

ETSI/MTS#35
Sophia Antipolis
October 23rd – 24th, 2002

Temporary Document TD020
page 1 of 1

LIAISON STATEMENT

Document Title: **LS on Document Review of DTR/MTS0082 UMTS Network Integration Testing Methodology and TSS&TP**

From:

Group: TC MTS
Organisation: ETSI
Approval / Status:
Respond by Date: January 2003
Contact Person: Giulio Maggiore tel +393357534819
Address: Via L. Rizzo 22 00167 Rome
e-mail: gmaggiore@mail.tim.it

To:

Group: 3GPP CN & 3GPP RAN & ETSI SPAN
Organisation:
Contact Person:
Address:
e-mail:

For:

Action: X
Information:

1. Action/Decision Requested

ETSI TC MTS has received the attached document DTR/MTS0082 UMTS Network Integration Testing Methodology and TSS&TP for approval as a TR at the next TC MTS meeting in March 2003.

MTS has discussed this document and requests that your body will provide technical comments to the proposed document before it is approved.

2. References

DTR/MTS0082 UMTS Network Integration Testing Methodology and TSS&TP

UMTS Testing Methodology



Reference

ETSI TC-MTS "UMTS Testing Methodology"

Keywords

UMTS, Network Integration Testing, TSS&TP

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

Individual copies of the present document can be downloaded from:

<http://www.etsi.org>

The present document may be made available in more than one electronic version or in print. In any case of existing or perceived difference in contents between such versions, the reference version is the Portable Document Format (PDF). In case of dispute, the reference shall be the printing on ETSI printers of the PDF version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at

<http://portal.etsi.org/tb/status/status.asp>

If you find errors in the present document, send your comment to:

editor@etsi.fr

Copyright Notification

Reproduction is only permitted for the purpose of standardization work undertaken within ETSI.
The copyright and the foregoing restrictions extend to reproduction in all media.

© European Telecommunications Standards Institute 2001.
All rights reserved.

Contents

| | |
|--|------------|
| Intellectual Property Rights | 4 |
| Foreword | 4 |
| 1 Scope | 5 |
| 2 References | 5 |
| Numbered reference format | 5 |
| Unnumbered reference format | 6 |
| 3 Definitions, symbols and abbreviations | 6 |
| 3.1 Definitions | 6 |
| 3.2 Symbols | 6 |
| 3.3 Abbreviations | 7 |
| 4. General description | 11 |
| 4.1 Reasons for an UMTS testing methodology | 11 |
| 4.2 Why should be used NIT technique | 11 |
| 4.3 Standard network configuration | 12 |
| 5. UMTS network suppliers contribution | 13 |
| 6. UMTS TESTING METHODOLOGY | 15 |
| 6.1 End to End approach | 15 |
| 6.1.1. Network Configuration | 15 |
| 6.1.2. Methodology | 16 |
| 6.1.2.1. Functional tests | 16 |
| 6.1.2.2. Quality of Service Test Cases | 16 |
| 7. TSS&TP | 19 |
| 7.1. End to End approach | 19 |
| 7.1.1. Test Cases | 19 |
| 7.1.2. Test Summary | 19 |
| 7.1.3. Test Forms | 24 |
| 7.1.4. Test Group | 25 |
| 7.1.4.1. Mobility Management | 25 |
| 7.1.4.2. Gs Interface Interoperability | 44 |
| 7.1.4.3. CS voice calls | 64 |
| 7.1.4.4. Session Management | 128 |
| 7.1.4.5. Gi/Gn Interface Interoperability | 151 |
| 7.1.4.6. HLR interoperability | 160 |
| 7.1.4.7. Supplementary services and SMS | 173 |
| 7.1.4.8. Applications | 303 |
| 7.1.4.9. Billing | 307 |
| 7.1.4.10. System stability | 319 |
| 7.1.4.11. Quality of Service | 322 |
| Annex A: Configurations of the system under test | 331 |
| History | 336 |
| History box entries | 336 |

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<http://www.etsi.org/legal/home.htm>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

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

ETRs are informative documents resulting from ETSI studies which are not appropriate for European Telecommunication Standard (ETS) or Interim European Telecommunication Standard (I-ETS) status.

An ETR may be used to publish material which is either of an informative nature, relating to the use or the application of ETSs or I-ETSs, or which is immature and not yet suitable for formal adoption as an ETS or an I-ETS.

1 Scope

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

2 References

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

Numbered reference format

- [1] 3GPP TS 24.008 (V3.8.0): "Core network protocol – stage 3" – R99 (2001-03).
- [2] 3GPP TS 23.121 (V3.5.1): "Architectural requirement for release 1999" – R99 (2000-12).
- [3] 3GPP TS 23.060 (V3.8.0): "Service description" – R99 (2001-03).
- [4] 3GPP TS 29.002 (V3.9.0): "Mobile Application Part (MAP) specification" – R99 (2001-03).
- [5] 3GPP TS 33.102 (V3.9.0): "Security architecture" – R99 (2001-03).
- [6] 3GPP TS 23.009 (V3.7.0): "Handover procedure" – R99 (2001-03).
- [7] 3GPP TS 29.060 (V3.9.0): "GPRS Tunnelling Protocol (GTP) across the Gn and Gp interface" R99 (2001-03).
- [8] 3GPP TS 29.061 (V3.5.0): "Interworking between the Public Land Mobile Network (PLMN) supporting packet based services and Packet Data Network (PDN)" R99 (2001-03).
- [9] 3GPP TS 24.081 (V3.1.0): "Line identification supplementary services–stage 3" – R99 (2000-06).
- [10] 3GPP TS 23.081 (V3.1.0): "Line identification supplementary services–stage 2" – R99 (2000-06).
- [11] 3GPP TS 23.082 (V3.6.0): "Call Forwarding (CF) supplementary services-stage 2" – R99 (2001-06).
- [12] 3GPP TS 23.083 (V3.2.0): "Call Waiting (CW) and Call Hold (HOLD) supplementary services" R99 (2000-10).
- [13] 3GPP TS 23.084 (V3.2.0): "Multy Party (MPTY) supplementary services - stage 2" R99 (2000-10).
- [14] ETSI TS 100 941 (V7.0.1): "Supplementary services specification, general aspects" – Release 1998 (1999-07).
- [15] 3GPP TS 23.088 (V3.2.0): "Call Barring (CB) supplementary services – stage 2" R99 (2000-10).
- [16] 3GPP TS 23.040 (V3.5.0): "Technical realization of the Short Message Service (SMS) R99 (2000-07).
- [17] 3GPP TS 32.015 (V3.4.0): "Charging and Billing– R99 (2000-12).
- [18] ISO/IEC 9646-1 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts".
- [19] ISO/IEC 9646-2 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 2: Abstract test suite specification".

- [20] ISO/IEC 9646-3 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 3: Tree and Tabular Combined Notation (TTCN)".
- [21] ISO/IEC 9646-4 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 4: Test realisation".
- [22] ISO/IEC 9646-5 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 5: Requirements on test laboratories and clients for the conformance assessment process".
- [23] ISO/IEC 9646-6 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 6: Protocol Profile Test Specification".
- [24] ISO/IEC 9646-7 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 7: Implementation Conformance Statements".
- [25] ETSI TR 100 000 (1999): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 3: Tree and Tabular Combined Notation (TTCN)".
- [26] ETR 193 (1995): "Methods for testing and Specification (MTS); Network Integration testing (NIT); Methodology aspects; Test Co-ordination Procedure (TCP) style guide".
- [27] DES/MTS-00051 (1999): "Method for Testing and Specification (MTS) – Test Synchronization Protocol 1+ (TSP1+) specification".
- [28] ETR 303 (1999): "Method for Testing and Specification (MTS) - Test Synchronization; Architectural reference; Test Synchronization Protocol 1 (TSP1) specification".
- [29] TR 101 667 "Method for Testing and Specification -Network Integration /Interconnection Testing, Reasons and Goals for a Global Testing approach".
- [30] EURESCOM P.412 Deliverable 3: "Guidelines for NIT session management: volume 2: Guidelines and proformas".
- [31] 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.

Unnumbered reference format

ETSI EN 301 234 (V2.1.1): "Example 1".

ETSI EG 201 568 (V1.3.5): "Example 2".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the [following] terms and definitions [given in ... and the following] apply:

3.2 Symbols

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

3.3 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
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-IWMSC: 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
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

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 an 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 standard 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).

A complete overview of Network Integration Testing has been provided in [31].

4.3 Standard network configuration

The network configuration considered is the 3GPP standard TS 23.002. 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

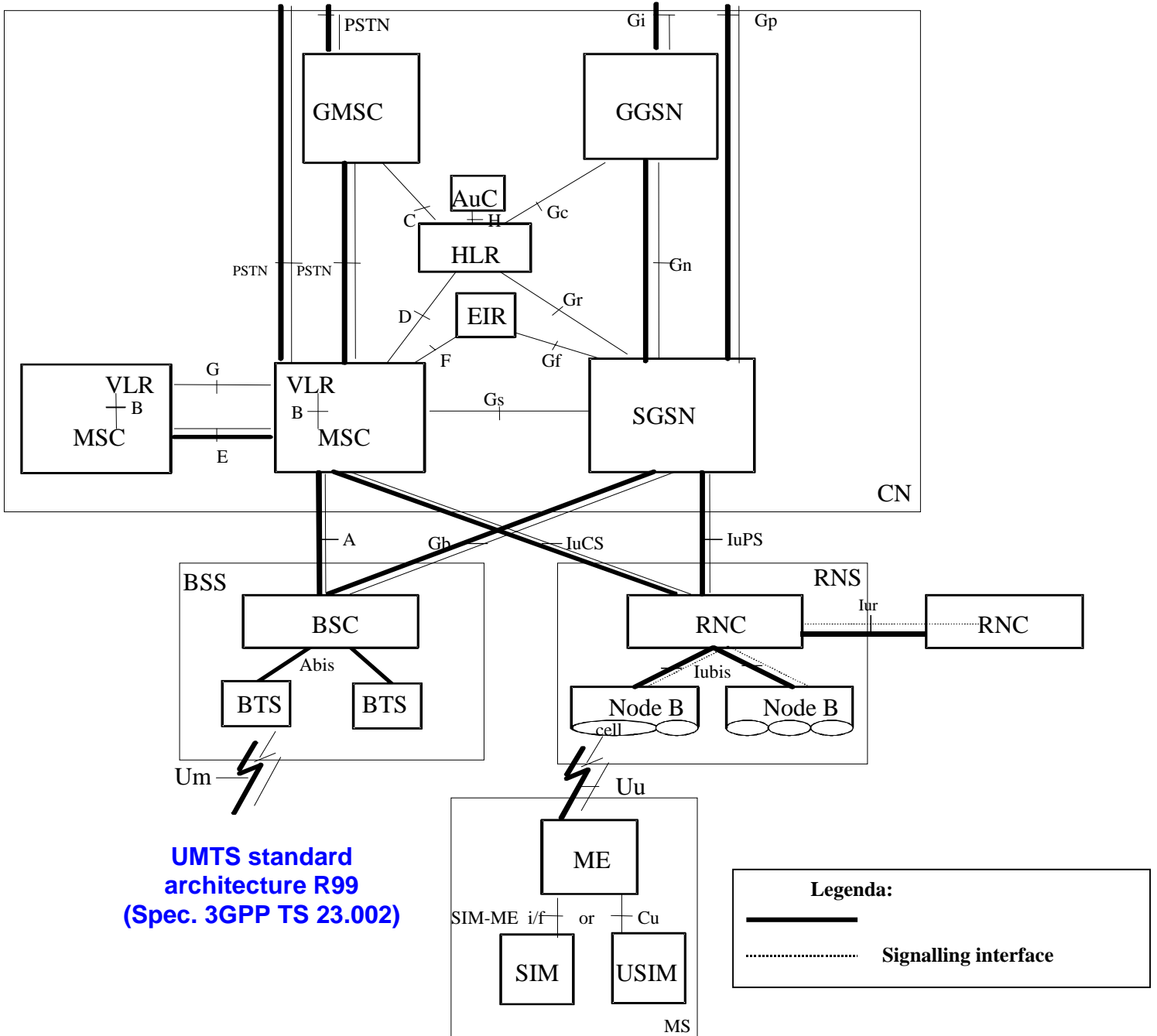


Figure 1: UMTS standard architecture R99

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 (fig 1). The information have 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 were 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 make 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 this 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”.

6.1.1. 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.

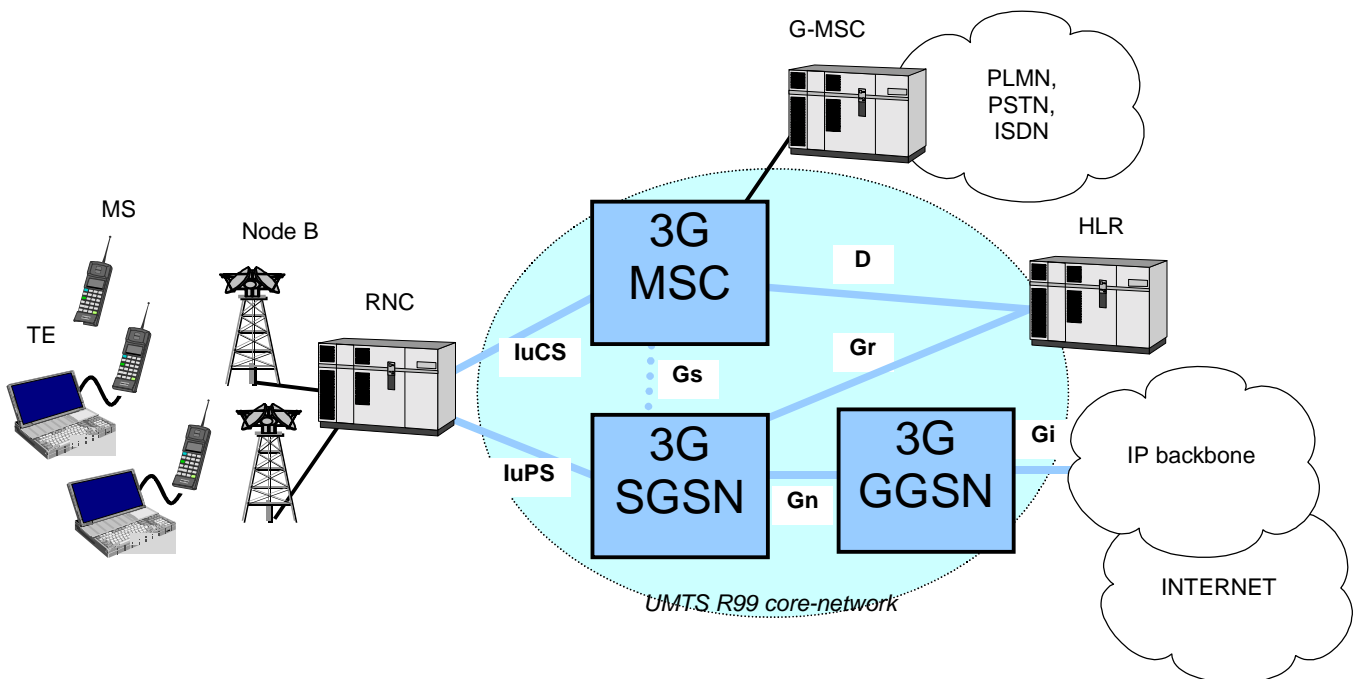


Figure 2: UMTS R99 core network

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

6.1.2. Methodology

The test list described in the following chapter 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.

6.1.2.1. Functional tests

Except for the last group, the tests in this document are functional, that is to say aimed at verifying the system's functionality described in the standard. 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.

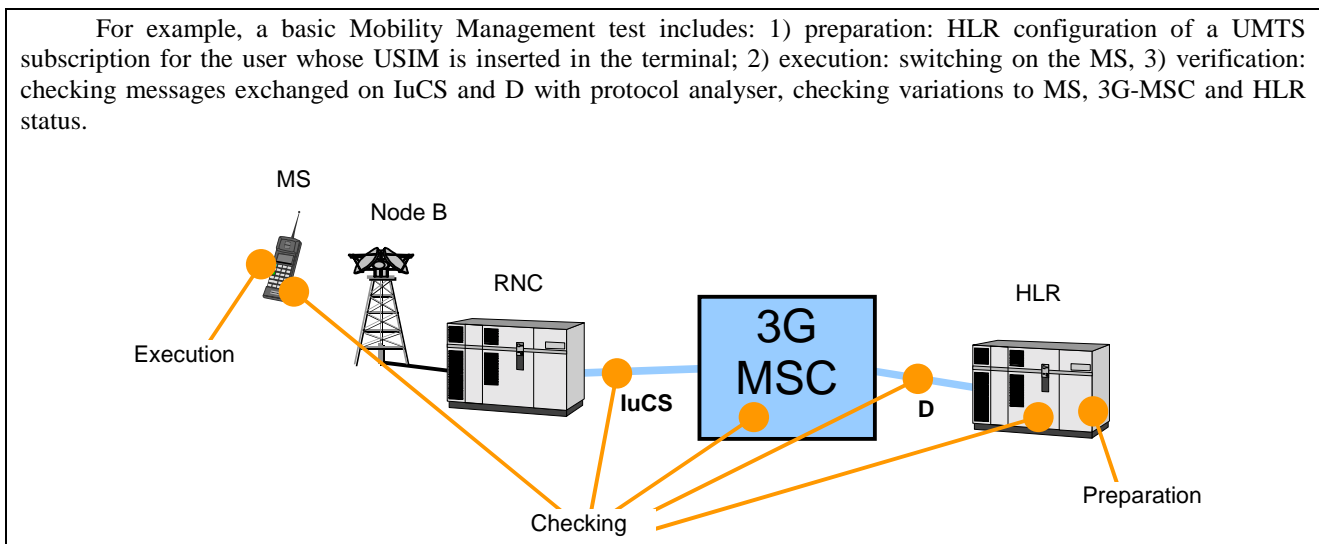


Figure 2: Example of Mobility Management test case

6.1.2.2. 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.

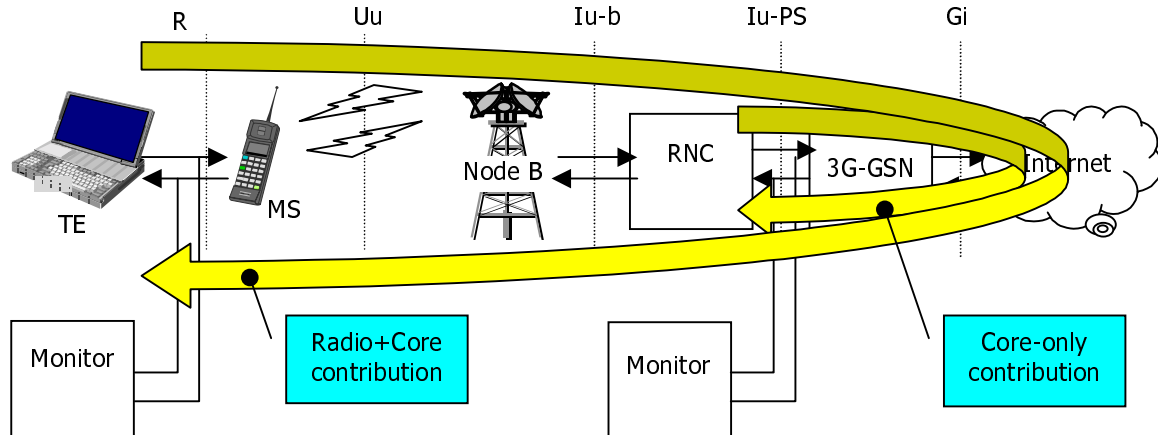


Figure 3: Example of round trip delay measurement

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 summarises the quantity of bytes transmitted per unit of time in the form of a graph¹. 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.

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.

¹ Some application makes it possible working on traces recorded with *monitor instruments*

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 the following figure:

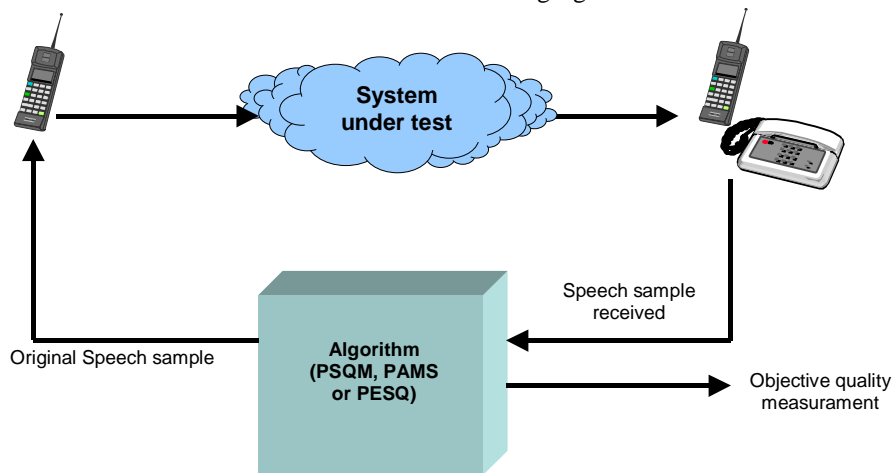


Figure 4: QOS test configuration

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. TSS&TP

7.1. End to End approach

7.1.1. Test Cases

The series of tests is divided into areas, with each area being subdivided into groups.

7.1.2. Test Summary

The following is a summary table.

| | | | | |
|-------------------------------------|--------------------------------------|--|-------------------------------|------------|
| Mobility Management | <i>CS Location Updating</i> | LOCATION UPDATING – IMSI ATTACH | MM_CS_101 | A |
| | | LOCATION UPDATING | MM_CS_102 | A |
| | <i>CS Detach</i> | IMSI DETACH | MM_CS_201 | A |
| | <i>PS Attach</i> | 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 |
| | <i>PS Location Management</i> | NORMAL ROUTING AREA UPDATE | MM_LM_401 | A |
| | | PERIODIC RA UPDATE TIMER FUNCTION | MM_LM_402 | A |
| | <i>PS Detach</i> | 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 |
| | <i>Security Functions</i> | 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 |
| | Gs Interface interoperability | <i>Combined procedures</i> | COMBINED ATTACH | Gs_IOT_101 |
| 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 |
| <i>Coordination</i> | | 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 |
| <i>Inter-NOM</i> | | INTER-NOM RA/LA UPDATE | Gs_IOT_301 | A |
| <i>Paging</i> | | CS PAGING VIA 3G-SGSN | Gs_IOT_401 | A |
| CS Voice calls | | <i>Basic Calls</i> | SPEECH CALL FROM UMTS TO PSTN | CS_VC_101 |
| | 3.1kHz 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 |
| | | 3.1kHz 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 |
| | | 3.1kHz 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 |
| | <i>Emergency Calls</i> | EMERGENCY CALL WITH USIM | CS_EC_501 | A |
| | | EMERGENCY CALL WITHOUT USIM | CS_EC_502 | A |
| | <i>Handover</i> | SRNS RELOCATION PROCEDURE | CS_HO_601 | A |
| | | INTERSYSTEM HANDOVER FROM UMTS TO GSM | CS_HO_602 | A |
| Session Management | <i>PDP Context Activation</i> | MS INITIATED PDPC ACTIVATION, DYNAMIC PDP ADDRESS | SM_PDP_101 | A |
| | | 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 | |
| | <i>PDP Context Deactivation</i> | | MS INITIATED DEACTIVATION | SM_PDP_301 | A |
| | | | 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 |
| | <i>Data Transfer Security</i> | | PACKET DATA TRANSFER BETWEEN 2 MS | SM_SEC_401 | B |
| <i>Data Paging</i> | | DOWNLINK PAGING PROCEDURE | SM_PAG_501 | A | |
| <i>PDP Context Handover</i> | | PDP CONTEXT HANDOVER FROM UMTS TO GPRS NETWORK | SM_HO_601 | B | |
| Gi/Gn Interface interoperability | <i>Transparent Connection Mode</i> | 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 | |
| | <i>Non Transparent Connection Mode</i> | 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 | |
| <i>GTP IP Support</i> | | IP FRAGMENTATION | Gi/Gn_IOT_301 | B | |
| HLR interoperability | <i>Insert subscriber data</i> | 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 | |
| | <i>Delete subscriber data</i> | 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 | |
| | <i>PS detach</i> | 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 | |
| | <i>Reset HLR</i> | | COMMAND INITIATED RESET FROM HLR TO 3G-SGSN | HLR_IOT_401 | A |
| <i>Line Identification</i> | | INTERROGATION PROCEDURE FOR CLI SUPPLEMENTARY SERVICES | SS_LI_101 | A | |
| | | CLIP IN A CALL BETWEEN UMTS USERS | SS_LI_111 | A | |

Supplementary services and SMS

| | | | |
|---|--|-------------|---|
| | 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 |
| <i>Call Forwarding</i> | 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 | |
| <i>Call Waiting and Call Hold</i> | 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 |
| <i>Multy Party</i> | 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 |
| <i>Call Barring</i> | 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 |
| <i>User to User Signalling</i> | UUS1 BETWEEN UMTS USERS | SS_UUS_601 | A |
| | UUS1 BETWEEN GSM AND UMTS USERS | SS_UUS_602 | A |
| <i>Subaddress</i> | 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 |
| <i>Interaction between Supplementary Services</i> | 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 |
| | <i>Short Message Service</i> | 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 |
| Applications | <i>Standard application</i> | 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 |
| Billing | <i>3G-GSNs accounting</i> | 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 | |
| | <i>MSC accounting</i> | PSTN-UMTS VOICE CALL | BILL_CS_201 | A |
| UMTS-PSTN VOICE CALL | | BILL_CS_202 | A | |
| UMTS-UMTS VOICE CALL | | BILL_CS_203 | A | |
| System Stability | <i>Endurance</i> | USER CONNECTION / DECONNECTION | STAB_END_101 | B |
| | | MULTI-USER TRAFFIC | STAB_END_102 | B |
| | | LARGE DATA FILE TRANSFER | STAB_END_103 | B |
| Quality of Service | <i>Round Trip Delay</i> | ACCESS AND CORE NETWORK ROUND TRIP DELAY MEASUREMENT | QoS_DEL_101 | A |
| | <i>Throughput</i> | THROUGHPUT MEASUREMENT | QoS_THR_201 | A |
| | <i>Jitter</i> | JITTER MEASUREMENT | QoS_JIT_301 | A |
| | <i>Packet errors</i> | PACKET LOSS, PACKET OUT OF SEQUENCE, DUPLICATE PACKETS | QoS_ERR_401 | A |
| | <i>Quality of voice</i> | 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 | |

7.1.3. Test Forms

This paragraph 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 can be missed the signalling on the Uu interface, that is however out of the scope of this document. For example at the beginning and at the end of the Iu procedures can have place the “RRC connection” establishment and release on the Uu interface (if there is not already present a signalling connection between CN and UE). 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 doesn’t 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.

7.1.4. Test Group

7.1.4.1. Mobility Management

| | |
|---|---|
| Mobility Management – CS Location Updating | |
| 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: | |
| <ol style="list-style-type: none"> 1. Check that the user is not already registered in 3G-MSC. 2. Carry out an IMSI attach with the MS. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: | |
| <pre> sequenceDiagram participant MS participant UTRAN participant MSC as 3G-MSC participant HLR UTRAN->>MSC: Location Updating Request MSC->>MS: Security Functions MSC->>HLR: Update Location HLR->>MSC: Insert Subscriber Data MSC->>HLR: Insert Subscriber Data Ack HLR->>MSC: Update Location Ack MSC->>MS: Location Updating Accept MSC->>MS: TMSI Reallocation Complete UTRAN->>MSC: Release </pre> | |
| <ol style="list-style-type: none"> 2. Check the following fields in the messages: <ul style="list-style-type: none"> Location Updating Request: Location Updating type = IMSI Attach; Mobile Identity=<IMSI>; Update location: Mobile Identity =<IMSI>; Insert Subscriber Data: subscription data; Location Updating Accept: 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.

NOTES:

Switching on most MS initiates the attach procedure.

REFERENCES: [1] §4.4.3, §4.4.4, [2] §4.3.13, [4] §B.1.

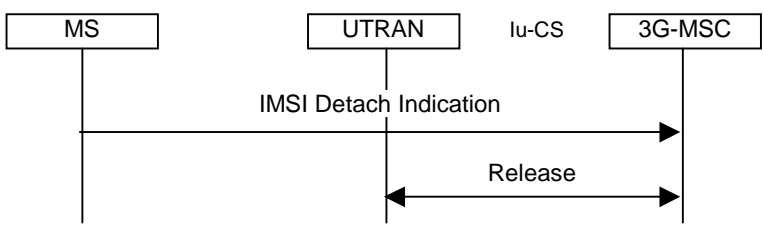
| | |
|--|--|
| Mobility Management –CS Location Updating | |
| MM_CS_102: LOCATION UPDATING | |
| OBJECTIVE: | This test aims to demonstrate completion of the Location Updating procedure when the MS changes 3G-MSC area. |
| INTERFACES: | IuCS, D. |
| PRECONDITIONS: | Requires at least configuration n°1*. The user must be registered in the HLR with UMTS subscription. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 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: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: | |
| <pre> sequenceDiagram participant UE participant UTRAN participant new_3G_MSC as new 3G-MSC participant HLR participant old_3G_MSC as old 3G-MSC UE->>new_3G_MSC: Location Updating Request new_3G_MSC->>old_3G_MSC: Send Identification Request old_3G_MSC-->>new_3G_MSC: Send Identification Request Ack new_3G_MSC->>UE: Security Functions new_3G_MSC->>HLR: Update Location HLR->>old_3G_MSC: Cancel Location old_3G_MSC-->>HLR: Cancel Location Ack HLR->>new_3G_MSC: Insert Subscriber Data new_3G_MSC-->>HLR: Insert Subscriber Data Ack HLR->>new_3G_MSC: Update Location Ack new_3G_MSC->>UE: Location Updating Accept UTRAN->>new_3G_MSC: TMSI Reallocation Complete UTRAN-->>new_3G_MSC: Release </pre> | |
| <ol style="list-style-type: none"> 2. Check the following fields in the messages: | |
| <p>Location Updating Request: Mobile identity=old TMSI; Location Area Identification=old LAI;</p> | |
| <p>Location Updating Accept: Mobile identity=new TMSI; Location Area Identification=new LAI;</p> | |
| <ol style="list-style-type: none"> 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.

