procedure.</li> <li>7. Carry out a CFNRc deactivation/erasure procedure by MS2.</li> </ol>
<b>EXPECTED RESULTS:</b> <ol style="list-style-type: none"> <li>1. The message exchange to check is as follows:</li> </ol> <pre> sequenceDiagram     participant VLR as 3G-MSC/VLR     participant GMSC as 3G-GMSC     participant HLR as 3G-HLR     participant ISDN as ISDN      Note over ISDN: Call from user1 to MS2     ISDN-&gt;&gt;GMSC: IAM(1)     GMSC-&gt;&gt;HLR: SRI     HLR--&gt;&gt;GMSC: PRN     GMSC--&gt;&gt;VLR: PRN (see note 2)     VLR--&gt;&gt;HLR: PRN Ack     HLR--&gt;&gt;GMSC: SRI Ack     GMSC-&gt;&gt;ISDN: ACM (1)     Note over ISDN: Notification to user1     ISDN-&gt;&gt;GMSC: IAM (2)     GMSC-&gt;&gt;HLR: ACM (2)     Note over ISDN: Call to user3     HLR-&gt;&gt;GMSC: CPG (1)     GMSC-&gt;&gt;ISDN: ANM (2)     HLR-&gt;&gt;GMSC: ANM (1)     Note over ISDN: Active call between ISDN users     Note over GMSC, HLR: Call Clearing Procedure     GMSC-&gt;&gt;ISDN:      </pre>
<ol style="list-style-type: none"> <li>2. Check the following fields in the messages:  <b>ACM(1):</b> Optional Backward Call Indicator('call diversion may occur'); Generic notification indicator;  <b>CPG(1):</b> Event Information(Alerting).</li> <li>3. Check that the call is forwarded to MS3 and that is successfully completed.</li> </ol>
<b>NOTE 1:</b> In this test at least three subscribers are required.
<b>NOTE 2:</b> The Provide Roaming Number procedure occurs only if MS2 is deregistered in the HLR.
<b>REFERENCES:</b> [11] clause 4; [29]; ([20] clause 4).



<b>Supplementary Services and SMS - Call Waiting and Call Hold</b> SS_CWH_301: PROCEDURE FOR CW SUPPLEMENTARY SERVICES
OBJECTIVE: This test aims to demonstrate completion of activation, interrogation, and deactivation procedure for CW supplementary services.
INTERFACES: <b>IuCS, D.</b>
PRECONDITIONS: Requires at least configuration n°1. The user must be registered in the HLR with UMTS subscription.
PRIORITY: A
DESCRIPTION/PROCEDURE: Carry out by the MS the following procedures for CW, (see note), supplementary service: 1. Activation; 2. Interrogation; 3. Deactivation;
EXPECTED RESULTS: 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant VLR as 3G-MSC/VLR     participant HLR      Note over UTRAN, VLR: ACTIVATION     UTRAN-&gt;&gt;VLR: Register     VLR-&gt;&gt;HLR: Register     HLR--&gt;&gt;VLR: Release Complete     VLR--&gt;&gt;UTRAN: Release Complete     UTRAN--&gt;&gt;MS: Release Complete      Note over UTRAN, VLR: INTERROGATION     UTRAN-&gt;&gt;VLR: Register     VLR-&gt;&gt;HLR: Register     HLR--&gt;&gt;VLR: Release Complete     VLR--&gt;&gt;UTRAN: Release Complete     UTRAN--&gt;&gt;MS: Release Complete      Note over UTRAN, VLR: DEACTIVATION     UTRAN-&gt;&gt;VLR: Register     VLR-&gt;&gt;HLR: Register     HLR--&gt;&gt;VLR: Release Complete     VLR--&gt;&gt;UTRAN: Release Complete     UTRAN--&gt;&gt;MS: Release Complete </pre>
2. Check the following fields in the messages: Activation <b>Register:</b> Facility(Invoke = ActivateSS(CW)); <b>Release Complete:</b> Facility(ReturnResult = ActivateSS); Interrogation <b>Register:</b> Facility(Invoke=InterrogateSS(CW)); <b>Release Complete:</b> Facility(Return Result=InterrogateSS); Deactivation <b>Register:</b> Facility(Invoke = DeactivateSS(CW)); <b>Release Complete:</b> Facility(ReturnResult = DeactivateSS).
3. Check that in the network the supplementary service is deactivated for the MS.
NOTE: Activation and deactivation of Call Hold supplementary service cause no signalling on the radio path, moreover the other procedures are not applicable.
REFERENCES: [11], [12].

**Supplementary Services and SMS - Call Waiting and Call Hold**  
**SS\_CWH\_311: CW AND HOLD IN A CALL BETWEEN UMTS USERS**

**OBJECTIVE:** This test aims to demonstrate the function of CW and HOLD supplementary services in a call that involves UMTS users.

**INTERFACES:** **IuCS.**

**PRECONDITIONS:** Requires at least configuration n°4, (see note 1). The MS must be registered in the HLR with UMTS subscription and must also be attached.

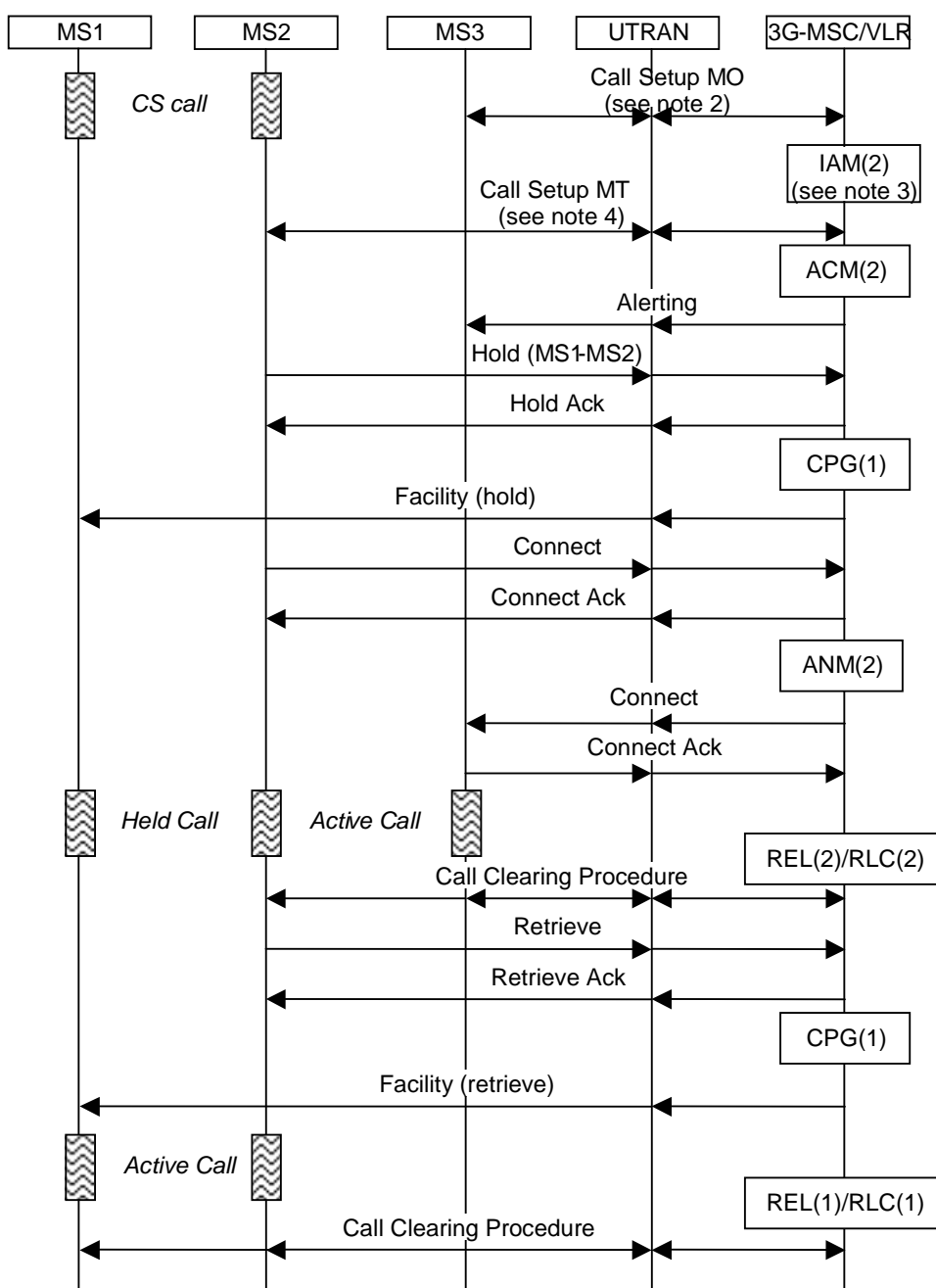
**PRIORITY:** A

**DESCRIPTION/PROCEDURE:**

1. Carry out a CW activation procedure by MS2.
2. Carry out a CW interrogation procedure by MS2.
3. Carry out a call from MS1 to MS2.
4. Carry out a call from MS3 to MS2 when the call MS1-MS2 is still active.
5. Carry out an HOLD procedure by MS2 for the call with MS1.
6. Complete the MS2-MS3 call.
7. Carry out a retrieve procedure for the held call (MS2-MS1).
8. Carry out a call clearing procedure for the MS2-MS1 call.

**EXPECTED RESULTS:**

1. The messages exchange to check is as follows:

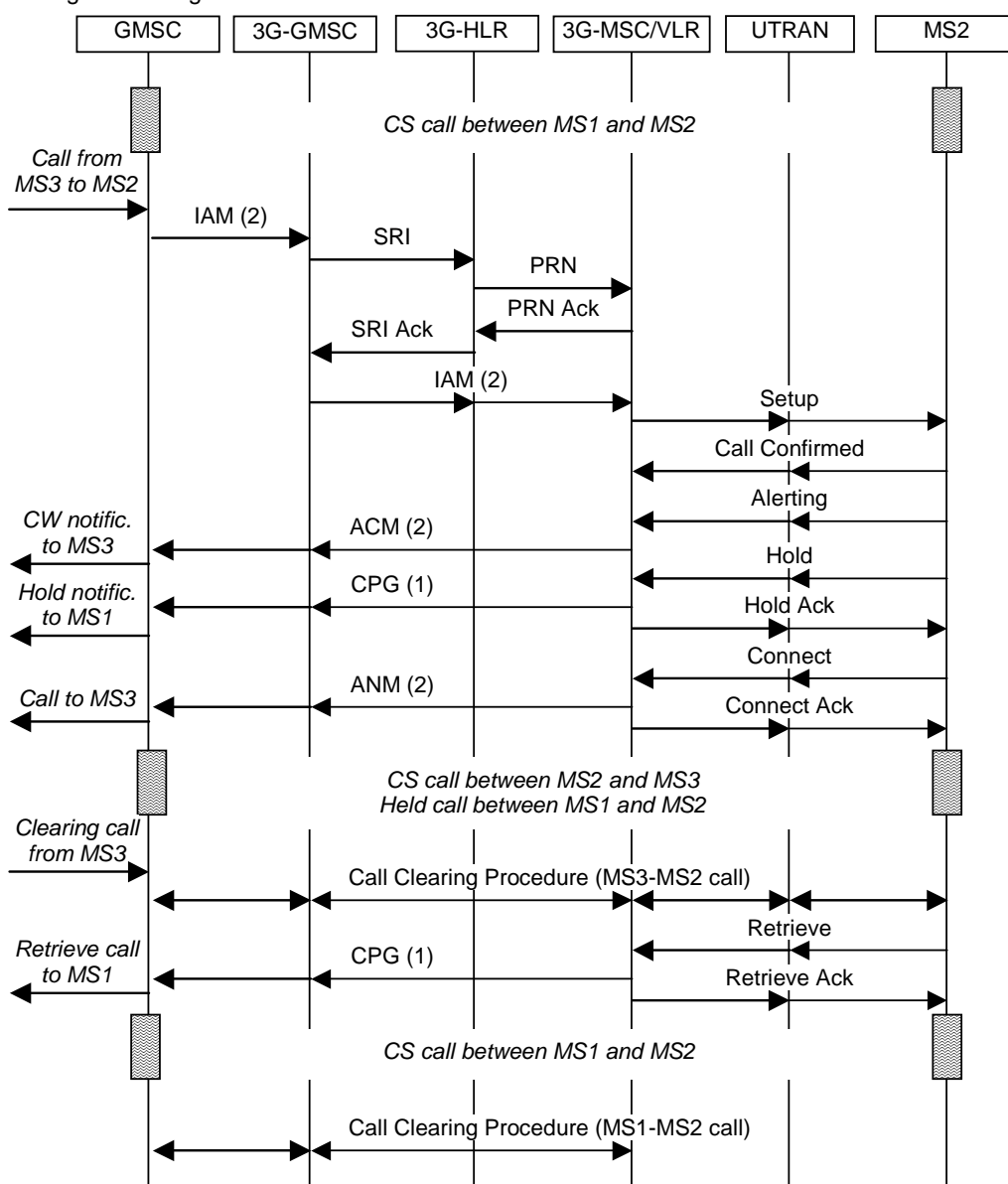


<p>2. Check the following fields in the messages:  <b>Call Confirmed:</b> Cause="user busy";  <b>Alerting(MT):</b> Facility(Invoke=NotifySS(CW, Call Waiting Indicator)), (see note 5);  <b>Facility(hold):</b> Facility(Invoke=NotifySS(HOLD, CallOnHold-Indicator);  <b>Facility(retrieve):</b> Facility(Invoke=NotifySS(HOLD, CallOnHold-Indicator).</p> <p>3. Check that MS2 held the call with MS1 and connects with the waiting call (MS3).</p> <p>4. Check that MS2 successful retrieves the call held (MS1) and that the call between MS3 and MS2 is successful terminated.</p>
<p>NOTE 1: In this test at least three subscribers are required.</p> <p>NOTE 2: The following messages are included in the Call Setup MO: CM Service Request, Security Functions messages, Setup, Call Proceeding, RAB Establishment messages and Alerting.</p> <p>NOTE 3: If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSCs take place.</p> <p>NOTE 4: The following messages are included in the Call Setup MT: Setup, Call Confirmed and Alerting.</p> <p>NOTE 5: If the SI is non-zero in the alerting message sent to the network by the MS2 then a notification of the active supplementary service is send to the MS3 in the alerting message or in a facility message.</p>
<p>REFERENCES: [1] clause 9.3; [12] clause 1.</p>

<p><b>Supplementary Services and SMS - Call Waiting and Call Hold</b>  SS_CWH_312: CW AND HOLD IN A GSM TO UMTS CALL</p>
<p>OBJECTIVE: This test aims to demonstrate the function of CW and call HOLD supplementary services in a call that involves UMTS and GSM users.</p>
<p>INTERFACES: <b>IuCS, ISUP.</b></p>
<p>PRECONDITIONS: Requires at least configuration n°4, (see note 1). The MS1 and MS3 must be registered in the HLR with GSM subscription, instead, the MS2 must have a UMTS subscription. All MSs must be attached.</p>
<p>PRIORITY: A</p>
<p>DESCRIPTION/PROCEDURE:</p> <ol style="list-style-type: none"> <li>1. Carry out a CW activation procedure by MS2.</li> <li>2. Carry out a CW interrogation procedure by MS2.</li> <li>3. Carry out a call from MS1 to MS2.</li> <li>4. Carry out a call from MS3 to MS2 when the call MS1-MS2 is still active.</li> <li>5. Carry out an HOLD procedure by MS2 for the call with MS1.</li> <li>6. Complete the MS2-MS3 call.</li> <li>7. Carry out a retrieve procedure for the held call (MS2-MS1).</li> <li>8. Carry out a call clearing procedure for the MS2-MS1 call.</li> </ol>

EXPECTED RESULTS:

1. The messages exchange to check is as follows:



2. Check the following fields in the messages:

- Call Confirmed:** Cause="user busy";
- ACM(2):** Generic Notification Indicator;
- Alerting/Facility(MT):** Facility(Invoke=NotifySS(CW, Call Waiting Indicator)), (see note 2);
- CPG(1):** Generic Notification Indicator;
- Facility(hold):** Facility(Invoke=NotifySS(HOLD, CallOnHold-Indicator);
- CPG(1):** Generic Notification Indicator, (see note 2);
- Facility(retrieve):** Facility(Invoke=NotifySS(HOLD, CallOnHold-Indicator);

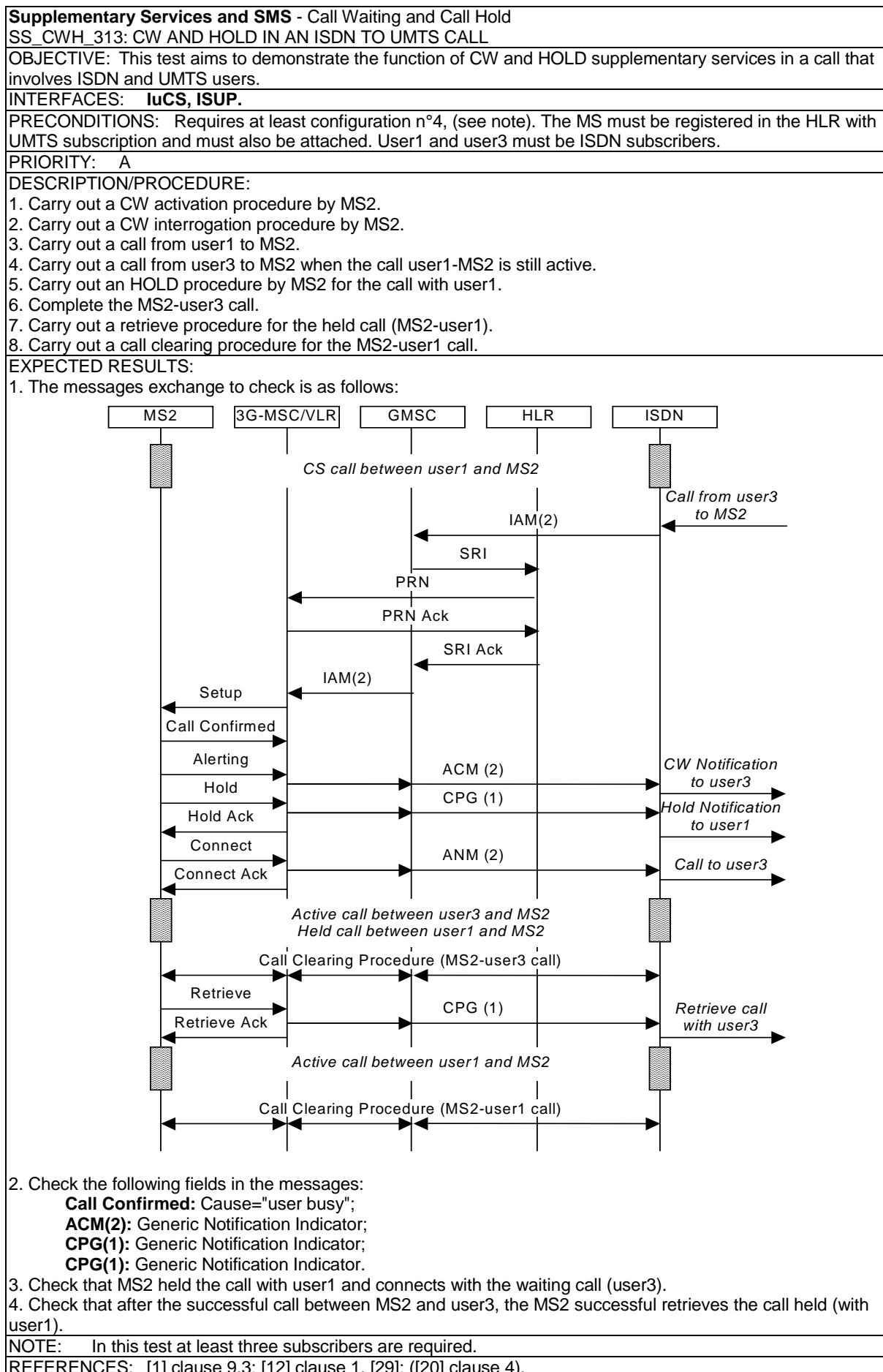
3. Check that MS2 held the call with MS1 and connects with the waiting call (MS3).