NOTES:

*. In this test the configuration n°1 have to be completed with another 3G-MSC.

REFERENCES: [1] §4.4.4, §9.2, [2] §4.3.13.

| | |
|--|---|
| Mobility Management - CS Detach | |
| 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: | IuCS. |
| 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 UTRAN->>3G-MSC: IMSI Detach Indication 3G-MSC-->>UTRAN: Release </pre> |
| | 2. Check that the MS is deregistered in the 3G-MSC. |
| NOTES: | |
| REFERENCES: | [1] §4.3.4 |

| | |
|--|--|
| Mobility Management - PS Attach | |
| 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: | IuPS, Gr. |
| 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: | |
| <ol style="list-style-type: none"> 1. Check that the user is not already registered in 3G-SGSN and that the MS does not have a valid PTMSI in the 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 as 3G-SGSN participant HLR MS->>3G_SGSN: Attach Request 3G_SGSN->>HLR: Update Location HLR->>3G_SGSN: Insert Subscriber Data 3G_SGSN->>HLR: Insert Subscriber Data Ack HLR->>3G_SGSN: Update Location Ack 3G_SGSN->>MS: Attach Accept 3G_SGSN->>UTRAN: Attach Complete UTRAN->>3G_SGSN: Release </pre> | |
| 2. Check the following fields in the messages: | |
| Attach Request: MS Identity = IMSI; | |
| Update Location: Mobile Identity=<IMSI>; | |
| Insert Subscriber Data: subscriber data; | |
| Attach Accept: 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. | |
| NOTES: | |
| The message “Attach Request” is carry by an “Initial UE” ranap message. | |
| The possible authentication and security functions are leave out because dealed in successive tests. | |

REFERENCES: [1] §4.7.3.1, §9.4, [3] §6.5, [4] §B.1.

| | |
|--|--|
| Mobility Management - PS Attach | |
| MM_PS_302: SUCCESSFUL PTMSI ATTACH, MS KNOWN IN THE NETWORK | |
| OBJECTIVE: | This test aims to demonstrate completion of the PS attach procedure when the MS has a valid PTMSI, known in the network. |
| INTERFACES: | IuPS, Gr. |
| PRECONDITIONS: | 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. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 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. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: <div> <pre> sequenceDiagram participant MS participant UTRAN participant 3G_SGSN as 3G-SGSN participant HLR MS->>UTRAN: Attach Request UTRAN->>3G_SGSN: Attach Request 3G_SGSN-->>UTRAN: Attach Accept UTRAN-->>MS: Attach Accept 3G_SGSN-->>UTRAN: Attach Complete UTRAN-->>MS: Attach Complete Note over MS, UTRAN, 3G_SGSN: ... 3G_SGSN-->>UTRAN: Release </pre> </div> 2. Check the following fields in the messages: <p>Attach Request: MS Identity = P-TMSI;</p> <p>Attach Accept¹: Allocated P-TMSI=<reallocated P-TMSI>.</p> 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. | |
| NOTES: | |
| The message “Attach Request” is carry by an “Initial UE” ranap message. | |
| ¹ . Check the field in the message Attach Accept only in case of PTMSI reallocation. | |
| REFERENCES: | [1] §4.7.3.1, §9.4, [3] §6.5 |

| | |
|--|--|
| Mobility Management - PS Attach | |
| MM_PS_303: SUCCESSFUL PTMSI ATTACH, MS UNKNOWN IN THE NETWORK | |
| OBJECTIVE: | This test aims to demonstrate completion of the PS attach procedure when the MS has a PTMSI unknown in the network. |
| INTERFACES: | IuPS, Gr. |
| PRECONDITIONS: | 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. |
| PRIORITY: | B |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 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. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: | |
| <pre> sequenceDiagram participant MS participant UTRAN participant 3G_SGSN as 3G-SGSN participant HLR UTRAN->>3G_SGSN: Attach Request 3G_SGSN->>MS: Identity Request MS->>3G_SGSN: Identity Response 3G_SGSN->>HLR: Update Location HLR->>3G_SGSN: Insert Subscriber Data 3G_SGSN->>HLR: Insert Subscriber Data Ack. HLR->>3G_SGSN: Update Location Ack. 3G_SGSN->>MS: Attach Accept MS->>3G_SGSN: Attach Complete UTRAN->>3G_SGSN: Release </pre> | |
| <ol style="list-style-type: none"> 2. Check the following fields in the messages: <ul style="list-style-type: none"> Attach Request: MS Identity = P-TMSI; Identity Request: Identity type= IMSI; Identity Response: Mobile Identity=<IMSI>; UpdateLocation: Mobile Identity=<IMSI>; Insert Subscriber Data: GPRS Subscription Data; Attach Accept: 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. | |

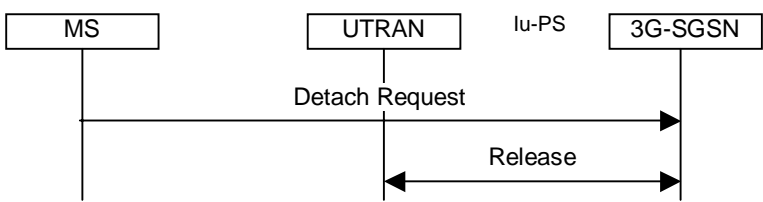
NOTES:

The message "Attach Request" is carry by an "Initial UE" ranap message.

REFERENCES: [1]§4.7.3.1, §9.4; [3]§6.5, [4] §B.1.

| | |
|--|---|
| Mobility Management -PS Location Management | |
| MM_LM_401: NORMAL ROUTING AREA UPDATE | |
| OBJECTIVE: | This test aims to demonstrate completion of the Routing Area Update procedure. |
| INTERFACES: | IuPS. |
| 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: | <ol style="list-style-type: none"> 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: | <ol style="list-style-type: none"> 1. The message exchange to check is as follows: <div> <pre> sequenceDiagram participant MS participant UTRAN participant SGSN as 3G-SGSN UTRAN->>SGSN: RA Update Request SGSN-->>UTRAN: Security Functions UTRAN->>MS: RA Update Accept UTRAN->>SGSN: RA Update Complete UTRAN-->>SGSN: Release </pre> </div> 2. Check the following fields in the messages: <p>RA Update Request: Old RAI; Update type= RA updating;</p> <p>RA Update Accept: Allocated P-TMSI=<re-allocated P-TMSI>.</p> 3. Check that the MM context of the MS is updated with the new RAI. |
| NOTES: | |
| REFERENCES: | [3] §6.9.2.1; [1] §9.4. |

| | |
|---|---|
| Mobility Management –PS Location Management | |
| MM_LM_402: PERIODIC RA UPDATE TIMER FUNCTION | |
| OBJECTIVE: | This test aims to demonstrate completion of the Periodic RA Update procedure. |
| INTERFACES: | Iu-PS. |
| 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 minutes. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 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: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: | |
| <pre> sequenceDiagram participant MS participant UTRAN participant SGSN as 3G-SGSN UTRAN->>SGSN: RA Update Request SGSN->>UTRAN: RA Update Accept UTRAN->>MS: RA Update Accept UTRAN->>SGSN: Release UTRAN->>SGSN: RA Update Request SGSN->>UTRAN: RA Update Accept UTRAN->>MS: RA Update Accept UTRAN->>SGSN: Release </pre> | |
| <ol style="list-style-type: none"> 2. Check the following field in the message: <p style="text-align: center;">RA Update Request: Update type=periodic updating.</p> | |
| NOTES: | |
| REFERENCES: | [3] §6.2.2, [1] §9.4, §4.7.2, §4.7.5. |

| | |
|--|---|
| Mobility Management - PS Detach | |
| 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: | IuPS. |
| 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: | <p>1. The message exchange to check is as follows:</p>  <pre> sequenceDiagram participant MS participant UTRAN participant SGSN as 3G-SGSN MS->>UTRAN: Detach Request UTRAN->>SGSN: Release style UTRAN fill:none,stroke:none style SGSN fill:none,stroke:none </pre> <p>2. Check the following fields in the messages:</p> <p style="padding-left: 40px;">Detach Request: Detach Type=GPRS detach.</p> <p>3. Check that the MS is deregistered in the 3G-SGSN.</p> |
| NOTES: | The message "Detach Request" is carry by an "Initial UE" ranap message. |
| REFERENCES: | [3] §6.6.1; [1] §9.4.5. |

| | |
|---|---|
| Mobility Management - PS Detach | |
| 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: | IuPS, Gr. |
| 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 PDPC. |
| 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->>SGSN: Cancel Location SGSN->>MS: Detach Request MS->>SGSN: Detach Accept SGSN->>HLR: Cancel Location Ack SGSN->>UTRAN: Release </pre> | |
| 2. Check the following fields in the messages: | |
| Cancel Location: Cancellation type=subscription withdrawn; IMSI; | |
| Detach Request: Detach type=re-attach not required. | |
| 3. Check that the MS is deregistered in the 3G-SGSN. | |
| NOTES: | |
| REFERENCES: | [3] §6.6.2; [1] §9.4.5, [4] §B.1. |

| | |
|--|---|
| Mobility Management - PS Detach | |
| 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: | IuPS. |
| PRECONDITIONS: | Requires at least configuration n°2. The user must be registered in the HLR with UMTS subscription. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 1. Set a mobile reachable timer value in the 3G-SGSN of around 15 minutes. 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 3G_SGSN as 3G-SGSN UTRAN->>3G_SGSN: Attach Request 3G_SGSN-->>UTRAN: Attach Accept UTRAN->>3G_SGSN: Release </pre> | |
| <ol style="list-style-type: none"> 2. Check the following fields in the messages: Attach Accept: 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. | |
| NOTES: | |
| REFERENCES: | [1] §6.2.3, §6.6, [3] §9.4 |

| | |
|--|--|
| Mobility Management - Security Functions | |
| MM_SEC_601: AUTHENTICATION OF UMTS SUBSCRIBER | |
| OBJECTIVE: | This test aims to demonstrate completion of the user authentication procedure. |
| INTERFACES: | IuPS, Gr. |
| 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->>3G_SGSN: Attach Request 3G_SGSN->>HLR: Send Authentication Info HLR-->>3G_SGSN: Send Authentication Info Ack 3G_SGSN->>MS: Authentication and Ciphering Request MS->>3G_SGSN: Authentication and Ciphering Response 3G_SGSN->>MS: Security Mode Control Command MS->>3G_SGSN: Security Mode Control Complete 3G_SGSN->>MS: Attach Accept MS->>3G_SGSN: Attach Complete 3G_SGSN->>UTRAN: Release </pre> | |
| 2. Check the following fields in the messages: | |
| AttachRequest: MS Identity=IMSI; IMSI=<IMSI>; | |
| Send Authentication Info: IMSI; | |
| Send Authentication Info Ack: array of quintuplets; | |
| Authentication and Ciphering Request: RAND, AUTN, CKSN; | |
| Attach Accept: 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. | |
| NOTES: | |

REFERENCES: [4] §B.1, [5] §6.4.5.

| | |
|--|--|
| Mobility Management – Security Function | |
| 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 authorised by the network. |
| INTERFACES: | IuCS, D. |
| PRECONDITIONS: | Requires at least configuration n°1. The user mustn't be registered in the HLR with UMTS subscription. The user must not have a valid TMSI stored in the USIM. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 1. Check that the user is not already registered in 3G-MSC. 2. Carry out an IMSI attach with the MS. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: | |
| <pre> sequenceDiagram participant MS participant UTRAN participant MSC as 3G-MSC participant HLR UTRAN->>MSC: Location Updating Request MSC->>HLR: Update Location HLR-->>MSC: Update Location Ack MSC-->>MS: Location Updating Reject MSC-->>UTRAN: Release </pre> | |
| <ol style="list-style-type: none"> 2. Check the following fields in the messages: <ul style="list-style-type: none"> Location Updating Request: Location Updating type = IMSI Attach; Mobile Identity=IMSI; Location Updating Reject: Reject Cause=IMSI unknown in HLR. 3. Check that the MS is not registered in the 3G-MSC. | |
| NOTES: | |
| REFERENCES: | [2] §4.3.14; [1] §4.4.3, §9.2 |

| | |
|--|--|
| Mobility Management – Security Functions | |
| 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 authorised by the network. |
| INTERFACES: | IuPS, Gr. |
| 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 SGSN as 3G-SGSN participant HLR MS->>SGSN: Attach Request SGSN->>HLR: Update Location HLR-->>SGSN: Update Location Ack SGSN->>MS: Attach Reject SGSN->>UTRAN: Release </pre> | |
| 2. Check the following fields in the messages: | |
| Attach Request: MS identity=IMSI; IMSI=<IMSI>; | |
| Attach Reject: GMM Cause='IMSI unknown in HLR'. | |
| NOTES: | |
| REFERENCES: | [3] §6.5, [1] §9.4. |

7.1.4.2. Gs Interface Interoperability

| <i>Gs Interface interoperability–Combined Procedures</i> | |
|---|---|
| Gs_IOT_101: COMBINED ATTACH | |
| OBJECTIVE: | This test aims to demonstrate completion of the combined attach procedure. |
| INTERFACES: | IuPS, Gs, Gr, D. |
| PRECONDITIONS: | Requires at least configuration n°3 ¹ . The user must be registered in the HLR with UMTS subscription. |
| PRIORITY: | B |
| DESCRIPTION/PROCEDURE: | |
| <p>1. Check that the user is not already registered in neither 3G-MSC nor 3G-SGSN.</p> <p>2. Carry out an attach with the MS.</p> | |
| EXPECTED RESULTS: | |
| <p>1. The message exchange to check is as follows:</p> <pre> sequenceDiagram participant MS participant UTRAN participant SGSN as 3G-SGSN participant MSC as 3G-MSC/VLR participant HLR MS->>SGSN: Attach Request UTRAN-->>MS: Authentication Procedure SGSN->>HLR: Update Location HLR->>MSC: Insert Subscriber Data MSC->>HLR: Insert Subscriber Data Ack HLR->>SGSN: Update Location Ack SGSN->>MSC: Location Update Req MSC->>HLR: Update Location HLR->>MSC: Insert Subscriber Data MSC->>HLR: Insert Subscriber Data Ack HLR->>MSC: Update Location Ack MSC->>SGSN: Location Update Accept SGSN->>MS: Attach Accept UTRAN-->>MS: Attach Complete UTRAN-->>SGSN: Release </pre> | |
| <p>2. Check the following fields in the messages:</p> <p>Attach Request: Attach Type=combined GPRS/IMSI attach, IMSI;</p> <p>Update Location: IMSI, SGSN number, SGSN address;</p> <p>Insert Subscriber Data: GPRS subscription data;</p> <p>Location Update Request: Location Update type = IMSI Attach, IMSI, SGSN number,</p> | |

new LAI;

Update Location: IMSI, new VLR;

Insert Subscriber Data: GSM subscription data;

Location Update Accept: TMSI.

3. Check that the user is registered in the 3G-MSC and in the 3G-SGSN.

4. Check that the MS indicates attached status.

5. Check that the 3G-SGSN address and the 3G-MSC address are stored in the HLR.

NOTES:

¹. In this test the configuration n°3 not requires the 3G-GGSN.

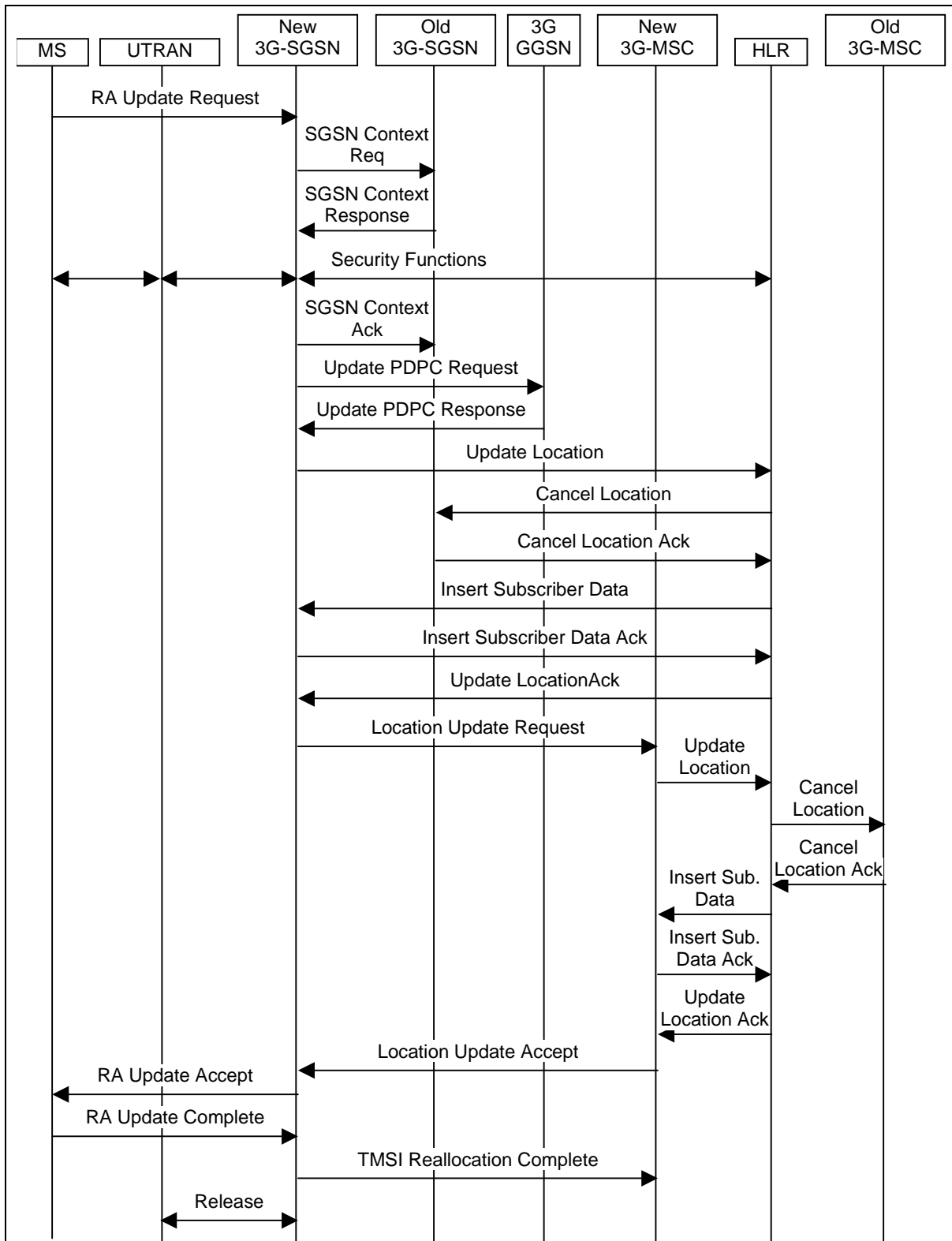
REFERENCES: [3] §6.5.3, [4] §B.1.

| | |
|---|--|
| Gs Interface interoperability–Combined Procedures | |
| Gs_IOT_102: COMBINED DETACH | |
| OBJECTIVE: | This test aims to demonstrate completion of the combined detach procedure. |
| INTERFACES: | IuCS, Gs, Gn. |
| 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->>SGSN: Detach Request SGSN->>GGSN: Delete PDPC Req GGSN-->>SGSN: Delete PDPC Response SGSN->>MSC: IMSI Detach Indication SGSN->>UTRAN: Release </pre> | |
| 2. Check the following fields in the messages: | |
| Detach Request: Detach Type=combined GPRS/IMSI detach; | |
| Delete PDPC Request: TEID; | |
| Delete PDPC Response: TEID. | |
| 3. Check that the MS is deregistered in both the 3G-MSC and 3G-SGSN. | |
| NOTES: | |
| REFERENCES: | [3] §6.6 |

| | |
|--|---|
| Gs Interface interoperability–Detach Procedures | |
| Gs_IOT_103: IMPLICIT COMBINED DETACH | |
| OBJECTIVE: | This test aims to demonstrate completion of the 3G-SGSN initiated combined detach procedure. |
| INTERFACES: | IuPS, Gs, Gn. |
| 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 <i>reachable timer</i> expiry, while make the MS unable to send <i>Periodic RAU</i> 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->>GGSN: Delete PDPC Req GGSN-->>SGSN: Delete PDPC Response GGSN->>MSC: IMSI Detach Indication MSC-->>GGSN: IMSI Detach Indication Ack MSC->>UTRAN: Release </pre> | |
| 2. Check the following fields in the messages: IMSI Detach Indication: Detach type="Implicit SGSN initiated IMSI detach from non-GPRS service". | |
| 3. Check that there isn't signalling on the IuPS interface. | |
| 4. Check that the MS is deregistered in both the 3G-SGSN and the 3G-MSC. | |
| NOTES: | |
| REFERENCES: | [1] §9.4, [3] §6.6, [26] §10 §17.1. |

| | |
|--|---|
| Gs Interface interoperability - 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: | IuPS, Gs. |
| PRECONDITIONS: | Requires at least configuration no. 3 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 UTRAN->>3G_SGSN: RA Update Request 3G_SGSN->>3G_MSC_VLR: Location Update Req 3G_MSC_VLR-->>3G_SGSN: Location Update Acc 3G_SGSN->>MS: RA Update Accept 3G_SGSN-->>MS: RA Update Complete² 3G_SGSN-->>3G_MSC_VLR: TMSI Realloc. Com³ UTRAN-->>3G_SGSN: Release </pre> | |
| 2. Check the following fields in the messages: | |
| RA Update Request: Old RAI; Update type= Combined RA/LA update. | |
| Location Update Request: 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. | |
| NOTES: | |
| ¹ . In this test the configuration n°3 not requires the 3G-GGSN. | |
| 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). | |
| ³ . The TMSI reallocation Complete message is displayed only in the event the TMSI is reallocated (in the Location Update Accept message). | |
| REFERENCES: | [3] §6.9, [26] §6, §17.1. |

| | |
|--|--|
| <i>Gs Interface interoperability – Combined Procedures</i> | |
| Gs_IOT_105: INTER 3G-SGSN COMBINED RA/LA UPDATE | |
| OBJECTIVE: | This test aims to demonstrate completion of the combined RA/LA update procedure. |
| INTERFACES: | IuPS, Gn, IuCS, Gr, D. |
| PRECONDITIONS: | Requires at least configuration n°3 ¹ . The user must be registered in the HLR with UMTS subscription and must be attached. |
| PRIORITY: | B |
| DESCRIPTION/PROCEDURE: | <ol style="list-style-type: none"> 1. Check that the MS is in PMM-Idle state. 2. Carry out a combined RA/LA Update procedure forcing the MS into a new LA. |
| EXPECTED RESULTS: | <ol style="list-style-type: none"> 1. The message exchange to check is as follows: |



2. Check the following fields in the messages:

RA Update Request: Old RAI; Update type= Combined RA/LA updating.

SGSN Context Request: old P-TMSI, old RAI, old P-TMSI signature;

SGSN Context Response: MM context, PDP context;

Update PDP Context Request: new SGSN address, QoS negotiated, TEID;

Update PDP Context Response: TEID;

Location Update Request: Location Update type=normal location update;

Location Update Accept: new TMSI;

RA Update Accept: new RAI.

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.

NOTES:

¹. In this test the configuration n°3 requires another RNC, 3G-MSC and 3G-SGSN.

REFERENCES: [3] §6.9.2.

| | |
|---|---|
| Gs Interface interoperability –Detach Procedures | |
| Gs_IOT_106: HLR INITIATED COMBINED DETACH | |
| OBJECTIVE: | This test aims to demonstrate completion of the HLR initiated combined detach procedure. |
| INTERFACES: | IuPS, Gs, Gn, Gr. |
| 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 combined 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 GGSN->>SGSN: Cancel Location SGSN->>GGSN: Delete PDPC Req GGSN->>SGSN: Delete PDPC Res SGSN->>MS: Detach Request MS->>SGSN: Detach Accept SGSN->>MSC: IMSI Detach Indication MSC->>SGSN: IMSI Detach Indication Ack SGSN->>HLR: Cancel Location Ack HLR->>UTRAN: Release </pre> | |
| 2. Check the following fields in the messages: | |
| Cancel Location: Cancellation Type="Subscription Withdrawn", IMSI; | |
| Detach Request: Detach Type="re-attach not required"; | |
| IMSI Detach Indication: Detach type="Combined explicit MS initiated IMSI detach from GPRS and non-GPRS services". | |
| 3. Check that the MS is deregistered in both the 3G-SGSN and the 3G-MSC/VLR. | |
| NOTES: | |
| REFERENCES: | [1] §9.4, [3] §6.6.2, [26] §17.1. |

| | |
|--|---|
| Gs Interface interoperability–Coordination | |
| 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: | IuPS, Gs, Gr, D. |
| PRECONDITIONS: | Requires at least configuration n°3 ¹ . The user must be registered in the HLR with UMTS subscription. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 1. Check that the user is only IMSI attached. 2. Carry out a PS attach by the MS. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: | |
| <pre> sequenceDiagram participant MS participant UTRAN participant SGSN as 3G-SGSN participant MSC as 3G-MSC/VLR participant HLR MS->>SGSN: Attach Request SGSN-->>HLR: Authentication Procedure HLR-->>SGSN: Authentication Procedure SGSN->>HLR: Update Location HLR->>MSC: Insert Subscriber Data MSC->>HLR: Insert Subscriber Data Ack HLR->>SGSN: Update Location Ack SGSN->>MSC: Location Update Req MSC->>SGSN: Location Update Accept SGSN->>MS: Attach Accept MS->>SGSN: Attach Complete SGSN->>MSC: Release MSC-->>HLR: TMSI Reallocation Complete² </pre> | |
| <ol style="list-style-type: none"> 2. Check the following fields in the messages: <ul style="list-style-type: none"> Attach Request: Attach Type=GPRS attach while already IMSI attach, IMSI; Update Location: IMSI, SGSN number, SGSN address; Insert Subscriber Data: GPRS subscription data; Location Update Request: 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. | |
| NOTES: | |

¹. In this test the configuration n°3 not requires the 3G-GGSN.

². The TMSI reallocation Complete message is displayed only in the event the TMSI is reallocated (in the Location Update Accept message).

REFERENCES: [1] §9.2; [3] §6.5.3, [26] §6.1, §17.1.

| | |
|--|---|
| Gs Interface interoperability – Coordination | |
| 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: | IuPS, Gs, Gr, D. |
| PRECONDITIONS: | Requires at least configuration n°3 ¹ . The user must be registered in the HLR with UMTS subscription. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 1. Check that the user is only PS attached. 2. Carry out an IMSI attach by the MS. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: | |
| <pre> sequenceDiagram participant MS participant UTRAN participant SGSN as 3G-SGSN participant MSC as 3G-MSC/VLR participant HLR MS->>SGSN: Routing Area Update Request SGSN-->>MS: Security Functions SGSN->>HLR: Location Update Request HLR-->>SGSN: Location Update Accept SGSN->>MS: Routing Area Update Accept SGSN->>MS: Routing Area Update Complete SGSN->>MSC: TMSI Reallocation Complete UTRAN->>SGSN: Release </pre> | |
| <ol style="list-style-type: none"> 2. Check the following fields in the messages: <ul style="list-style-type: none"> Routing Area Update Request: Update Type="Combined RA\LA Update with IMSI attach", old RAI; Location Update Request: Update type = IMSI Attach, IMSI, SGSN number, new Cell; Location Update Accept: 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. | |
| NOTES: | |
| ¹ . In this test the configuration n°3 not requires the 3G-GGSN. | |
| REFERENCES: | [1] §9.2, [3] §6.9.1.3, [26] §17.1. |

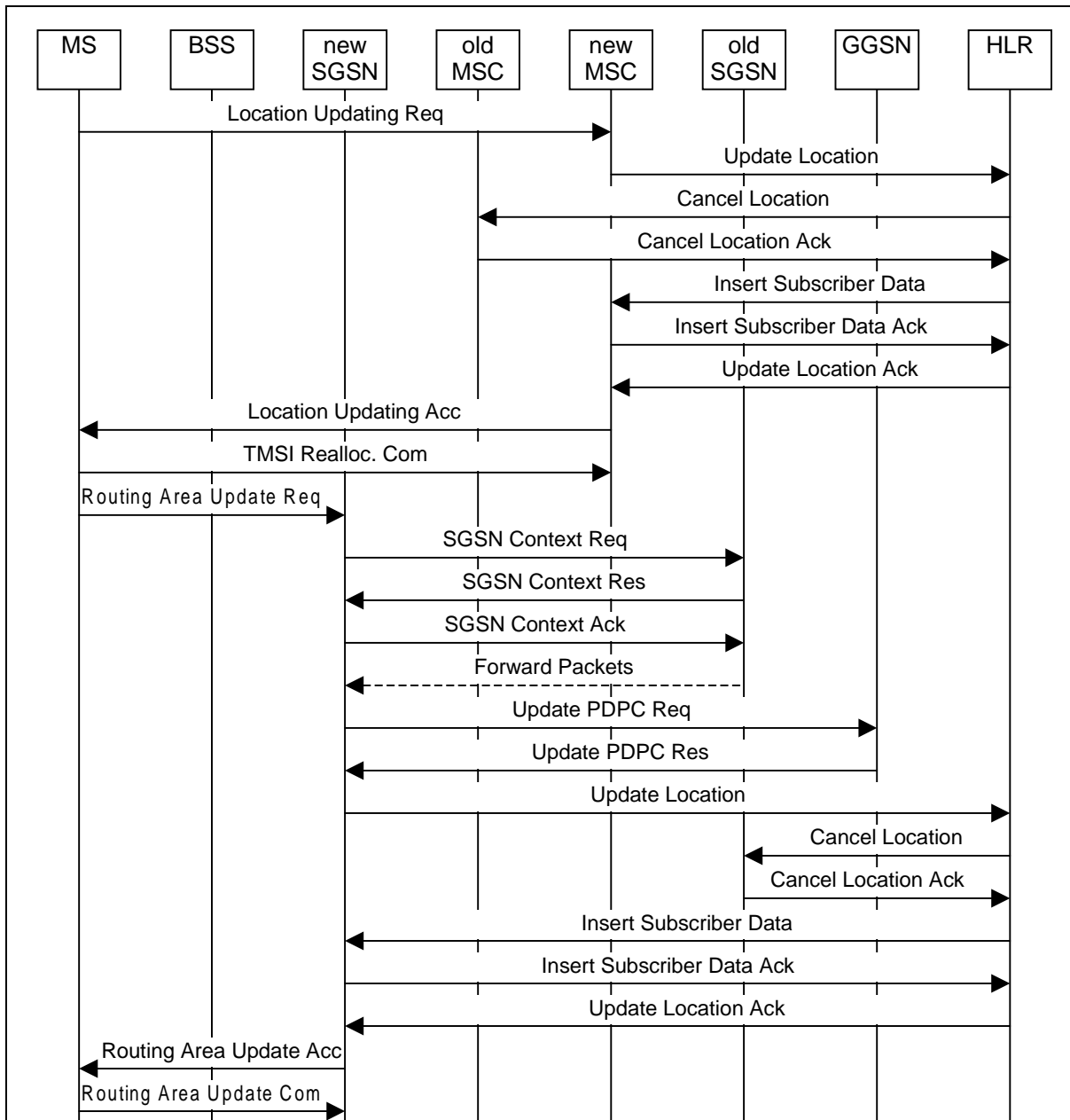
| | |
|--|---|
| Gs Interface interoperability – Coordination | |
| Gs_IOT_203: IMSI ONLY DETACH | |
| OBJECTIVE: | This test aims to demonstrate completion of the only IMSI detach when the MS is still PS attached. |
| INTERFACES: | IuPS, Gs, Gn. |
| PRECONDITIONS: | Requires at least configuration n°3. 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 MS->>SGSN: Detach Request SGSN->>MSC: IMSI Detach Indication MSC-->>SGSN: IMSI Detach Indication Ack SGSN->>MS: Detach Accept UTRAN->>SGSN: Release </pre> | |
| 2. Check the following fields in the messages: | |
| Detach Request: Detach Type="IMSI detach"; | |
| IMSI Detach Indication: Detach type="Explicit MS initiated IMSI detach from non- GPRS service". | |
| 3. Check that the MS is deregistered in the 3G-SGSN. | |
| NOTES: | |
| REFERENCES: | [1] §9.4, [3] §6.6.1, [26] §9, §17.1. |

| | |
|---|---|
| Gs Interface interoperability – Coordination | |
| 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: | IuPS, Gs, Gn. |
| 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 MS->>SGSN: Detach Request (IuPS) SGSN->>GGSN: Delete PDPC Req (Gn) GGSN-->>SGSN: Delete PDPC Response (Gn) SGSN->>MSC: GPRS Detach Indication (Gs) MSC-->>SGSN: GPRS Detach Indication Ack (Gs) SGSN->>MS: Detach Accept (IuPS) UTRAN->>SGSN: Release (IuPS) </pre> | |
| 2. Check the following fields in the messages: | |
| Detach Request: Detach Type="GPRS Detach"; | |
| GPRS Detach Indication: 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. | |
| NOTES: | |
| REFERENCES: | [1] §9.4, [3] §6.6.1, [26] §8, §17.1. |

| | |
|--|---|
| Gs Interface interoperability – Coordination | |
| Gs_IOT_205: 3G-SGSN INITIATED PS DETACH | |
| OBJECTIVE: | This test aims to demonstrate completion of the 3G-SGSN initiated PS detach procedure. |
| INTERFACES: | IuPS, Gs, Gn. |
| 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 GSN as 3G-GSN participant MSC as 3G-MSC/VLR SGSN->>MS: Detach Request MS->>SGSN: Detach Accept SGSN->>GSN: Delete PDPC Req GSN-->>SGSN: Delete PDPC Response SGSN->>MSC: GPRS Detach Indication MSC-->>SGSN: GPRS Detach Indication Ack SGSN->>UTRAN: Release </pre> | |
| 2. Check the following fields in the messages: | |
| Detach Request: Detach Type="re-attach not required"; GPRS Detach Indication: 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. | |
| NOTES: | |
| REFERENCES: | [1] §9.4, [3] §6.6.2, [26] §17.1. |

| | |
|--|---|
| Gs Interface interoperability – Coordination | |
| Gs_IOT_206: HLR INITIATED PS DETACH | |
| OBJECTIVE: | This test aims to demonstrate completion of the HLR initiated combined detach procedure. |
| INTERFACES: | IuPS, Gs, Gn, Gr. |
| 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 GGSN->>SGSN: Cancel Location SGSN->>MS: Detach Request SGSN->>GGSN: Delete PDPC Req GGSN-->>SGSN: Delete PDPC Res SGSN->>MS: Detach Accept SGSN->>MSC: GPRS Detach Indication MSC-->>SGSN: GPRS Detach Indication Ack SGSN->>HLR: Cancel Location Ack UTRAN->>SGSN: Release </pre> | |
| 2. Check the following fields in the messages: | |
| Cancel Location: Cancellation Type="Subscription Withdrawn", IMSI; Detach Request: Detach Type="re-attach not required"; GPRS Detach Indication: 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. | |
| NOTES: | |
| REFERENCES: | [1] §9.4, [3] §6.6.2, [26] §17.1. |

| | |
|--|---|
| Gs Interface interoperability – Inter NOM | |
| Gs_IOT_301: INTER-NOM RA/LA UPDATE | |
| OBJECTIVE: | This test aims to demonstrate completion of the combined Routing Area Update procedure when a mobile change a RA switching the NOM. |
| INTERFACES: | IuPS, IuCS, Gs. |
| PRECONDITIONS: | Requires at least configuration no. 3 ¹ . The user must be registered in the HLR with UMTS subscription, must be PS and IMSI attached and must have an active PDPC. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <ol style="list-style-type: none"> 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) |
| EXPECTED RESULTS: | <ol style="list-style-type: none"> 1. The message exchange to check is as follows: |



2. Check the following fields in the messages:

Location Updating Request: new LAI; Update type= Normal location update.

RA Update Request: Old RAI; Update type= Normal location update.

SGSN Context Req.: new RAI; TLLI.

SGSN Context Res.: Cause=Req. Accepted; MM & PDP context.

Update PDPC Res.: 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.

NOTES:

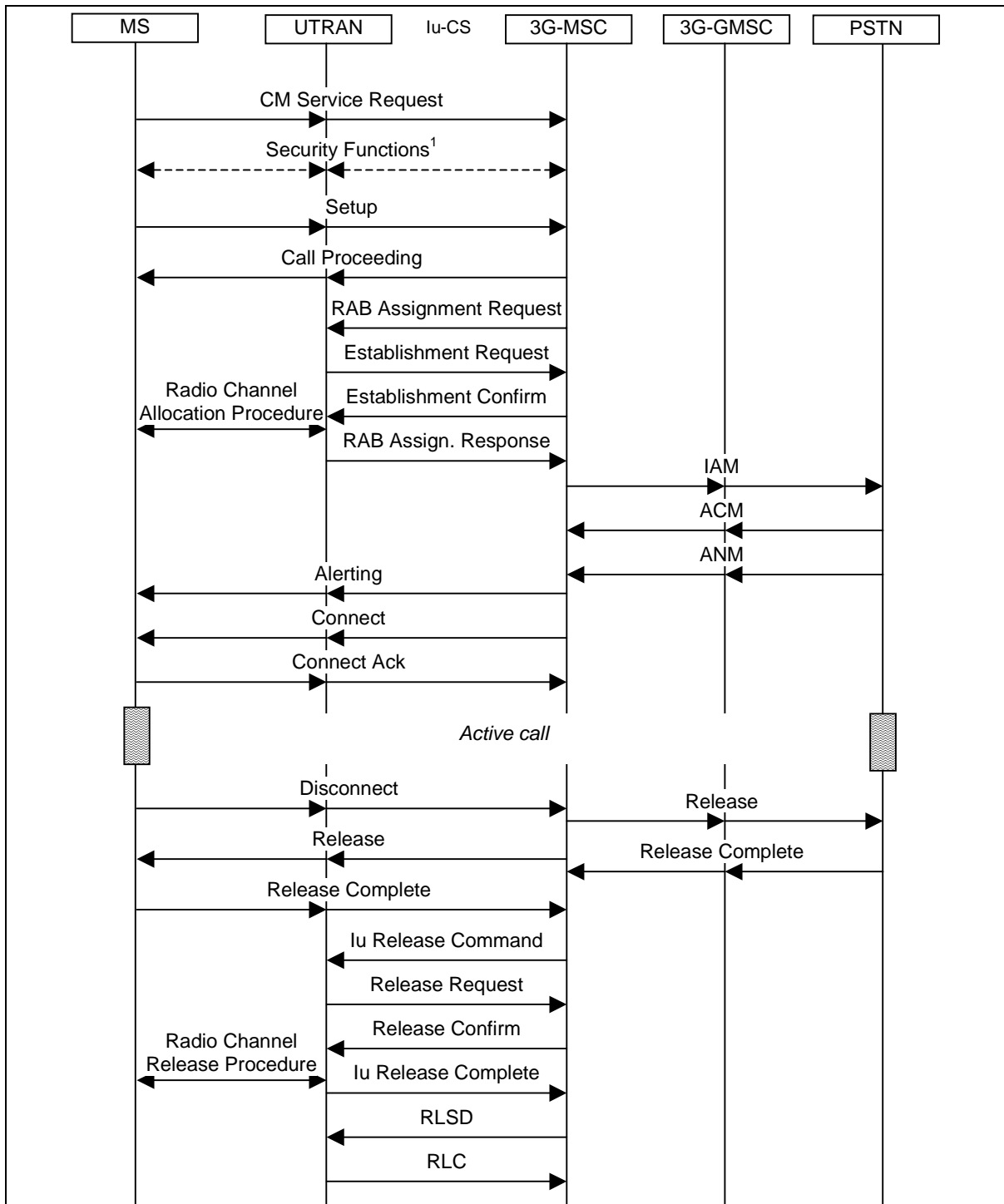
¹. In this test the configuration n°3 requires another RNC, 3G-MSC and 3G-SGSN.

REFERENCES: [3] §6.9, [7] §7.7

| | |
|---|--|
| Gs Interface interoperability – Paging | |
| 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: | IuCS, Gs. |
| PRECONDITIONS: | Requires at least configuration n°3 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 ² . | |
| 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 3G_MSC_VLR->>3G_SGSN: Paging Request (Gs) 3G_SGSN->>UTRAN: Paging (IuPS) UTRAN->>MS: Paging Request MS->>UTRAN: Initial Direct Transfer (Paging Response) UTRAN->>3G_MSC_VLR: Initial UE (Paging Response) </pre> | |
| 2. Check the following fields in the messages: Paging Request: IMSI, VLR number; Paging: CN Domain Indicator=CS Domain, Permanent NAS UE Identity=IMSI. | |
| NOTES: | |
| ¹ . In this test the configuration n°3 doesn't require the 3G-GGSN. | |
| 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] §9.1, [3] §6.3.3, [26] §5 §17.1, [27] §8.15 §9.1.23. |

7.1.4.3. CS voice calls

| | |
|---|--|
| <i>CS Voice calls – Basic Calls</i> | |
| CS_VC_101: SPEECH CALL FROM UMTS TO PSTN | |
| OBJECTIVE: | This test aims to demonstrate the capacity of a MS to successfully make an MO speech call to 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. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 1. Carry out a CS MO speech call to PSTN user. 2. Carry out a Call Clearing procedure by the MS. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: | |



2. Check the following fields in the messages:

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

Alerting: Progress Indicator='destination address is not PLMN/ISDN'².

3. Check that the CS call is successful.

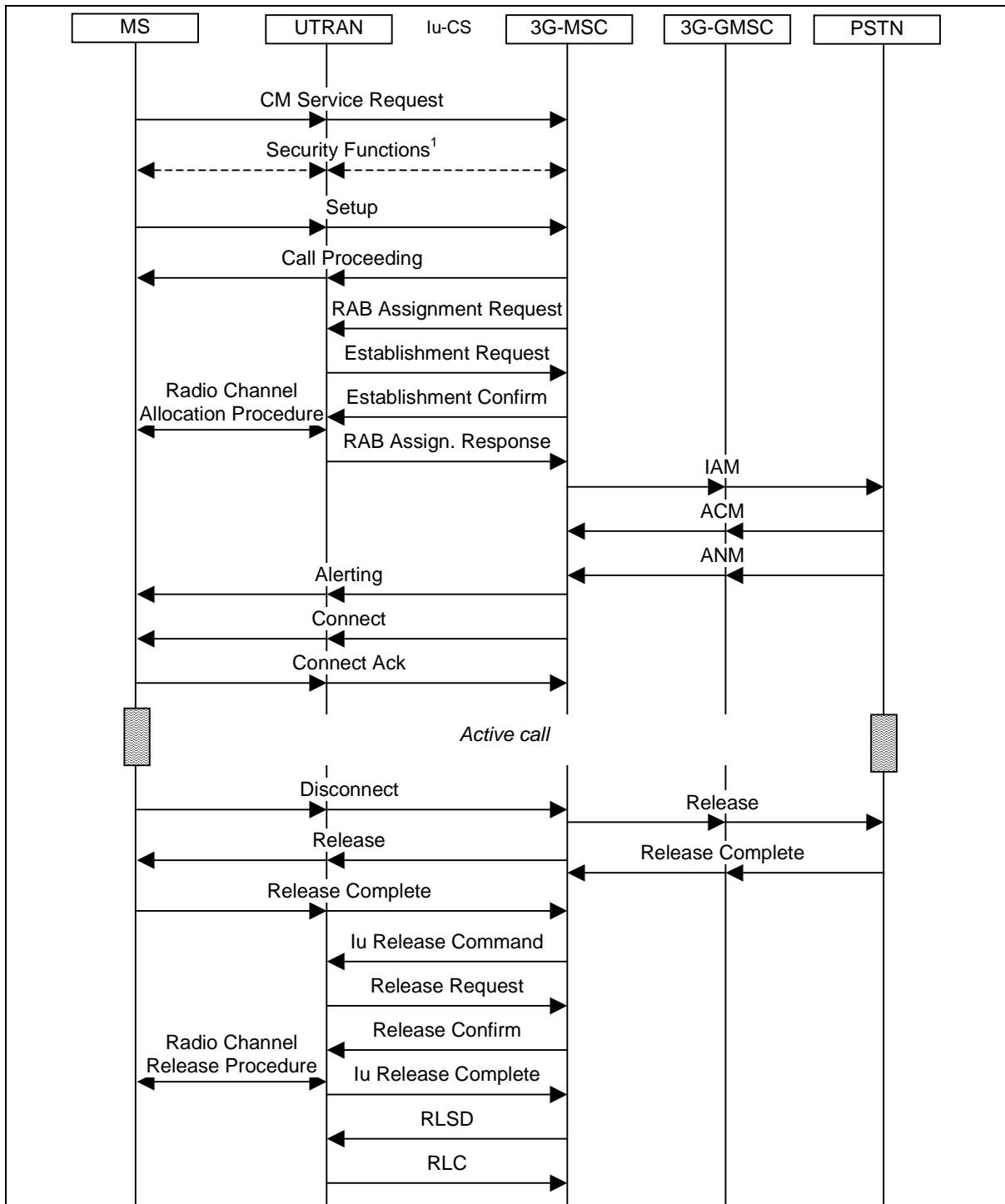
NOTES:

¹ . The network may decide to invoke the security mode control procedure otherwise the CM_Service_Accept message can occur.

² . The progress indicator IE could be send in either Alerting or Connect message.

REFERENCES: [1] §5.2.1, §5.2.1.4.1, §5.4.3, §4.5.1, §9.3; [18] §9; [19] §5.

| |
|--|
| <i>CS Voice calls – Basic Calls</i> |
| 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: <ol style="list-style-type: none">1. Carry out a 3.1kHz audio call to PSTN user.2. Carry out a Call Clearing procedure by the MS. |
| EXPECTED RESULTS: <ol style="list-style-type: none">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'¹.

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

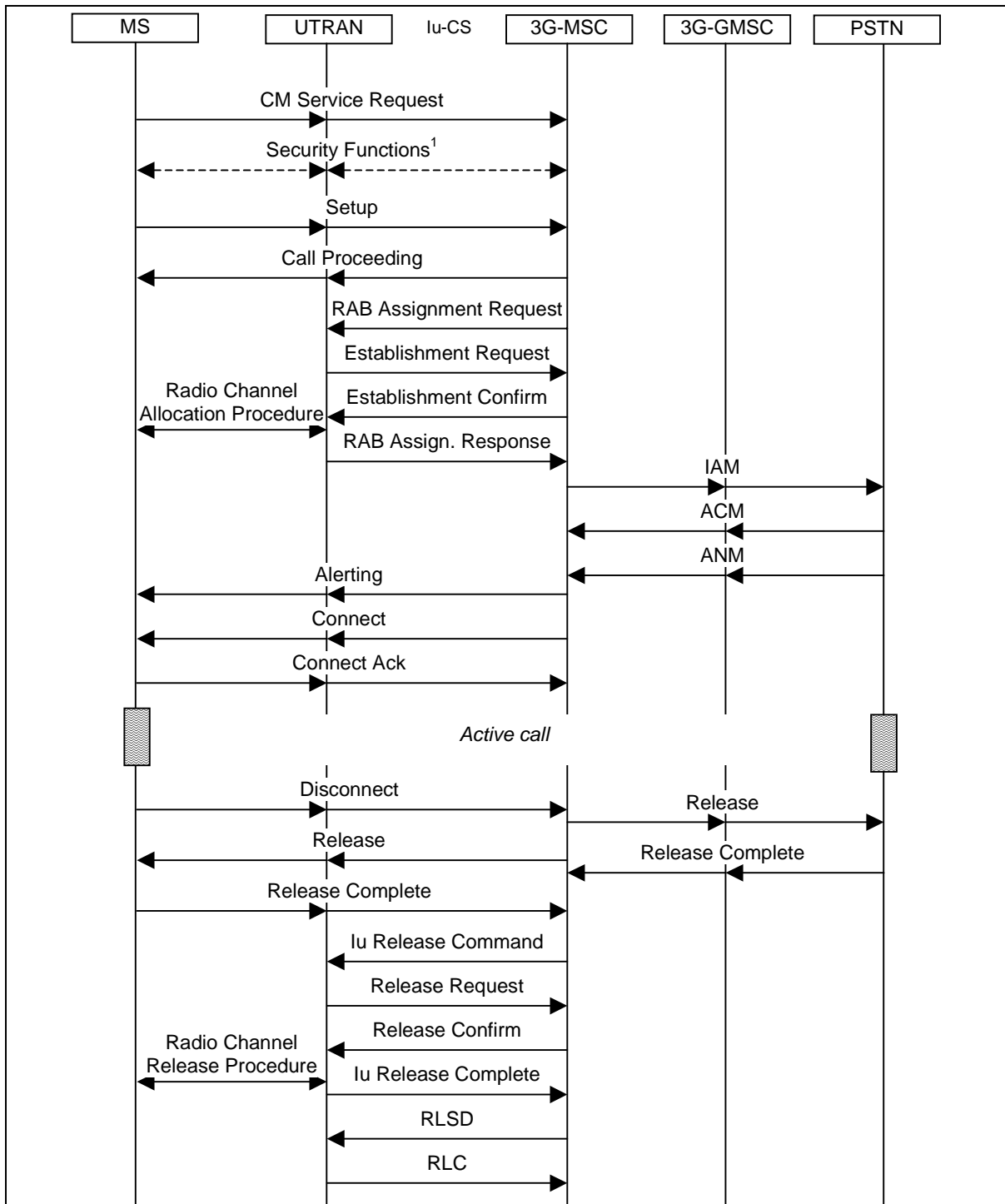
4. Check that the CS call is successful.

NOTES:

¹. The progress indicator IE could be send in either Alerting or Connect message.

REFERENCES: [1] §5.2.1, §5.2.1.4.1, §5.4.3, §4.5.1, §9.3; [18] §9.2; [19] §5.

| |
|---|
| <i>CS Voice calls – Basic Calls</i> |
| 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: <ol style="list-style-type: none">1. Carry out a facsimile G3 call to PSTN user.2. Carry out a Call Clearing procedure by the MS. |
| EXPECTED RESULTS: <ol style="list-style-type: none">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'¹.

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

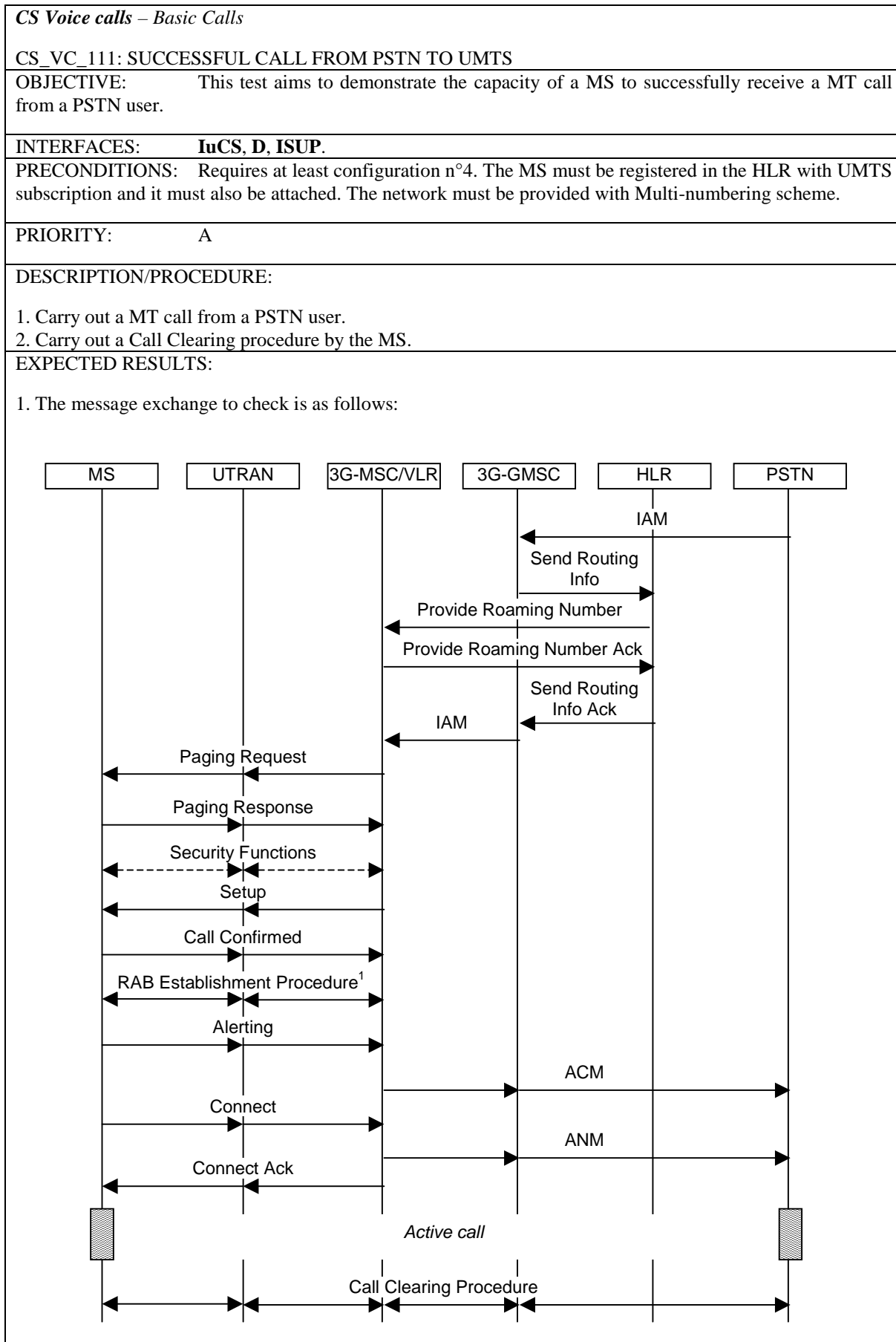
4. Check that the CS call is successful.

NOTES:

¹. The progress indicator IE could be send in either Alerting or Connect message.

REFERENCES: [1] §5.2.1, §5.2.1.4.1, §5.4.3, §4.5.1, §9.3; [18] §9.2; [19] §5.

| | |
|--|--|
| <i>CS Voice calls – Basic Calls</i> | |
| CS_VC_104: UNSUCCESSFUL UDI CALL FROM UMTS TO PSTN | |
| OBJECTIVE: | This test aims to demonstrate the correct handling of a UDI call from an UMTS subscriber 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. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| 1. Carry out an UDI call from the MS to the PSTN user. | |
| EXPECTED RESULTS: | |
| 1. The message exchange to check is as follows: | |
| <pre> sequenceDiagram participant MS participant UTRAN participant MSC as 3G-MSC MS->>UTRAN: CM Service request UTRAN->>MSC: Security Functions MS->>MSC: Setup MSC->>UTRAN: Disconnect MS->>MSC: Release MSC->>UTRAN: Release Complete </pre> | |
| 2. Check the following field in the message: | |
| Setup: Bearer Capability 1(Information Transfer Capability='UDI',); | |
| Disconnect: 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 initiate a successful call clearing procedure to the calling user. | |
| NOTES: | |
| REFERENCES: | [1] §5.4.4, §9.3, §10.5.4.11; [18] §9.2. |



2. Check the following fields in the messages:

Provide Roaming Number: IMSI, Bearer Capability 1(Information Transfer Capability='speech')

IAM: Transmission medium requirement ='speech'

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

3. Check that the call is successful.

NOTES:

The call setup to the MS will contain a BC mapped from the BC/LLC/HLC stored in the VLR.

¹. The RAB Establishment procedure consists of all the procedures that are necessary to allocate the radio bearer (refer to CS_VC_101).