4. Check that after the successful call between MS2 and MS3, the MS2 successful retrieves the call held (with MS1).

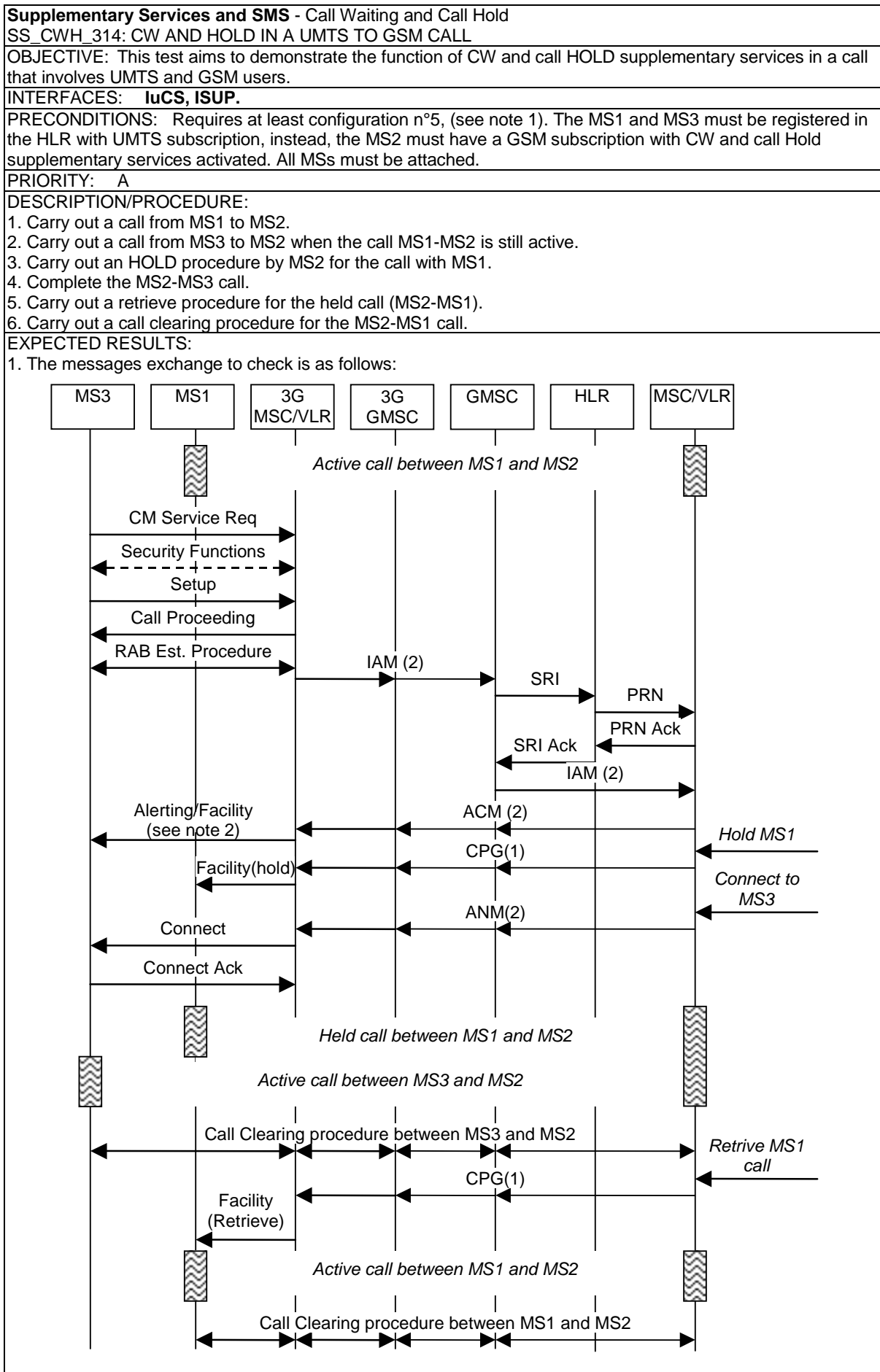
NOTE 1: In this test at least three subscribers are required.

NOTE 2: If the SI is non-zero in the alerting message send to the network by the MS2 then a notification of the active supplementary service is send to the MS3 in the alerting message or in a facility message.

REFERENCES: [1] clause 9.3; [12] clause 1; [29]; ([20] clause 4).





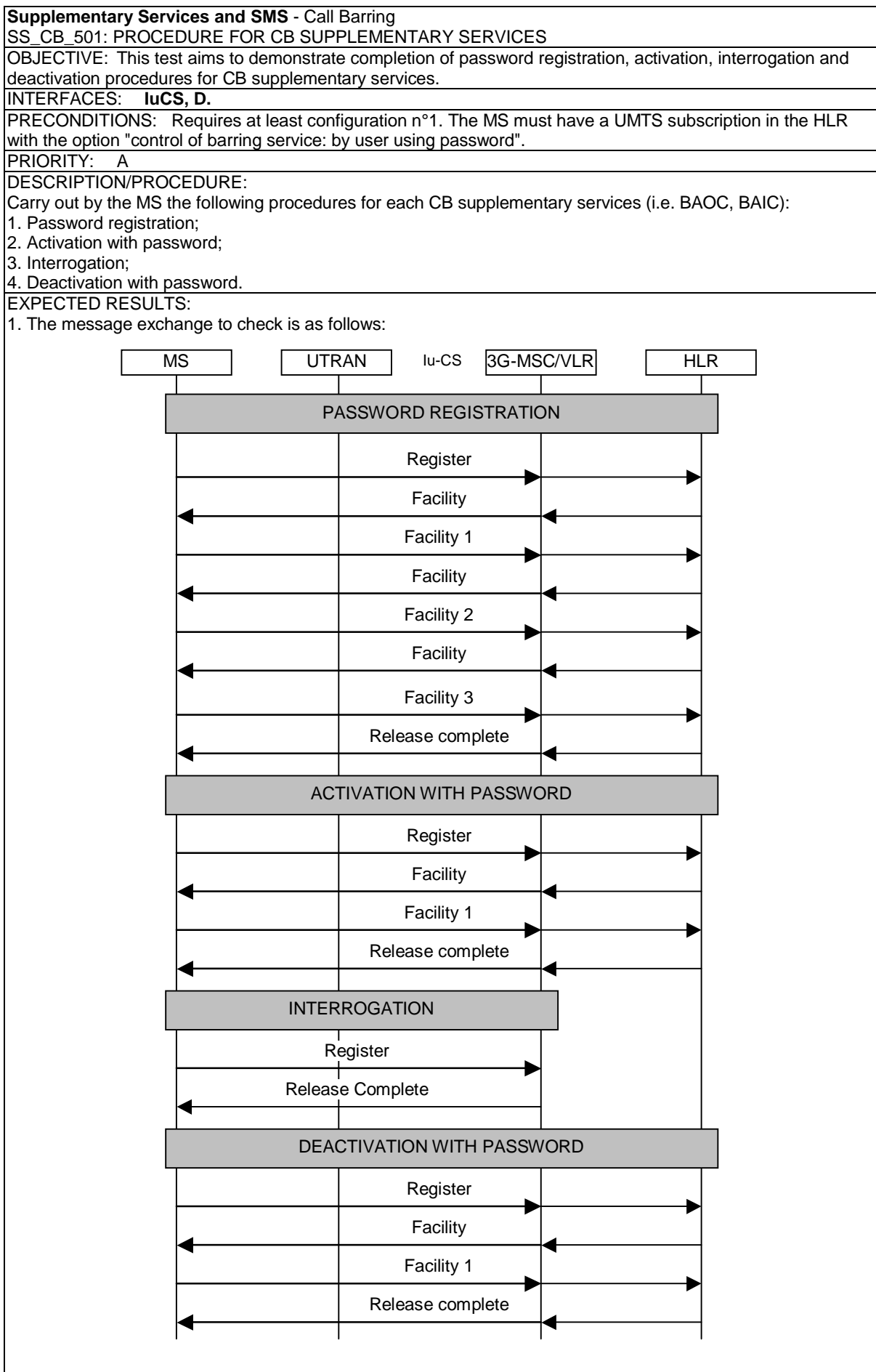


<p>2. Check the following fields in the messages:</p> <p><b>ACM(2):</b> Generic Notification Indicator;</p> <p><b>Alerting/Facility(MT):</b> Facility(Invoke=NotifySS(CW, Call Waiting Indicator)), (see note 2);</p> <p><b>CPG(1):</b> Generic Notification Indicator;</p> <p><b>Facility(hold):</b> Facility(Invoke=NotifySS(HOLD, CallOnHold-Indicator);</p> <p><b>CPG(1):</b> Generic Notification Indicator, (see note 2);</p> <p><b>Facility(retrieve):</b> Facility(Invoke=NotifySS(HOLD, CallOnHold-Indicator);</p> <p>3. Check that MS2 held the call with MS1 and connects with the waiting call (MS3).</p> <p>4. Check that after the successful call between MS2 and MS3, the MS2 successful retrieves the call held (with MS1).</p> <p>NOTE 1: In this test at least three subscribers are required.</p> <p>NOTE 2: If the SI is non-zero in the alerting message send to the network by the MS2 then a notification of the active supplementary service is send to the MS3 in the alerting message or in a facility message.</p> <p>REFERENCES: [1] clause 9.3; [12] clause 1, [29]; ([20] clause 4).</p>
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<p><b>Supplementary Services and SMS - Multy Party</b>  <b>SS_MPTY_401: MPTY CALL BETWEEN UMTS USERS</b></p> <p>OBJECTIVE: This test aims to demonstrate the function of the MPTY supplementary service in a call between UMTS subscribers.</p> <p>INTERFACES: <b>IuCS.</b></p> <p>PRECONDITIONS: Requires at least configuration n°4, (see note). The MS must have a UMTS subscription in the HLR and must also be attached.</p> <p>PRIORITY: A</p> <p>DESCRIPTION/PROCEDURE:</p> <ol style="list-style-type: none"> <li>Carry out a call from MS1 to MS2.</li> <li>Carry out a call from MS1 to MS3 after having held the call with MS2.</li> <li>Carry out a MPTY call by MS1 to MS2 and MS3.</li> <li>Release the multycall from MS1.</li> </ol> <p>EXPECTED RESULTS:</p> <ol style="list-style-type: none"> <li>The messages exchange to check is as follows:</li> </ol>
<pre> sequenceDiagram     participant MS1     participant VLR as 3G-MSC/VLR     participant MS2     participant MS3      Note over MS1, VLR: MS1-MS2 call Hold     MS1-&gt;&gt;VLR: Facility(MPTY)     VLR-&gt;&gt;MS2: Facility(HOLD,MPTY)     MS2-&gt;&gt;MS3: Facility(MPTY)     VLR-&gt;&gt;MS1: Facility(Result)      Note over MS1, VLR: MPTY call     MS1-&gt;&gt;VLR: Disconnect     VLR-&gt;&gt;MS2: Release     VLR-&gt;&gt;MS3: Release     MS2-&gt;&gt;VLR: Release Complete     VLR-&gt;&gt;MS1: Release Complete     MS1-&gt;&gt;VLR: Disconnect     VLR-&gt;&gt;MS2: Release     VLR-&gt;&gt;MS3: Release     MS2-&gt;&gt;VLR: Release Complete     VLR-&gt;&gt;MS1: Release Complete   </pre>
<p>2. Check the following fields in the messages:</p> <p><b>Facility(MPTY):</b> Facility(Invoke=BuildMPTY);</p> <p><b>Facility(HOLD,MPTY):</b> Facility(Invoke=NotifySS(HOLD, CallOnHold-Indicator), Invoke=NotifySS(MTPY, MTPYindicator));</p> <p><b>Facility(MPTY):</b> Facility(Invoke=NotifySS(MTPY, MTPYindicator));</p> <p><b>Facility(Result):</b> Facility(Return Result);</p> <p>3. Check that the multyparty call is successful.</p> <p>NOTE: In this test at least three subscribers are required.</p> <p>REFERENCES: [1] clause 9.3; [13].</p>

<b>Supplementary Services and SMS - Multy Party</b> <b>SS_MPTY_402: MPTY CALL BETWEEN UMTS AND GSM USERS</b>
<b>OBJECTIVE:</b> This test aims to demonstrate the function of a MPTY call between two UMTS users and a GSM user.
<b>INTERFACES:</b> <b>IuCS, ISUP.</b>
<b>PRECONDITIONS:</b> Requires at least configuration n°4, (see note 1). The MS1 and MS2 must have a UMTS subscription in the HLR, instead, the MS3 must have a GSM subscription. All MSs must be attached.
<b>PRIORITY:</b> A
<b>DESCRIPTION/PROCEDURE:</b> 1. Carry out a call from MS1 to the MS2. 2. Carry out a call from MS1 to MS3 after having held the call with MS2. 3. Carry out a MPTY call between three mobiles. 4. Release the multycall from MS1.
<b>EXPECTED RESULTS:</b> 1. The messages exchange to check is as follows: <div style="text-align: center;"> <pre> sequenceDiagram     participant MS1     participant MS2     participant VLR as 3G-MSC/VLR     participant GMSC as 3G-GMSC     participant GSMSC as GMSC      MS1-&gt;&gt;MS2: MS1-MS2 call Hold     MS1-&gt;&gt;VLR: Facility     VLR-&gt;&gt;MS2: Facility     VLR-&gt;&gt;GMSC: CPG(1) (see note 2)     GMSC-&gt;&gt;GSMSC: Notification to MS3     VLR-&gt;&gt;MS1: Facility     MS1-&gt;&gt;VLR: MPTY call     VLR-&gt;&gt;MS2: MPTY call     VLR-&gt;&gt;MS2: Disconnect (to MS2)     VLR-&gt;&gt;VLR: REL(1)/RLC(1)     VLR-&gt;&gt;MS1: Release Complete     VLR-&gt;&gt;VLR: Disconnect (to MS3)     VLR-&gt;&gt;GSMSC: REL(2)     GSMSC-&gt;&gt;GSMSC: Call Clearing to MS3     VLR-&gt;&gt;MS1: Release Complete   </pre> </div>
2. Check the following fields in the messages: <b>Facility(by MS1):</b> Facility(Invoke=BuildMPTY); <b>Facility(to MS2):</b> Facility(Invoke=NotifySS(HOLD, CallOnHold-Indicator), Invoke=NotifySS(MTPY, MPTYindicator)); <b>CPG(2):</b> Generic Notification Indicator=Conference established.
3. Check that the multyparty call is successful.
<b>NOTE 1:</b> In this test at least three subscribers are required.
<b>NOTE 2:</b> If the two UMTS users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSCs take place.
<b>REFERENCES:</b> [1] clause 9.3; [13]; [29]; ([20] clause 4).

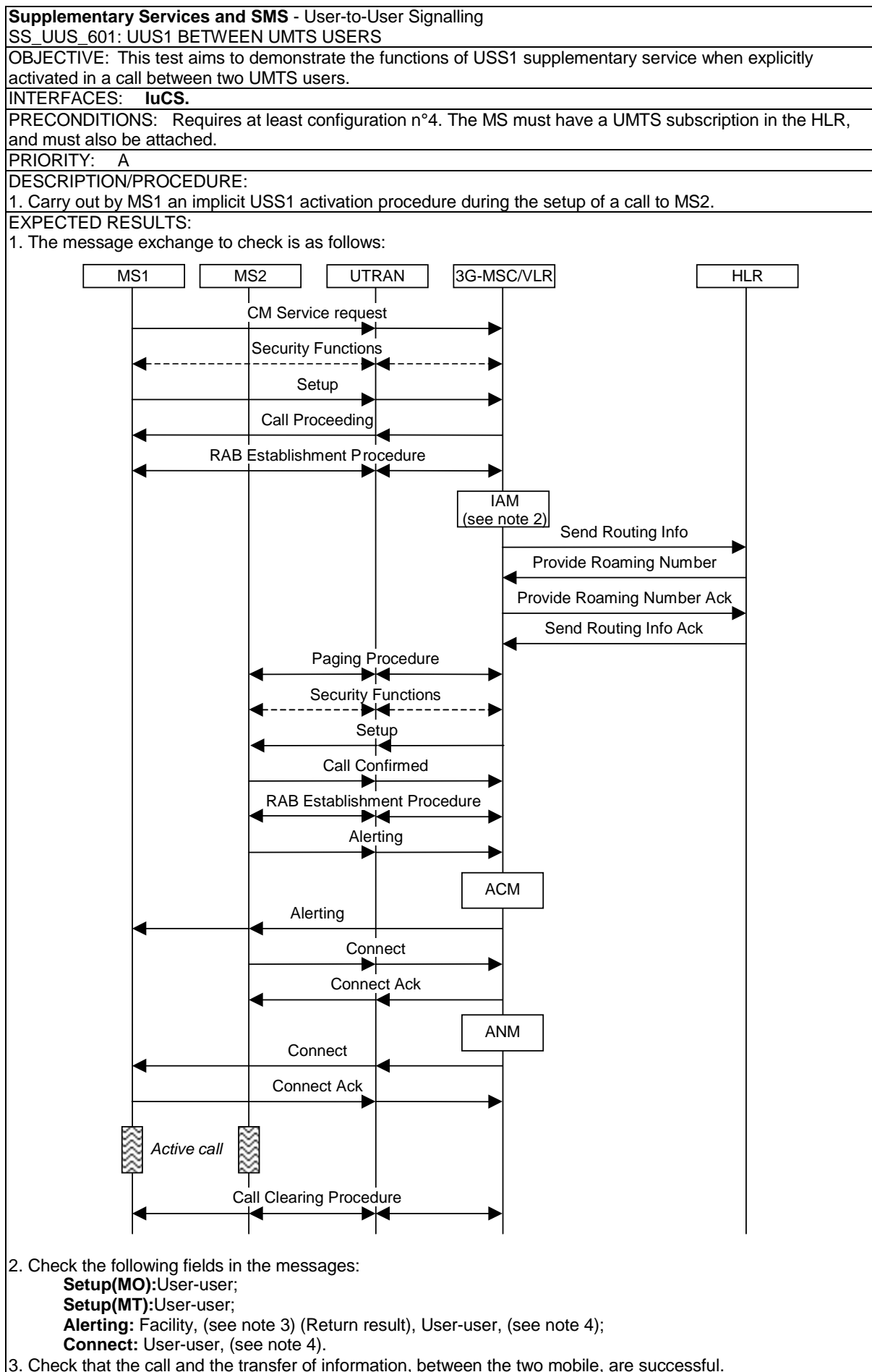
<b>Supplementary Services and SMS - Multy Party</b> <b>SS_MPTY_403: MPTY CALL BETWEEN UMTS AND ISDN USERS</b>
<b>OBJECTIVE:</b> This test aims to demonstrate the function of a MPTY call between two UMTS users and an ISDN user.
<b>INTERFACES:</b> <b>IuCS, ISUP.</b>
<b>PRECONDITIONS:</b> Requires at least configuration n°4, (see note 1). The MS1 and MS2 must have a UMTS subscription in the HLR, and must also be attached.
<b>PRIORITY:</b> A
<b>DESCRIPTION/PROCEDURE:</b> 1. Carry out a call from MS1 to MS2. 2. Carry out a call from MS1 to the ISDN user (user3) after having held the call with MS2. 3. Carry out a MPTY call between the three users. 4. Release the multycall from MS1.
<b>EXPECTED RESULTS:</b> 1. The messages exchange to check is as follows: <div style="text-align: center;"> <pre> sequenceDiagram     participant MS1     participant MS2     participant VLR as 3G-MSC/VLR     participant GMSC as 3G-GMSC     participant ISDN      Note over MS1, MS2: MS1-MS2 call Hold     Note over MS1, MS2: MPTY call     Note over MS1, VLR: Facility     Note over VLR, MS2: Facility     Note over VLR, GMSC: CPG(1) (see note 2)     Note over GMSC, ISDN: CPG(2)     Note over ISDN: Notification to user3     Note over MS1, VLR: Disconnect (to MS2)     Note over VLR, GMSC: REL(1)/RLC(1)     Note over VLR, MS1: Release Complete     Note over VLR, ISDN: Disconnect (to user3)     Note over VLR, GMSC: REL(2)     Note over GMSC, ISDN: REL(2)     Note over ISDN: Call Clearing to user3           </pre> </div>
2. Check the following fields in the messages: <b>Facility(by MS1):</b> Facility(Invoke=BuildMPTY); <b>Facility(to MS2):</b> Facility(Invoke=NotifySS(HOLD, CallOnHold-Indicator), Invoke=NotifySS(MTPY, MTPYindicator)); <b>CPG(2):</b> Generic Notification Indicator=Conference established.
3. Check that the multyparty call is successful.
<b>NOTE 1:</b> In this test at least three subscribers are required.
<b>NOTE 2:</b> If the two UMTS users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSCs take place.
<b>REFERENCES:</b> [1] clause 9.3; [13]; [29]; ([20] clause 4).