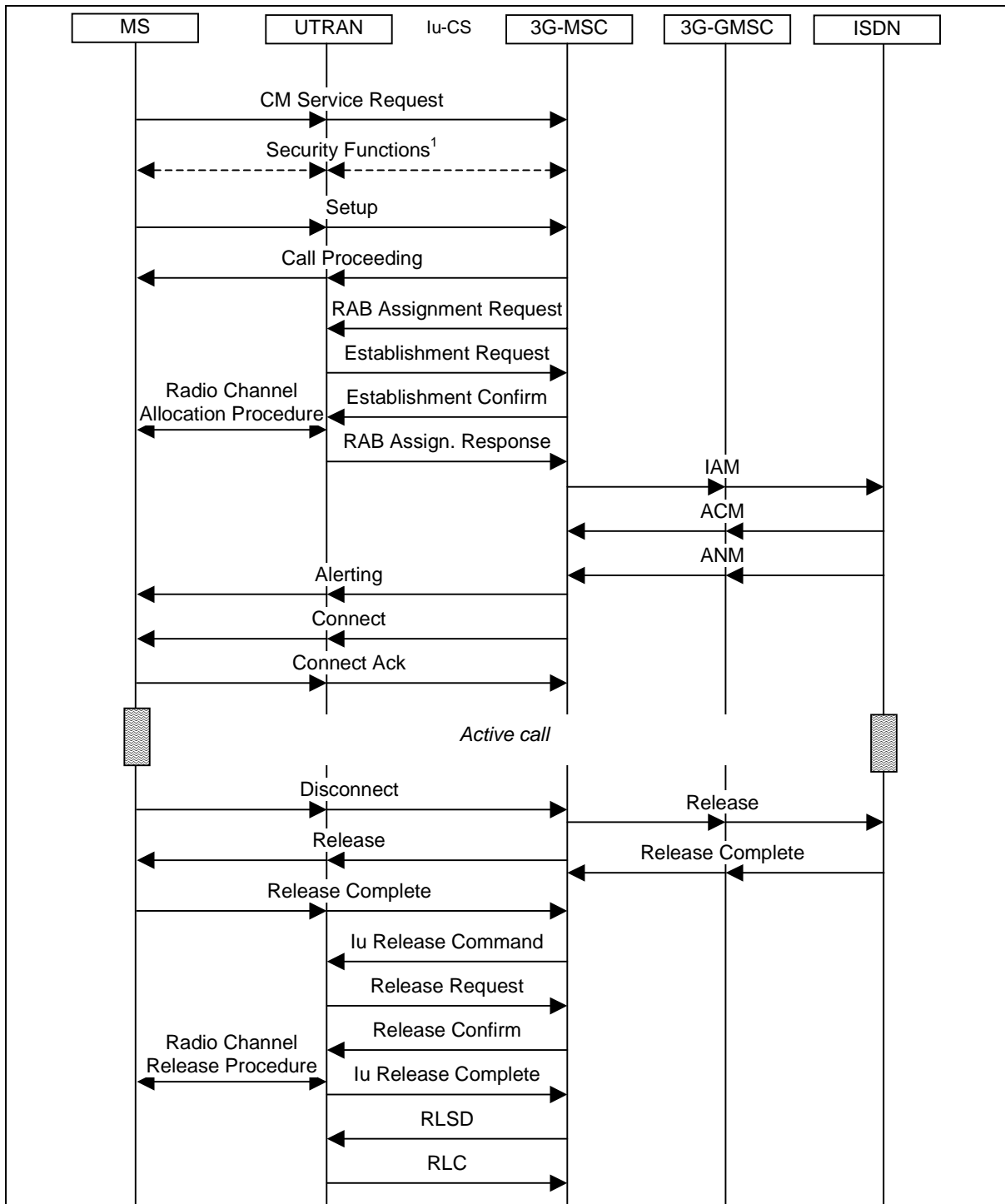
REFERENCES: [1] §5.2.2, §5.4, §4.5.1, §9.3.23; [19] §8.3, §5. [20] §4.

| | |
|--|---|
| <i>CS Voice calls – Basic Calls</i> | |
| CS_VC_112: UNSUCCESSFUL CALL FROM PSTN TO UMTS – REJECTED BY CALLED PARTY | |
| OBJECTIVE: | This test aims to demonstrate the correct handling of a call from a PSTN user to an UMTS user that refuse the call. |
| INTERFACES: | IuCS. |
| PRECONDITIONS: | Requires at least configuration n°4. The MS must have an UMTS subscription in the HLR and must also be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 1. Check that there aren't any supplementary services activated for the MS (e.g. CF, CW). 2. Carry out a call from the PSTN user to the MS. 3. Refuse the call by MS. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: | |
| <pre> sequenceDiagram participant MS participant UTRAN participant VLR as 3G-MSC/VLR participant GMSC as 3G-GMSC participant HLR participant PSTN PSTN->>GMSC: IAM GMSC->>HLR: Send Routing Info HLR->>GMSC: Provide Roaming Number GMSC->>VLR: Provide Roaming Number Ack GMSC->>VLR: IAM VLR->>MS: Paging Request MS->>VLR: Paging Response VLR->>MS: Security Functions VLR->>MS: Setup MS->>VLR: Call Confirmed¹ VLR->>MS: RAB Establishment Procedure VLR->>MS: Alerting VLR->>GMSC: Disconnect GMSC->>PSTN: ACM GMSC->>PSTN: REL GMSC->>VLR: RLC VLR->>MS: Release MS->>VLR: Release Complete </pre> | |
| <ol style="list-style-type: none"> 2. Check the following fields in the messages: <ul style="list-style-type: none"> Disconnect: Cause='User busy'; Release Complete: Cause='User busy'; 3. Check that the call is unsuccessful. | |
| NOTES: | |
| ¹ . In the chart the Call Confirmed message, the Channel Allocation procedure, the Alerting message and the | |

ACM message could not occur; it depends on the user equipment. If the RAB is allocated this must be released after the call control release procedure.

REFERENCES: [1] §5.2.2, §5.4.2, §9.3.

| |
|--|
| <i>CS Voice calls – Basic Calls</i> |
| 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: InCS, 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: <ol style="list-style-type: none">1. Carry out by the MS a speech call to ISDN user.2. Carry out a Call Clearing procedure by the MS. |
| EXPECTED RESULTS: <ol style="list-style-type: none">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.

NOTES:

REFERENCES: [1] §5.2.1, §5.2.1.4.1, §5.4.3, §4.5.1, §9.3.23; [18] §10; [19] §5; [20] §4.

| | |
|---|--|
| CS Voice calls – Basic Calls | |
| CS_VC_202: 3.1 kHz AUDIO CALL FROM UMTS TO ISDN | |
| OBJECTIVE: | This test aims to demonstrate the capacity of an UMTS user to successfully make a 3.1 kHz audio call to an ISDN user. |
| INTERFACES: | Iu-CS, 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: | |
| <ol style="list-style-type: none"> 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. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: | |
| | |
| <ol style="list-style-type: none"> 2. Check the following fields in the messages: <ul style="list-style-type: none"> Setup: Bearer Capability 1(Information Transfer Capability='speech'); IAM: 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. | |
| NOTES: | |
| REFERENCES: | [1] §5.2.1, §5.2.1.4.1, §5.4.3, §4.5.1, §9.3.23; [18] §10.2; [19] §5; [20] §4. |

| | |
|---|--|
| <i>CS Voice calls – Basic Calls</i> | |
| CS_VC_203: FAX G3 CALL FROM UMTS TO ISDN | |
| OBJECTIVE: | This test aims to demonstrate the capacity of an UMTS user to successfully make a facsimile G3 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: | |
| <ol style="list-style-type: none"> 1. Carry out by the MS a fax G3 call to ISDN user. 2. Carry out a Call Clearing procedure by the MS. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: | |
| | |
| <ol style="list-style-type: none"> 2. Check the following fields in the messages: <ul style="list-style-type: none"> Setup: Bearer Capability 1(Information Transfer Capability='Facsimile G3'). IAM: Transmission medium requirement='3.1 kHz audio', ATP(HLC=facsimile G3). 3. In the active call state ensure that data transfer is performed correctly. 4. Check that the call is successful. | |
| NOTES: | |
| REFERENCES: | [1] §5.2.1, §5.2.1.4.1, §5.4.3, §4.5.1, §9.3.23; [18] §10.2; [19] §5; [20] §4. |

| | |
|---|--|
| <i>CS Voice calls – Basic Calls</i> | |
| CS_VC_204: UDI CALL FROM UMTS TO ISDN | |
| OBJECTIVE: | This test aims to demonstrate the capacity of an UMTS user to successfully make an UDI call to an ISDN user. |
| INTERFACES: | Iu-CS, 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: | |
| <ol style="list-style-type: none"> 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: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: | |
| | |
| <ol style="list-style-type: none"> 2. Check the following fields in the messages: <ul style="list-style-type: none"> 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. | |
| NOTES: | |
| REFERENCES: | [1] §5.2.1, §5.2.1.4.1, §5.4.3, §4.5.1, §9.3.23; [18] §10.2; [19] §5; [20] §4; [21] |

§4.5.19.

| | |
|---|--|
| <i>CS Voice calls – Basic Calls</i> | |
| CS_VC_211: SPEECH CALL FROM ISDN TO UMTS | |
| OBJECTIVE: | This test aims to demonstrate the capacity of an UMTS user to successfully receive a speech call from an ISDN user. |
| INTERFACES: | IuCS, D, 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: | |
| <ol style="list-style-type: none"> 1. Carry out a speech call from an ISDN user to the UMTS user. 2. Carry out a Call Clearing procedure by the MS. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: | |
| <pre> sequenceDiagram participant MS participant UTRAN participant VLR as 3G-MSC/VLR participant GMSC as 3G-GMSC participant HLR participant ISDN ISDN->>HLR: IAM HLR->>GMSC: Send Routing Info GMSC->>VLR: Provide Roaming Number VLR->>HLR: Provide Roaming Number Ack HLR->>GMSC: Send Routing Info Ack GMSC->>VLR: IAM VLR->>UTRAN: Paging Request UTRAN->>MS: Paging Response UTRAN->>VLR: Security Functions VLR->>UTRAN: Setup UTRAN->>MS: Call Confirmed UTRAN->>VLR: RAB Establishment Procedure UTRAN->>VLR: Alerting VLR->>GMSC: ACM GMSC->>ISDN: ANM VLR->>UTRAN: Connect UTRAN->>MS: Connect Ack MS->>VLR: Call Clearing Procedure </pre> | |
| <ol style="list-style-type: none"> 2. Check the following fields in the messages: | |

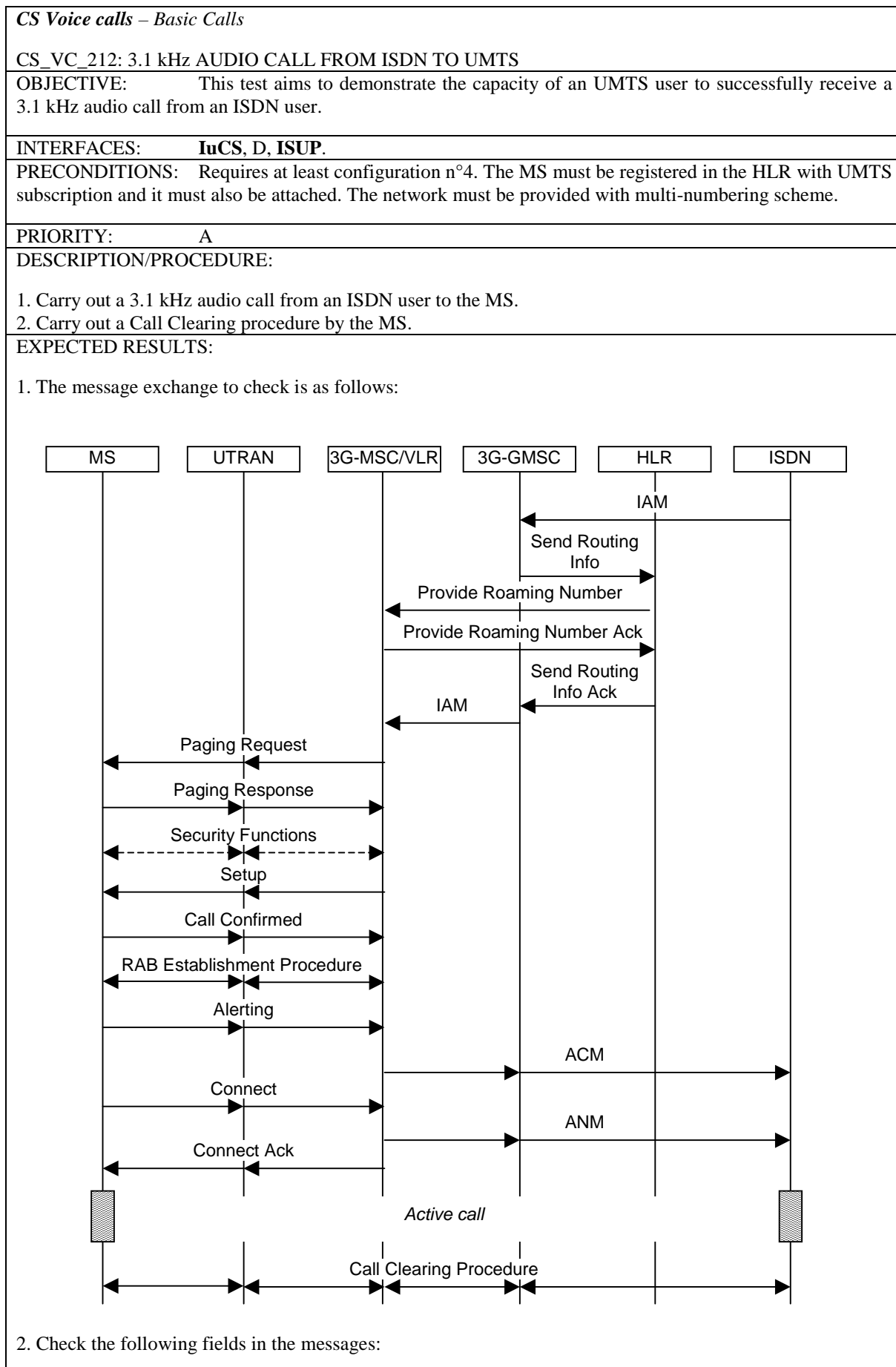
IAM: Transmission medium requirement='speech';

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

3. Check that call establishment using en-bloc sending is performed correctly and that the call is successful.

NOTES:

REFERENCES: [1] §5.2.2, §5.4, §4.5.1, §9.3.23; [18] §10; [19] §5; [20] §4.



IAM: Transmission medium requirement='3.1 kHz audio';

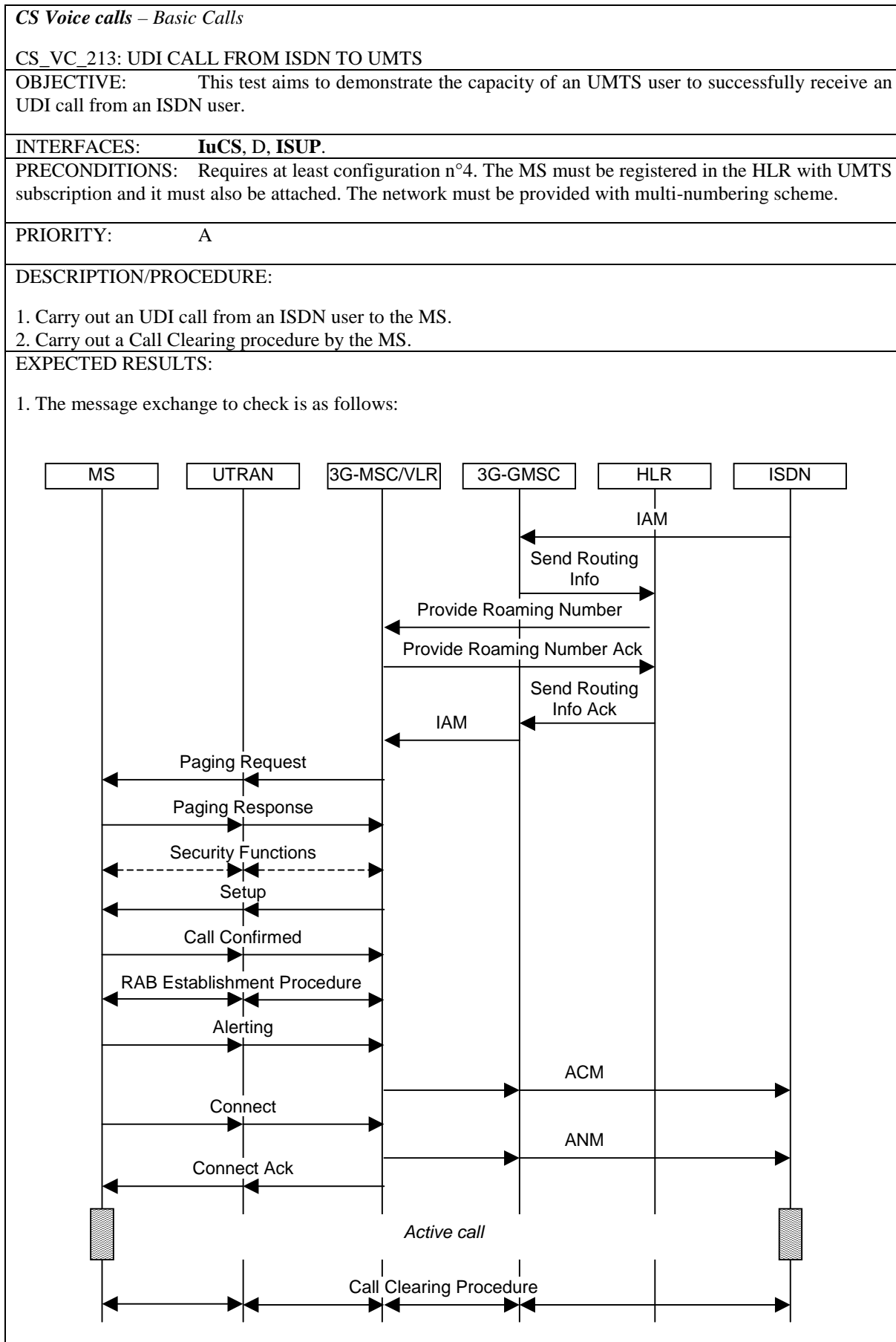
Setup: Bearer Capability 1 (Information Transfer Capability='3.1 kHz audio, ex PLMN').

3. Check that call establishment without exhaustive compatibility information in the IAM message (no HLC or without modem type) for deducing a the basic service using en-bloc sending is performed correctly and that the call is successful.

NOTES:

The call setup to the MS will contain a BC mapped from the BC/LLC/HLC stored in the VLR.

REFERENCES: [1] §5.2.2, §5.4, §4.5.1, §9.3.23; [18] §10.2.2; [19] §5; [20] §4.



2. Check the following fields in the messages:

IAM: Transmission medium requirement='UDI';

Setup: Bearer Capability 1(Information Transfer Capability='UDI',).

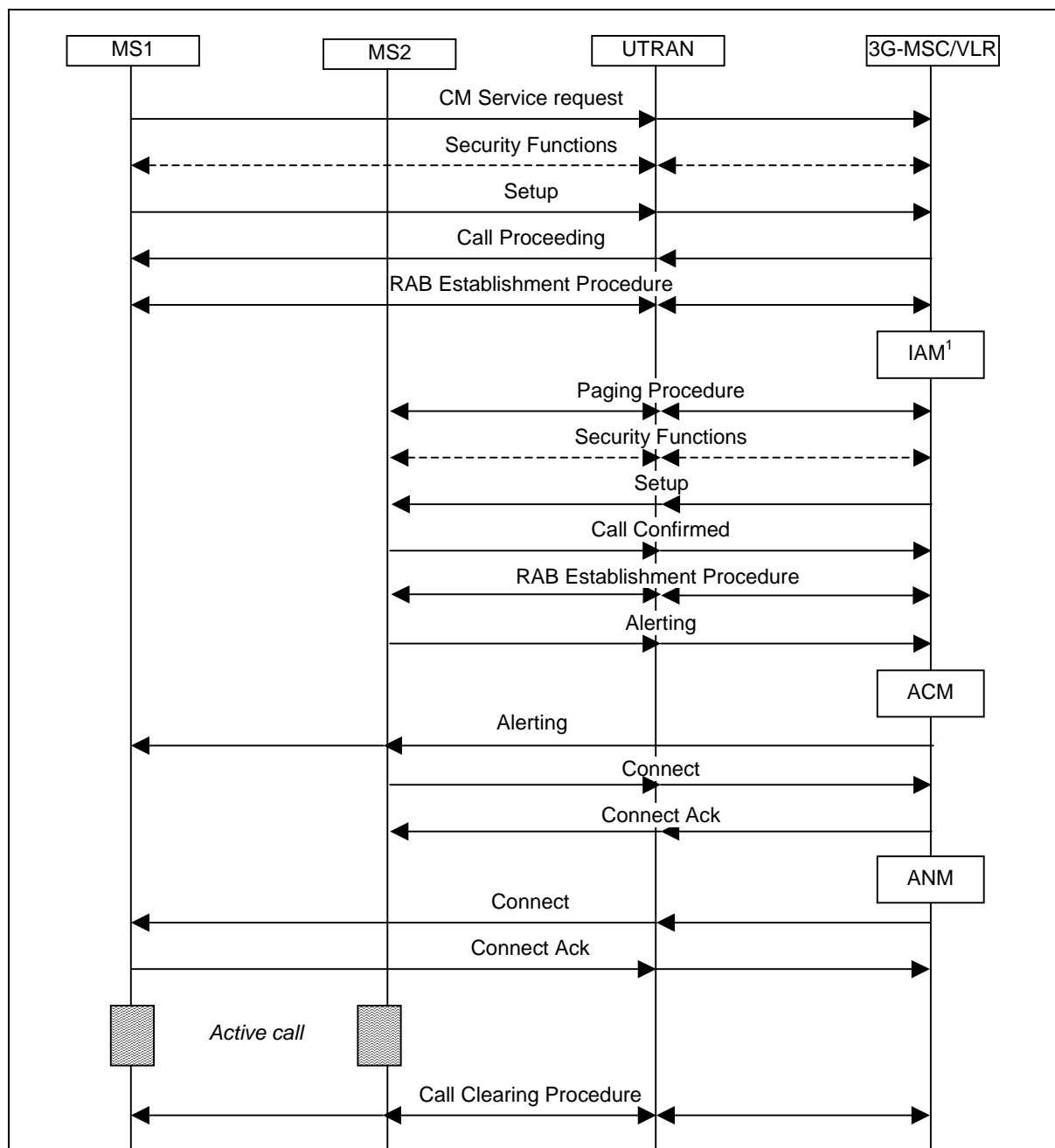
3. Check that call establishment is performed correctly and that the call is successful.

NOTES:

The call setup to the MS will contain a BC mapped from the BC/LLC/HLC stored in the VLR.

REFERENCES: [1] §5.2.2, §5.4, §4.5.1, §9.3.23; [18] §10.2.2; [19] §5; [20] §4.

| | |
|--|--|
| <i>CS Voice calls – Basic Calls</i> | |
| CS_VC_301: SPEECH CALL BETWEEN UMTS USERS | |
| OBJECTIVE: | This test aims to demonstrate completion of a speech call between two UMTS users. |
| INTERFACES: | IuCS. |
| PRECONDITIONS: | Requires at least configuration n°4. Both the MS must be registered in the HLR with UMTS subscription and must also be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none">1. Carry out a speech call from MS1 to MS2.2. Carry out a Call Clearing procedure by the MS1. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none">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').

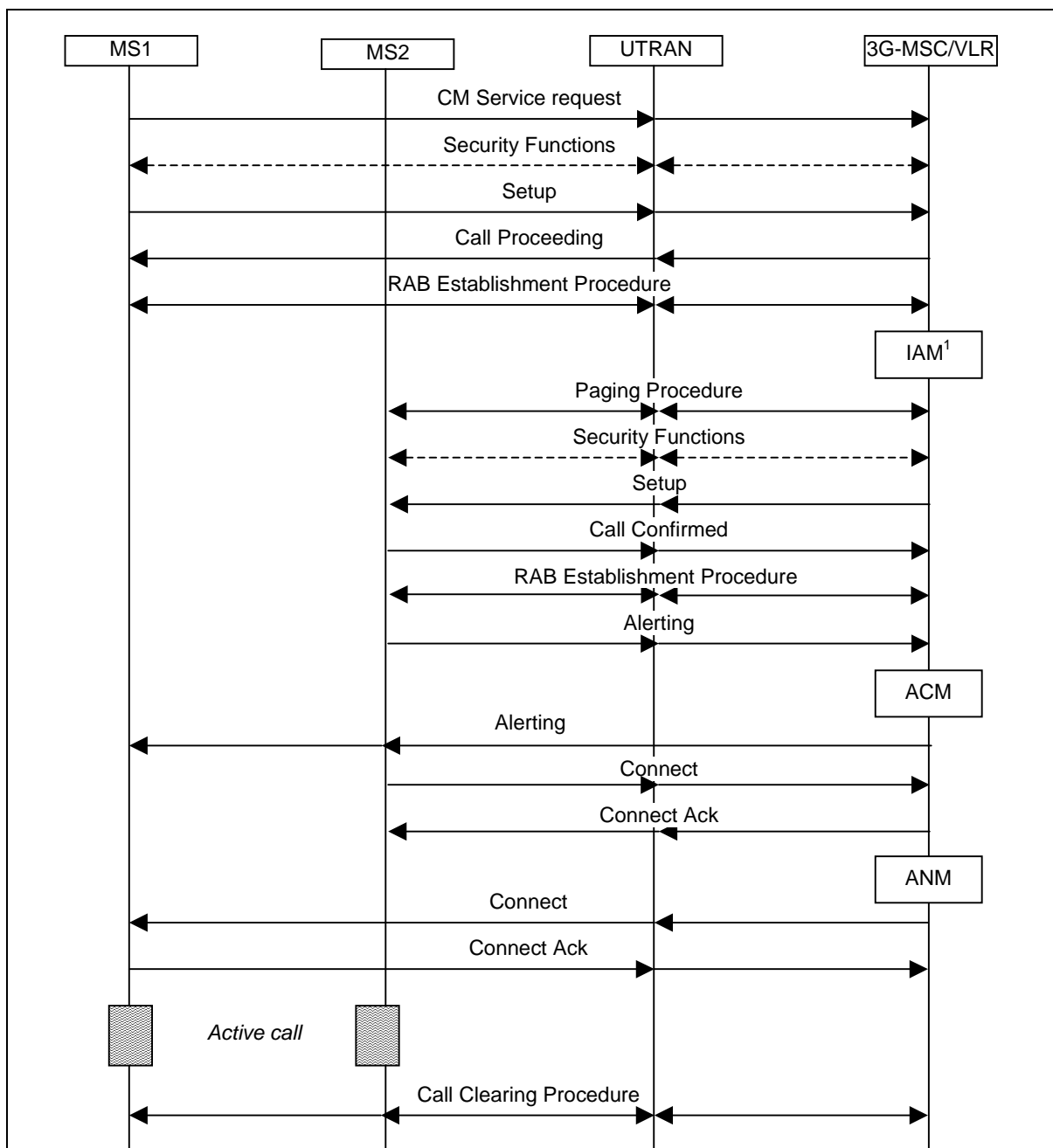
3. Check that call establishment and call clearing procedures are performed correctly, and ensure that in the active state the speech transfer on the traffic channel is performed correctly.

NOTES:

¹. If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSC take place.

REFERENCES: [1] §5.2.1, §5.2.2, §5.4, §4.5.1, §9.3.23; [19] §5.

| | |
|---|--|
| <i>CS Voice calls – Basic Calls</i> | |
| CS_VC_302: 3.1 kHz AUDIO CALL BETWEEN UMTS USERS | |
| OBJECTIVE: | This test aims to demonstrate completion of a call, with bearer capability set to 3.1 kHz audio ex PLMN, between two UMTS users. |
| INTERFACES: | IuCS. |
| PRECONDITIONS: | Requires at least configuration n°4. Both the MS must be registered in the HLR with UMTS subscription and must also be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none">1. Carry out a 3.1 kHz audio call from MS1 to MS2.2. Carry out a Call Clearing procedure by the MS1. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none">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='3.1 kHz audio, ex PLMN');

Setup(MT): Bearer Capability 1(Information Transfer Capability='3.1 kHz audio, ex PLMN').

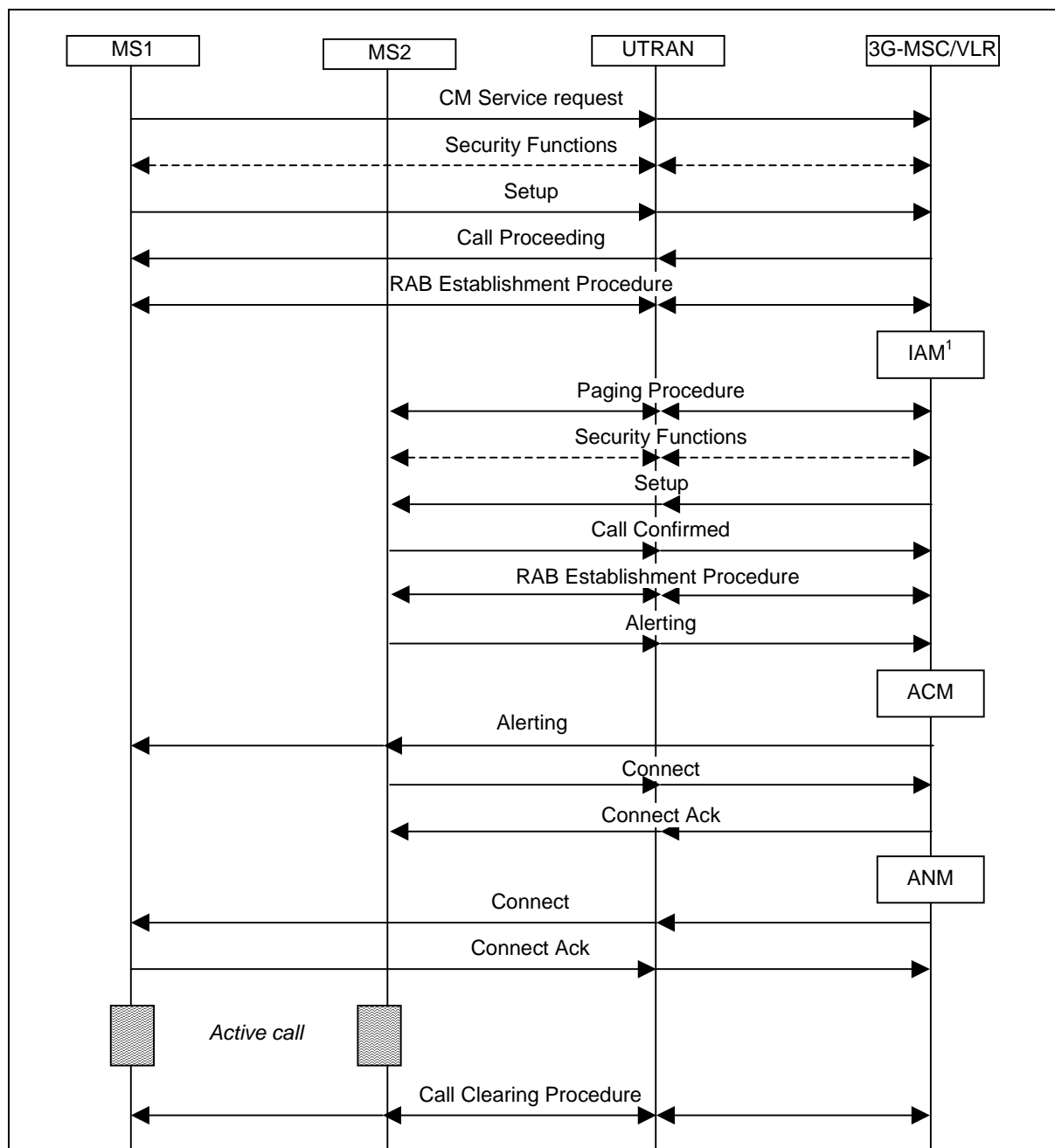
3. Check that call establishment and call clearing procedures are performed correctly, and ensure that in the active state the traffic is performed correctly.

NOTES:

¹. If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSC take place.

REFERENCES: [1] §5.2.1, §5.2.2, §5.4, §4.5.1, §9.3.23; [19] §5.

| |
|--|
| <i>CS Voice calls – Basic Calls</i> |
| CS_VC_303: UDI CALL BETWEEN UMTS USERS |
| OBJECTIVE: This test aims to demonstrate completion of a data call, with bearer capability set to “unrestricted digital information”, between two UMTS users. |
| INTERFACES: IuCS. |
| PRECONDITIONS: Requires at least configuration n°4. Both the MS must be registered in the HLR with UMTS subscription and must also be attached. |
| PRIORITY: A |
| DESCRIPTION/PROCEDURE: <ol style="list-style-type: none">1. Carry out a UDI call from MS1 to MS2.2. Carry out a Call Clearing procedure by the MS1. |
| EXPECTED RESULTS: <ol style="list-style-type: none">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='UDI'²);

Setup(MT): Bearer Capability 1(Information Transfer Capability='UDI'²);

3. Check that call establishment and call clearing procedures are performed correctly, and ensure that in the active state the data traffic is performed correctly.

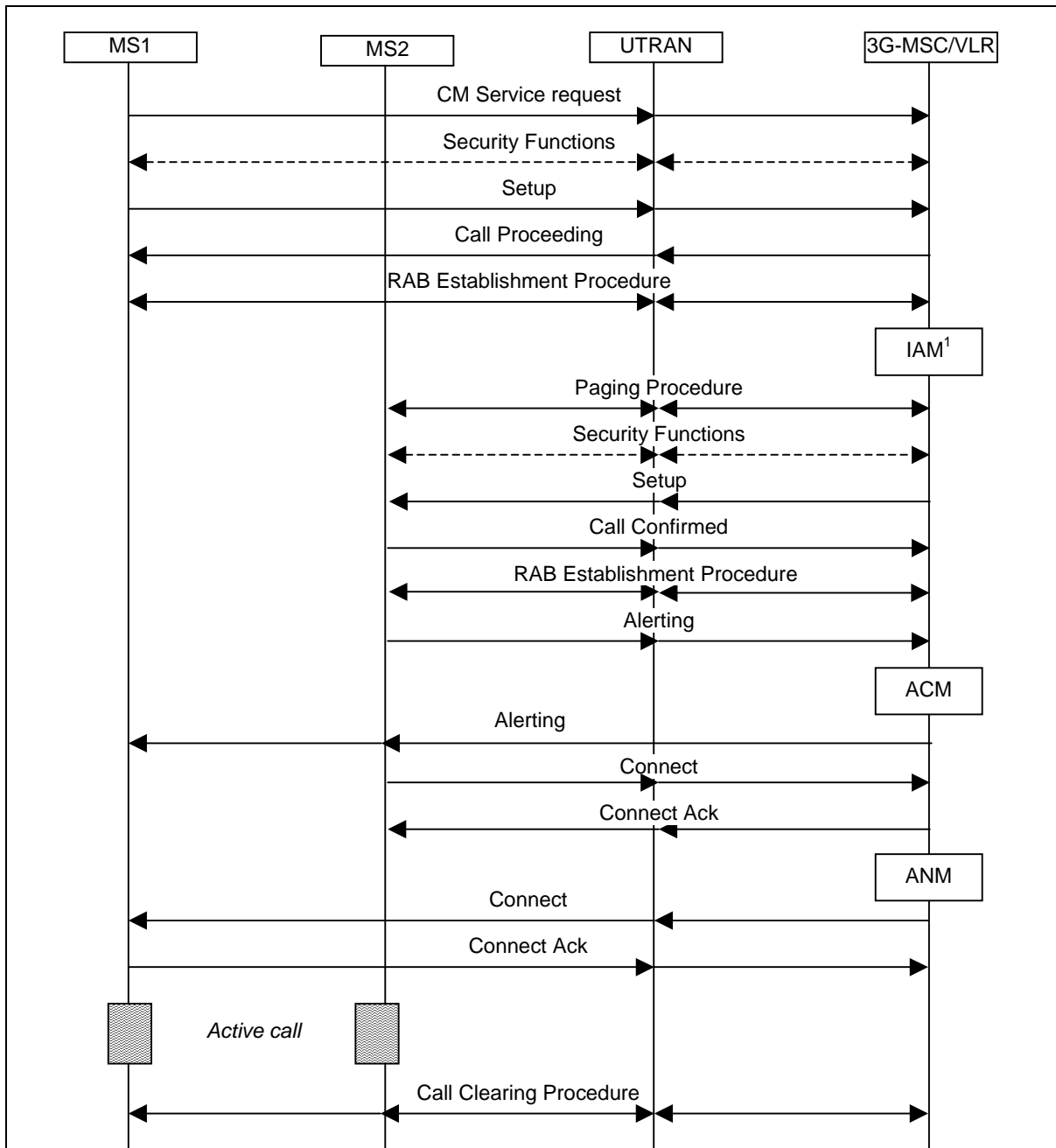
NOTES:

¹. If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSC take place.

². In case of H.324 call the protocols H.223 and H.245 shall be specified in the field Other rate adaption.

REFERENCES: [1] §5.2.1, §5.2.2, §5.4, §4.5.1, §9.3.23; [19] §5.

| | |
|--|--|
| <i>CS Voice calls – Basic Calls</i> | |
| 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 ex PLMN, between two UMTS users. |
| INTERFACES: | IuCS. |
| PRECONDITIONS: | Requires at least configuration n°4. Both the MS must be registered in the HLR with UMTS subscription and must also be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none">1. Carry out a fax G3 call from MS1 to MS2.2. Carry out a Call Clearing procedure by the MS1. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none">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.

NOTES:

¹. If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSC take place.

REFERENCES: [1] §5.2.1, §5.2.2, §5.4, §4.5.1, §9.3.23; [19] §5.

| | |
|---|--|
| <i>CS Voice calls – Basic Calls</i> | |
| CS_VC_305: UNSUCCESSFUL CALL BETWEEN UMTS USERS – CALLED PARTY BUSY | |
| OBJECTIVE: | This test aims to demonstrate the correct handling of an UMTS-UMTS call in case of user busy. |
| INTERFACES: | IuCS. |
| PRECONDITIONS: | Requires at least configuration n°4. Both of the MS must have an UMTS subscription in the HLR and must also be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 1. Check that there aren't 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: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: | |
| <pre> sequenceDiagram participant MS1 participant MS2 participant UTRAN participant MSC as 3G-MSC/VLR MS2->>MSC: CM Service request MSC-->>MS2: Security Functions MSC-->>MS1: Setup MS1->>MSC: Call Proceeding MSC-->>MS2: RAB Establishment Procedure MSC->>MSC: IAM¹ MSC->>MSC: REL/RLC MSC-->>MS1: Call Clearing Procedure </pre> | |
| <ol style="list-style-type: none"> 2. Check the following fields in the messages: Disconnect²: Cause='User busy'; 3. Check that the call is unsuccessful. | |
| NOTES: | |
| <ol style="list-style-type: none"> ¹. If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSC take place. ². The Disconnet message is included in the Call Clearing Procedure. | |
| REFERENCES: | [1] §5.2.2, §5.4.2, §9.3.7, §10.5.4.11. |

| | |
|--|--|
| <i>CS Voice calls – Basic Calls</i> | |
| CS_VC_306: UNSUCCESSFUL CALL BETWEEN UMTS USERS - REJECTED BY CALLED PARTY | |
| OBJECTIVE: | This test aims to demonstrate the correct handling of an UMTS-UMTS call in case of the called party reject the call. |
| INTERFACES: | IuCS. |
| PRECONDITIONS: | Requires at least configuration n°4. Both of the MS must have an UMTS subscription in the HLR and must also be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| 1. Check that there aren't any supplementary services activated for MS2 (e.g. CF). 2. Carry out a call from MS1 to MS2, and reject the call by MS2. | |
| EXPECTED RESULTS: | |
| 1. The message exchange to check is as follows: | |
| <pre> sequenceDiagram participant MS1 participant MS2 participant UTRAN participant MSC as 3G-MSC/VR MS2->>MSC: CM Service request MSC-->>MS2: Security Functions MSC-->>MS1: Setup MS1->>MSC: Call Proceeding MSC-->>MS2: RAB Establishment Procedure MSC->>MSC: IAM¹ MSC-->>MS2: Paging Procedure MSC-->>MS2: Security Functions MSC-->>MS2: Setup MS2->>MSC: Call Confirmed MSC-->>MS2: RAB Establishment Procedure MSC-->>MS2: Alerting MSC->>MSC: ACM MSC-->>MS1: Alerting MSC-->>MS2: Call Clearing Procedure MSC-->>MSC: REL/RLC MSC-->>MS1: Call Clearing Procedure </pre> | |
| 2. Check the following fields in the messages: Disconnect² : Cause='User busy'; | |
| 3. Check that the call is unsuccessful. | |
| NOTES: | |
| ¹ . If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction | |

between the two 3G-MSC take place.

². The Disconnect messages ere included in the Call Clearing Procedures.

REFERENCES: [1] §5.2.2, §5.4.2, §9.3.7, §10.5.4.11.

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

INTERFACES: **IuCS, D.**

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

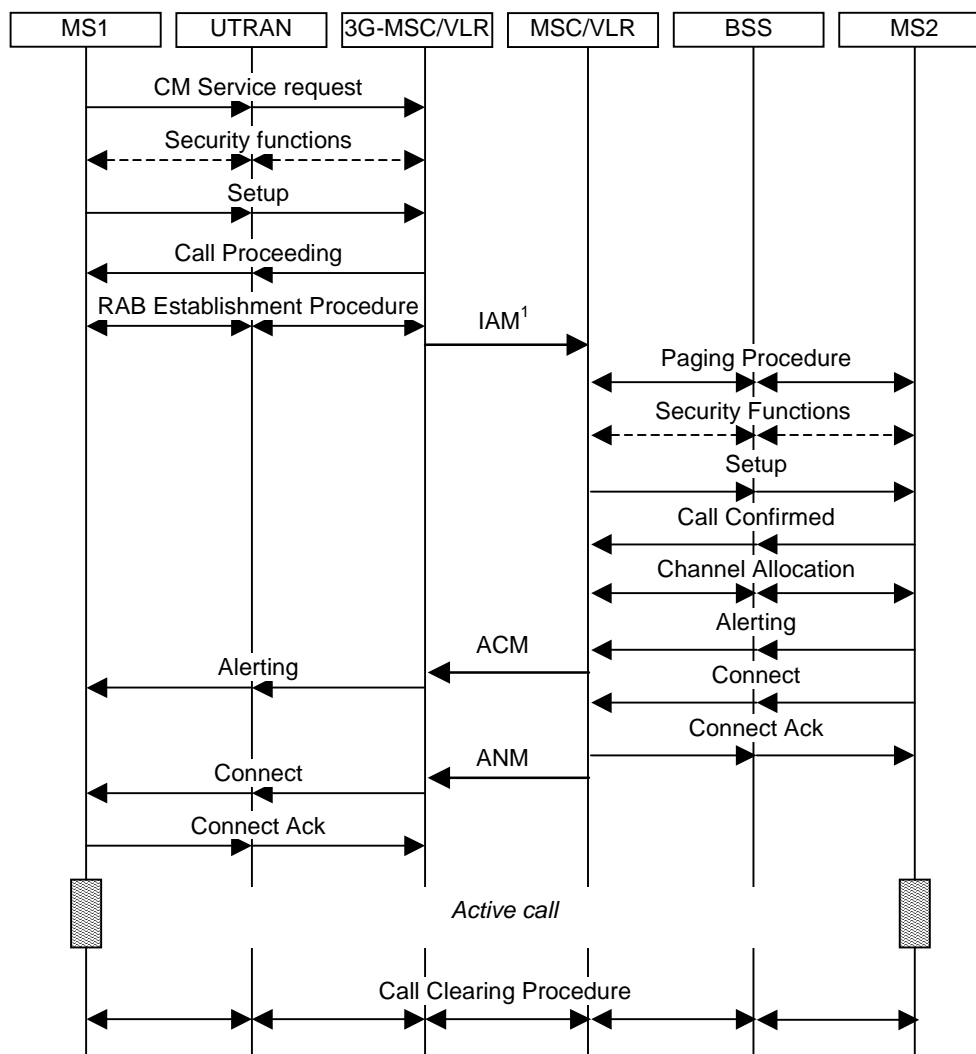
PRIORITY: A

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.

NOTES:

¹ In the diagram is not reported the possible message exchange between the GMSC and the HLR in the GSM network.

REFERENCES: [1] §5.2.1, §5.4, §9.3.23; [19] §5.

CS Voice calls – Basic Calls**CS_VC_402: 3.1 kHz AUDIO CALL FROM UMTS TO GSM**

OBJECTIVE: This test aims to demonstrate completion of a data call (with the BC set to 3.1 kHz audio) from an UMTS user to a GSM user.

INTERFACES: **IuCS, D.**

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

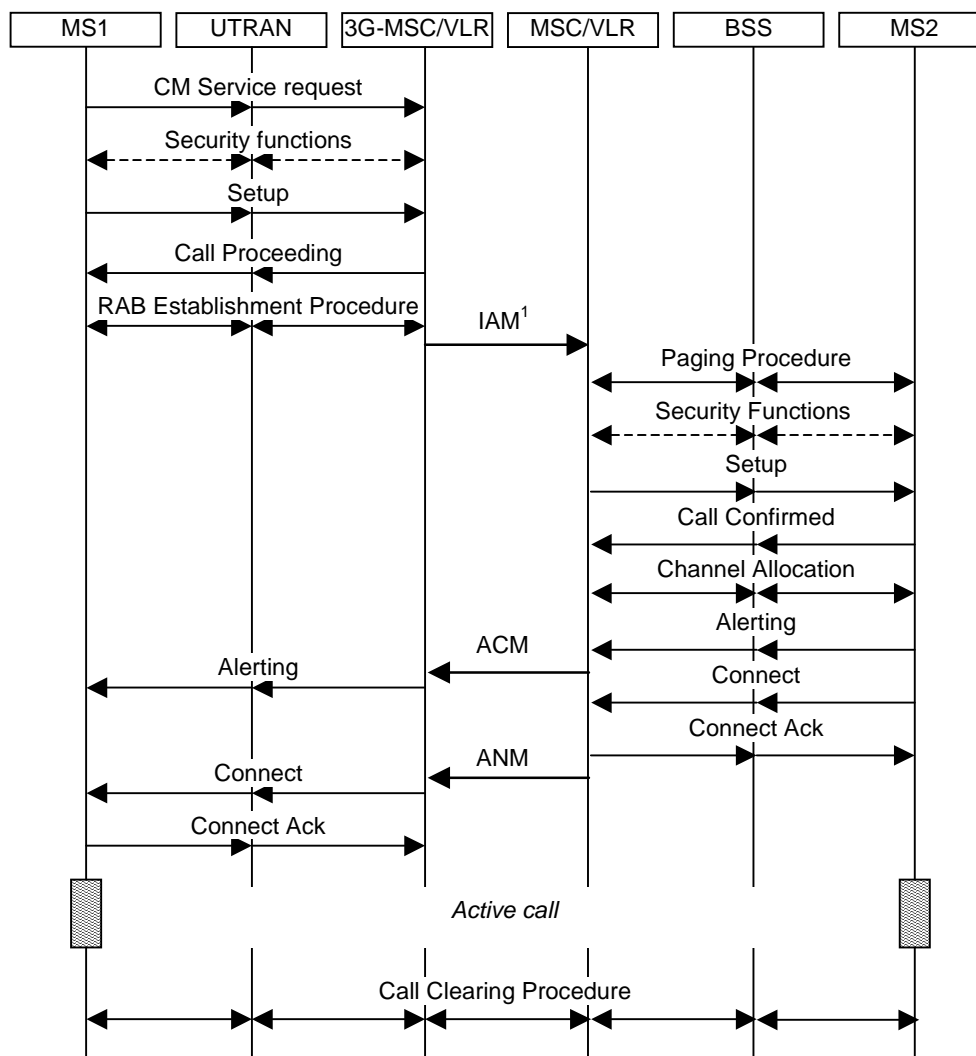
PRIORITY: A

DESCRIPTION/PROCEDURE:

1. Carry out a 3.1 kHz 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='3.1 kHz audio ex PLMN');

Setup(MT): Bearer Capability 1(Information Transfer Capability='3.1 kHz audio ex

PLMN'.

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

4. Check that the call is successful.

NOTES:

¹ In the diagram is not reported the possible message exchange between the GMSC and the HLR in the GSM network.

REFERENCES: [1] §5.2.1, §5.4, §9.3.23; [19] §5.

| | |
|---|---|
| CS Voice calls – Basic Calls | |
| CS_VC_403: UDI CALL FROM UMTS TO GSM | |
| OBJECTIVE: | This test aims to demonstrate completion of a data call (with BC set to UDI) from an UMTS user to a GSM user. |
| INTERFACES: | IuCS, D. |
| PRECONDITIONS: | Requires at least configuration n°5. The MS1 must have an UMTS subscription in the HLR, instead MS2 must have a GSM subscription. Both the MS must be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 1. Carry out an UDI 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='UDI'); LLC 1(Information Transfer Capability='UDI'); | |
| Setup(MT): Bearer Capability 1(Information Transfer Capability='UDI'); LLC | |

1 (Information Transfer Capability='UDI').

3. Check that call establishment and call clearing procedures are performed correctly, and ensure that in the active state the data transfer on the traffic channels are performed correctly.

NOTES:

¹ In the diagram is not reported the possible message exchange between the GMSC and the HLR in the GSM network.

REFERENCES: [1] §5.2.1, §5.4, §9.3.23; [19] §5; [21] §4.5.19.

| | |
|--|---|
| 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 an UMTS user to a GSM user. |
| INTERFACES: | IuCS, D. |
| PRECONDITIONS: | Requires at least configuration n°5. The MS1 must have an UMTS subscription in the HLR, instead MS2 must have a GSM subscription. Both the MS must be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> Carry out a fax G3 call from MS1 to MS2. Carry out a Call Clearing procedure by MS1. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> The message exchange to check is as follows: | |
| <pre> sequenceDiagram participant MS1 participant UTRAN participant 3G_MSC_VLR as 3G-MSC/VLR participant MSC_VLR as MSC/VLR participant BSS participant MS2 MS1->>UTRAN: CM Service request UTRAN->>3G_MSC_VLR: Security functions 3G_MSC_VLR-->>UTRAN: Security functions 3G_MSC_VLR->>MS1: Setup MS1->>3G_MSC_VLR: Call Proceeding 3G_MSC_VLR->>MSC_VLR: IAM¹ MSC_VLR->>BSS: Paging Procedure BSS->>MS2: Security Functions MS2-->>BSS: Security Functions BSS->>MSC_VLR: Setup MSC_VLR->>MS1: Call Confirmed MSC_VLR->>BSS: Channel Allocation BSS->>MS2: Alerting MS2->>BSS: Connect BSS->>MSC_VLR: Connect Ack MSC_VLR->>3G_MSC_VLR: ANM 3G_MSC_VLR->>MS1: Connect MS1->>3G_MSC_VLR: Connect Ack 3G_MSC_VLR->>MSC_VLR: ACM MSC_VLR->>BSS: Alerting BSS->>MS2: Connect MS2->>BSS: Connect Ack BSS->>MSC_VLR: Channel Allocation MSC_VLR->>3G_MSC_VLR: Call Confirmed 3G_MSC_VLR->>MS1: Call Proceeding MS1->>3G_MSC_VLR: RAB Establishment Procedure 3G_MSC_VLR->>UTRAN: RAB Establishment Procedure UTRAN->>MS1: CM Service request Note over MS1, MS2: Active call Note over MS1, MS2: Call Clearing Procedure MS1->>3G_MSC_VLR: Call Clearing Procedure 3G_MSC_VLR->>MSC_VLR: Call Clearing Procedure MSC_VLR->>BSS: Call Clearing Procedure BSS->>MS2: Call Clearing Procedure MS2->>BSS: Call Clearing Procedure BSS->>MSC_VLR: Call Clearing Procedure MSC_VLR->>3G_MSC_VLR: Call Clearing Procedure 3G_MSC_VLR->>MS1: Call Clearing Procedure MS1->>UTRAN: Call Clearing Procedure UTRAN->>MS1: Call Clearing Procedure </pre> | |
| <ol style="list-style-type: none"> Check the following fields in the messages: <p>Setup(MO): Bearer Capability 1(Information Transfer Capability='Facsimile G3');</p> <p>Setup(MT): Bearer Capability 1(Information Transfer Capability='Facsimile G2/G3').</p> | |

| |
|--|
| 3. Check that the call is successful. |
| NOTES: ¹ In the diagram is not reported the possible message exchange between the GMSC and the HLR in the GSM network. |
| REFERENCES: [1] §5.2.1, §5.4, §9.3.23; [19] §5. |

| | |
|--|--|
| CS Voice calls – Basic Calls | |
| CS_VC_411: SPEECH CALL FROM GSM TO UMTS | |
| OBJECTIVE: | This test aims to demonstrate completion of a speech call from a GSM user to an 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 an UMTS subscription. Both of the MS must be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 1. Carry out a speech call from MS1 to MS2. 2. Carry out a Call Clearing procedure by MS1. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: | |
| <pre> sequenceDiagram participant MS1 participant BSS participant MSC_VLR as MSC/VLR participant 3G_MSC_VLR as 3G-MSC/VLR participant UTRAN participant MS2 MS1->>BSS: CM Service request BSS->>MSC_VLR: Setup MSC_VLR-->>BSS: Security functions BSS->>MS1: Call Proceeding BSS->>MSC_VLR: Channel Allocation MSC_VLR->>3G_MSC_VLR: IAM¹ 3G_MSC_VLR->>UTRAN: Paging Procedure UTRAN->>MS2: Security Functions MS2-->>UTRAN: Security Functions UTRAN->>3G_MSC_VLR: Setup 3G_MSC_VLR->>MSC_VLR: Call Confirmed MSC_VLR->>BSS: Alerting BSS->>MS1: Alerting 3G_MSC_VLR->>UTRAN: RAB Est. Procedure UTRAN->>MS2: Alerting MS2->>UTRAN: Connect UTRAN->>3G_MSC_VLR: Connect Ack 3G_MSC_VLR->>MSC_VLR: ANM MSC_VLR->>BSS: Connect BSS->>MS1: Connect Ack Note over MS1, MS2: Active call Note over MS1, MS2: Call Clearing Procedure MS1->>BSS: Call Clearing Procedure BSS->>MSC_VLR: Call Clearing Procedure MSC_VLR->>3G_MSC_VLR: Call Clearing Procedure 3G_MSC_VLR->>UTRAN: Call Clearing Procedure UTRAN->>MS2: Call Clearing Procedure MS2->>UTRAN: Call Clearing Procedure </pre> | |
| <ol style="list-style-type: none"> 2. Check the following fields in the messages: | |
| <p>Setup(MO): Bearer Capability 1(Information Transfer Capability='speech');</p> <p>Setup(MT): Bearer Capability 1(Information Transfer Capability='speech').</p> | |

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.

NOTES:

¹ In the diagram is not reported the possible message exchange between the GMSC and the HLR in the UMTS network.

REFERENCES: [1] §5.2.2, §5.4, §9.3.23; [19] §5.

| | |
|--|--|
| CS Voice calls – Basic Calls | |
| CS_VC_412: 3.1 kHz AUDIO CALL FROM GSM TO UMTS | |
| OBJECTIVE: | This test aims to demonstrate completion of a data call (with BC of 3.1 kHz audio) from a GSM user to an 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 an UMTS subscription. Both of the MS must be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> Carry out a 3.1 kHz call from MS1 to MS2. 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='3.1 kHz audio ex PLMN'); | |
| Setup(MT): Bearer Capability 1(Information Transfer Capability='3.1 kHz audio ex | |

PLMN').

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

4. Check that the call is successful.

NOTES:

¹ In the diagram is not reported the possible message exchange between the GMSC and the HLR in the UMTS network.

REFERENCES: [1] §5.2.2, §5.4, §9.3.23; [19] §5.

| | |
|---|--|
| <i>CS Voice calls – Basic Calls</i> | |
| CS_VC_413: UDI CALL FROM GSM TO UMTS | |
| OBJECTIVE: | This test aims to demonstrate completion of an UDI call from a GSM subscriber to an UMTS subscriber. |
| INTERFACES: | IuCS, Gr. |
| PRECONDITIONS: | Requires at least configuration n°5. The MS1 must have a GSM subscription in the HLR, instead MS2 must have an UMTS subscription. Both of the MS must be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 1. Carry out an UDI call from MS1 to MS2. 2. Carry out a Call Clearing procedure by MS1. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: | |
| | |
| <ol style="list-style-type: none"> 2. Check the following fields in the messages: | |
| <p>Setup(MO): Bearer Capability 1(Information Transfer Capability='UDI'), LLC 1(Information Transfer Capability='UDI');</p> <p>Setup(MT): Bearer Capability 1(Information Transfer Capability='UDI'</p> | |

Adaption=V.110/X.30), LLC 1(Information Transfer Capability='UDI').

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

4. Check that the call is successful.

NOTES:

¹ In the diagram is not reported the possible message exchange between the GMSC and the HLR in the UMTS network.

REFERENCES: [1] §5.2.2, §5.4, §9.3.23; [19] §5; [21] §4.5.19.

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 an 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 an UMTS subscription. Both of the MS must be attached.