<p>2. Check the following fields in the messages:</p> <p>Password Registration</p> <p><b>Register:</b> Facility(Invoke = Register Password (SS-Code));  <b>Facility:</b> Facility(Invoke = GetPassword);  <b>Facility 1:</b> Facility(ReturnResult = GetPassword "old password");  <b>Facility 2:</b> Facility(ReturnResult = GetPassword "new password");  <b>Facility 3:</b> Facility(ReturnResult = GetPassword "new password");  <b>Release Complete:</b> Facility(ReturnResult = RegisterPassword "new password").</p> <p>Activation with password</p> <p><b>Register:</b> Facility(Invoke = ActivateSS(SS-Code));  <b>Facility:</b> Facility(Invoke = GetPassword);  <b>Facility 1:</b> Facility(ReturnResult = GetPassword "password");  <b>Release Complete:</b> Facility(ReturnResult = ActivateSS(SS-Code)).</p> <p>Interrogation</p> <p><b>Register:</b> Facility(Invoke = InterrogateSS(SS-Code));  <b>Release Complete:</b> Facility(ReturnResult = InterrogateSS(SS-Code)).</p> <p>Deactivation with password</p> <p><b>Register:</b> Facility(Invoke = DeactivateSS(SS-Code));  <b>Facility:</b> Facility(Invoke = GetPassword);  <b>Facility 1:</b> Facility(ReturnResult = GetPassword "password");  <b>Release Complete:</b> Facility(ReturnResult = DeactivateSS(SS-Code)).</p> <p>REFERENCES: [14] clause 6.</p>
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<p><b>Supplementary Services and SMS - Call Barring</b>  SS_CB_511: BAOCS BY UMTS USER</p>
<p>OBJECTIVE: This test aims to demonstrate the functions of BAOCS supplementary service.</p>
<p>INTERFACES: <b>Iu-CS.</b></p>
<p>PRECONDITIONS: Requires at least configuration n°4. The MS must have a UMTS subscription in the HLR, and must also be attached.</p>
<p>PRIORITY: A</p>
<p>DESCRIPTION/PROCEDURE:</p> <ol style="list-style-type: none"> <li>Carry out a password registration for BAOCS by MS1.</li> <li>Check that the following subscription options are stored in the HLR for MS1: <ul style="list-style-type: none"> <li>control of barring services by subscriber using password;</li> <li>call barring password;</li> <li>wrong password attempts counter.</li> </ul> </li> <li>Carry out, by MS1, a BAOCS activation procedure for calls relating to all basic service groups.</li> <li>Carry out a call by MS1 to MS2.</li> <li>Carry out a deactivation procedure by MS1.</li> </ol>
<p>EXPECTED RESULTS:</p> <ol style="list-style-type: none"> <li>The message exchange to check is as follows:</li> </ol> <pre> sequenceDiagram     participant MS1     participant MS2     participant UTRAN     participant Iu-CS     participant MSC as 3G-MSC/VLR      MS1-&gt;&gt;UTRAN: CM Service Request     UTRAN-&gt;&gt;MS2: Security Functions     MS2-&gt;&gt;UTRAN: Setup     UTRAN-&gt;&gt;MS1: Disconnect     MS1-&gt;&gt;UTRAN: Release     UTRAN-&gt;&gt;MS2: Release Complete   </pre>
<p>2. Check the following fields in the messages:</p> <p><b>Disconnect:</b> Cause=('Operator determined barring'), Facility (Invoke=NotifySS(SS-Code)).</p>
<p>3. Check that the call is rejected.</p>
<p>4. Check that after the deactivation procedure the call is successful.</p>
<p>REFERENCES: [1] clause 9.3; [14]; [15].</p>

<b>Supplementary Services and SMS - Call Barring</b>	
SS_CB_512: BAIC FOR UMTS USER	
OBJECTIVE: This test aims to demonstrate the function of BAIC supplementary service.	
INTERFACES: <b>IuCS.</b>	
PRECONDITIONS: Requires at least configuration n°4. The MS must have a UMTS subscription in the HLR, and must also be attached.	
PRIORITY: A	
DESCRIPTION/PROCEDURE:	
<ol style="list-style-type: none"> <li>1. Carry out, by MS1, a password registration procedure for BAIC.</li> <li>2. Check that the following subscription option are stored in the HLR for MS1: <ul style="list-style-type: none"> <li>• control of barring services by subscriber using password;</li> <li>• call barring password;</li> <li>• wrong password attempts counter.</li> </ul> </li> <li>3. Carry out a BAIC activation procedure by MS1.</li> <li>4. Carry out a call by MS2 to MS1.</li> <li>5. Carry out a deactivation procedure by MS1.</li> </ol>	
EXPECTED RESULTS:	
1. The message exchange to check is as follows:	
<pre> sequenceDiagram     participant MS1     participant MS2     participant UTRAN     participant MSC as 3G-MSC/VLR     Note over UTRAN, MSC: Iu-CS     MS2-&gt;&gt;MSC: CM Service Request     MSC--&gt;&gt;MS2: Security Functions     MS2-&gt;&gt;MSC: Setup     MSC--&gt;&gt;MS2: Call Proceeding     MS2-&gt;&gt;UTRAN: RAB Establishment Procedure     UTRAN--&gt;&gt;MSC: Call Clearing Procedure     MS2-&gt;&gt;MSC: Call Clearing Procedure     MSC--&gt;&gt;MS2: IAM (see note 1)     MSC--&gt;&gt;MS2: REL/RLC     </pre>	
2. Check the following fields in the messages:	
<b>Disconnect:</b> Cause=('Call barred'), Facility(Invoke = NotifySS(SS-Code)), (see note 2);	
3. Check that the call is rejected.	
4. Check that after the deactivation procedure the call is successful.	
NOTE 1: If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSCs take place.	
NOTE 2: The Disconnect message is included in the Call Clearing Procedure.	
REFERENCES: [1] clause 9.3; [14]; [15].	





NOTE 1: Some networks may support the transmission of UUI with a maximum length of only 32 octets per message for service 1.  
 NOTE 2: If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSCs take place.  
 NOTE 3: The Return result in the facility information element may be sent either in the Alerting or in the Connect message.  
 NOTE 4: The field User-user is optional in the call control messages from the called party.  
 REFERENCES: [1] clause 9.3; [22] clause 4.1; [23] clause 5.2.1.

**Supplementary Services and SMS - User-to-User Signalling**  
**SS\_UUS\_602: UUS1 BETWEEN GSM AND UMTS USERS**

OBJECTIVE: This test aims to demonstrate the functions of USS1 supplementary service when explicitly activated in a call between a GSM user and a UMTS user.

INTERFACES: **IuCS, ISUP.**

PRECONDITIONS: Requires at least configuration n°4. The MS1 must have a UMTS subscription in the HLR, instead, the MS2 must have a GSM subscription. Both MSs must be attached.

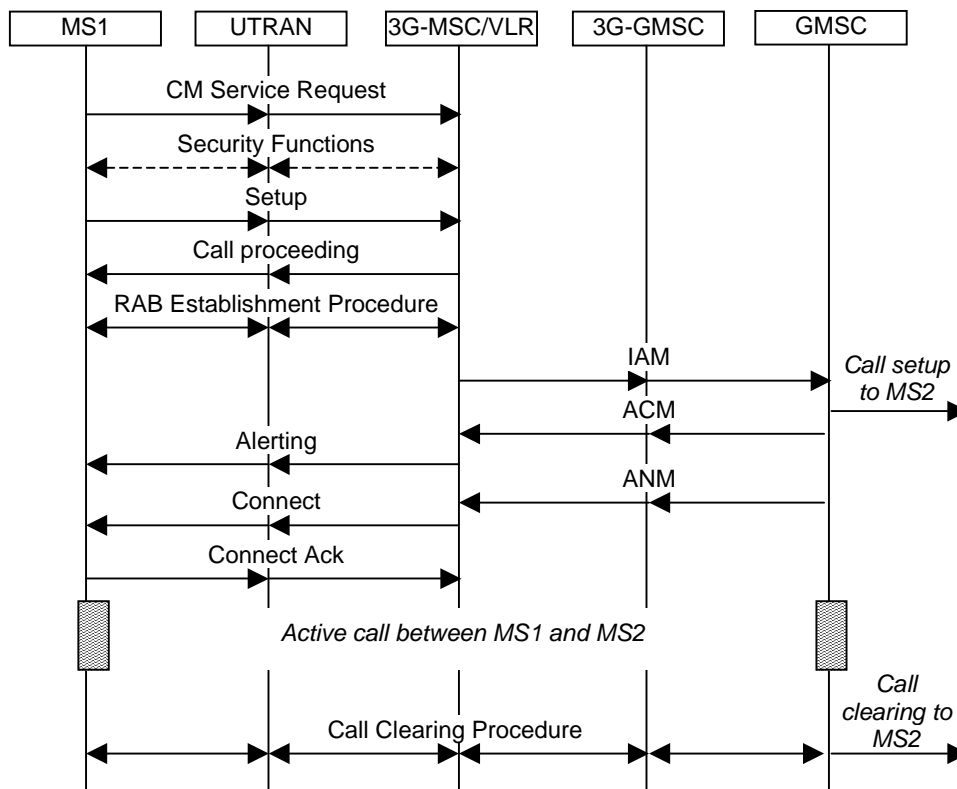
PRIORITY: A

DESCRIPTION/PROCEDURE:

1. Carry out by MS1 an explicitly USS1 activation procedure during the setup of a call to MS2.

EXPECTED RESULTS:

1. The message exchange to check is as follows:



2. Check the following fields in the messages:

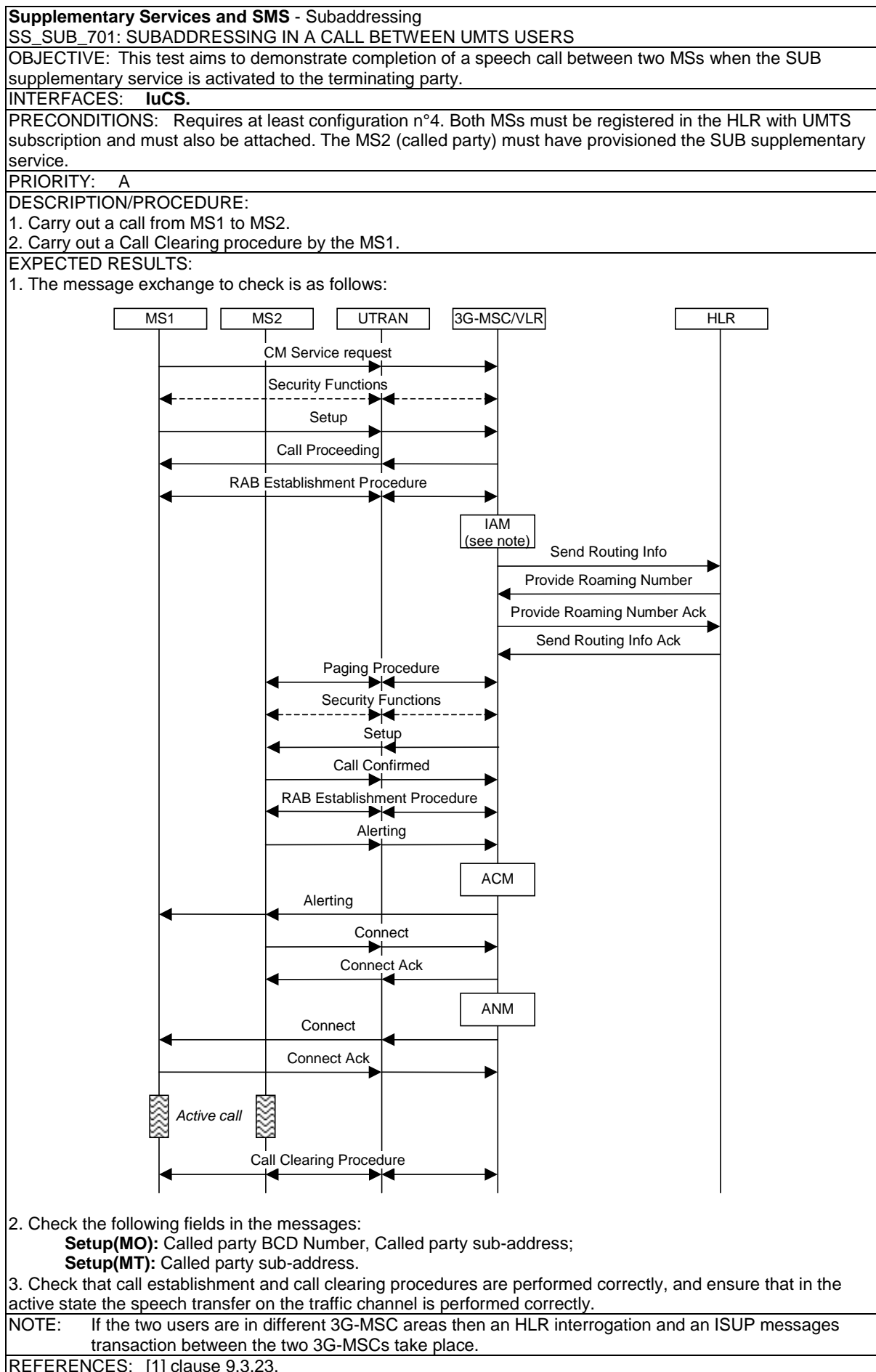
- Setup(MO):** User-user;
- IAM:** User to user information;
- Setup(MT):** User-user, (see note 2);
- Alerting:** User-user, (see note 2);
- Connect:** User-user, (see note 2).

3. Check that the call and the transfer of information, between the two mobiles, are successful.

NOTE 1: Some networks may support the transmission of UUI with a maximum length of only 32 octets per message for service 1.

NOTE 2: The field User-user is optional in the call control messages from the called party.

REFERENCES: [1] clause 9.3; [22] clause 4.1; [23] clause 5.2.1.



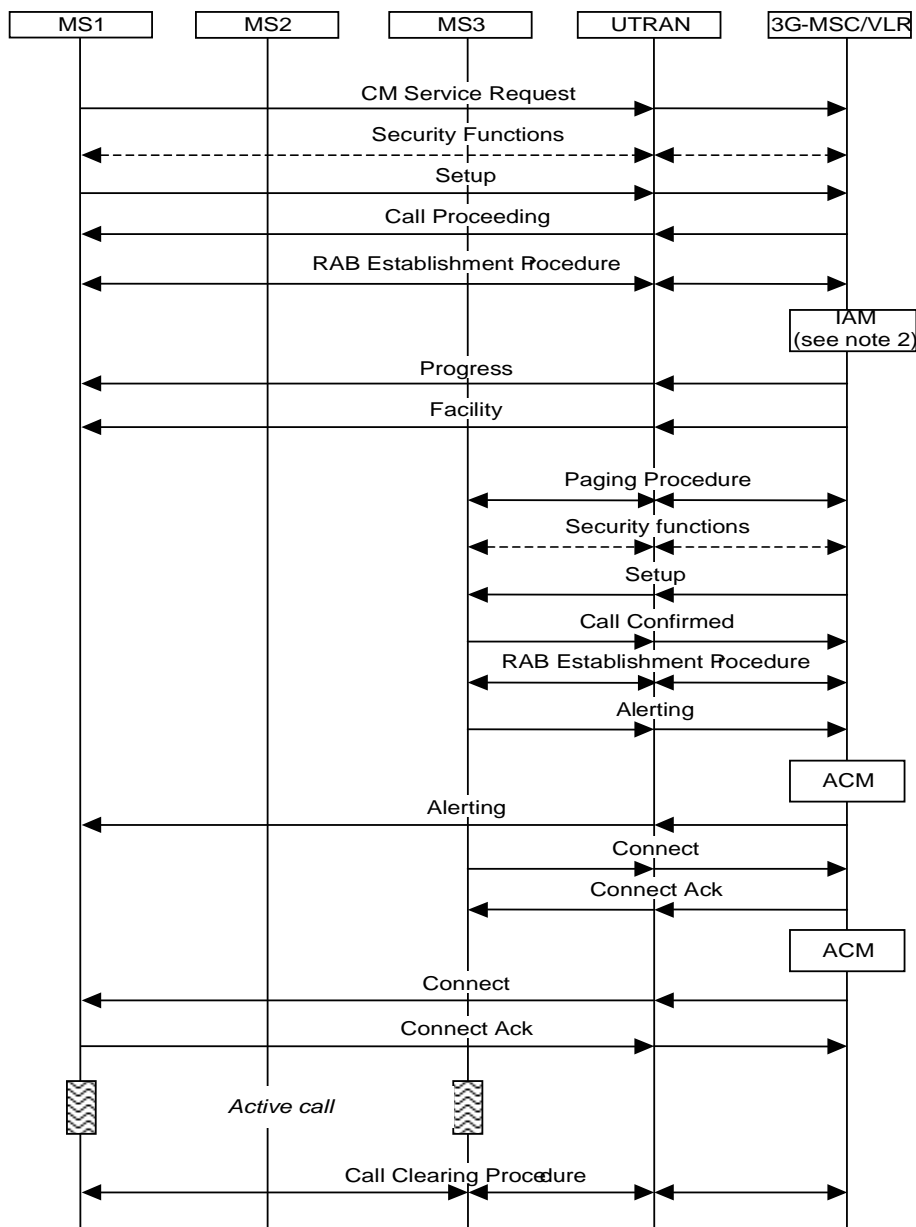
<p><b>Supplementary Services and SMS - Subaddressing</b>  <b>SS_SUB_702: SUBADDRESSING IN A GSM TO UMTS CALL</b></p>
<p><b>OBJECTIVE:</b> This test aims to demonstrate completion of a speech call from a GSM to a UMTS subscriber when the SUB supplementary service is activated to the terminating party.</p>
<p><b>INTERFACES:</b> <b>IuCS, ISUP.</b></p>
<p><b>PRECONDITIONS:</b> Requires at least configuration n°5. The MS1 must have a UMTS subscription in the HLR with SUB supplementary service provisioned, instead MS2 must have a GSM subscription.</p>
<p><b>PRIORITY:</b> A</p>
<p><b>DESCRIPTION/PROCEDURE:</b>                  1. Carry out a MO call from MS2 to MS1 ensuring that the setup MO includes the field 'called party sub-address'.                  2. Carry out a Call Clearing procedure.</p>
<p><b>EXPECTED RESULTS:</b>                  1. The message exchange to check is as follows:</p> <pre> sequenceDiagram     participant MS1     participant UTRAN     participant VLR as 3G-MSC/VLR     participant GMSC3G as 3G-GMSC     participant GMSC      Note over GMSC: Call setup to MS1     GMSC3G-&gt;&gt;VLR: IAM     VLR-&gt;&gt;MS1: Paging Procedure     VLR-&gt;&gt;MS1: Security Functions     VLR-&gt;&gt;MS1: Setup     MS1-&gt;&gt;VLR: Call Confirmed     VLR-&gt;&gt;MS1: RAB Establishment Procedure     VLR-&gt;&gt;MS1: Alerting     VLR-&gt;&gt;MS1: Connect     MS1-&gt;&gt;VLR: Connect Ack     VLR-&gt;&gt;GMSC3G: ACM     VLR-&gt;&gt;GMSC3G: ANM     GMSC3G-&gt;&gt;GMSC: ANM     Note over MS1, VLR: Active call between MS1 and MS2     Note over GMSC: Call clearing to MS2     GMSC-&gt;&gt;GMSC3G: Call Clearing Procedure     GMSC3G-&gt;&gt;VLR: Call Clearing Procedure     </pre>
<p>2. Check the following fields in the messages:  <b>IAM:</b> Access Transport Parameter(Called party Sub-address);  <b>Setup:</b> Called party sub-address.</p>
<p>3. Check that the call is successful.</p>
<p><b>REFERENCES:</b> [1] clause 9.3.23; [29]; ([20] clause 4).</p>

<b>Supplementary Services and SMS - Subaddressing</b>
<b>SS_SUB_703: SUBADDRESSING IN A ISDN TO UMTS CALL</b>
OBJECTIVE: This test aims to demonstrate completion of a speech call from an ISDN to a UMTS user when the SUB supplementary service is activated to the terminating party.
INTERFACES: <b>IuCS, ISUP.</b>
PRECONDITIONS: Requires at least configuration n°4. The MS must be registered in the HLR with UMTS subscription, it must have provisioned the SUB supplementary service and it must also be attached.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Carry out a speech call by the ISDN user to the MS ensuring that the setup (MO) includes the field 'called party sub-address'. 2. Carry out a Call Clearing procedure.
EXPECTED RESULTS: 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS     participant UTRAN     participant MSC as 3G-MSC/VLR     participant GMSC as 3G-GMSC     participant ISDN      ISDN-&gt;&gt;GMSC: Call setup to MS     GMSC-&gt;&gt;MSC: IAM     MSC-&gt;&gt;MS: Paging Procedure     MSC-&gt;&gt;MS: Security Functions     MSC-&gt;&gt;MS: Setup     MSC-&gt;&gt;MS: Call Confirmed     MSC-&gt;&gt;MS: RAB Establishment Procedure     MSC-&gt;&gt;MS: Alerting     MSC-&gt;&gt;MS: Connect     MSC-&gt;&gt;MS: Connect Ack     MSC-&gt;&gt;GMSC: ACM     MSC-&gt;&gt;GMSC: ANM     Note over MS, MSC: Active call between MS and user1     MSC-&gt;&gt;GMSC: Call Clearing Procedure     GMSC-&gt;&gt;ISDN: Call clearing to user1   </pre>
2. Check the following field in the message: <b>IAM:</b> Access Transport Parameter(Called party Sub-address); <b>Setup:</b> Called party sub-address.
3. In the active call state ensure that speech transfer on the traffic and B-channels are performed correctly.
4. Check that the call is successful.
REFERENCES: [1] clause 9.3.23; [29]; ([20] clause 4).

<b>Supplementary Services and SMS - Interaction between Supplementary Services</b>
<b>SS_INT_801: CFU-CLIP-COLP IN A UMTS-UMTS CALL</b>
OBJECTIVE: This test aims to demonstrate the interactions between CFU CLIP and COLP during a call between UMTS subscribers.
INTERFACES: <b>IuCS.</b>
PRECONDITIONS: Requires at least configuration n°4, (see note 1). The MSs must be registered in the HLR with UMTS subscription and must also be attached. The calling party (MS1) must be provided with COLP, the called party (MS2) must be provided with CFU and the forwarded party (MS3) must be provided with CLIP.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Carry out a CS call from MS1 to MS2. 2. Carry out a Call clearing procedure.

EXPECTED RESULTS:

1. The message exchange to check is as follows:



2. Check the following fields in the messages:

**Facility:** Facility(Invoke=NotifySS(CFU, SS-Notification)).

**Setup(MT):** Facility(Invoke=NotifySS(CFU, SS-Notification)), Redirecting party number(SI, PI, LI), Calling Number(MS1);

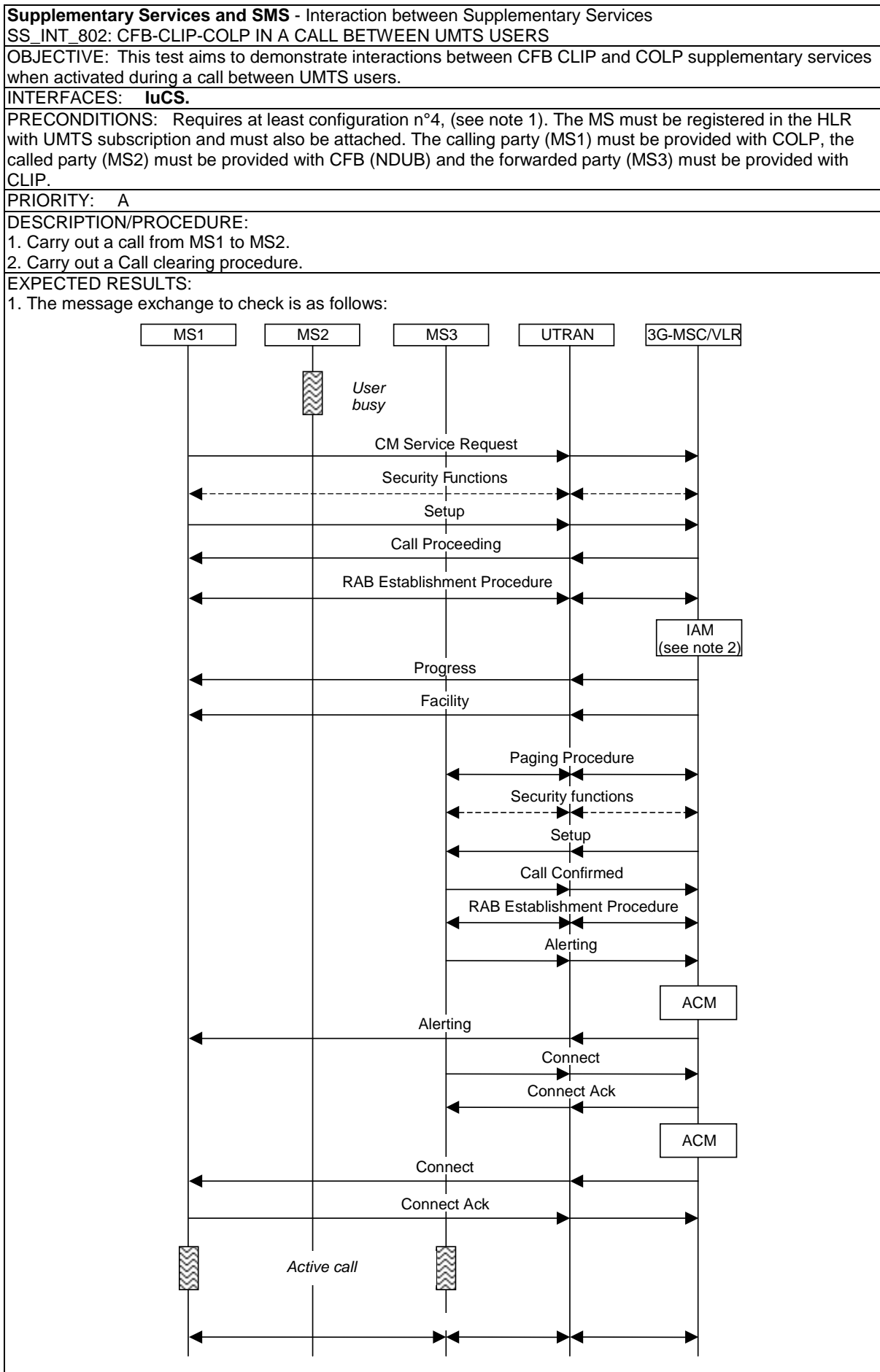
**Connect(to MS1):** Connected Number(MS3).

3. Check that the call is forwarded to MS3 and that it is successfully completed.

NOTE 1: In this test at least three users are required.

NOTE 2: If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSCs take place.

REFERENCES: [1] clause 9.3; [11] clause 1.



2. Check the following fields in the messages:  
**Facility:** Facility(Invoke=NotifySS(CFB, SS-Notification));  
**Setup (MT):** Facility(Invoke=NotifySS(CFB, SS-Notification), Redirecting party BCD number(SI, PI, LI), Calling Number (MS1);  
**Connect(MT):** Connected number(MS3).
3. Check that the call is forwarded to MS3 and that the call is successfully completed.
- NOTE 1: In this test at least three users are required.  
 NOTE 2: If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSCs take place.
- REFERENCES: [1] clause 9.3; [11] clause 2.

**Supplementary Services and SMS - Interaction between Supplementary Services**  
 SS\_INT\_803: CFNRy-CLIP-COLP IN A CALL BETWEEN UMTS USERS

OBJECTIVE: This test aims to demonstrate interactions between CFNRy CLIP and COLP supplementary services when activated during a call between UMTS users.

INTERFACES: **IuCS.**

PRECONDITIONS: Requires at least configuration n°4, (see note 1). The MS must be registered in the HLR with UMTS subscription and must also be attached. The calling party (MS1) must be provided with COLP, the called party (MS2) must be provided with CFNRy and the forwarded party (MS3) must be provided with CLIP.

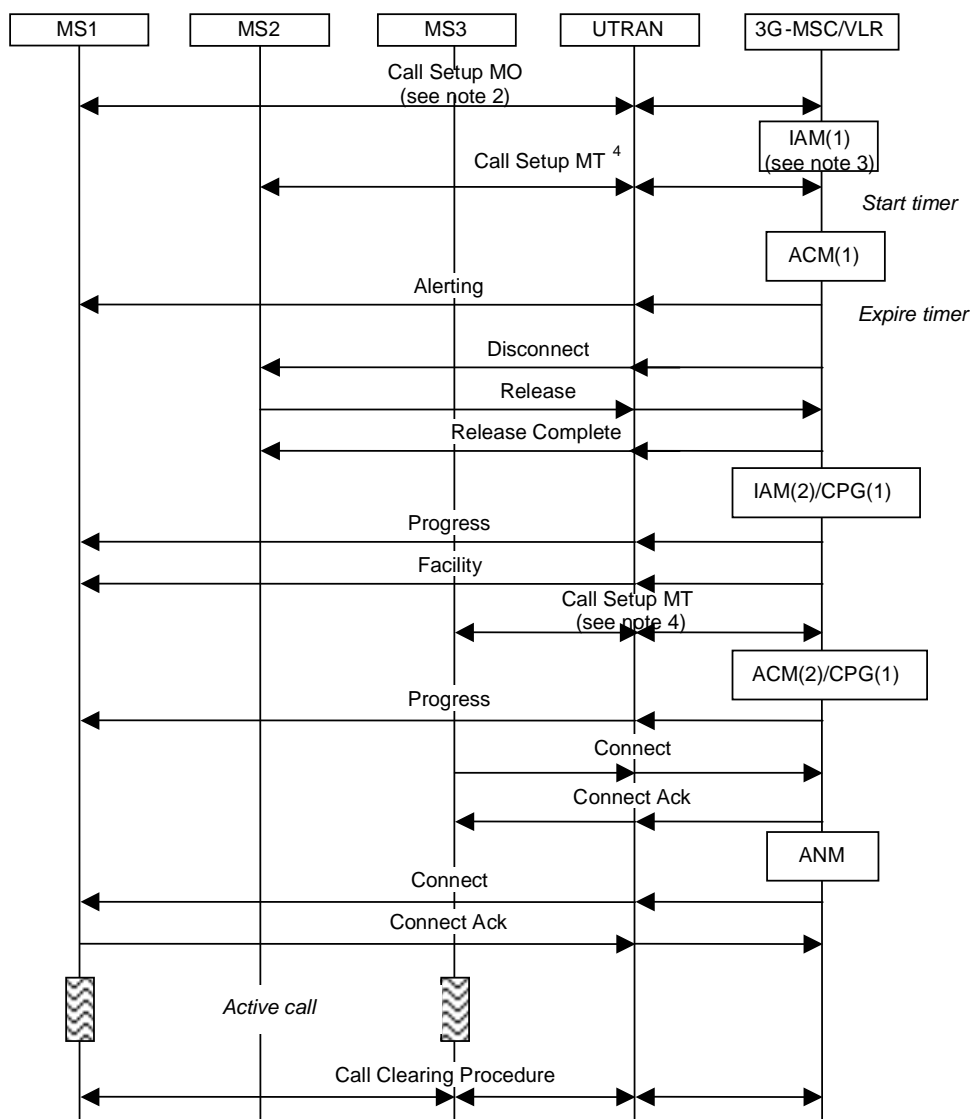
PRIORITY: A

DESCRIPTION/PROCEDURE:

1. Carry out a call from MS1 to MS2.
2. Carry out a Call clearing procedure.

EXPECTED RESULTS:

1. The message exchange to check is as follows:



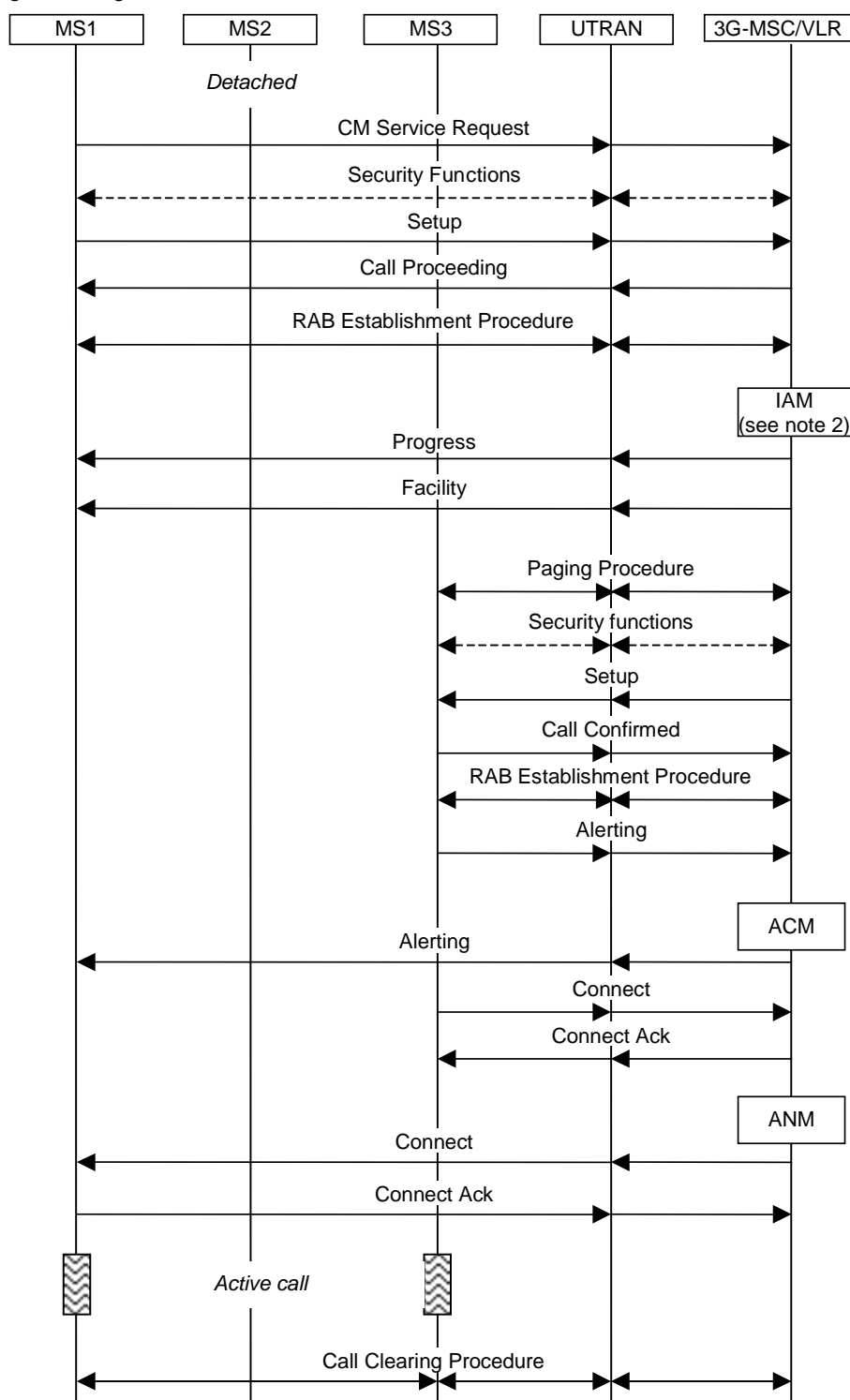
<p>2. Check the following fields in the messages:  <b>Facility:</b> Facility(Invoke=NotifySS(CFNRY, SS-Notification));  <b>Setup (MT):</b> Facility(Invoke=NotifySS(CFNRY, SS-Notification)), Redirecting party BCD number (SI, PI, LI), Calling Number(MS1);  <b>Connect(MT):</b> Connected number(MS3).</p>
<p>3. Check that the call is forwarded to MS3 and that it is successfully completed.</p>
<p>NOTE 1: In this test at least three subscribers are required.</p>
<p>NOTE 2: In the Call Setup MO are included the following messages: CM Service Request, Setup, Call Proceeding, RAB Establishment Procedure messages and Alerting.</p>
<p>NOTE 3: If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSCs take place.</p>
<p>NOTE 4: In the Call Setup MT are included the following messages: Paging Procedure messages, Setup, Call Confirmed, RAB Establishment Procedure messages and Alerting.</p>
<p>REFERENCES: [1] clause 9.3; [11] clause 3.</p>