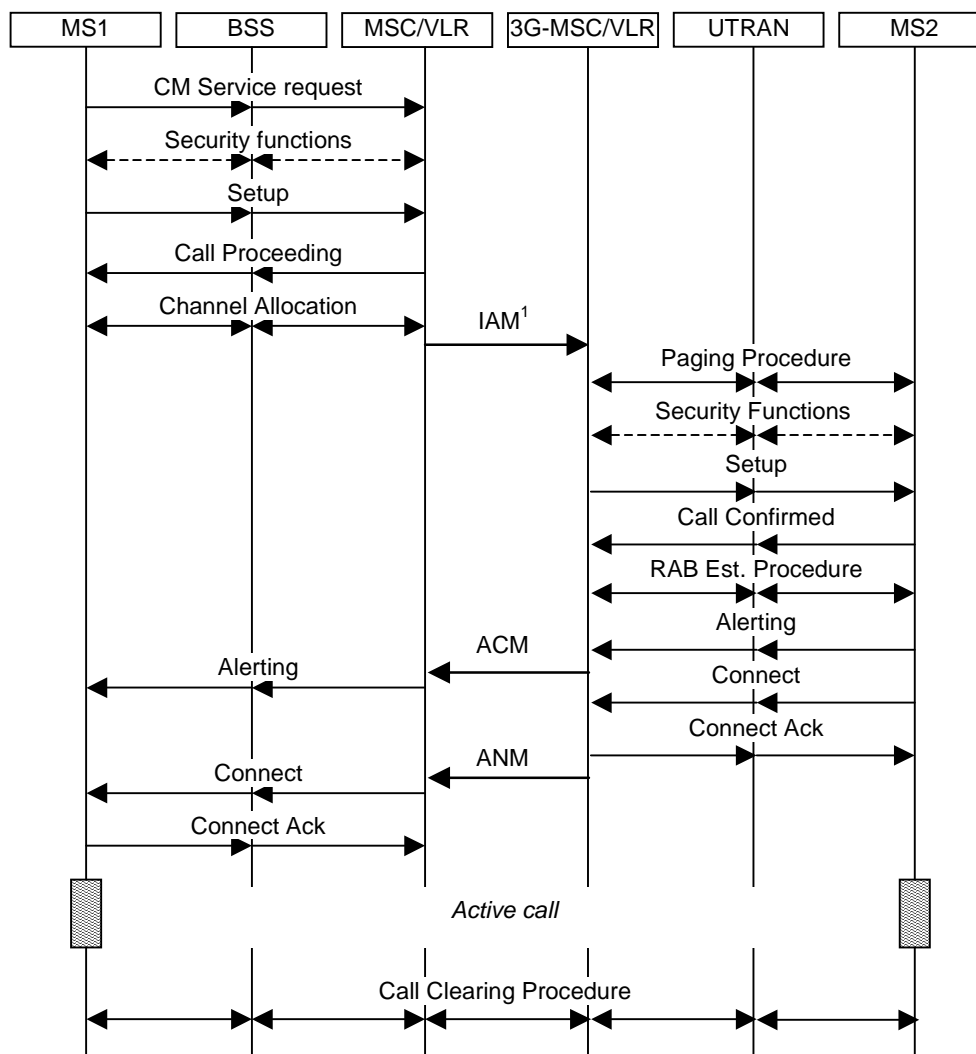
PRIORITY: A

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. |
| NOTES: ¹ In the diagram is not reported the possible message exchange between the GMSC and the HLR in the UMTS network. |
| REFERENCES: [1] §5.2.2, §5.4, §9.3.23; [19] §5. |

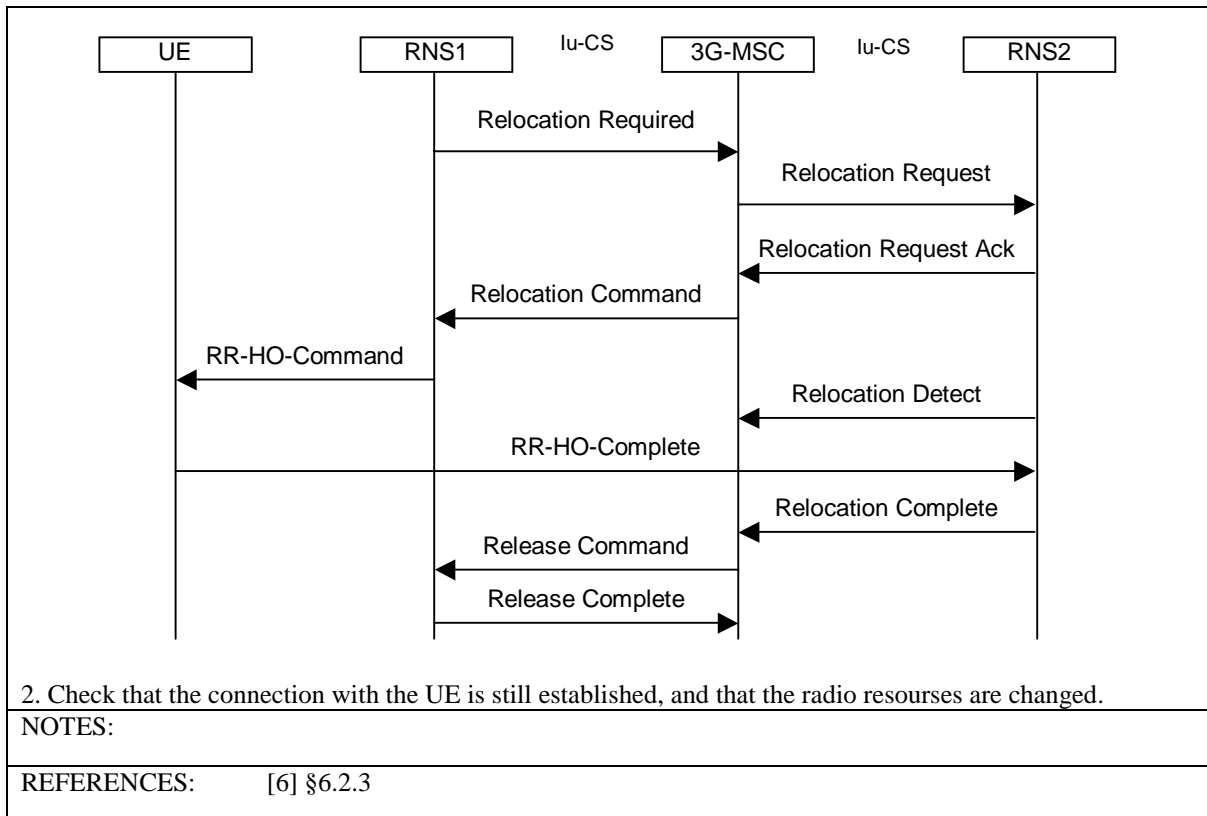
| | |
|--|--|
| <i>CS Voice calls – Emergency Calls</i> | |
| CS_EC_501: EMERGENCY CALL WITH USIM | |
| OBJECTIVE: | This test aims to demonstrate the capacity of a MS to successfully make an emergency call. |
| INTERFACES: | IuCS. |
| PRECONDITIONS: | Requires at least configuration n°4. The MS must be registered in the HLR with UMTS subscription and it must also be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 1. Carry out an emergency call from the MS. 2. Carry out a Call Clearing procedure by the MS. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: | |
| <pre> sequenceDiagram participant MS participant UTRAN participant MSC as 3G-MSC participant GMSC as 3G-GMSC participant PSTN MS->>MSC: CM Service Request MSC-->>MS: Security Functions MSC->>MSC: Emergency Setup MSC->>MS: Call Proceeding MS->>MSC: RAB Establishment Procedure MSC->>GMSC: IAM GMSC->>MSC: ACM GMSC->>MSC: ANM MSC->>MS: Alerting MSC->>MS: Connect MS->>MSC: Connect Ack Note over MS, MSC: Active call MS->>MSC: Call Clearing Procedure MSC->>GMSC: Call Clearing Procedure GMSC->>PSTN: Call Clearing Procedure </pre> | |
| <ol style="list-style-type: none"> 2. Check the following fields in the messages: <ul style="list-style-type: none"> Emergency Setup: Bearer Capability 1 (Information Transfer Capability='speech')¹; IAM: Transmission medium requirement='speech'. 3. In the active call state ensure that the voice transfer is performed correctly. 4. Check that the emergency call is successful. | |
| NOTES: | |

¹. This IE is optional, If it is not included the network shall, by default, assume speech.

REFERENCES: [1] §5.2.1, §5.2.1.4.1, §5.4.3, §4.5.1, §9.3.8; [20] §4.

| | |
|--|--|
| <i>CS Voice calls – Emergency Calls</i> | |
| CS_EC_502: EMERGENCY CALL WITHOUT USIM | |
| OBJECTIVE: | This test aims to demonstrate completion of an emergency call when the ME is without the USIM. |
| INTERFACES: | IuCS. |
| PRECONDITIONS: | Requires at least configuration n°4. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 1. Remove the USIM by the MS. 2. Carry out an emergency call by the MS. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: | |
| <pre> sequenceDiagram participant MS participant UTRAN participant MSC as 3G-MSC participant GMSC as 3G-GMSC participant PSTN MS->>MSC: CM Service Request MSC->>MS: CM Service Accept MSC->>MSC: Emergency Setup MSC->>MS: Call Proceeding MSC->>MSC: RAB Establishment Procedure MSC->>GMSC: IAM GMSC->>MSC: ACM PSTN->>GMSC: ANM MSC->>MS: Alerting MSC->>MS: Connect MSC->>MSC: Connect Ack Note over MS, MSC: Active call Note over MSC, GMSC: Call Clearing Procedure Note over GMSC, PSTN: Call Clearing Procedure Note over MS, MSC: Call Clearing Procedure </pre> | |
| <ol style="list-style-type: none"> 2. Check the following fields in the message: CM service request: Service Type='emergency call establishment', Mobile Identity=IMEI. 3. Check that the emergency call is successful. | |
| NOTES: | |
| REFERENCES: | [1] §4.1.1.1, §4.5.1.5, §9.2.9; [5] §6.4.9. |

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



| | |
|--|--|
| CS Voice calls – Handover | |
| CS_HO_602: INTERSYSTEM HANDOVER FROM UMTS TO GSM | |
| OBJECTIVE: | This test aims to demonstrate completion of the handover procedure when the MS comes from an UMTS area to a GSM area. |
| INTERFACES: | IuCS. |
| PRECONDITIONS: | Requires at least configuration n°5. The user must be registered in the HLR with UMTS subscription and must have an active voice call. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | 1. Carry out an handover procedure forcing the MS in a GSM area. |
| EXPECTED RESULTS: | 1. The message exchange to check is as follows: |
| <pre> sequenceDiagram participant MSRNS participant IuCS participant 3G_MSC as 3G-MSC participant MSC participant BSS_MS as BSS\MS MSRNS->>3G_MSC: Relocation Required 3G_MSC->>MSC: MAP-Prep-Handover Req MSC->>BSS_MS: Handover Request BSS_MS-->>MSC: Handover Request Ack MSC-->>3G_MSC: MAP-Prep_Handover Resp 3G_MSC-->>MSC: IAM 3G_MSC-->>MSC: ACM MSC-->>MSRNS: Relocation Command 3G_MSC-->>MSC: MAP-Process-Access-Sig Req BSS_MS-->>MSC: Handover Detect MSC-->>MSRNS: Release Complete 3G_MSC-->>MSC: MAP-Send-End-Signal Req BSS_MS-->>MSC: Handover Complete 3G_MSC-->>MSC: ANM 3G_MSC-->>MSC: Release MSC-->>3G_MSC: MAP-Send-End-Signal Resp </pre> | |
| | 2. Check that the call is successful. |
| NOTES: | |
| REFERENCES: | [6] §8.1 |

7.1.4.4. Session Management

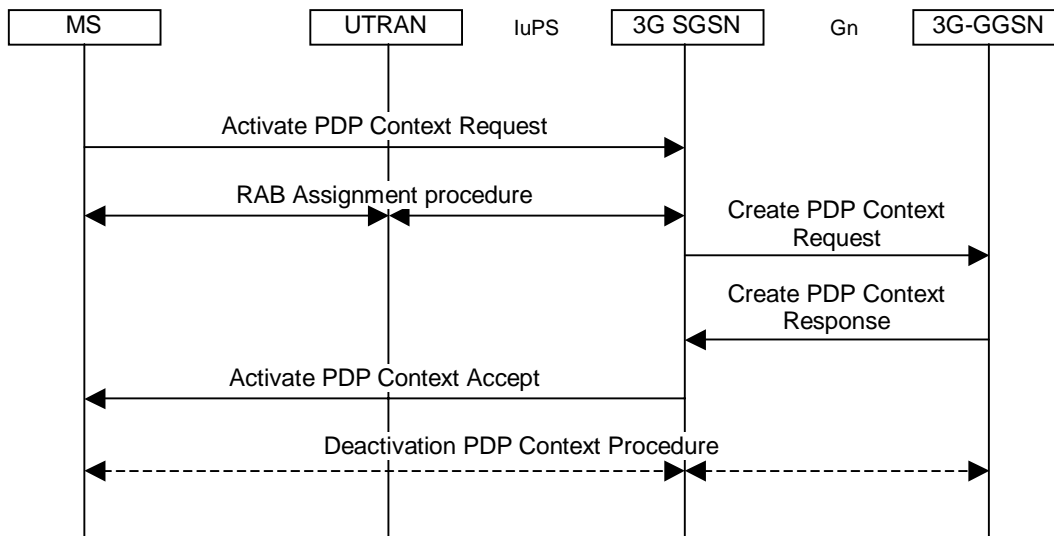
| | |
|--|--|
| <i>Session Management – PDP Context Activation</i> | |
| SM_PDP_101: MS INITIATED PDPC ACTIVATION, DYNAMIC PDP ADDRESS | |
| OBJECTIVE: | This test aims to demonstrate completion of the PDP Context Activation procedure with dynamic allocation of the IP address. |
| INTERFACES: | IuPS, Gn, Gi. |
| PRECONDITIONS: | Requires at least configuration n°7. The user must be registered in the HLR with an 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: | |
| <pre> sequenceDiagram participant MS participant UTRAN participant SGSN as 3G SGSN participant GGSN as 3G-GGSN UTRAN-->>MS: Service request UTRAN-->>SGSN: Common ID UTRAN-->>MS: Security mode procedure UTRAN-->>SGSN: Activate PDP Context Request UTRAN-->>MS: RAB Assignment procedure SGSN-->>GGSN: Create PDP Context Request GGSN-->>SGSN: Create PDP Context Response SGSN-->>MS: Activate PDP Context Accept </pre> | |
| 2. Check the following fields in the messages: | |
| Activate PDP Context Request: Requested PDP Address=< >, APN=<APN>; | |
| Create PDP Context Request: Selection Mode=<subscribed verified>; | |
| Activate PDP Context Accept: PDP Address=<Allocated PDP Address>. | |
| 3. Check that the PDP context is activated in the GSNs. | |
| NOTES: | |
| The “service request” procedure is performed only if there is not already present a PS signalling connection. | |
| REFERENCES: | [1] §9.5, [3] §9.2, [7] §7.3.1. |

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

| | |
|---|--|
| Session Management – PDP Context Activation | |
| SM_PDP_103: QoS NEGOTIATION | |
| OBJECTIVE: | This test aims to demonstrate the capacity of the 3G-SGSN to negotiate the QoS during a PDP Context Activation procedure. |
| INTERFACES: | IuPS, Gn, Gi. |
| PRECONDITIONS: | Requires at least configuration n°7. The user must be registered in the HLR with an UMTS subscription that envisages a record of the appropriate QoS parameters; moreover, the MS must be PS attached. |
| PRIORITY: | B |
| DESCRIPTION/PROCEDURE: | |
| Case A: $QoS_req=0$ & $QoS_min \leq QoS_sub$ | |
| 1. Carry out a PDPC activation procedure without indicating the QoS parameters required in the Activate PDP Context Request message. | |
| Case B: $QoS_min \leq QoS_sub < QoS_req$ | |
| 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). | |
| Case C: $QoS_sub < QoS_min \leq QoS_req$ | |
| 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). | |
| Case D: $QoS_min \leq QoS_req < QoS_sub$ | |
| 1. Carry out a PDPC activation procedure requesting a worse QoS than that subscribed by the user (e.g. lower peak throughput value). | |
| Case E: QoS_req not supported by SGSN ($QoS_req < QoS_sub$) | |
| 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. | |

EXPECTED RESULTS:

1. The message exchange to check is as follows:



2. Check the following fields in the messages:

Case A:

Activate PDP Context Request: QoS Requested='0'

Create PDP Context Request: QoS Negotiated=QoS subscribed

Create PDP Context Response: QoS Negotiated=QoS subscribed

Activate PDP Context Accept: QoS Negotiated=QoS subscribed

Case B:

Activate PDP Context Request: QoS Requested=<QoS>

Create PDP Context Request: QoS Negotiated=QoS subscribed

Create PDP Context Response: QoS Negotiated=QoS subscribed

Activate PDP Context Accept: QoS Negotiated=QoS subscribed

Case C:

Activate PDP Context Request: QoS Requested=<QoS>

Create PDP Context Request: QoS Negotiated=QoS subscribed

Create PDP Context Response: QoS Negotiated=QoS subscribed

Activate PDP Context Accept: QoS Negotiated=QoS subscribed

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

NOTES:

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] §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 an 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: | |
| <p><u>Case A:</u> Carry out a PDPC activation procedure not sending the APN. <u>Case B:</u> Carry out a PDPC activation procedure sending an APN different to the subscriber's.</p> | |
| EXPECTED RESULTS: | |
| <u>Case A:</u> | |
| 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->>SGSN: Activate PDP Context Request SGSN->>GGSN: Create PDP Context Request GGSN-->>SGSN: Create PDP Context Response SGSN->>MS: Activate PDP Context Accept UTRAN-->>SGSN: RAB Assignment procedure </pre> | |
| 2. Check the following field in the message: | |
| Create PDP context Request: Selection Mode=<subscribed verified>. | |
| 3. Check that the PDPC is successfully activated. | |
| <u>Case B:</u> | |
| 1. The message exchange to check is as follows: | |
| <pre> sequenceDiagram participant MS participant UTRAN participant SGSN as 3G-SGSN MS->>SGSN: Activate PDP Context Request SGSN-->>MS: Activate PDP Context Reject </pre> | |
| 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. | |
| NOTES: | |
| REFERENCES: | [1] §9.2, §9.5.3, [7] §7.3.1. |

| | |
|---|---|
| Session Management – PDP Context Activation | |
| SM_PDP_202: APN SELECTION RULES, STATIC PDP ADDRESS | |
| OBJECTIVE: | 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. |
| INTERFACES: | IuPS, Gn, Gi. |
| PRECONDITIONS: | Requires at least configuration n°7. The user must be registered in the HLR with an UMTS subscription that envisages a single PDPC with APN data and a static IP address; moreover, the MS must be PS attached. |
| PRIORITY: | B |
| DESCRIPTION/PROCEDURE: | |
| <p><u>Case A:</u> Carry out a PDPC activation procedure sending the same APN and PDP address as the subscribed. <u>Case B:</u> Carry out a PDPC activation procedure sending a subscriber APN and a PDP address different to the subscribed.</p> | |
| EXPECTED RESULTS: | |
| <u>Case A:</u> | |
| 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->>SGSN: Activate PDP Context Request SGSN->>UTRAN: RAB Assignment procedure SGSN->>GGSN: Create PDP Context Request GGSN-->>SGSN: Create PDP Context Response SGSN-->>MS: Activate PDP Context Accept </pre> | |
| 2. Check the following field in the message: | |
| Create PDP context Request: Selection Mode=<subscribed verified>. | |
| 3. Check that the PDPC is successfully activated. | |
| <u>Case B:</u> | |
| 1. The message exchange to check is as follows: | |
| <pre> sequenceDiagram participant MS participant UTRAN participant SGSN as 3G-SGSN MS->>SGSN: Activate PDP Context Request SGSN-->>MS: Activate PDP Context Reject </pre> | |
| 2. Check the following field in the message: | |
| Activate PDP Context Reject: Cause='Unknown PDP address or PDP type'. | |

| |
|--|
| 3. Check the failure of the PDPC activation procedure. |
| NOTES: |
| REFERENCES: [3] §9.2, [1] §9.5, §10.5.6.6, [7] §7.3.1. |

| | |
|---|--|
| Session Management – PDP Context Activation | |
| SM_PDP_203: APN SELECTION RULES, TWO PDPC SUBSCRIBED | |
| OBJECTIVE: | 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. |
| INTERFACES: | IuPS, Gn, Gi. |
| PRECONDITIONS: | Requires at least configuration n°7. The user must be registered in the HLR with an UMTS subscription that envisages two PDPC, both with APN data and dynamic IP address assignment; moreover, the MS must be PS attached. |
| PRIORITY: | B |
| DESCRIPTION/PROCEDURE: | |
| 1. Carry out a PDPC activation procedure not sending the APN. | |
| EXPECTED RESULTS: | |
| 1. The message exchange to check is as follows: | |
| <pre> sequenceDiagram participant MS participant UTRAN participant SGSN as 3G-SGSN MS->>SGSN: Activate PDP Context Request SGSN-->>MS: Activate PDP Context Reject </pre> | |
| 2. Check the following field in the message: | |
| Activate PDP Context Reject: Cause='Missing or unknown APN' | |
| 3. Check the failure of the PDPC activation procedure. | |
| NOTES: | |
| REFERENCES: | [3] §9.2, [1] §9.5, §10.5.6.6. |

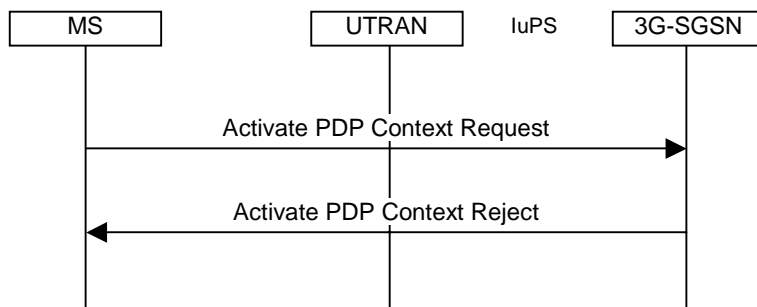
| | |
|---|--|
| Session Management – PDP Context Activation | |
| SM_PDP_204: APN SELECTION RULES, WILDCARD SUBSCRIBED | |
| OBJECTIVE: | This test aims to demonstrate the correct selection of the APN by the 3G-SGSN according to user subscription and the request sent by it. |
| INTERFACES: | IuPS, Gn, Gi. |
| PRECONDITIONS: | Requires at least configuration n°7. The user must be registered in the HLR with an UMTS subscription that envisages a single PDPC with an APN wildcard; moreover, the MS must be PS attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <p><u>Case A:</u> Carry out a PDPC activation procedure not sending the APN. <u>Case B:</u> Carry out a PDPC activation procedure sending an APN known to the 3G-GSN. <u>Case C:</u> Carry out a PDPC activation procedure sending an APN unknown to the 3G-GGSN¹. <u>Case D:</u> Carry out a PDPC activation procedure sending an APN unknown to the 3G-SGSN².</p> | |
| 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->>SGSN: Activate PDP Context Request UTRAN->>SGSN: RAB Assignment procedure SGSN->>GGSN: Create PDP Context Request GGSN-->>SGSN: Create PDP Context Response SGSN-->>MS: Activate PDP Context Accept/Reject </pre> | |
| <u>Case A:</u> | |
| 2. Check the following field in the message: | |
| Create PDP context Request: Selection Mode=<Network provided APN, subscription not verified>. | |
| 3. Check that the PDPC is successfully activated. | |
| <u>Case B:</u> | |
| 2. Check the following field in the message: | |
| Create PDP context Request: Selection Mode=<subscription verified>. | |
| 3. Check that the PDPC is successfully activated. | |
| <u>Case C:</u> | |
| 2. Check the following fields in the messages: | |
| Create PDP Context Response: Cause='service not supported' | |

Activate PDP Context Reject: Cause='activation rejected by GGSN'

3. Check the failure of the PDPC activation procedure.

Case D:

1. The message exchange to check is as follows:



2. Check the following field in the message:

Activate PDP Context Reject: Cause='missing or unknown APN'

3. Check the failure of the PDPC activation procedure.

NOTES:

¹ The 3G-SGSN resolves the APN sent to a given 3G-GGSN in which the APN is not configured.

² The 3G-SGSN does not find an item corresponding to the APN requested in the DNS (internal or external).

REFERENCES: [3] §9.2.2, [1] §9.5, §10.5.6.6, [7] §7.3.2, §7.7.1, §7.7.12.

| | |
|---|---|
| <i>Session Management – PDP Context Deactivation</i> | |
| SM_PDP_301: MS INITIATED DEACTIVATION | |
| OBJECTIVE: | This test aims to demonstrate completion of the PDP Context Deactivation procedure requested by the MS. |
| INTERFACES: | IuPS, Gn, Gi. |
| 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->>SGSN: Deactivate PDP Context Request SGSN->>GGSN: Delete PDP Context Request GGSN-->>SGSN: Delete PDP Context Response SGSN-->>MS: Deactivate PDP Context Accept MS->>UTRAN: RAB Release procedure UTRAN-->>SGSN: Release </pre> | |
| 2. Check the following field in the message: | |
| Deactivate PDP Context Request: 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. | |
| NOTES: | |
| REFERENCES: | [3] §9.2.4.1, [1] §9.5.14, §10.5.6.6. |

| | |
|--|---|
| Session Management – PDP Context Deactivation | |
| 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: | IuPS, Gn, Gi. |
| 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: | |
| 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->>SGSN: Detach Request (via UTRAN) SGSN->>GGSN: Delete PDP Context Request (via Gn) GGSN-->>SGSN: Delete PDP Context Response (via Gn) MS->>UTRAN: RAB Release procedure UTRAN->>SGSN: Release </pre> | |
| 2. Check the following fields in the messages: | |
| Detach Request: Detach Type: GPRS Detach. | |
| Delete PDP Context Response: 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. | |
| NOTES: | |
| REFERENCES: | [3] §9.2.4, [1] §9.4, [7] §7.7.1. |

| | |
|--|---|
| Session Management – PDP Context Deactivation | |
| SM_PDP_303: MOBILE REACHABLE TIMER EXPIRY | |
| OBJECTIVE: | This test aims to demonstrate that upon expiry of the mobile reachable timer all the PDPC of the MS are automatically detached by the 3G-SGSN. |
| INTERFACES: | IuPS, Gn, Gi. |
| 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: | |
| <pre> sequenceDiagram participant MS participant UTRAN participant SGSN as 3G-SGSN participant GGSN as 3G-GGSN Note over SGSN: Timer expiry SGSN->>GGSN: Delete PDP Context Request GGSN-->>SGSN: Delete PDP Context Response Note over UTRAN: RAB Release procedure Note over MS, UTRAN: RAB Release procedure Note over UTRAN, SGSN: Release </pre> | |
| 2. Check the following fields in the messages: | |
| Delete PDP Context Response: Cause='request accepted'. | |
| 3. Check that the MS is considered deregistered in the 3G-SGSN. | |
| NOTES: | |
| REFERENCES: | [3] §6.2.3; [7] §7.3.6, §7.7.1. |

| | |
|--|---|
| Session Management – PDP Context Deactivation | |
| 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: | IuPS, Gn, Gi. |
| 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: | |
| <u>Case A:</u> | |
| Carry out the PDPC deactivation procedure initiated by the 3G-GGSN | |
| <u>Case B:</u> | |
| Carry out the PDPC deactivation initiated by the 3G-SGSN. | |
| EXPECTED RESULTS: | |
| <u>Case A.</u> | |
| 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->>SGSN: Delete PDP Context Request SGSN->>MS: Deactivate PDP Context Request MS->>SGSN: Deactivate PDP Context Accept SGSN->>GGSN: Delete PDP Context Response SGSN->>UTRAN: RAB Release procedure UTRAN->>SGSN: Release </pre> | |
| <u>Case B:</u> | |
| 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->>GGSN: Delete PDP Context Request GGSN->>SGSN: Delete PDP Context Response SGSN->>MS: Deactivate PDP Context Request MS->>SGSN: Deactivate PDP Context Accept SGSN->>UTRAN: RAB Release procedure UTRAN->>SGSN: Release </pre> | |

In both of the cases:

2. Check the following field in the message:

Deactivate PDP Context Request: 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:

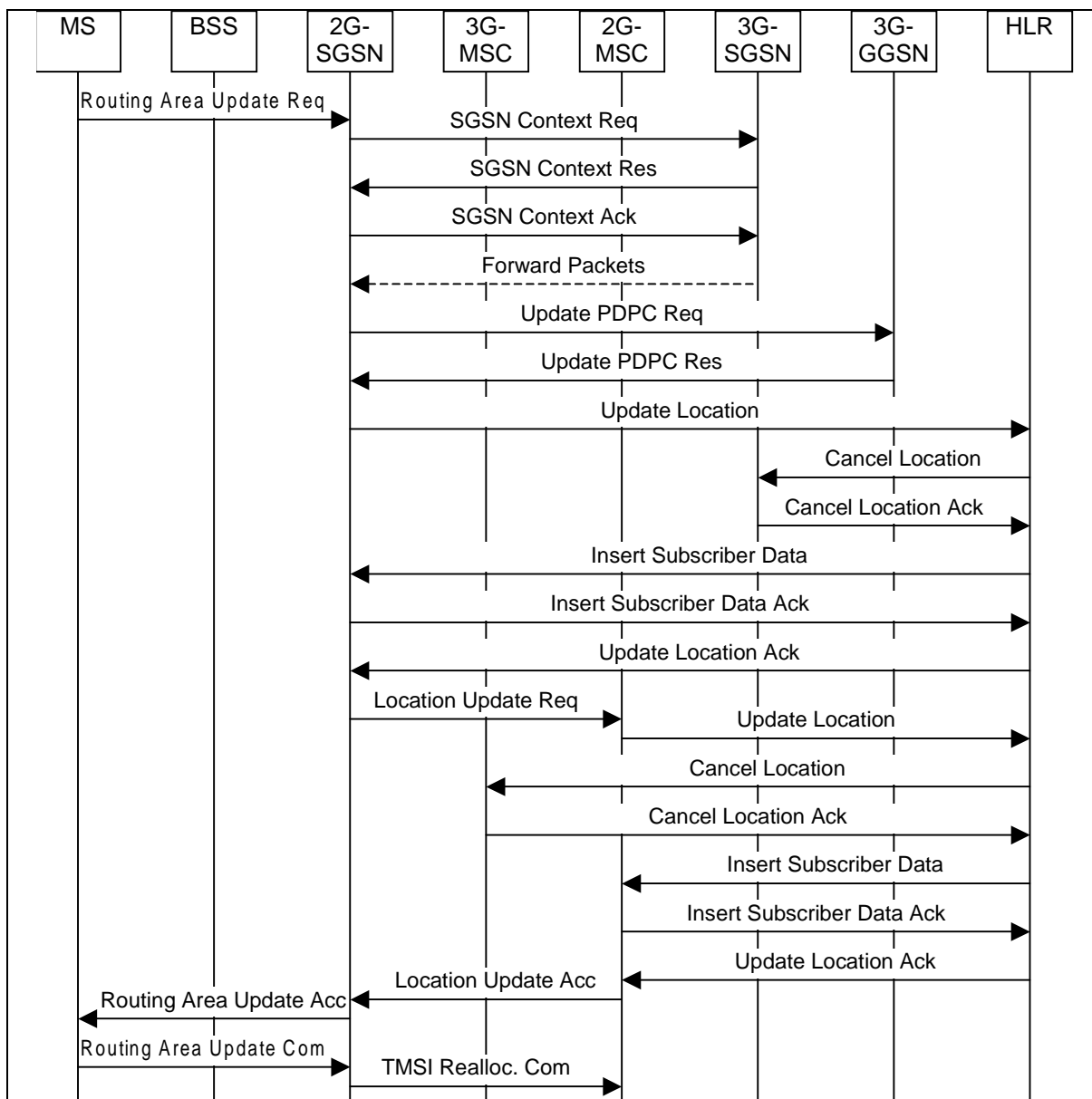
REFERENCES: [1] §9.4, [3] §9.2.4.

| | |
|--|---|
| Session Management – PDP context Deactivation | |
| 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: | IuPS, Gr, Gn, Gi. |
| PRECONDITIONS: | Requires at least configuration n°7. The MS must be registered in the HLR with UMTS subscription; moreover, 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->>SGSN: Delete Subscriber Data SGSN->>HLR: Delete Subscriber Data Ack SGSN->>GGSN: Delete PDP Context Request GGSN->>SGSN: Delete PDP Context Response SGSN->>MS: Deactivate PDPC Request MS->>SGSN: Deactivate PDPC Request Accept MS->>SGSN: RAB Release procedure SGSN->>MS: Release </pre> | |
| 2. Check that the MS PDPC concerned has been cancelled in the 3G-SGSN and has been disabled. | |
| NOTES: | |
| The 3G-SGSN may not await the reply from the 3G-GGSN before sending the deactivate message to the MS. | |
| REFERENCES: | [1] §6.10.1.2 |

| | |
|--|--|
| <i>Session Management – Data Transfer Security</i> | |
| 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: | IuPS, Gn, Gi. |
| PRECONDITIONS: | Requires at least configuration n°8. The two MS must be registered in the HLR with UMTS subscription and must also be PS attached. |
| PRIORITY: | B |
| DESCRIPTION/PROCEDURE: | |
| <u>Case A</u> | |
| 1. Configure and activate the PDPC on both MS using the same Transparent APN. | |
| 2. Carry out a ping from one MS to the other MS. | |
| <u>Case B</u> | |
| 1. Configure and activate the PDPC on both MS using different Non Transparent APN. | |
| 2. Carry out a ping from one MS to the other MS. | |
| EXPECTED RESULTS: | |
| <u>Case A</u> | |
| Check that the ping is successful and check that no packets have been sent via the Gi interface. | |
| <u>Case B</u> | |
| Check that the ping is successful and check that a ping has been sent via the Gi interface. | |
| NOTES: | |
| REFERENCES: | [3] §9.3. |

| | |
|--|--|
| Session Management- – Data Paging | |
| SM_PAG_501: DOWNLINK PAGING PROCEDURE | |
| OBJECTIVE: | This test aims to demonstrate completion of the paging procedure after sending data to an MS in idle state. |
| INTERFACES: | IuPS , Gn, Gi. |
| PRECONDITIONS: | Requires at least configuration n°7. The MS, PS attached, must be in PMM idle state and have an active PDPC. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| 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. | |
| EXPECTED RESULTS: | |
| 1. The message exchange to check is as follows: | |
| <pre> sequenceDiagram participant MS participant UTRAN participant SGSN as 3G-SGSN SGSN->>SGSN: PDP PDU/Downlink sign. UTRAN->>MS: Paging MS->>SGSN: Service Request SGSN->>UTRAN: RAB Assignment procedure¹ SGSN->>MS: Security Function SGSN->>MS: PDP PDU/Downlink sign. </pre> | |
| 2. Check the following fields in the messages: | |
| Paging: Permanent NAS UE identity, CN Domain Indicator=PS domain. | |
| Service Request: Service type=paging response. | |
| NOTES: | |
| ¹. The RAB Assignment procedure is performed only in case of PDP PDU. | |
| REFERENCES: | [1] §8.4; [3] §9.1.22, §10.5.1.4 |

| | |
|---|--|
| <i>Session Management – PDP Context handover</i> | |
| SM_HO_601: PDP CONTEXT HANDOVER FROM UMTS TO GSM/GPRS NETWORK | |
| OBJECTIVE: | This test aims to demonstrate completion of the PDP context switching between 3G and 2G SGSN. |
| INTERFACES: | IuPS , Gn, Gi. |
| PRECONDITIONS: | Requires at least configuration n°12. The MS must have an active PDPC on the 3G network. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <ol style="list-style-type: none">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. |
| EXPECTED RESULTS: | <ol style="list-style-type: none">1. The message exchange to check is as follows: |



2. Check the following fields in the messages:

RA Update Request: Old RAI; Update type= RA update.