<p><b>Supplementary Services and SMS - Interaction between Supplementary Services</b>  SS_INT_804: CFNRc-CLIP-COLP IN A CALL BETWEEN UMTS USERS</p>
<p>OBJECTIVE: This test aims to demonstrate interactions between CFNRc CLIP and COLP supplementary services when activated during a call between UMTS users.</p>
<p>INTERFACES: <b>IuCS.</b></p>
<p>PRECONDITIONS: Requires at least configuration n°4 (see note 1). The user must be registered in the HLR with UMTS subscription and must also be attached. The calling party (MS1) must be provided with COLP, the called party (MS2) must be provided with CFNRc and the forwarded party (MS3) must be provided with CLIP.</p>
<p>PRIORITY: A</p>
<p>DESCRIPTION/PROCEDURE:  1. Carry out a call from MS1 to MS2.  2. Carry out a Call clearing procedure.</p>



## EXPECTED RESULTS:

1. The message exchange to check is as follows:



1. Check the following fields in the messages:

**Setup (MT):** Facility(Invoke=NotifySS(CFNRC, SS-Notification)), Redirecting party BCD number (SI, PI, LI), Calling Number(MS1);

**Facility:** Facility(Invoke=NotifySS(CFNRC, SS-Notification));

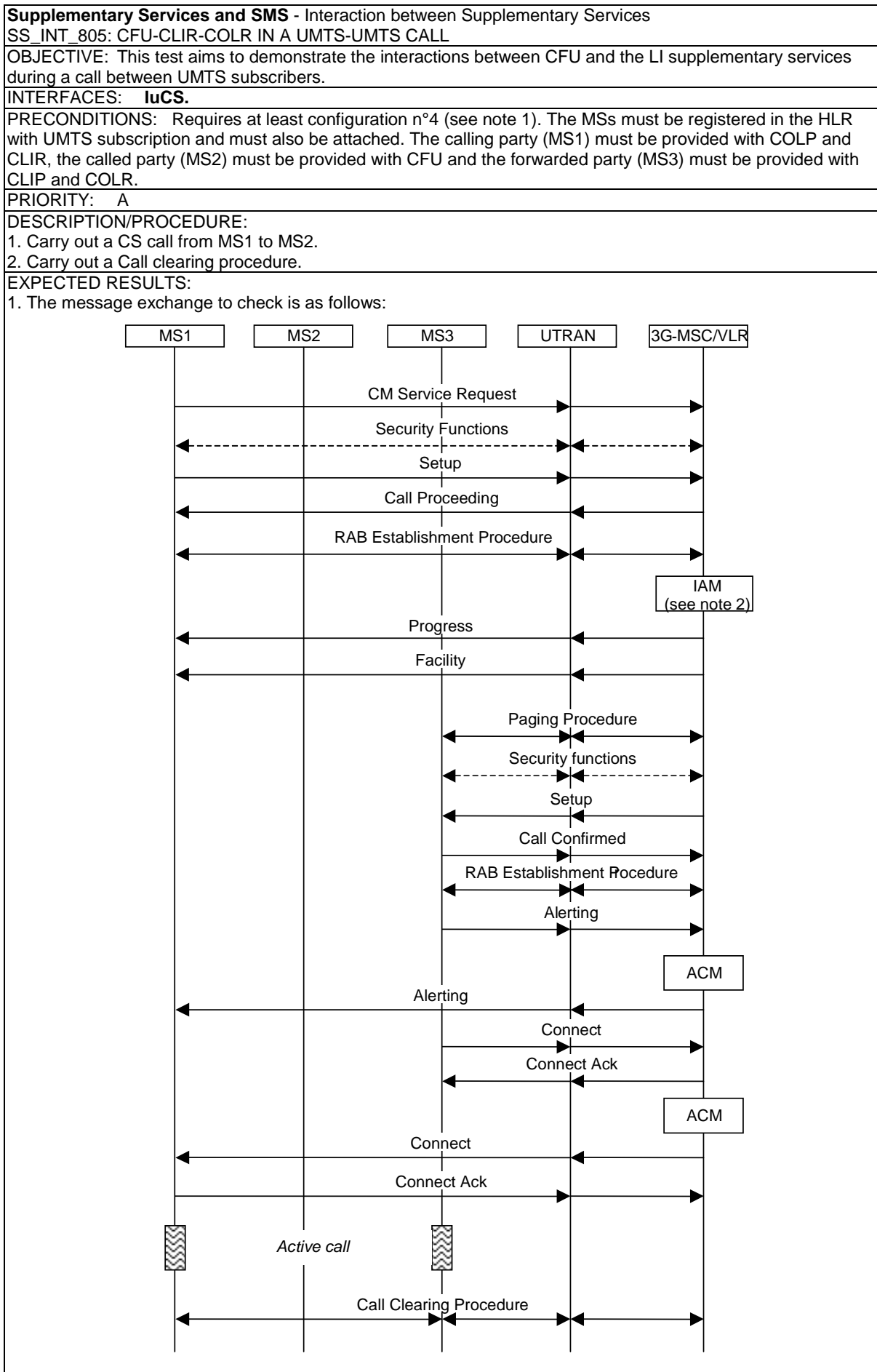
**Connect(MT):** Connected Number(MS3).

2. Check that the call is forwarded to MS3 and that is successfully completed.

NOTE 1: In this test at least three users are required.

NOTE 2: If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSCs take place.

REFERENCES: [1] clause 9.3; [11] clause 4.

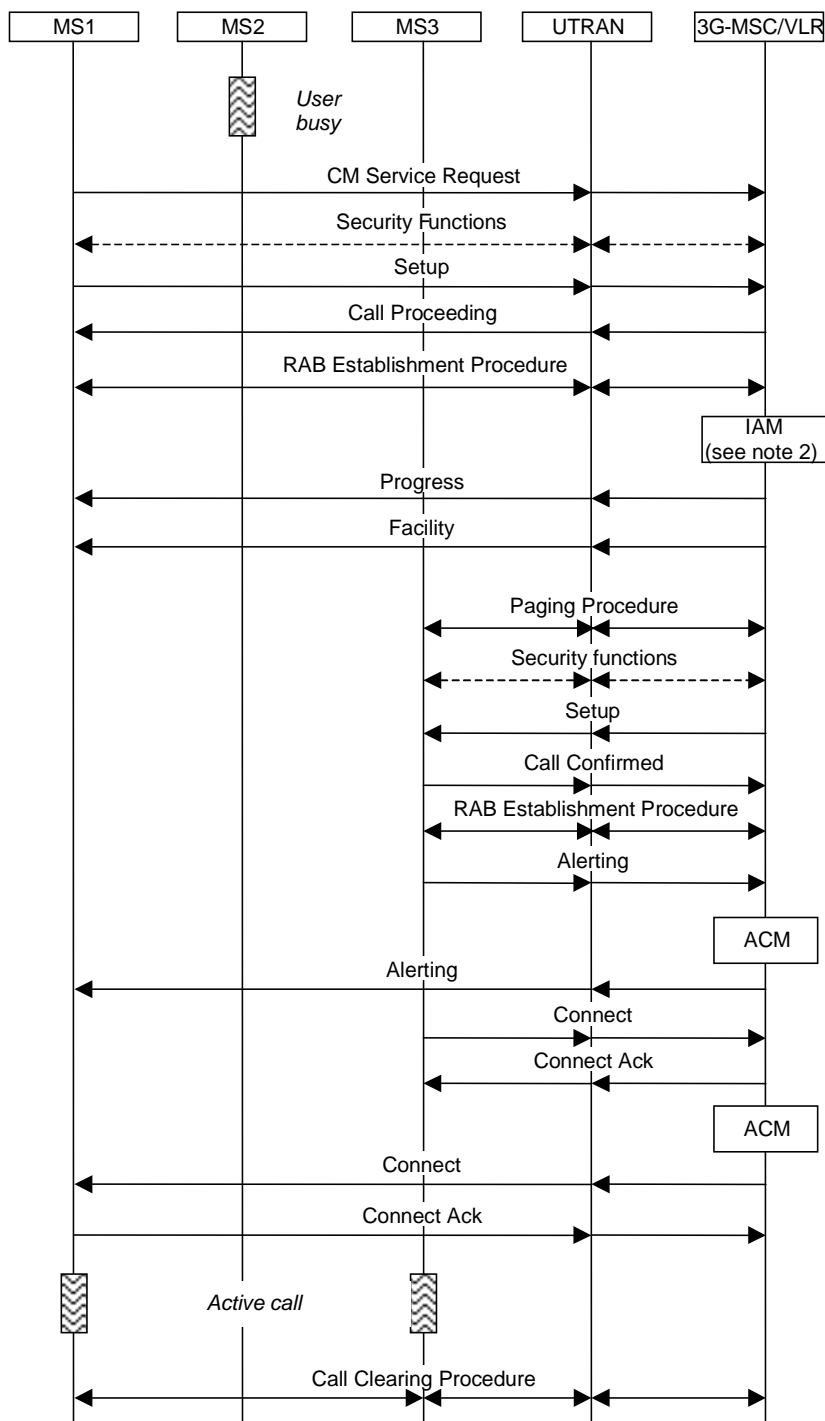


<p>2. Check the following fields in the messages:  <b>Facility:</b> Facility(Invoke=NotifySS(CFU, SS-Notification));  <b>Setup(MT):</b> Facility(Invoke=NotifySS(CFU, SS-Notification)), Redirecting party number(SI, PI, LI).</p> <p>3. Check that the Setup(MT) does not contain the LI of MS1 and that the Connect(MT) does not contain the LI of MS3.</p> <p>4. Check that the call is forwarded to MS3 and that it is successfully completed.</p> <p>NOTE 1: In this test at least three users are required.  NOTE 2: If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSCs take place.</p> <p>REFERENCES: [1] clause 9.3; [11] clause 1.</p>
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<p><b>Supplementary Services and SMS</b> - Interaction between Supplementary Services</p> <p>SS_INT_806: CFB-CLIR-COLR IN A CALL BETWEEN UMTS USERS</p>
<p>OBJECTIVE: This test aims to demonstrate interactions between CFB and LI supplementary services when activated during a call between UMTS users.</p>
<p>INTERFACES: <b>IuCS.</b></p>
<p>PRECONDITIONS: Requires at least configuration n°4, (see note 1). The MS must be registered in the HLR with UMTS subscription and must also be attached. The calling party (MS1) must be provided with COLP and CLIR, the called party (MS2) must be provided with CFB (NDUB) and the forwarded party (MS3) must be provided with CLIP and COLR.</p>
<p>PRIORITY: A</p>
<p>DESCRIPTION/PROCEDURE:</p> <ol style="list-style-type: none"> <li>1. Carry out a call from MS1 to MS2.</li> <li>2. Carry out a Call clearing procedure.</li> </ol>

EXPECTED RESULTS:

1. The message exchange to check is as follows:



2. Check the following fields in the messages:

**Facility:** Facility(Invoke=NotifySS(CFB, SS-Notification));

**Setup (MT):** Facility(Invoke=NotifySS(CFB, SS-Notification), Redirecting party BCD number(SI, PI, LI).

3. Check that the Setup(MT) does not contain the LI of MS1 and that the Connect(MT) does not contain the LI of MS3.

4. Check that the call is forwarded to MS3 and that the call is successfully completed.

NOTE 1: In this test at least three users are required.

NOTE 2: If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSCs take place.

REFERENCES: [1] clause 9.3; [11] clause 2.

**Supplementary Services and SMS - Interaction between Supplementary Services****SS\_INT\_807: CFNRy-CLIR-COLR IN A CALL BETWEEN UMTS USERS**

**OBJECTIVE:** This test aims to demonstrate interactions between CFNRy and LI supplementary services when activated during a call between UMTS users.

**INTERFACES:** **IuCS.**

**PRECONDITIONS:** Requires at least configuration n°4 (see note 1). The MS must be registered in the HLR with UMTS subscription and must also be attached. The calling party (MS1) must be provided with COLP and CLIR, the called party (MS2) must be provided with CFNRy and the forwarded party (MS3) must be provided with CLIP and COLR.

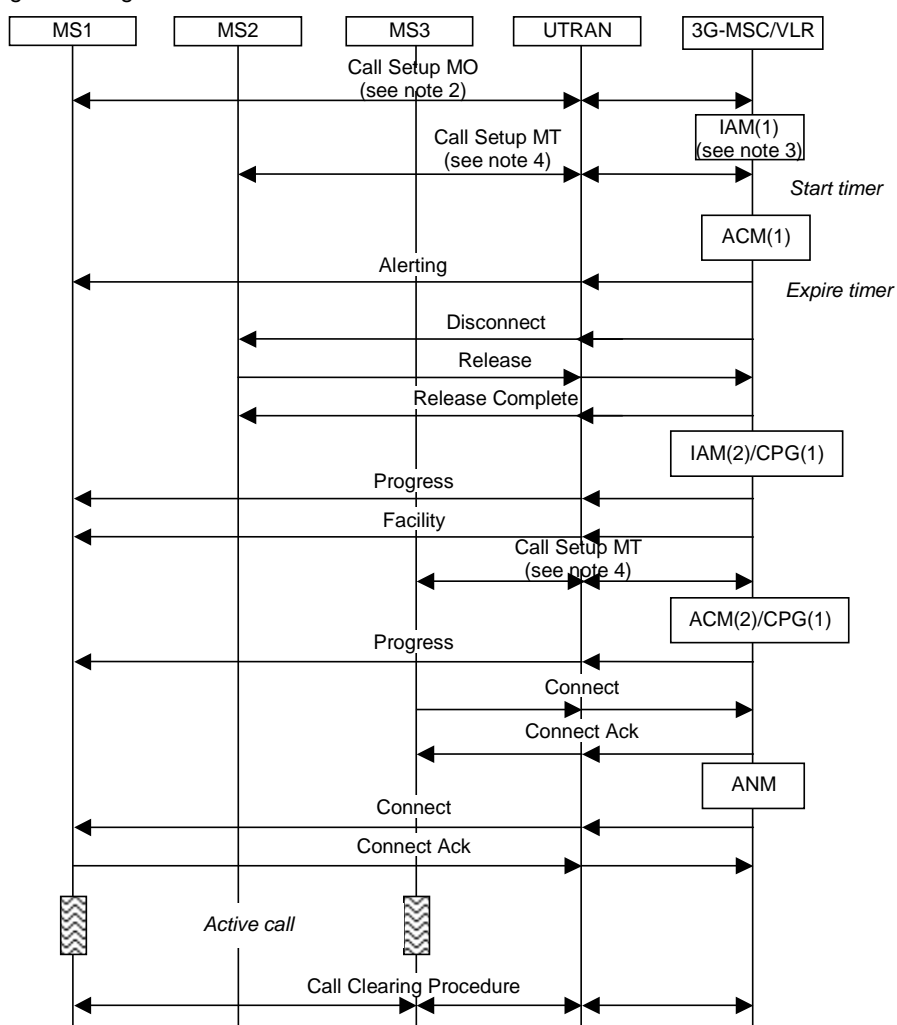
**PRIORITY:** A

**DESCRIPTION/PROCEDURE:**

1. Carry out a call from MS1 to MS2.
2. Carry out a Call clearing procedure.

**EXPECTED RESULTS:**

1. The message exchange to check is as follows:



2. Check the following fields in the messages:

**Facility:** Facility(Invoke=NotifySS(CFNRy, SS-Notification));

**Setup (MT):** Facility(Invoke=NotifySS(CFNRy, SS-Notification)), Redirecting party BCD number (SI, PI, LI).

3. Check that the Setup(MT) does not contain the LI of MS1 and that the Connect(MT) does not contain the LI of MS3.

4. Check that the call is forwarded to MS3 and that it is successfully completed.

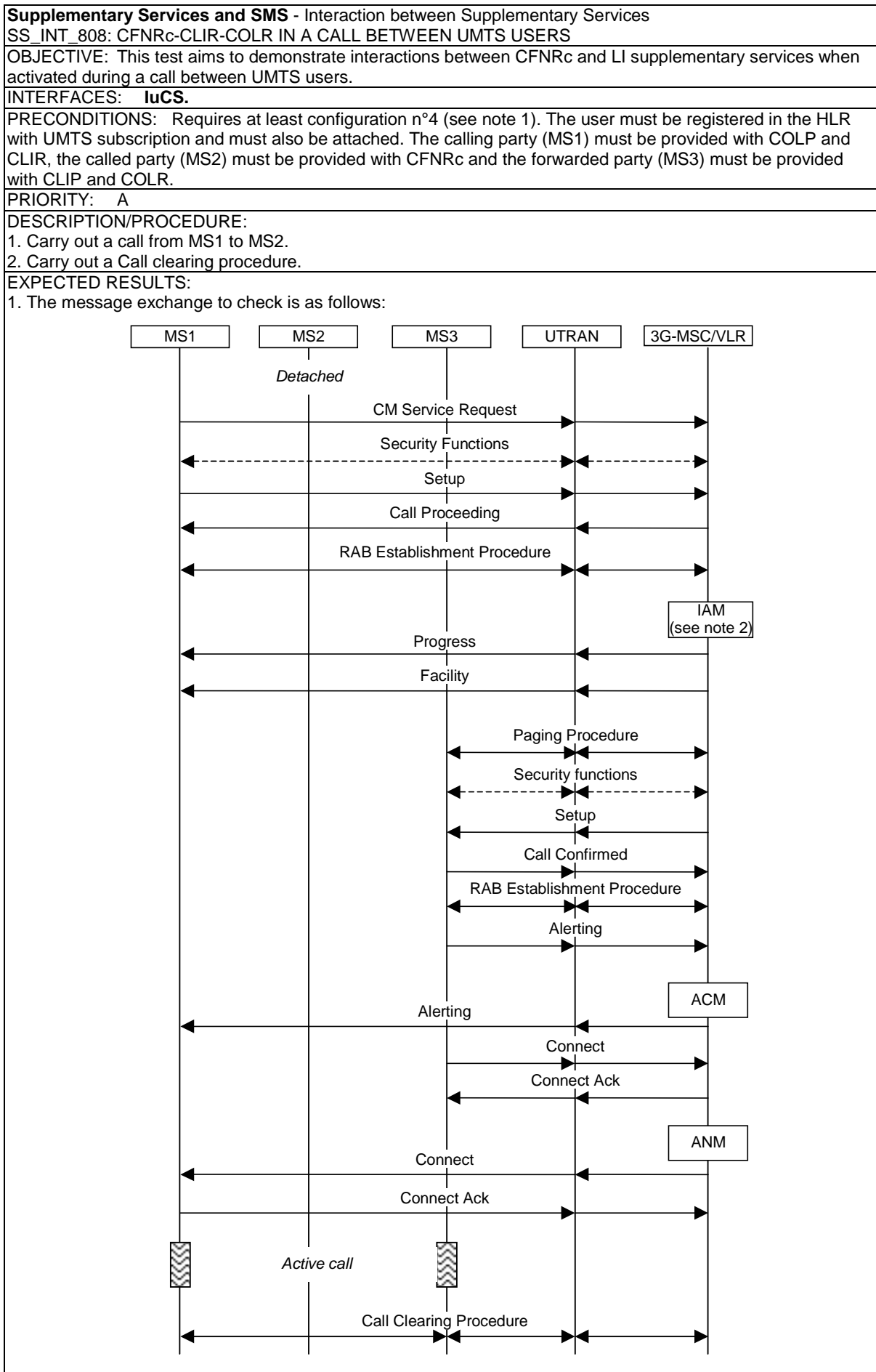
**NOTE 1:** In this test at least three subscribers are required.

**NOTE 2:** The following messages are included in the Call Setup MO: CM Service Request, Setup, Call Proceeding, RAB Establishment Procedure messages and Alerting.

**NOTE 3:** If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSCs take place.

**NOTE 4:** The following messages are included in the Call Setup MT: Paging Procedure messages, Setup, Call Confirmed, RAB Establishment Procedure messages and Alerting.

**REFERENCES:** [1] clause 9.3; [11] clause 3.

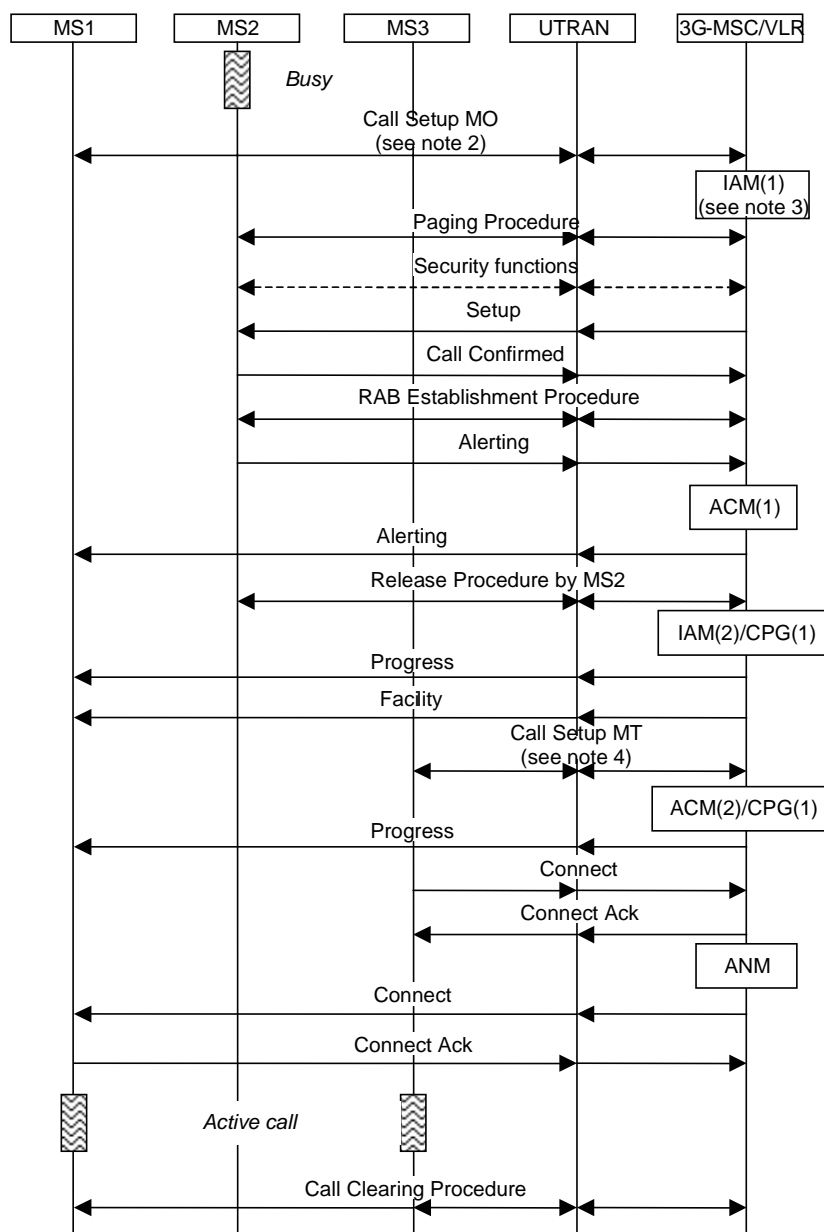


<p>2. Check the following fields in the messages:  <b>Setup (MT):</b> Facility(Invoke=NotifySS(CFNRC, SS-Notification)), Redirecting party BCD number (SI, PI, LI);  <b>Facility:</b> Facility(Invoke=NotifySS(CFNRC, SS-Notification)).</p> <p>3. Check that the Setup(MT) does not contain the LI of MS1 and that the Connect(MT) does not contain the LI of MS3.</p> <p>4. Check that the call is forwarded to MS3 and that is successfully completed.</p> <p>NOTE 1: In this test at least three users are required.  NOTE 2: If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSCs take place.</p> <p>REFERENCES: [1] clause 9.3; [11] clause 4.</p>
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<p><b>Supplementary Services and SMS - Interaction between Supplementary Services</b>  SS_INT_809: CFB(UDUB)-CW IN A CALL BETWEEN UMTS USERS</p>
<p>OBJECTIVE: This test aims to demonstrate interactions between CFB (UDUB) and CW supplementary services when activated during a call between UMTS users.</p>
<p>INTERFACES: <b>IuCS.</b></p>
<p>PRECONDITIONS: Requires at least configuration n°4 (see note 1). The user must be registered in the HLR with UMTS subscription and must also be attached. The served party (MS2) must be provided with CFB (MS3 as forwarded party) and CW supplementary services.</p>
<p>PRIORITY: A</p>
<p>DESCRIPTION/PROCEDURE:</p> <ol style="list-style-type: none"> <li>1. Carry out a call from MS1 to MS2 when the MS2 has already an active call and ensuring that the call from MS1 is rejected by MS2.</li> <li>2. Carry out a Call clearing procedure.</li> </ol>

## EXPECTED RESULTS:

1. The message exchange to check is as follows:



2. Check the following fields in the messages:

**Call Confirmed:** Cause='user busy';

**Facility(to MS1):** Facility(Invoke=NotifySS(SS-Notification));

3. Check that the call is forwarded to MS3 and that is successfully completed.

NOTE 1: In this test at least four users are required.

NOTE 2: The following messages are included in the Call Setup MO: CM Service Request, Security Functions messages, Setup, Call Proceeding, RAB Establishment Procedure messages and Alerting.

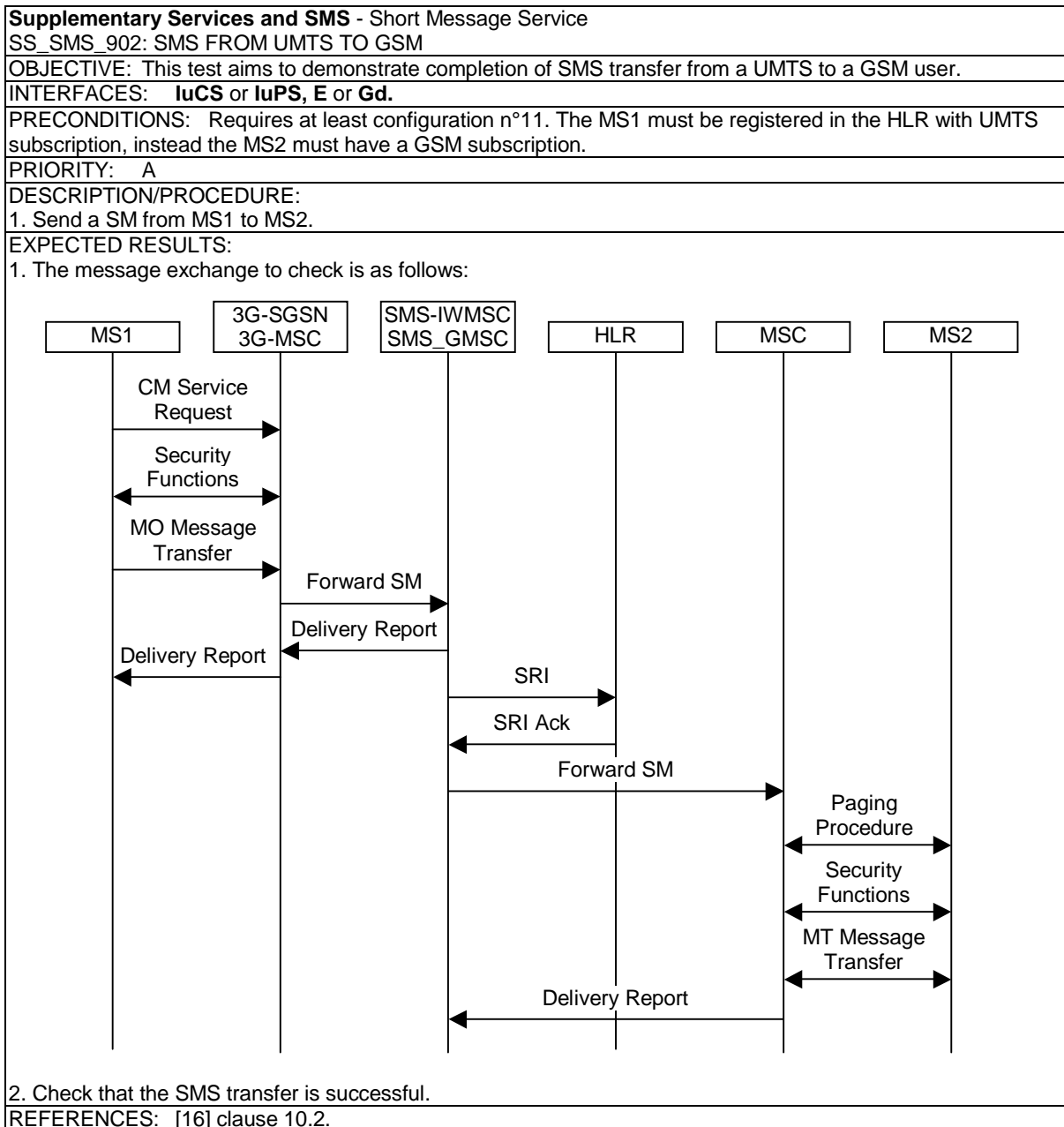
NOTE 3: If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSCs take place.

NOTE 4: The following messages are included in the Call Setup MT: Paging Procedure messages, Security Functions messages, Setup, Call Confirmed, RAB Establishment Procedure messages and Alerting.

REFERENCES: [1] clause 9.3; [11] clause 2; [12] clause 1.



<b>Supplementary Services and SMS - Short Message Service</b>
SS_SMS_901: SMS BETWEEN UMTS USERS
OBJECTIVE: This test aims to demonstrate completion of SMS transfer between two UMTS MS.
INTERFACES: <b>luCS</b> or <b>luPS, E</b> or <b>Gd</b> .
PRECONDITIONS: Requires at least configuration n°11. The users must be registered in the HLR with UMTS subscription.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Send a SM from MS1 to MS2.
EXPECTED RESULTS: 1. The message exchange to check is as follows:
<pre> sequenceDiagram     participant MS1     participant MS2     participant UTRAN     participant 3G_SGSN as 3G-SGSN 3G-MSC     participant SMS_IWMSC as SMS-IWMSC SMS-GMSC     participant HLR      MS1-&gt;&gt;UTRAN: CM Service Request     UTRAN-&gt;&gt;3G_SGSN: CM Service Request     3G_SGSN-&gt;&gt;MS1: Security Functions     MS1-&gt;&gt;3G_SGSN: MO Message Transfer     3G_SGSN-&gt;&gt;SMS_IWMSC: Forward SM     SMS_IWMSC-&gt;&gt;3G_SGSN: Delivery Report     3G_SGSN-&gt;&gt;MS1: Delivery Report     SMS_IWMSC-&gt;&gt;HLR: SRI     HLR-&gt;&gt;SMS_IWMSC: SRI Ack     SMS_IWMSC-&gt;&gt;3G_SGSN: Forward SM     3G_SGSN-&gt;&gt;MS2: Paging Procedure     MS2-&gt;&gt;3G_SGSN: Security Functions     3G_SGSN-&gt;&gt;MS2: MT Message Transfer     MS2-&gt;&gt;SMS_IWMSC: Delivery Report     </pre>
2. Check that the SMS transfer is successful.
REFERENCES: [16] clause 10.2.



<b>Supplementary Services and SMS - Short Message Service</b>					
SS_SMS_903: SMS FROM GSM TO UMTS					
OBJECTIVE: This test aims to demonstrate completion of SMS transfer from a GSM to a UMTS user.					
INTERFACES: <b>IuCS</b> or <b>IuPS, E</b> or <b>Gd</b> .					
PRECONDITIONS: Requires at least configuration n°11. The MS1 must be registered in the HLR with GSM subscription, instead the MS2 must have a UMTS subscription.					
PRIORITY: A					
DESCRIPTION/PROCEDURE: 1. Send a SM from MS1 to MS2.					
EXPECTED RESULTS: 1. The message exchange to check is as follows:					
<pre> sequenceDiagram     participant MS1     participant MSC     participant SMS_IWMSC as SMS-IWMSC SMS_GMSC     participant 3G_HLR as 3G-HLR     participant 3G_MSC as 3G-MSC 3G-SGSN     participant MS2      MS1-&gt;&gt;MSC: CM Service Request     MSC-&gt;&gt;MS1: Security Functions     MS1-&gt;&gt;MSC: MO Message Transfer     MSC-&gt;&gt;SMS_IWMSC: Forward SM     SMS_IWMSC-&gt;&gt;MSC: Delivery Report     MSC-&gt;&gt;MS1: Delivery Report     SMS_IWMSC-&gt;&gt;3G_HLR: SRI     3G_HLR-&gt;&gt;SMS_IWMSC: SRI Ack     SMS_IWMSC-&gt;&gt;3G_MSC: Forward SM     3G_MSC-&gt;&gt;MS2: Paging Procedure     MS2-&gt;&gt;3G_MSC: Security Functions     3G_MSC-&gt;&gt;MS2: MT Message Transfer     3G_MSC-&gt;&gt;SMS_IWMSC: Delivery Report   </pre>					
2. Check that the SMS transfer is successful.					
REFERENCES: [16] clause 10.2.					

## A.3.8 Applications

<b>Applications - Standard applications</b>	
APP_STD_101: FTP FILE TRANSFER	
OBJECTIVE: This test aims to demonstrate correct function of the FTP protocol on the PS network.	
INTERFACES: <b>IuPS, Gn, Gi</b> .	
PRECONDITIONS: Requires at least configuration n°7. The MS must be registered with a UMTS subscription.	
PRIORITY: A	
DESCRIPTION/PROCEDURE: 1. Carry out an attach and a PDPC activation with a transparent APN. 2. Run various FTP applications with files of various sizes. 3. Measure the time taken for each transfer to perform the download end-to-end.	
EXPECTED RESULTS: 1. Check that each data transfer is successful.	

<b>Applications-</b> Standard applications
APP_STD_102: WEB BROWSING
OBJECTIVE: This test aims to demonstrate the correct function of HTTP protocol on the PS network.
INTERFACES: <b>IuPS, Gn, Gi.</b>
PRECONDITIONS: Requires at least configuration n°7. The MS must be registered in the HLR with UMTS subscription.
PRIORITY: A
DESCRIPTION/PROCEDURE:
<ol style="list-style-type: none"> <li>1. Carry out a PS attach and a PDPC activation with a transparent APN.</li> <li>2. Run various HTTP applications(web browser) using web pages of various sizes.</li> <li>3. Measure the time taken for each transfer to perform the download end-to-end.</li> </ol>
EXPECTED RESULTS:
<ol style="list-style-type: none"> <li>1. Check that each data transfer is successful.</li> </ol>

<b>Applications-</b> Standard applications
APP_STD_103: E-MAIL APPLICATION
OBJECTIVE: This test aims to demonstrate the correct function of Mail services on the PS network.
INTERFACES: <b>IuPS, Gn, Gi.</b>
PRECONDITIONS: Requires at least configuration n°7. The MS must be registered in the HLR with UMTS subscription.
PRIORITY: A
DESCRIPTION/PROCEDURE:
<ol style="list-style-type: none"> <li>1. Carry out a PS attach and a PDPC activation with a transparent APN.</li> <li>2. Run various E-mail applications (e.g. Netscape, Messenger) using the following downlink transfers: <ul style="list-style-type: none"> <li>• download a text only message (2 KB);</li> <li>• download a message with attachment (100 KB).</li> </ul> </li> <li>3. Carry out the following SMTP uplink: <ul style="list-style-type: none"> <li>• upload a text only message (2 KB);</li> <li>• upload a message with attachment (100 KB).</li> </ul> </li> <li>4. Measure the time taken for each transfer to perform the download end-to-end.</li> </ol>
EXPECTED RESULTS:
<ol style="list-style-type: none"> <li>1. Check that each data transfer is successful.</li> </ol>

<b>Applications-</b> Standard applications
APP_STD_104: WAP SERVICE
OBJECTIVE: This test aims to demonstrate the correct function of the WAP service.
INTERFACES: <b>IuPS, Gn, Gi.</b>
PRECONDITIONS: Requires at least configuration n°7. The MS must be registered in the HLR with UMTS subscription.
PRIORITY: A
DESCRIPTION/PROCEDURE:
<ol style="list-style-type: none"> <li>1. Carry out a PS attach and a PDPC activation with the APN configured for the WAP service.</li> <li>2. Run WAP browsing from the MS.</li> </ol>
EXPECTED RESULTS:
<ol style="list-style-type: none"> <li>1. Check that data transfers are successful.</li> </ol>

## A.3.9 Billing

<b>Billing</b> - 3G-GSNs accounting
BILL_PS_101: ACTIVATION, DEACTIVATION OF PDP CONTEXT
OBJECTIVE: This test aims to demonstrate correct CDRs creation and recording (S-CDR and G-CDR).
INTERFACES: <b>IuPS, Gn, Gi.</b>
PRECONDITIONS: Requires at least configuration n°7. The MS must be PS attached.
PRIORITY: A
DESCRIPTION/PROCEDURE:
1. Carry out a PDPC activation procedure requesting the same QoS as the subscription. 2. Carry out a data transfer with the MS. 3. Deactivate the PDPC of the MS.
EXPECTED RESULTS:
1. Check opening of an S-CDR and a G-CDR with the same charging ID provided by the 3G-GGSN. 2. Check that the requested QoS in the CDR is the same as the user subscription and that the volume of data recorded is the same as that effectively transmitted. 3. Check that the CDRs are correctly stored in the 3G-SGSN and 3G-GGSN.
NOTES:
REFERENCES: [17].