SGSN Context Req.: new RAI; TLLI.

SGSN Context Res.: Cause=Req. Accepted; MM & PDP context.

Update PDPC Res.: Charging ID.

RA Update Accept: Allocated P-TMSI=<re-allocated P-TMSI> o <P-TMSI>

3. Check that the mobility context of the MS is updated with the new RAI.

4. Check that a data transfer after the procedure is successful.

NOTES:

REFERENCES:

7.1.4.5. Gi/Gn Interface Interoperability

| | |
|---|--|
| <i>Gi/Gn Interface interoperability –Transparent Connection Mode</i> | |
| 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: | IuPS, Gn, Gi. |
| 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: | <ol style="list-style-type: none"> 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: | <ol style="list-style-type: none"> 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. |
| NOTES: | |
| REFERENCES: | [8] §11.2. |

| | |
|--|---|
| Gi/Gn Interface interoperability –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: | IuPS, Gn, Gi. |
| 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: | <ol style="list-style-type: none"> 1. Carry out a PDPC activation procedure. 2. Carry out data traffic with the MS. 3. Carry out a PDPC deactivation procedure. |
| EXPECTED RESULTS: | <ol style="list-style-type: none"> 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. |
| NOTES: | |
| REFERENCES: | [8] §11.2.1.1. |

| | |
|---|--|
| Gi/Gn Interface interoperability –Transparent Connection Mode | |
| Gi/Gn_IOT_103: NO AUTHENTICATION, STATIC IP ADDRESS | |
| OBJECTIVE: | This test aims to demonstrate the possibility of completing a PDPC activation procedure, with transparent connection, through assignment of a static IP address to the MS. |
| INTERFACES: | IuPS, Gn, Gi. |
| 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: | |
| <ol style="list-style-type: none"> 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. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: <div> <pre> sequenceDiagram participant MS participant UTRAN participant SGSN as 3G-SGSN participant GGSN as 3G-GGSN MS->>SGSN: Activate PDP Context Request UTRAN->>SGSN: RAB Assignment procedure SGSN->>GGSN: Create PDP Context Request GGSN-->>SGSN: Create PDP Context Response SGSN-->>MS: Activate PDP Context Accept </pre> </div> | |
| <ol style="list-style-type: none"> 2. Check the following fields in the messages: <p style="text-align: center;">Activate PDP Context Request: Requested PDP Address=< >, APN=<APN>.</p> 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. | |
| NOTES: | |
| REFERENCES: | [8] §11.2.1.1. |

| | |
|--|---|
| Gi/Gn Interface interoperability –Non Transparent Connection Mode | |
| Gi/Gn_IOT_201: UNTUNNELLED WITH RADIUS/DHCP SERVER AUTHENTICATION | |
| OBJECTIVE: | This test aims to demonstrate the possibility of a PDPC activation procedure with non-transparent connection through allocation of an IP address to the MS by the Radius/DHCP server. |
| INTERFACES: | IuPS, Gn, Gi. |
| 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 GGSN, the APN must be configured with a valid Radius/DHCP address. |
| PRIORITY: | B |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 1. Carry out a PDPC activation procedure. 2. Carry out data traffic with the MS. 3. Carry out a PDPC deactivation procedure. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: | |
| <pre> sequenceDiagram participant MS participant IuPS participant SGSN as 3G-SGSN participant Gn participant GGSN as 3G-GGSN participant Gi participant Server as RADIUS/DHCP Server MS->>SGSN: Activate PDPC Request SGSN->>MS: RAB Assignment Procedure SGSN->>GGSN: Create PDPC Request GGSN->>Server: Access Request Server->>GGSN: Access Accept GGSN->>Server: DHCP-Discover Server->>GGSN: DHCP-OFFER GGSN->>Server: DHCP-Request Server->>GGSN: DHCP-Ack GGSN->>SGSN: Create PDPC Response SGSN->>MS: Activate PDPC Accept MS<->>GGSN: DATA Transfer GGSN->>Server: DHCP-Release GGSN->>MS: PDPC Deactivation Procedure MS->>SGSN: RAB Release Procedure SGSN->>MS: Release </pre> | |
| <ol style="list-style-type: none"> 2. Check that the PDPC is successfully activated and that to the MS is assigned an IP address from the | |

Radius/DHCP pool.

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.

NOTES:

REFERENCES: [8] §11.2.1.2.

| | |
|---|--|
| <i>Gi/Gn Interface interoperability – Non Transparent Connection Mode</i> | |
| Gi/Gn_IOT_202: UNTUNNELLED WITH RADIUS SERVER AUTHENTICATION | |
| OBJECTIVE: This test aims to demonstrate the possibility of completing a PDPC activation procedure by allocating a dynamic IP address to the MS. | |
| INTERFACES: IuPS, Gn, Gi. | |
| 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: | |
| <ol style="list-style-type: none"> 1. Carry out a PDPC activation procedure. 2. Carry out data traffic with the MS. 3. Carry out a PDPC deactivation procedure. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: | |
| <pre> sequenceDiagram participant MS participant SGSN as 3G-SGSN participant GGSN as 3G-GGSN participant Server as RADIUS Server MS->>SGSN: Activate PDPC Request SGSN->>MS: RAB Assignment Procedure SGSN->>GGSN: Create PDPC Request GGSN->>Server: Access Request Server-->>GGSN: Access Accept GGSN-->>SGSN: Create PDPC Response SGSN->>MS: Activate PDPC Accept MS<-><->GGSN: DATA Transfer MS->>SGSN: PDPC Deactivation Procedure SGSN->>GGSN: PDPC Deactivation Procedure MS->>SGSN: RAB Release Procedure SGSN->>MS: RAB Release Procedure MS->>SGSN: Release SGSN->>MS: Release </pre> | |
| <ol style="list-style-type: none"> 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. | |
| NOTES: | |
| REFERENCES: [8] §11.2.1.2. | |

| | |
|---|--|
| Gi/Gn Interface interoperability – Non Transparent Connection Mode | |
| Gi/Gn_IOT_203: L2TP/IPSEC/GRE TUNNELS | |
| OBJECTIVE: | This test aims to demonstrate the possibility of completing a PDPC activation procedure with non-transparent connection using L2TP, IPSEC or GRE tunnelling. |
| INTERFACES: | IuPS, Gn, Gi. |
| 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: | <ol style="list-style-type: none"> 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: | <ol style="list-style-type: none"> 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. |
| NOTES: | |
| REFERENCES: | [8] §11.2. |

| | |
|--|--|
| Gi/Gn Interface interoperability – GTP IP Support | |
| Gi/Gn_IOT_301: IP FRAGMENTATION | |
| OBJECTIVE: | This test aims to demonstrate the capacity of the 3G-SGSN and 3G-GGSN to fragment and reassemble IP packets that exceed the maximum size allowed for lower levels. |
| INTERFACES: | IuPS, Gn, Gi. |
| 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 IuPS participant SGSN as 3G-SGSN participant Gn participant GGSN as 3G-GGSN participant Gi participant IPbackbone as IP backbone IPbackbone->>GGSN: Echo req GGSN->>SGSN: Echo req. (fragm.1) GGSN->>SGSN: Echo req. (fragm.2) SGSN->>MS: Echo req. (fragm1) SGSN->>MS: Echo req. (fragm.2) MS->>SGSN: Echo res. (fragm1) MS->>SGSN: Echo res. (fragm2) SGSN->>GGSN: Echo res. (fragm1) SGSN->>GGSN: Echo res. (fragm2) GGSN->>IPbackbone: 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. | |
| NOTES: | |
| REFERENCES: | [8] §12. |

7.1.4.6. HLR interoperability

| | |
|--|--|
| HLR Interoperability – 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: | IuPS, Gr, Gn, Gi. |
| PRECONDITIONS: | Requires at least configuration n°8. The MS must be registered in the HLR with UMTS subscriptions; moreover, 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 Note over 3G-SGSN, HLR: Gr 3G-SGSN->>HLR: Insert Subscriber Data HLR-->>3G-SGSN: 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. | |
| NOTES: | |
| REFERENCES: | [3] §6.11.1.1. |

| | |
|--|---|
| HLR interoperability – Insert subscriber data | |
| HLR_IOT_102: ADD OTHER SERVICES IN THE HLR WITH AN ACTIVE PDP CONTEXT | |
| OBJECTIVE: | This test aims to demonstrate completion of the Insert Subscriber Data procedure if the HLR user profile is changed and there is an active PDPC. |
| INTERFACES: | IuPS, Gr, Gn, Gi. |
| PRECONDITIONS: | Requires at least configuration n°8. The MS must be registered in the HLR with UMTS subscriptions; moreover, 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 Note over 3G-SGSN, HLR: Gr 3G-SGSN->>HLR: Insert Subscriber Data HLR-->>3G-SGSN: 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. | |
| NOTES: | |
| REFERENCES: | [3] §6.11.1.1 |

| | |
|---|---|
| HLR interoperability – Insert subscriber data | |
| HLR_IOT_103: UNSUCCESSFUL INSERT SUBSCRIBER DATA | |
| OBJECTIVE: | This test aims to demonstrate completion of the Insert Subscriber Data in the event a teleservice such as SMS is not supported. |
| INTERFACES: | IuPS, Gr. |
| PRECONDITIONS: | Requires at least configuration n°2. The MS must be PS attached and must have SMS services disabled. |
| PRIORITY: | B |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 1. Check that the SMS service is disabled in the 3G-SGSN. 2. Enable SMS service for the user on the HLR. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: <div style="text-align: center; margin: 10px 0;"> <pre> sequenceDiagram participant 3G-SGSN participant HLR HLR->>3G-SGSN: Insert Subscriber Data 3G-SGSN-->>HLR: Insert Subscriber Data Ack </pre> </div> 2. Check the following field in the message: <p style="text-align: center;">Insert Subscriber Data Ack: Cause='service not supported'</p> 3. Check that the SMS service is not enabled in the user profile stored in the 3G-SGSN. | |
| NOTES: | |
| REFERENCES: | |

| | |
|---|---|
| HLR interoperability – Insert subscriber data | |
| HLR_IOT_104: MULTIPLE INSERT SUBSCRIBER DATA MESSAGES | |
| OBJECTIVE: | 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. |
| INTERFACES: | IuPS, Gr. |
| PRECONDITIONS: | 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. |
| PRIORITY: | B |
| DESCRIPTION/PROCEDURE: 1. Carry out an attach with the MS. | |
| EXPECTED RESULTS: 1. Check that the information relative to the various PDPC is subdivided into various “insert subscriber data” messages: | |
| <pre> sequenceDiagram participant HLR participant Gr participant 3G-SGSN HLR->>3G-SGSN: Insert Subscriber Data HLR->>3G-SGSN: ... HLR->>3G-SGSN: Insert Subscriber Data 3G-SGSN-->>HLR: Insert Subscriber Data Ack </pre> | |
| 2. Check that all the PDPC are stored in the 3G-SGSN. | |
| NOTES: | |
| REFERENCES: | |

| | |
|--|--|
| HLR interoperability – Insert subscriber data | |
| HLR_IOT_105: MASSIVE CHANGE OF SUBSCRIBER DATA | |
| OBJECTIVE: | This test aims to demonstrate the possibility of changing the subscription data of a series of users. |
| INTERFACES: | IuPS, Gr. |
| PRECONDITIONS: | Requires at least configuration n°2*. The two MS 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 HLR->>3G-SGSN: Insert Subscriber Data (MS1) HLR->>3G-SGSN: Insert Subscriber Data (MS2) 3G-SGSN->>HLR: Insert Subscriber Data Ack (MS1) 3G-SGSN->>HLR: Insert Subscriber Data Ack (MS2) </pre> | |
| 2. Check that the profiles of the two users are updated in the 3G-SGSN. | |
| NOTES: | |
| * The configuration must envisage at least two MS. | |
| REFERENCES: | |

| | |
|---|---|
| HLR interoperability – 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 in the case where a non-active PDPC is cancelled from the user profile in the HLR. |
| INTERFACES: | IuPS, Gr, Gn, Gi. |
| 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 HLR->>3G-SGSN: Delete Subscriber Data 3G-SGSN-->>HLR: 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. | |
| NOTES: | |
| REFERENCES: | [3] §6.11.1.2 |

| | |
|---|---|
| HLR interoperability – Delete subscriber data | |
| HLR_IOT_202: DELETE OTHER SERVICES IN THE HLR WITH AN ACTIVE PDP CONTEXT | |
| OBJECTIVE: | This test aims to demonstrate completion of the Delete Subscriber Data procedure in the event that a service is cancelled from the user profile in the HLR with an active PDPC. |
| INTERFACES: | IuPS, Gr, Gn, Gi. |
| 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. Cancel a service (e.g. SMS) 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 HLR->>3G-SGSN: Delete Subscriber Data 3G-SGSN-->>HLR: 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. | |
| NOTES: | |
| REFERENCES: | [3] §6.11.1.2 |

| | |
|--|--|
| HLR interoperability – Delete subscriber data | |
| HLR_IOT_203: WITHDRAW OF A LIST OF PDP CONTEXTS | |
| OBJECTIVE: | This test aims to demonstrate the possibility of removing a list of PDPC from the 3G-SGSN through a single Delete Subscriber Data message. |
| INTERFACES: | IuPS, Gr, Gn, Gi. |
| PRECONDITIONS: | 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. |
| PRIORITY: | B |
| DESCRIPTION/PROCEDURE: | 1. Eliminate at least two PDPC from the HLR with a single command, excluding the active one. |
| EXPECTED RESULTS: | 1. Check the following messages: <div> <pre> sequenceDiagram participant HLR participant Gr participant 3G-SGSN HLR->>3G-SGSN: Delete Subscriber Data 3G-SGSN-->>HLR: Delete Subscriber Data Ack </pre> </div> |
| | 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. |
| NOTES: | |
| REFERENCES: | [3] §6.11.1.2. |

| | |
|--|--|
| HLR interoperability – PS detach | |
| 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: | IuPS, Gr, Gn, Gi. |
| 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 ¹ . | |
| 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->>SGSN: Cancel Location SGSN->>GGSN: Delete PDP Context Request GGSN-->>SGSN: Delete PDP Context Response SGSN->>MS: Detach Request MS-->>SGSN: Detach Accept SGSN->>HLR: Cancel Location Ack MS->>SGSN: RAB Release Procedure MS->>SGSN: Release </pre> | |
| 2. Check the following field in the message: | |
| Cancel Location: 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. | |
| NOTES: | |
| The Delete PDP context and GPRS Detach procedures can be carried out together, not necessarily in the order indicated. | |
| ¹ . This can be obtained by a subscription withdraw or deleting the location info. | |
| REFERENCES: | [3] § 6.6.2 |

| | |
|---|---|
| HLR interoperability – PS detach | |
| HLR_IOT_302: 3G-SGSN INITIATED PURGE | |
| OBJECTIVE: | This test aims to demonstrate completion of the Purge procedure. |
| INTERFACES: | IuPS, Gr. |
| 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: | |
| <ol style="list-style-type: none"> 1. Carry out a detach switching off the MS. 2. Await expiry of the purge timer. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: <div> <pre> sequenceDiagram participant MS participant UTRAN participant SGSN as 3G-SGSN participant HLR UTRAN->>SGSN: Detach Request (switch off) SGSN->>HLR: Purge MS HLR-->>SGSN: Purge MS Ack </pre> </div> 2. Check the following field in the message: <p style="text-align: center;">Purge MS: IMSI=<IMSI>.</p> 3. Check the absence of user information in the 3G-SSN and successful delocation in the HLR. | |
| NOTES: | |
| Certain 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] §6.7 |

| | |
|--|--|
| <i>HLR interoperability – PS detach</i> | |
| 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: | IuPS, Gr. |
| PRECONDITIONS: | Requires at least configuration n°2. The MS must be registered with UMTS subscription and must be PS attached. |
| PRIORITY: | B |
| DESCRIPTION/PROCEDURE: | <ol style="list-style-type: none"> 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: | <ol style="list-style-type: none"> 1. Check that there are no messages on the Gr interface. |
| NOTES: | 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. |
| REFERENCES: | |

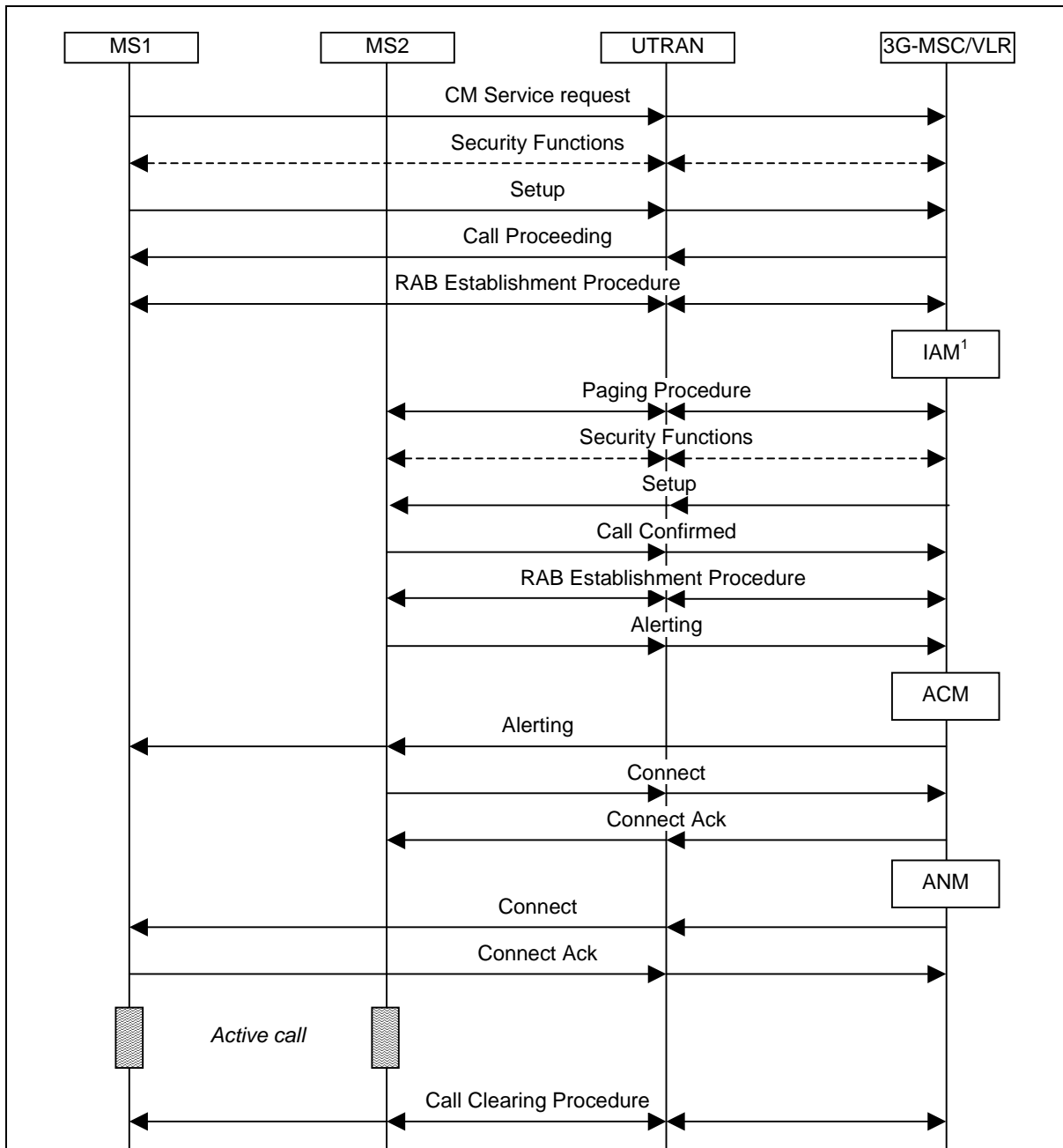
| | |
|---|---|
| <i>HLR interoperability – PS Detach</i> | |
| HLR_IOT_304: HOLDING OF THE DATA IN THE 3G-SGSN AFTER SUBSCRIBER IS DETACHED – REMOVE A BATTERY | |
| OBJECTIVE: | This test aims to demonstrate a function of the 3G-SGSN that envisages holding of subscriber data following a detach of the 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: | IuPS, Gr. |
| PRECONDITIONS: | Requires at least configuration n°2. The MS must be registered with UMTS subscription and must be PS attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <ol style="list-style-type: none"> 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: | <ol style="list-style-type: none"> 1. Check that there are no messages on the Gr interface. |
| NOTES: | 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. |
| REFERENCES: | |

| | |
|--|---|
| HLR interoperability – Reset HLR | |
| 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: | Iu-PS, Gr. |
| 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: | |
| <ol style="list-style-type: none"> 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->>SGSN: Periodic RAU or Any user frame SGSN->>HLR: Update Location HLR->>SGSN: Insert Sub. Data SGSN->>HLR: Insert Sub. Data Ack HLR->>SGSN: Update Location Ack HLR->>SGSN: Reset Note over HLR: Reload </pre> | |
| 3. Check updating of the user profile in the 3G-SGSN, including the last PDPC added. | |
| NOTES: | |
| REFERENCES: | [3] §13.8.1 |

7.1.4.7. Supplementary services and SMS

| | |
|---|---|
| Supplementary Services and SMS– Line Identification | |
| SS_LI_101: INTERROGATION PROCEDURE FOR CLI SUPPLEMENTARY SERVICES | |
| OBJECTIVE: | This test aims to demonstrate completion of interrogation procedure for CLI supplementary services. |
| INTERFACES: | IuCS. |
| PRECONDITIONS: | Requires at least configuration n°1. The user must be registered in the HLR with UMTS subscription. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 1. Check that the tested supplementary service is provisioned for the user¹. 2. Carry out by the MS an interrogation procedure for the supplementary service that will be tested. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: <div> <pre> sequenceDiagram participant MS participant UTRAN participant MSC as 3G-MSC/VLR UTRAN->>MSC: Register MSC->>MS: Release Complete </pre> </div> 2. Check the following fields in the messages: <p>Register: Facility(Invoke (InterrogateSS(SS-Code²)));</p> <p>Release Complete: Facility(Return Result (InterrogateSS(SS-Status))).</p> | |
| NOTES: | |
| <ol style="list-style-type: none"> ¹. This test can be performed for CLIP, CLIR, COLP, COLR supplementary services. ². The field SS-Code depends to the supplementary service that has to be tested. | |
| REFERENCES: | [9], [10]. |

| | |
|---|--|
| <i>Supplementary Services and SMS – Line Identification</i> | |
| SS_LI_111: CLIP IN A CALL BETWEEN UMTS USERS | |
| OBJECTIVE: | This test aims to demonstrate completion of a call between two UMTS users when the supplementary service CLIP is provisioned to the terminating party. |
| INTERFACES: | IuCS. |
| PRECONDITIONS: | Requires at least configuration n°4. The users must be registered in the HLR with UMTS subscription and must also be attached. The calling user mustn't have the CLIR provisioned. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 1. Check that CLIP is provisioned to the called party (MS2) carrying out an interrogation procedure. 2. Carry out a call from MS1 to MS2. 3. Carry out a Call Clearing procedure. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: | |



2. Check the following fields in the messages:

Setup (MO): Calling party subaddress;

Setup (MT): Calling Party BCD number(SI=NP, LI, PI= allowed), Calling party subaddress.