<b>Billing</b> - 3G-GSNs accounting
BILL_PS_102: QoS NEGOTIATION
OBJECTIVE: This test aims to demonstrate correct negotiation of the QoS during the creation of the CDRs (S-CDR and G-CDR).
INTERFACES: <b>IuPS, Gn, Gi.</b>
PRECONDITIONS: Requires at least configuration n°7. The MS must be PS attached.
PRIORITY: A
DESCRIPTION/PROCEDURE:
<b>Case 1:</b>
1. Carry out a PDPC activation procedure requesting a QoS inferior to the subscribed one. 2. Carry out a data transfer with the MS. 3. Deactivate the PDPC of the MS.
<b>Case 2:</b>
1. Carry out a PDPC activation procedure requesting a QoS better than the subscribed one. 2. Carry out a data transfer with the MS. 3. Deactivate the PDPC of the MS.
EXPECTED RESULTS:
<b>Case 1:</b>
1. Check that the QoS negotiated in the CDR is the same as the one requested by the user.
<b>Case 2:</b>
2. Check that the QoS negotiated in the CDR is the same as the one subscribed by the user.
REFERENCES: [17].

<b>Billing</b> - 3G-GSNs accounting
BILL_PS_103: QoS UPDATE
OBJECTIVE: This test aims to demonstrate correct partial closure of the CDRs (S-CDRs and G-CDR) and their recording in the 3G-GSN in the event of changes to the QoS by PDPC data.
INTERFACES: <b>IuPS, Gn, Gi.</b>
PRECONDITIONS: Requires at least configuration n°7. The MS must be PS attached and have an active PDPC.
PRIORITY: A
DESCRIPTION/PROCEDURE:
1. Carry out a data transfer with the MS. 2. Carry out a PDPC modification procedure changing the QoS parameters of the subscriber. 3. Deactivate the PDPC of the MS.
EXPECTED RESULTS:
1. Check partial closure of the CDR following a PDPC modification procedures and their recording in the 3G-SGSN and 3G-GGSN. 2. Check that new CDRs have been opened with the same Charging ID and with a higher Sequence Number. 3. Check that the CDRs are correctly stored in the 3G-SGSN and 3G-GGSN following deactivation of the MS PDPC and that the volume of data recorded is the same as that effectively transmitted.
REFERENCES: [3] clause 9.2.3; [17].

<b>Billing</b> - 3G-GSNs accounting BILL_PS_104: DATA VOLUME LIMIT
OBJECTIVE: This test aims to demonstrate the correct partial closure of the CDRs (S-CDR and G-CDR) and their recording in the 3G-GSN in the event that the quantity of data transmitted exceeds the volume limit set for the nodes.
INTERFACES: <b>IuPS, Gn, Gi.</b>
PRECONDITIONS: Requires at least configuration n°7. The MS must be PS attached and have an active PDPC.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Set a volume limit of around 100 kb and a time limit of around 24 h. 2. Carry out a data transfer with the MS so that the data volume (up/downlink) exceeds the set volume limit threshold. 3. Deactivate the PDPC of the MS.
EXPECTED RESULTS: 1. Check partial closure of the CDRs on reaching the volume limit and their recording in the 3G-GSN. Also check that the PDPC remains active. 2. Check that new CDRs are opened with the same Charging ID and with higher Sequence Number. 3. Following deactivation of the MS PDPC, check that the CDRs are correctly stored in the 3G-GSN and that the volume of data recorded is the same as that effectively transmitted.
NOTES: The volume limit and time limit values are set so that the partial closure of the CDR occurs on reaching the volume limit threshold.
REFERENCES: [17].

<b>Billing</b> - 3G-GSNs accounting BILL_PS_105: TIME LIMIT
OBJECTIVE: This test aims to demonstrate the correct partial closure of the CDRs (S-CDR and G-CDR) and their recording in the 3G-GSN on expiry of the time limit.
INTERFACES: <b>IuPS, Gn, Gi.</b>
PRECONDITIONS: Requires at least configuration n°7. The MS must be PS attached and have an active PDPC.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Set a time limit of around 15 min and a volume limit of around 10 Mb. 2. Carry out a data transfer (e.g. FTP, http or mail). 3. Await expiry of the time limit. 4. Deactivate the PDPC of the MS.
EXPECTED RESULTS: 1. Check partial closure of the CDRs on reaching the time limit and their recording in the 3G-GSN. Also check that the PDPC remains active. 2. Check the opening of new CDRs with the same Charging ID and with a higher Sequence Number. 3. Following deactivation of the MS PDPC, check that the CDRs are correctly stored in the 3G-GSN and that the volume of data recorded is the same as that effectively transmitted.
NOTE: The volume limit and time limit are set so that partial closure of the CDRs occurs on expiry of the time limit.
REFERENCES: [17].

<b>Billing</b> - 3G-GSNs accounting BILL_PS_106: TARIFF CHANGE
OBJECTIVE: This test aims to demonstrate the correct partial closure of the CDRs (S-CDR and G-CDR) and their recording in the 3G-GSN following a tariff change.
INTERFACES: <b>IuPS, Gn, Gi.</b>
PRECONDITIONS: Requires at least configuration n°7. The MS must be PS attached and have an active PDPC.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Set at least two tariff periods at an interval of around 10 min. 2. Carry out a data transfer (e.g. FTP, http or mail) for a sufficient length of time to observe the set tariff change. 3. Deactivate the PDPC of the MS.
EXPECTED RESULTS: 1. Check partial closure of the CDRs and their recording in the 3G-GSN following each tariff change. Also check that the PDPC remains active. 2. Check that new CDRs are opened with the same Charging ID and with a higher Sequence Number. 3. Following deactivation of the MS PDPC, check that the CDR are correctly stored in the 3G-GSN and that the volume of data recorded is the same as that effectively transmitted.
REFERENCES: [17].

<b>Billing</b> - 3G-GSNs accounting
BILL_PS_107: INTER SGSN RA UPDATE
OBJECTIVE: This test aims to demonstrate the correct partial closure of the CDRs (S-CDR and G-CDR) and their recording in the 3G-GSN following a change of 3G-SGSN.
INTERFACES: <b>IuPS, Gn, Gi.</b>
PRECONDITIONS: Requires at least configuration n°7. The MS must be PS attached and have an active PDPC.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Carry out a data transfer (e.g. FTP, http or mail). 2. Carry out an Inter SGSN Routing Area Update moving the MS into a cell belonging to a different 3G-SGSN. 3. Deactivate the PDPC of the MS.
EXPECTED RESULTS: 1. Check partial closure of the CDRs and their recording in the 3G-GSN following a change in cell. 2. Check opening of an S-CDR with the same Charging ID in the new 3G-SGSN and a new G-CDR with a higher Sequence Number. 3. Following deactivate of the MS PDPC, check that the CDRs are correctly stored in the 3G-GSN and that the volume of data recorded is the same as that effectively transmitted.
REFERENCES: [17].

<b>Billing</b> - 3G-GSNs accounting
BILL_PS_108: ACCURACY OF CDRs
OBJECTIVE: This test aims to demonstrate the correct compilation of the CDRs (S-CDR and G-CDR) and their accuracy in describing the data traffic.
INTERFACES: <b>IuPS, Gn, Gi.</b>
PRECONDITIONS: Requires at least configuration n°7. The MS must be PS attached.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Activate a PDPC for the MS. 2. Carry out a data transfer (e.g. FTP, http or mail). 3. Deactivate the PDPC of the MS.
EXPECTED RESULTS: 1. Check that the duration recorded in the CDRs is coherent with the time for which the PDPC remained active. 2. Check that the volume of traffic (up/downlink) measured by a protocol analyser, is identical to that recorded in the CDRs.
REFERENCES: [17]

<b>Billing</b> - 3G-GSNs accounting
BILL_PS_109: CDR FORMAT VERIFICATION
OBJECTIVE: This test aims to demonstrate the correct decoding of the CDRs in the billing centres.
INTERFACES: <b>IuPS, Gn, Gi.</b>
PRECONDITIONS: Requires at least configuration n°7. The MS must be PS attached and have an active PDPC.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Carry out different types of data transfer (e.g. FTP, http and mail). 2. Deactivate the PDPC of the MS.
EXPECTED RESULTS: 1. Check that the structure of the recorded CDRs is coherent with ASN.1 format and with that envisaged by [6].
REFERENCES: [17].

<b>Billing</b> - MSC accounting
BILL_CS_201: PSTN-UMTS VOICE CALL
OBJECTIVE: This test aims to demonstrate correct CDR creation and recording in case of PSTN to UMTS voice call.
INTERFACES: <b>IuCS.</b>
PRECONDITIONS: Requires at least configuration n°4. The MS must be CS attached.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Carry out a CS Voice calls from a PSTN user to a UMTS user 2. Release the call.
EXPECTED RESULTS: 1. Check the creation of an LM-CDR by the 3G-MSC. 2. Check that the following interesting fields are correctly recorded: <b>Called Party Number,</b> <b>Calling Party Number,</b> <b>Chargeable Duration,</b> <b>Date and Time for Start of Charging,</b> <b>Disconnecting Party,</b> <b>Tariff Class.</b>
NOTE: The MSC can generate several CDRs for the voice call, in this case check all the partial output with the same "Call Identification Number".

<b>Billing</b> - MSC accounting
BILL_CS_202: UMTS-PSTN VOICE CALL
OBJECTIVE: This test aims to demonstrate correct CDR creation and recording in case of UMTS to PSTN voice call.
INTERFACES: <b>IuCS.</b>
PRECONDITIONS: Requires at least configuration n°4 The MS must be CS attached.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Carry out a CS voice call from a UMTS user to a PSTN user. 2. Release the call.
EXPECTED RESULTS: 1. Check the creation of an ML-CDR by the 3G-MSC. 2. Check that the following interesting fields are correctly recorded: <b>Called Party Number,</b> <b>Calling Party Number,</b> <b>Chargeable Duration,</b> <b>Date and Time for Start of Charging,</b> <b>Disconnecting Party, Tariff Class.</b>
NOTE: The 3G-MSC can generate several CDRs for the same voice call, in this case check all the partial output with the same "Call Identification Number".

<b>Billing</b> - MSC accounting
BILL_CS_203: UMTS-UMTS VOICE CALL
OBJECTIVE: This test aims to demonstrate correct CDR creation and recording in case of UMTS to UMTS voice call.
INTERFACES: <b>IuCS.</b>
PRECONDITIONS: Requires at least configuration n°4. Both MSs must be CS attached.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Carry out a CS voice call from a UMTS user to another UMTS user. 2. Release the call.
EXPECTED RESULTS: 1. Check the creation of an LM-CDR and a ML-CDR by the 3G-MSC. 2. Check that the following interesting fields are correctly and coherently recorded in both CDRs: <b>Called Party Number,</b> <b>Calling Party Number,</b> <b>Chargeable Duration,</b> <b>Date and Time for Start of Charging,</b> <b>Disconnecting Party, Tariff Class.</b>
NOTE: The 3G-MSC can generate several CDRs for the same voice call, in this case check all the partial output with the same "Call Identification Number".



### A.3.10 System stability

<b>System stability</b> - Endurance
STAB_END_101: USER CONNECTION / DECONNECTION
OBJECTIVE: This test aims to demonstrate the capacity of the network to endure a high number of connection procedures and disconnection procedures for a given call rate.
INTERFACES: <b>IuPS, Gn, Gi.</b>
PRECONDITIONS: Requires at least configuration n°7.
PRIORITY: B
DESCRIPTION/PROCEDURE: 1. Carry out different procedures (attach-detach, PDPC act-deact, RA update, etc.) at the indicated rate for a significant period.
EXPECTED RESULTS: 1. Check the performance of the network.
NOTE: To render the test more significant, a traffic generator may be used.

<b>System stability</b> - Endurance
STAB_END_102: MULTI-USER TRAFFIC
OBJECTIVE: This test aims to demonstrate the capacity of the network to handle traffic from a high number of subscribers.
INTERFACES: <b>IuPS, Gn, Gi.</b>
PRECONDITIONS: Requires at least configuration n°8.
PRIORITY: B
DESCRIPTION/PROCEDURE: 1. Connect the UMTS subscribers to the network and carry out simultaneous data transfers for a significant length of time.
EXPECTED RESULTS: 1. Check the performance of the network.

<b>System stability</b> - Endurance
STAB_END_103: LARGE DATA FILE TRANSFER
OBJECTIVE: This test aims to demonstrate the capacity of the system to permit transfer of large data file.
INTERFACES: <b>IuPS, Gn, Gi.</b>
PRECONDITIONS: Requires at least configuration n°7.
PRIORITY: B
DESCRIPTION/PROCEDURE: 1. Carry out a data transfer for a large file (> 3 Mb).
EXPECTED RESULTS: 1. Check system performance.

## A.3.11 Quality of Service

<b>Quality of Service - Round Trip Delay</b>
QoS_DEL_101: ACCESS AND CORE NETWORK ROUND TRIP DELAY MEASUREMENT
OBJECTIVE: This test aims to measure the Quality of Service of a PS connection in terms of round trip delay.
INTERFACES: <b>IuPS, Gn, Gi, R</b> (see note).
PRECONDITIONS: Requires at least configuration n°7. The MS must be PS attached and have an active PDP.
PRIORITY: A
DESCRIPTION/PROCEDURE:
<ol style="list-style-type: none"> <li>1. Carry out a series of echo packets (either ICMP or UDP port 7) towards a server placed directly on the Gi interface.</li> <li>2. Measure the round trip delay as the average of the response times in the series. It is recommended to perform this test several times with different packet sizes.</li> </ol>
EXPECTED RESULTS:
<ol style="list-style-type: none"> <li>1. Check that the contribution to the round trip delay of the access network (measured at the R interface) is much greater than the core network one (measured at the IuPS interface).</li> </ol>
NOTE: The test is performed by monitoring either the IuPS and R interface. The R interface stays between the Mobile Termination (e.g. the handset) and the Terminal Equipment (e.g. the laptop). It is not to be confused with the radio interface (Uu).

<b>Quality of Service - Throughput</b>
QoS_THR_201: THROUGHPUT MEASUREMENT
OBJECTIVE: This test aims to measure the Quality of Service of a PS connection in terms of throughput.
INTERFACES: <b>IuPS, Gn, Gi, R</b> (see note).
PRECONDITIONS: Requires at least configuration n°7. The MS must be PS attached and have an active PDP.
PRIORITY: A
DESCRIPTION/PROCEDURE:
<ol style="list-style-type: none"> <li>1. Carry out some FTP (downlink and uplink) traffic with the MS. The FTP is preferred because is less affected to delay effects (unlike web browsing).</li> <li>2. Using an appropriate application (based on traces captured on IuPS and/or R interfaces), measure the quantity of bytes (IP header+payload) transferred in the unit of time.</li> </ol>
EXPECTED RESULTS:
<ol style="list-style-type: none"> <li>1. Check that the throughput measured is coherent with the bandwidth used by the MS.</li> </ol>
NOTE: The test is performed by monitoring either the IuPS and/or R interface.

<b>Quality of Service - Jitter</b>
QoS_JIT_301: JITTER MEASUREMENT
OBJECTIVE: This test aims to measure The Quality of Service of a PS connection in terms of jitter.
INTERFACES: <b>IuPS, Gn, Gi, R</b> (see note).
PRECONDITIONS: Requires at least configuration n°7. The MS must be PS attached and have an active PDPC.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Carry out some traffic of class "streaming" or "conversational" with the MS. This traffic can be, for instance, either an audio or a video RTP stream or an IP voice call or a H323 video-conference. 2. Using an appropriate application, measure the jitter.
EXPECTED RESULTS: 1. Check that the jitter measured is compatible with the applications of streaming class.
NOTE: The test is performed by monitoring either the IuPS and/or R interface.

<b>Quality of Service - Packet errors</b>
QoS_ERR_401: PACKET LOSS, PACKET OUT OF SEQUENCE, DUPLICATE PACKETS
OBJECTIVE: This test aims to measure The Quality of Service of a PS connection in terms of packet errors.
INTERFACES: <b>IuPS, Gn, Gi, R</b> (see note).
PRECONDITIONS: Requires at least configuration n°7. The MS must be PS attached and have an active PDPC.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Carry out some traffic of class "streaming" or "conversational" with the MS. This traffic can be, for instance, either an audio or a video RTP stream or an IP voice call or a H323 video-conference. 2. Using an appropriate application, measure the packet loss, the packets-out-of-sequence and the duplicate packets.
EXPECTED RESULTS: 1. Check that the error rates measured are compatible with the applications of streaming class.
NOTE: The test is performed by monitoring either the IuPS and/or R interface.

<b>Quality of Service - Quality of voice</b>
QoS_CS_501: CLARITY END-TO-END
OBJECTIVE: This test aims to estimate the QoS of a call in terms of clarity end-to-end. This test has to be repeated for the following pair of users: UMTS-UMTS, UMTS-GSM, UMTS-ISDN, UMTS-PSTN (in both directions).
INTERFACES:
PRECONDITIONS: Requires at least configuration n°4.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Carry out some voice calls (see note 1) between the UMTS terminal and its peer using a previously established vocal pattern. The audio signals have to be recorded end-to-end. 2. Measure the QoS using the methods PSQM/PESQ/PAMS method (see note 2).
EXPECTED RESULTS: 1. Check that the call is successful and that the clarity measured is compatible with the expected one.
NOTE 1: This test requires several calls to be statistically relevant.
NOTE 2: The instrument and the methods used for these measures are described in clause 1.4.3.

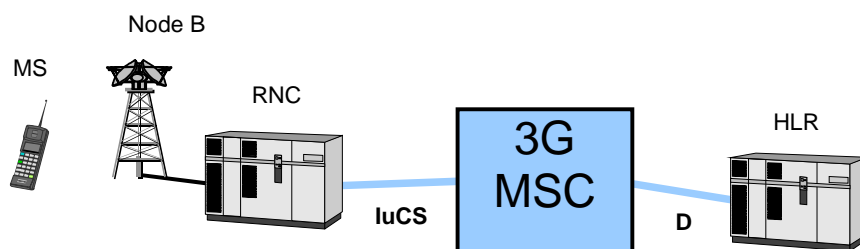
<b>Quality of Service</b> - Quality of voice QoS_CS_502: CLARITY CORE NETWORK
OBJECTIVE: This test aims to estimate the QoS of a call in terms of clarity in the CoreNetwork (i.e. excluding the radio loss). This test has to be repeated for the following kind of callers: UMTS, GSM, ISDN, PSTN; while the called is always UMTS.
INTERFACES: <b>IuCS.</b>
PRECONDITIONS: Requires at least configuration n°4.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Carry out some voice calls (see note 1) toward the UMTS terminal from its peer using a previously established vocal pattern. The audio signals have to be recorded on the IuCS interface, extracted from AAL2 stream. 2. Measure the QoS using the methods PSQM/PESQ/PAMS method (see note 2).
EXPECTED RESULTS: 1. Check that the call is successful and that the clarity measured is compatible with the expected one.
NOTE 1: This test requires several calls to be statistically relevant.
NOTE 2: The instrument and the methods used for these measures are described in clause 1.4.3.

<b>Quality of Service</b> - Quality of voice QoS_CS_503: ONE WAY DELAY
OBJECTIVE: This test aims to estimate the QoS of a call in terms of one way delay. This test has to be repeated for the following pair of users: UMTS-UMTS, UMTS-GSM, UMTS-ISDN, UMTS-PSTN (in both directions).
INTERFACES: <b>IuCS.</b>
PRECONDITIONS: Requires at least configuration n°4.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Carry out a voice call between the UMTS terminal and its peer using a previously established vocal pattern. 2. Measure the delay from the originating terminal to terminating one (see note).
EXPECTED RESULTS: 1. Check that the call is successful and that the delay measured is compatible with the expected one.
NOTE: The instrument and the methods used for these measures are described in clause 1.4.3.

<b>Quality of Service</b> - Quality of voice QoS_CS_504: ROUND TRIP DELAY
OBJECTIVE: This test aims to estimate the QoS of a call in terms of round trip delay. This test has to be repeated for the following pair of users: UMTS-UMTS, UMTS-GSM, UMTS-ISDN, UMTS-PSTN (in both directions).
INTERFACES: <b>IuCS.</b>
PRECONDITIONS: Requires at least configuration n°4.
PRIORITY: A
DESCRIPTION/PROCEDURE: 1. Carry out a voice call between the UMTS terminal and its peer using a previously established vocal pattern while the terminating peer is being closed in a loop. 2. Measure the round trip time from the originating terminal to the terminating one and back (see note).
EXPECTED RESULTS: 1. Check that the call is successful and that the delay measured is compatible with the expected one.
NOTE: The instrument and the methods used for these measures are described in clause 1.4.3.

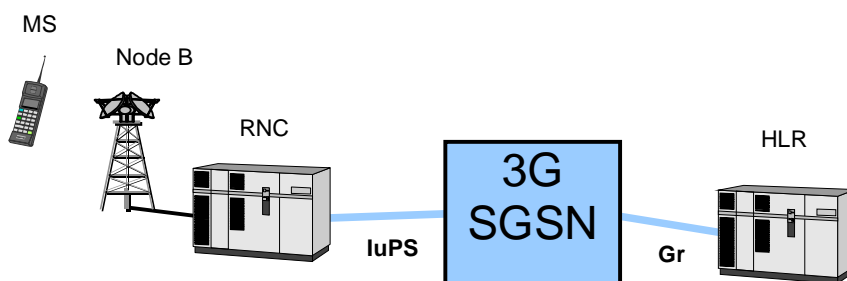
## A.4 Configurations of the system under test

The various system configurations necessary for carrying out the tests are illustrated below. For lower configurations it is only possible to carry out sub-sections of this TOL. The minimum configuration required is specified for each test.



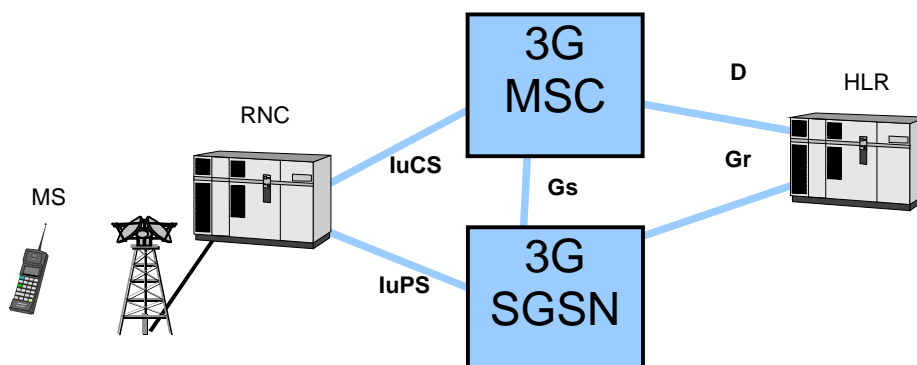
**Configuration n° 1**

(requires only a MS and the CS-domain. TE and PS-domain nodes not required)



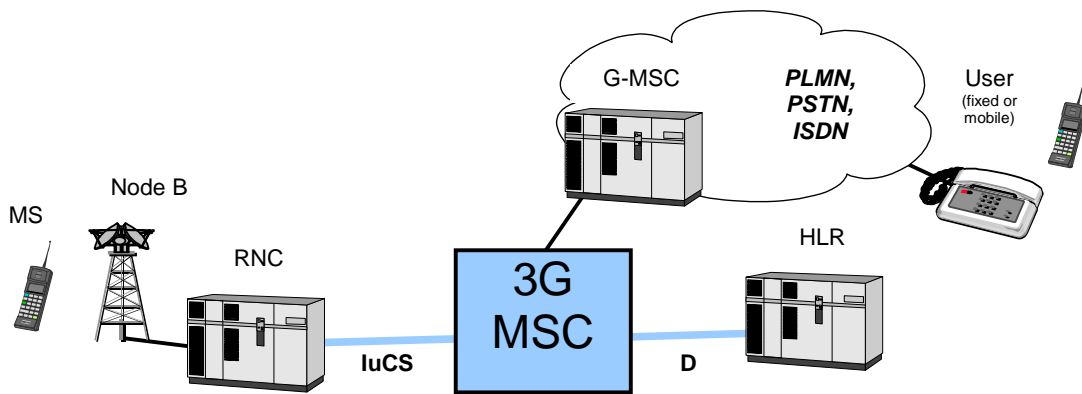
**Configuration n° 2**

(requires only MS and the 3G-SGSN. TE and 3G-GGSN not required)



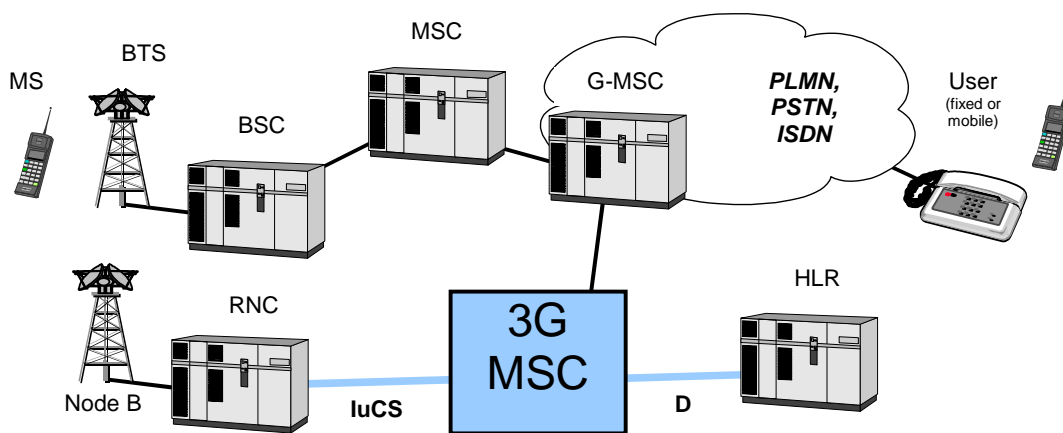
**Configuration n° 3**

(requires also the Gs interface and network working in mode I)



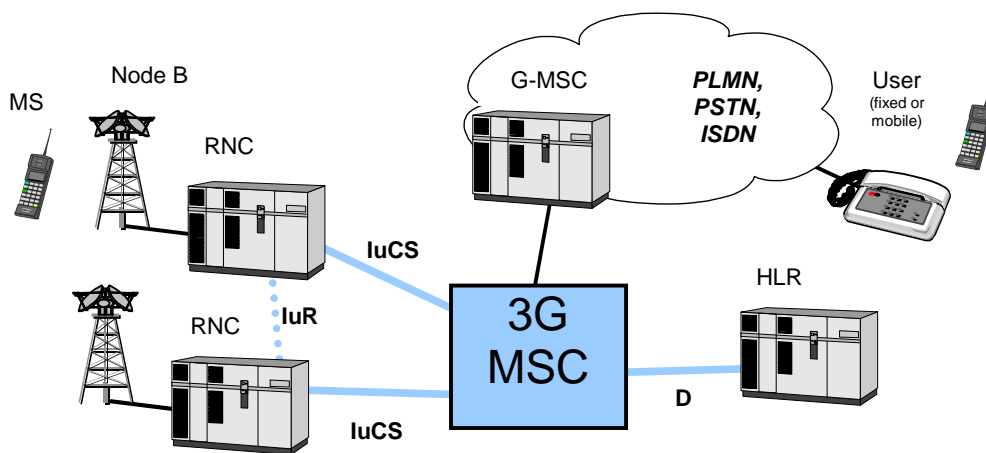
Configuration n° 4

(requires the CS-domain with a connection to an user of PLMN/PSTN/ISDN network)



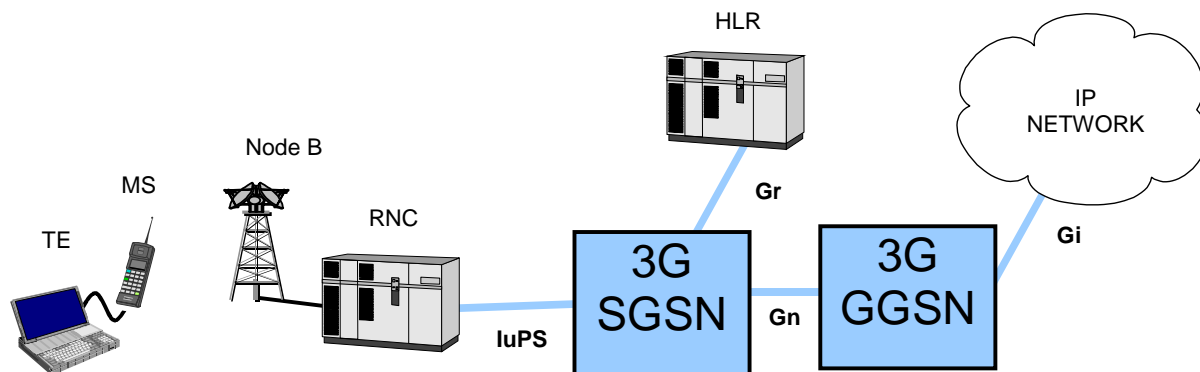
Configuration n° 5

(requires the CS-domain to interwork with GSM nodes for inter-systems test, also requires a MS dual mode)



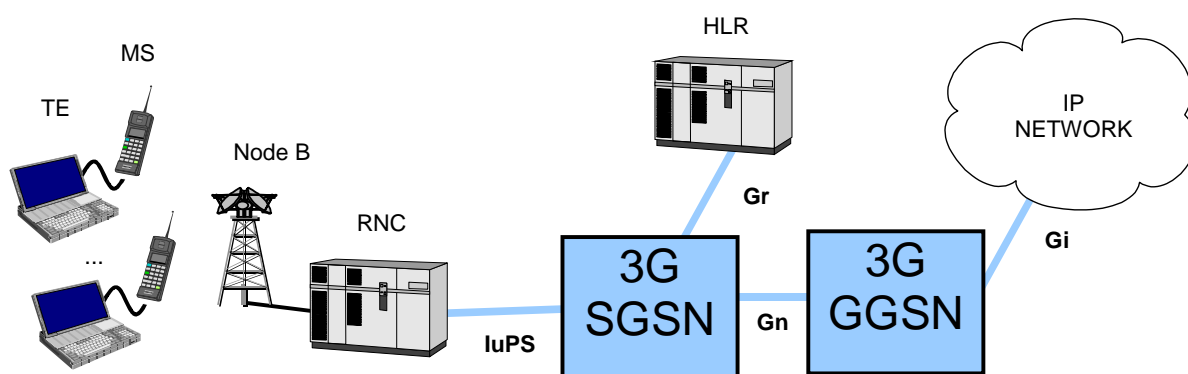
Configuration n° 6

(requires the CS-domain with two RNC for handover tests)



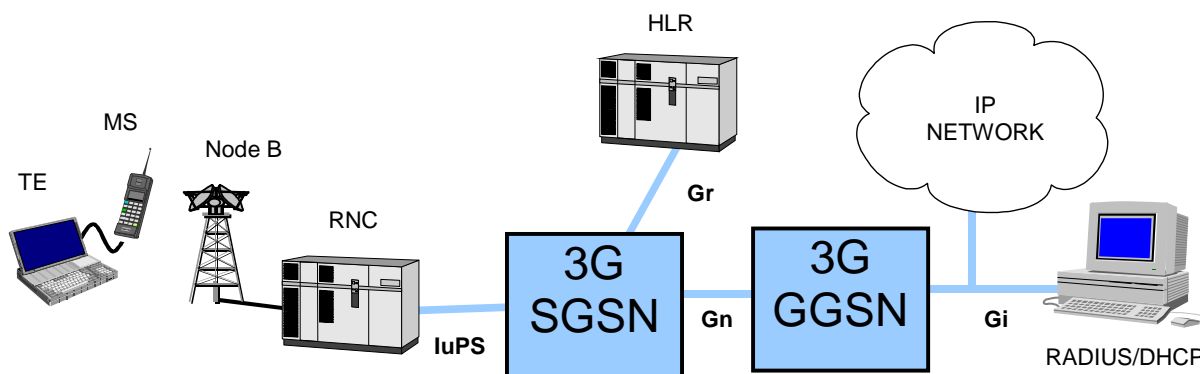
**Configuration n°7**

(requires only a MS+TE and the PS-domain with a minimal connection to an IP network)



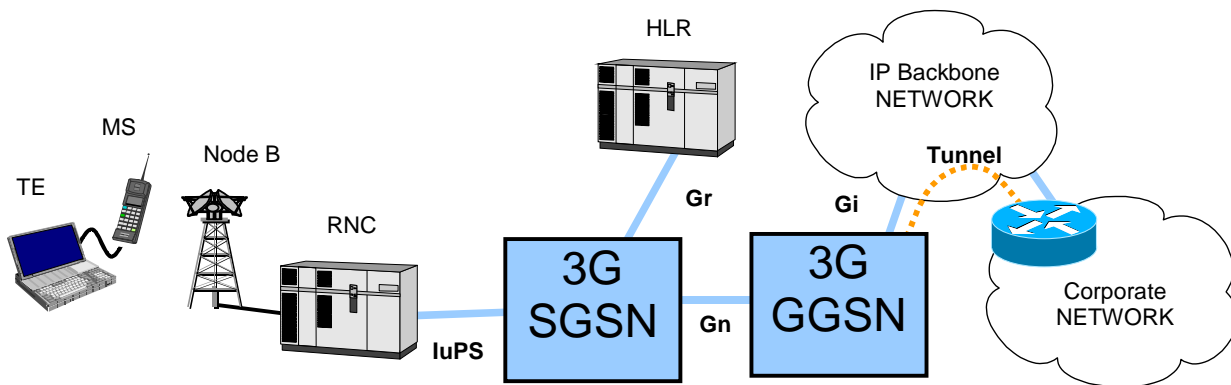
**Configuration n°8**

(requires only PS-domain and two or more MS and TE)



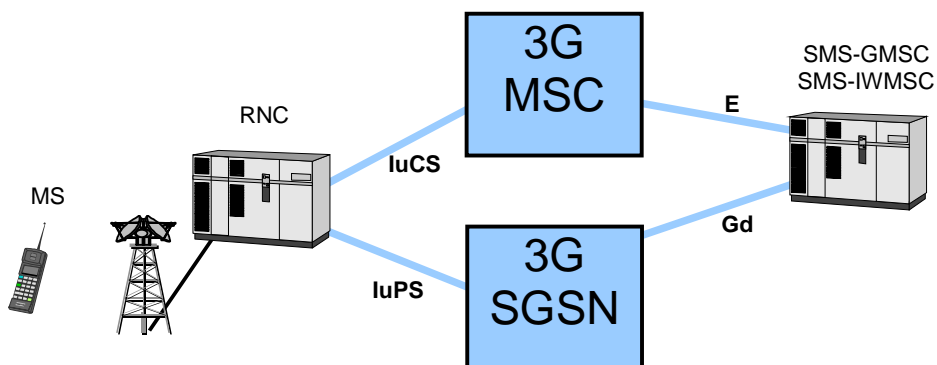
**Configuration n°9**

(requires a RADIUS and/or DHCP server configured on the Gi)



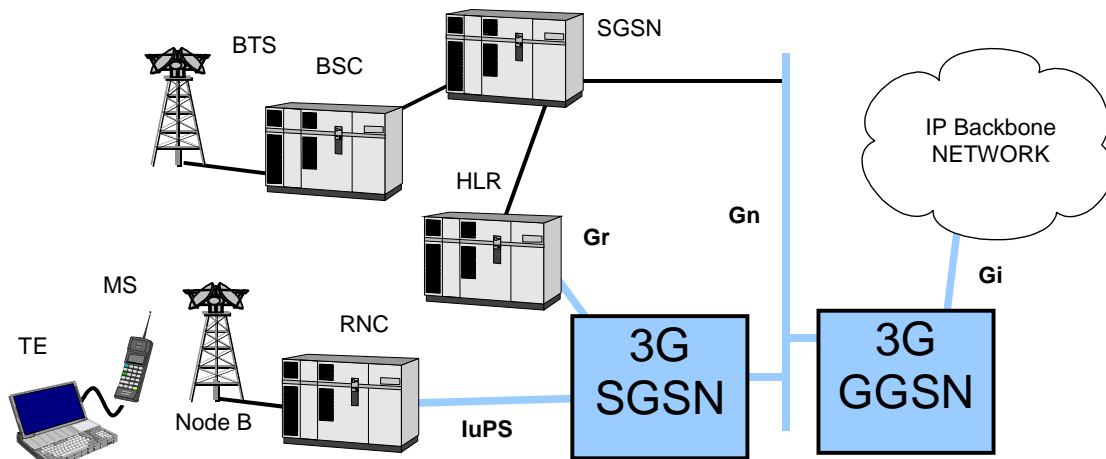
Configuration n°10

(requires configuration of an L2TP/IPSEC tunnel between GGSN and the *Border Gateway* of a *corporate*)



Configuration n° 11

(requires the PS or the CS domain with respectively the Gd or E interface and the SMS-IWMSC/GMSC)



Configuration n° 12

(requires the PS-domain to interwork with GPRS nodes for inter-systems test, also requires a MS dual mode)



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## History

<b>Document history</b>		
V1.1.1	July 2003	Publication