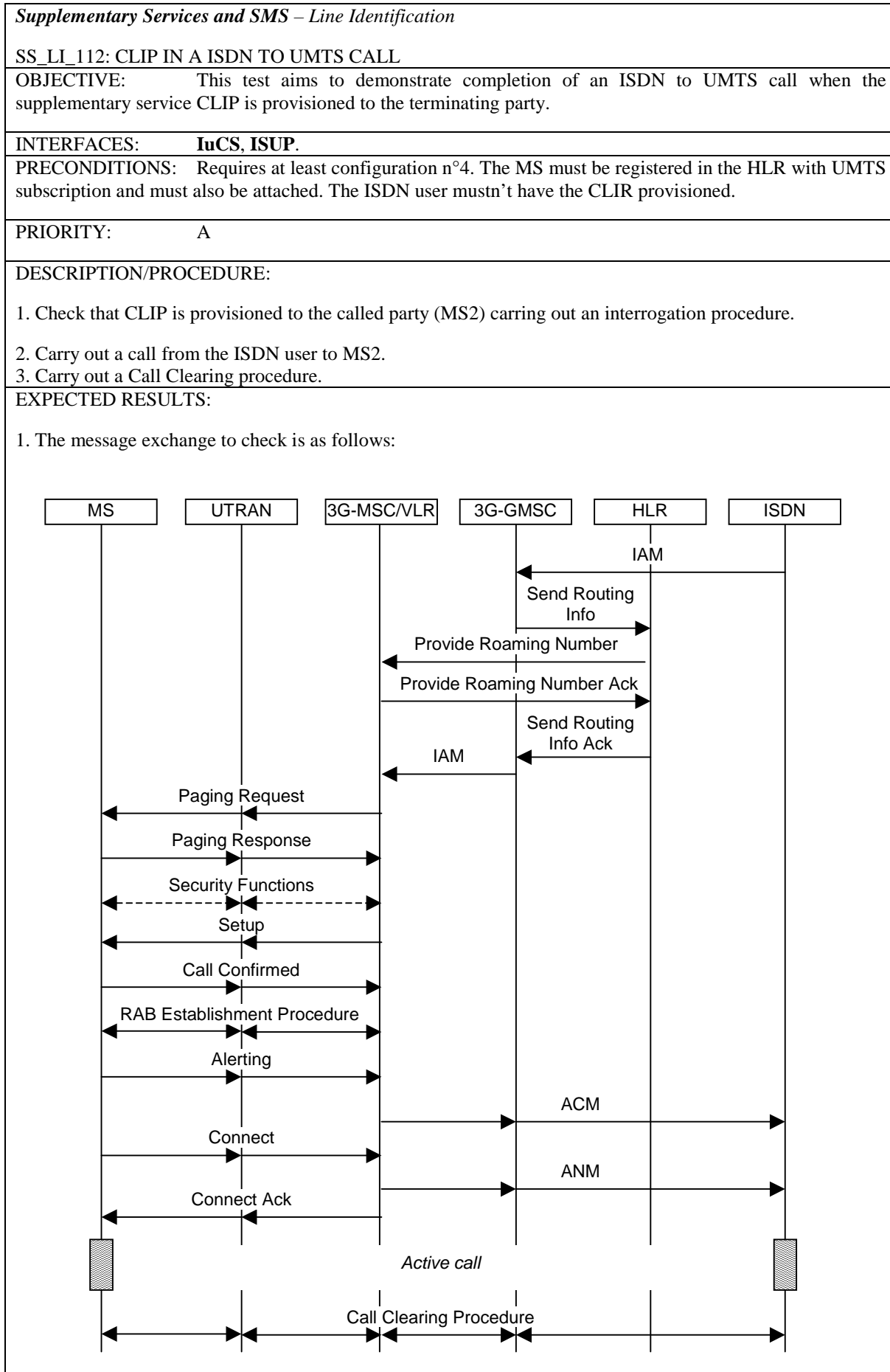
3. Check that the line identity of MS1 is presented to MS2 and that the call is successful.

NOTES:

The calling party subaddress is delivered to the called user when it is provisioned to the calling user.

¹. If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSC take place.

REFERENCES: [1] § 9.3.23, [9] §1, [10] §1.



| |
|--|
| <p>2. Check the following fields in the messages:</p> <p style="padding-left: 40px;">IAM:Calling Party number(SI=UPVP, LI, PI= allowed), Access Transport Parameter(Calling Party subaddress);</p> <p style="padding-left: 40px;">Setup (MT): Calling Party BCD number(SI=UPVP, LI, PI= allowed), Calling Party Subaddress.</p> <p>3. Check that the line identity of the ISDN user is presented to MS2 and that the call is successful.</p> |
| <p>NOTES:</p> <p>The calling party subaddress is delivered to the called user when it is provisioned to the calling user.</p> |
| <p>REFERENCES: [1] § 9.3.23, [9] §1, [10] §1; [20] §4.</p> |

Supplementary Services and SMS – Line Identification

SS_LI_113: CLIP IN A GSM TO UMTS CALL

OBJECTIVE: This test aims to demonstrate completion of a GSM to UMTS call when the supplementary service CLIP is provisioned to the terminating party.

INTERFACES: IuCS.

PRECONDITIONS: Requires at least configuration n°5. MS1 and MS2 must be registered in the HLR with respectively GSM and UMTS subscription and must also be attached. The calling user (MS1) mustn't have the CLIR SS provisioned.

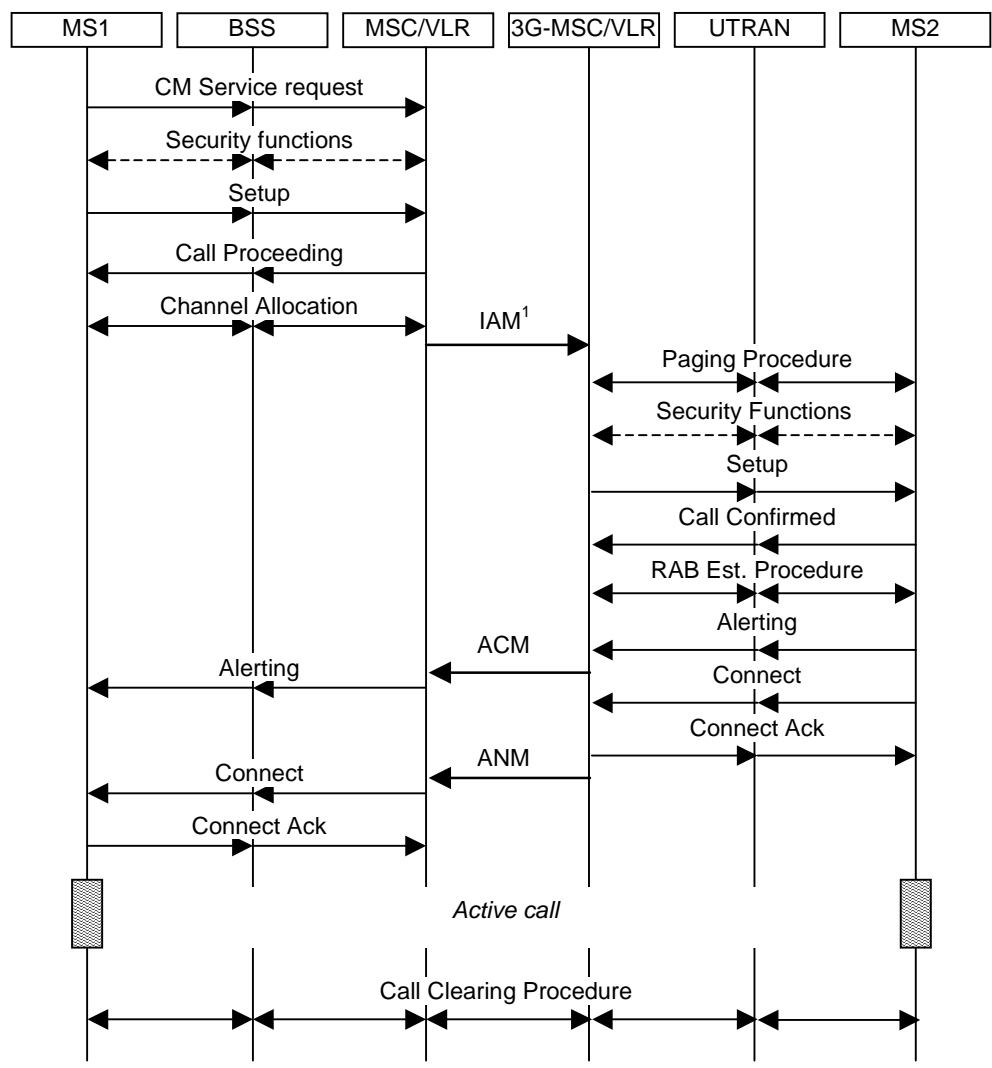
PRIORITY: A

DESCRIPTION/PROCEDURE:

1. Check that CLIP is provisioned to the called party (MS2) carrying out an interrogation procedure.
2. Carry out a call from MS1 to MS2.
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 messages:

- Setup (MO):** Calling party subaddress;
- Setup (MT):** Calling Party BCD number(SI=NP, LI, PI= allowed), Calling party

subaddress;

3. Check that the line identity of MS1 is presented to MS2 and that the call is successful.

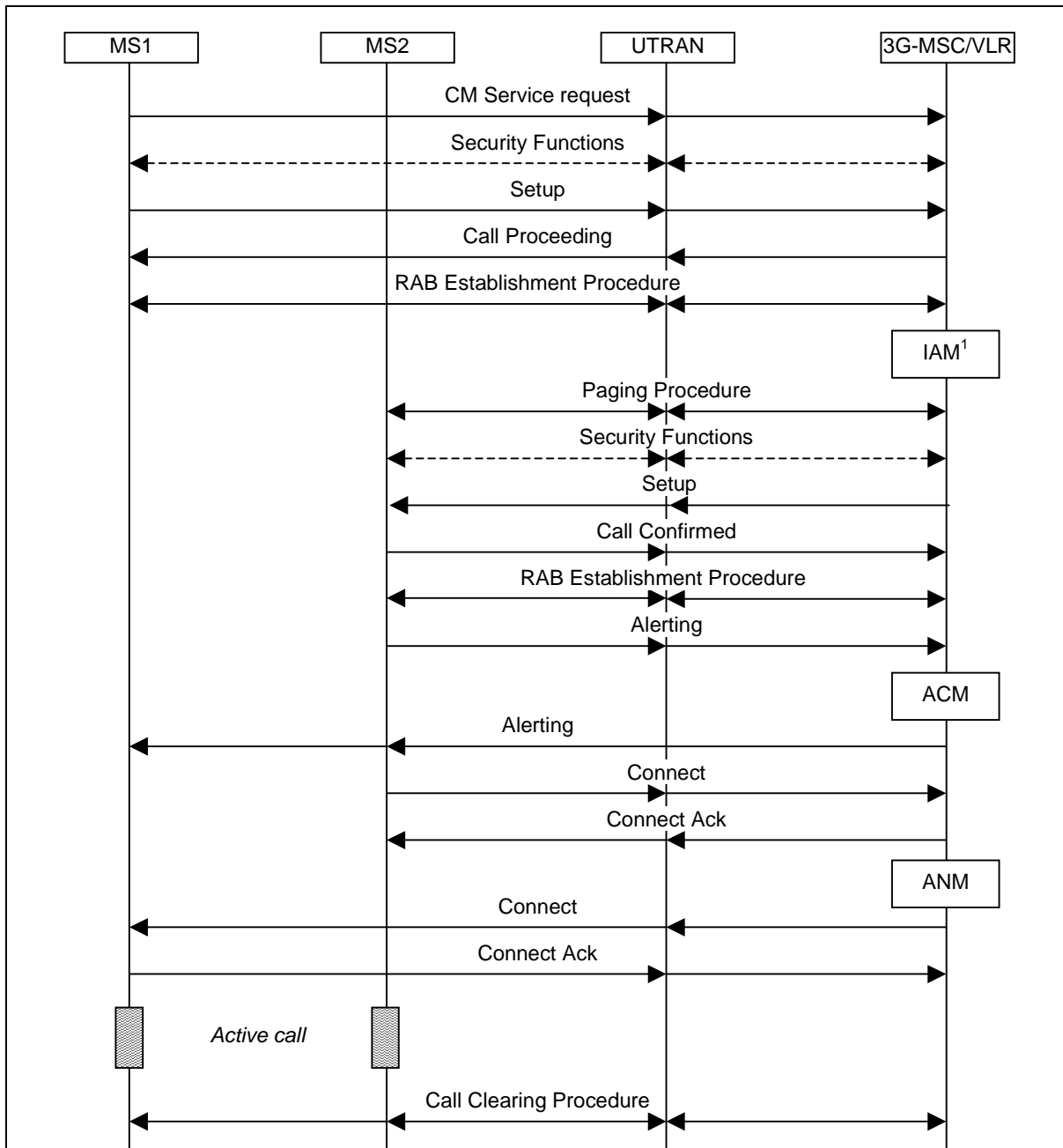
NOTES:

The calling party subaddress is delivered to the called user when it is provisioned to the calling user.

¹ In the diagram is not reported the possible message exchange between the GMSC and the HLR in the UMTS network.

REFERENCES: [1] § 9.3.23, [9] §1, [10] §1.

| | |
|---|--|
| <i>Supplementary Services and SMS – Line Identification</i> | |
| SS_LI_114: CLIR IN A CALL BETWEEN UMTS USERS | |
| OBJECTIVE: | This test aims to demonstrate completion of a call between two UMTS users when the supplementary service CLIR is provisioned to the calling party |
| INTERFACES: | IuCS. |
| PRECONDITIONS: | Requires at least configuration n°4. The users must be registered in the HLR with UMTS subscription and must also be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <ol style="list-style-type: none">1. Check that CLIR is provisioned (case A and B) or withdrawn (case C) for 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. |
| EXPECTED RESULTS: | <ol style="list-style-type: none">1. The message exchange to check is as follows: |



2. Check the following fields in the messages:

Case A: CLI restriction in permanent or temporary mode with the default value presentation restricted

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

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

Case B: CLI presentation in temporary mode with the default value presentation restricted

Setup (MO): CLIR suppression, Called party BCD number;

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

Check that the line identification of MS1 is presented to MS2.

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

Setup (MO): CLIR invocation;

| |
|--|
| <p>Setup (MT): Calling Party BCD Number(SI=NP, LI, PI=restricted), CoNC. Check that the line identification of MS1 is not presented to MS2.</p> <p>3. Check that the CS call is successful.</p> |
| <p>NOTES:</p> <p>¹. If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSC take place.</p> |
| <p>REFERENCES: [1] §9.3.23; [9] §2; [10] §2.</p> |

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 an UMTS to an ISDN user when the supplementary service CLIR is provisioned to the calling party.

INTERFACES: **Iu-CS.**

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.

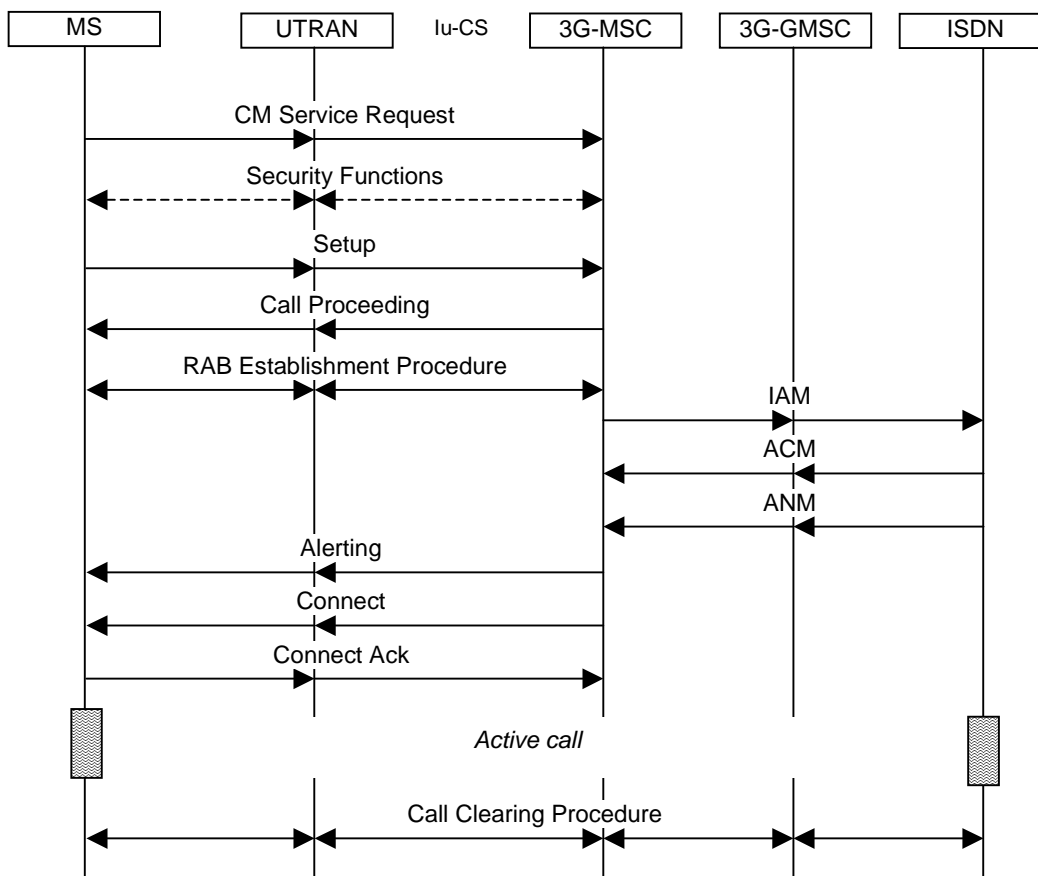
PRIORITY: A

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.

NOTES:

REFERENCES: [9] §2, [10] §2; [20] §4.

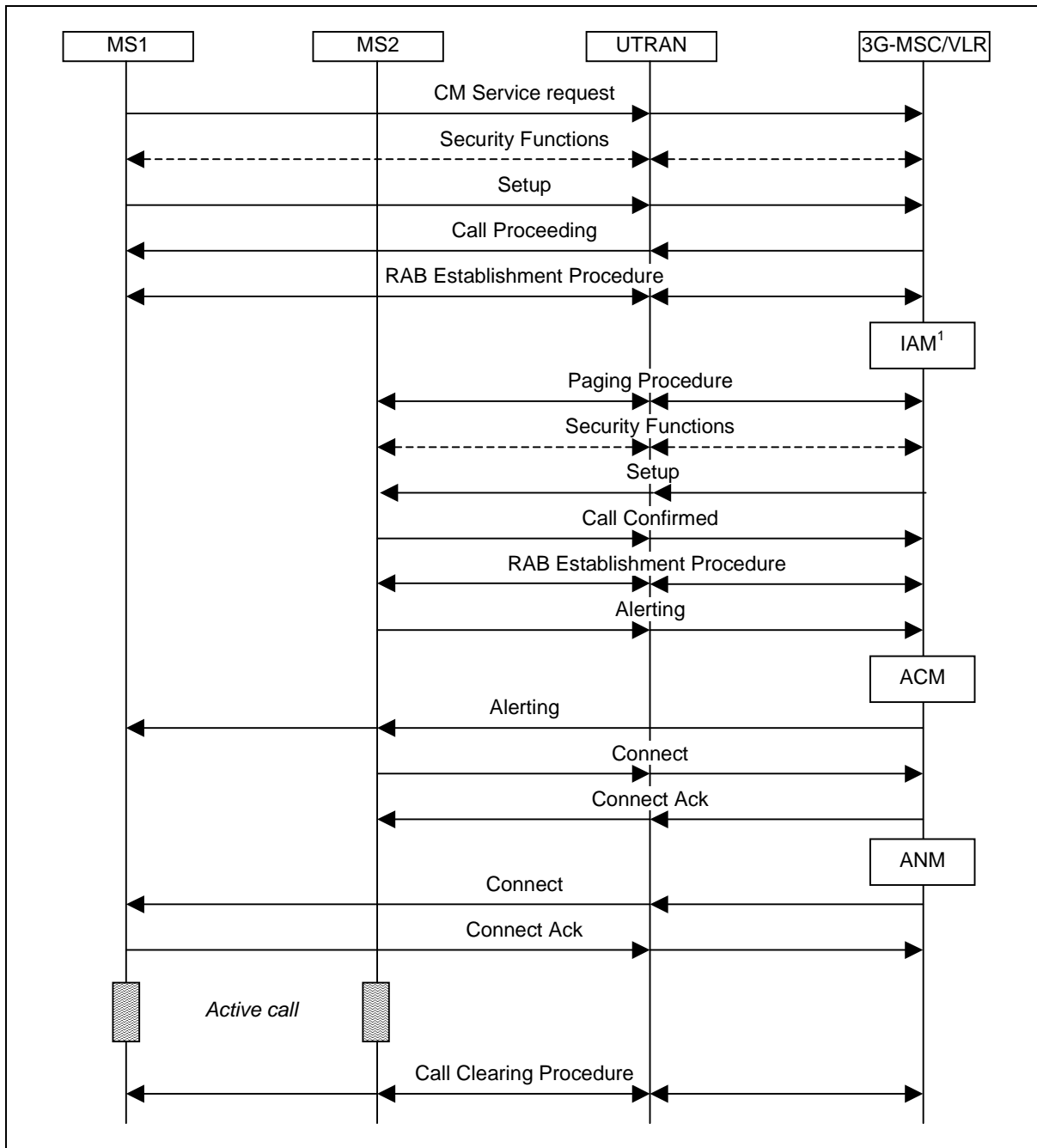
| | |
|--|---|
| <i>Supplementary Services and SMS – Line Identification</i> | |
| SS_LI_116: CLIR IN A UMTS TO GSM CALL | |
| OBJECTIVE: | This test aims to demonstrate completion of a call from an UMTS to a GSM user when the supplementary service CLIR is provisioned to the calling party. |
| INTERFACES: | 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: | |
| <ol style="list-style-type: none"> 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: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: | |
| | |
| <ol style="list-style-type: none"> 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. | |

NOTES:

¹ In the diagram is not reported the possible message exchange between the GMSC and the HLR in the GSM network.

REFERENCES: [9] §2, [10] §2; [20] §4.

| | |
|---|---|
| <i>Supplementary Services and SMS – Line Identification</i> | |
| SS_LI_121: COLP IN A CALL BETWEEN UMTS USERS | |
| OBJECTIVE: | This test aims to demonstrate completion of a call between two UMTS users when the supplementary service COLP is provisioned to the originating party. |
| INTERFACES: | IuCS. |
| PRECONDITIONS: | Requires at least configuration n°4. The users must be registered in the HLR with UMTS subscription and must also be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <ol style="list-style-type: none">1. Check that COLP is provisioned to MS1 (calling party) carrying out an interrogation procedure.2. Carry out a call from MS1 to MS2.3. Carry out a Call Clearing procedure by MS1. |
| EXPECTED RESULTS: | <ol style="list-style-type: none">1. The message exchange to check is as follows: |



2. Check the following fields in the messages:

Connect(by MS2): Connected subaddress;

Connect(to MS1): Connected Number (SI=NP, LI, PI=allowed), Connected subaddress.

3. Check that the line identity of the connected party is received by the calling party and that the call is successful.

NOTES:

The connected subaddress is delivered to the calling user when it is provisioned to the called user.

¹. If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSC take place.

REFERENCES: [1] §9.3.5; [9] §3; [10] §3.

Supplementary Services and SMS – Line Identification**SS_LI_122: COLP IN A UMTS TO ISDN CALL**

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

INTERFACES: **Iu-CS.**

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

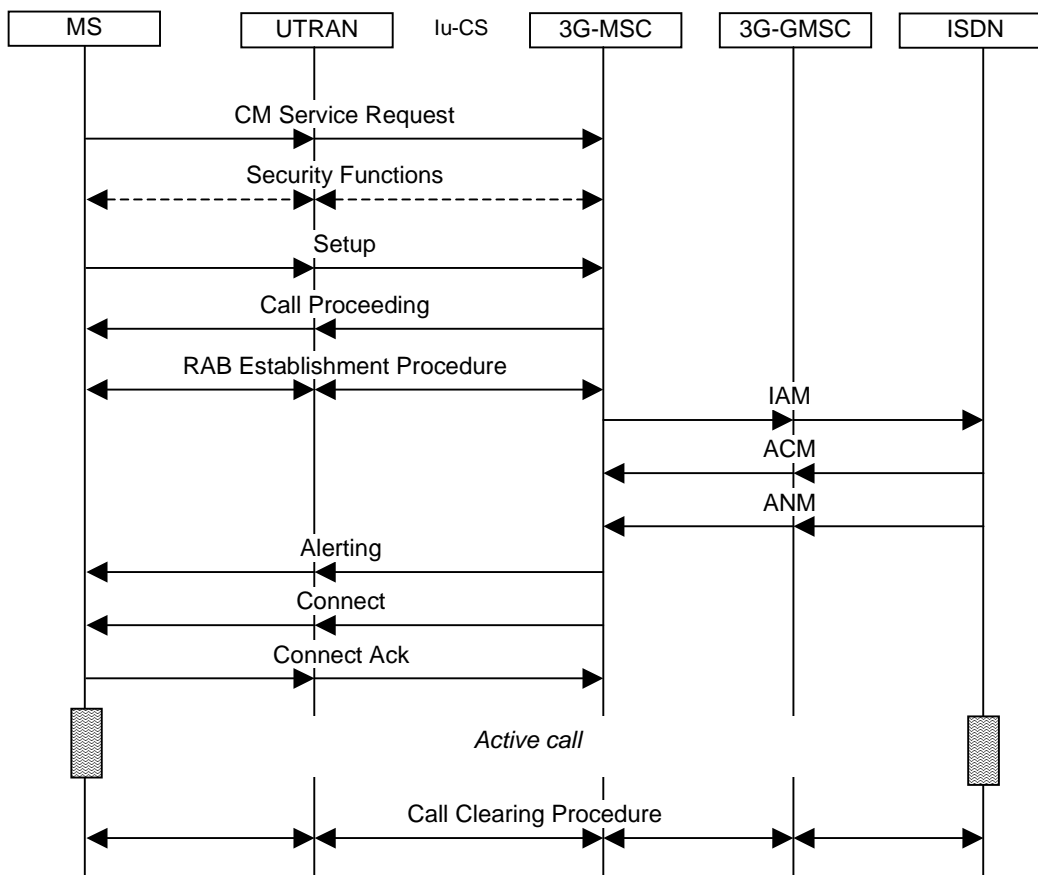
PRIORITY: A

DESCRIPTION/PROCEDURE:

1. Check that COLP is provisioned to the MS (calling party) carrying out an interrogation procedure.
2. Carry out a call from MS to an 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 messages:

Connect(by MS2): Connected subaddress;

Connect(to MS1): connected number (SI=UPVP, LI, PI=allowed), Connected subaddress.

3. Check that the line identity of the connected party is received by the calling party and that the call is successful.

NOTES:

The connected subaddress is delivered to the calling user when it is provisioned by the called user.

REFERENCES: [1] §9.3.5; [9] §3, [10] §3.

Supplementary Services and SMS – Line Identification**SS_LI_123: COLP IN A UMTS TO GSM CALL**

OBJECTIVE: This test aims to demonstrate completion of a call from an UMTS to a GSM user when the supplementary service COLP is provisioned to the originating party.

INTERFACES: **IuCS.**

PRECONDITIONS: Requires at least configuration n°5. The MS1 and MS2 must be registered in the HLR respectively with UMTS and GSM subscription and must also be attached.

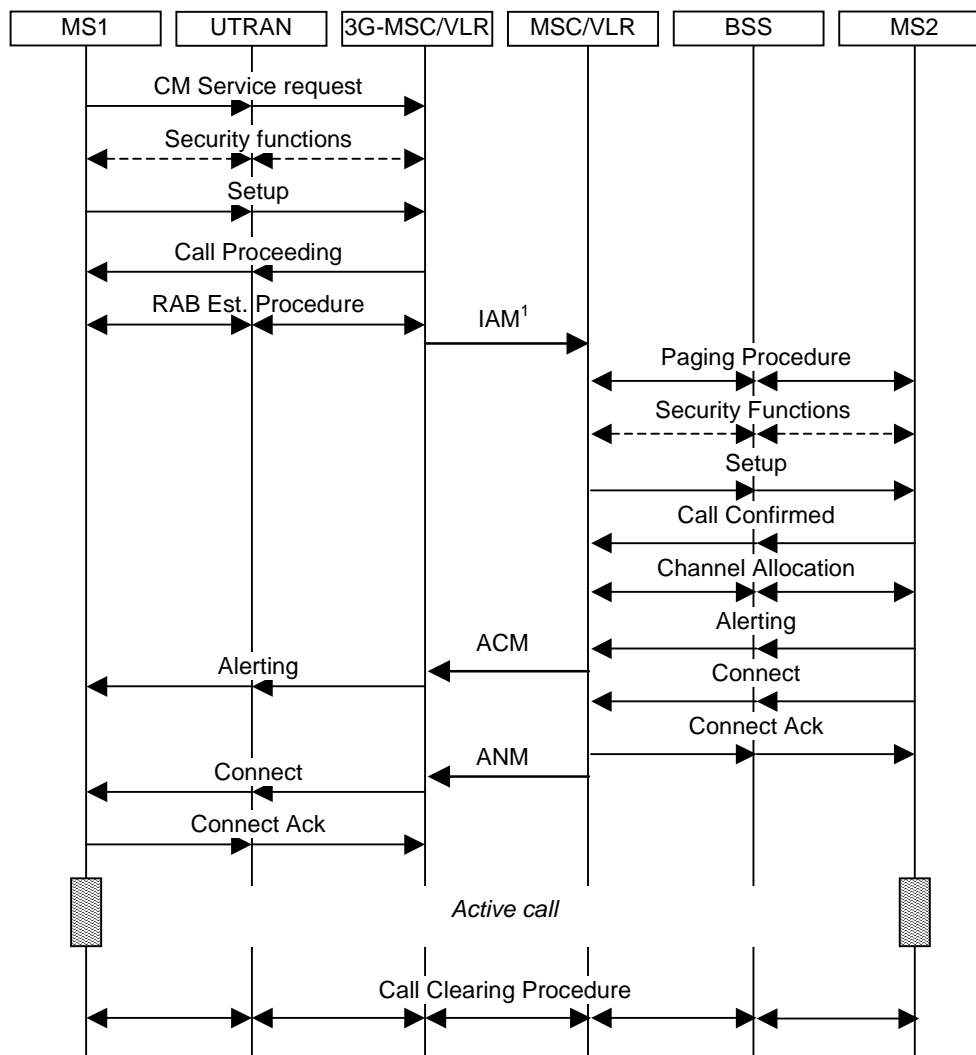
PRIORITY: A

DESCRIPTION/PROCEDURE:

1. Check that COLP is provisioned to the MS1 (calling party) carrying out an interrogation procedure.
2. Carry out a call from MS1 to MS2.
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 messages:

Connect(by MS2): Connected subaddress;

Connect(to MS1): connected number (SI=NP, LI, PI=allowed), Connected

subaddress.

3. Check that the line identity of the connected party is received by the calling party and that the call is successful.

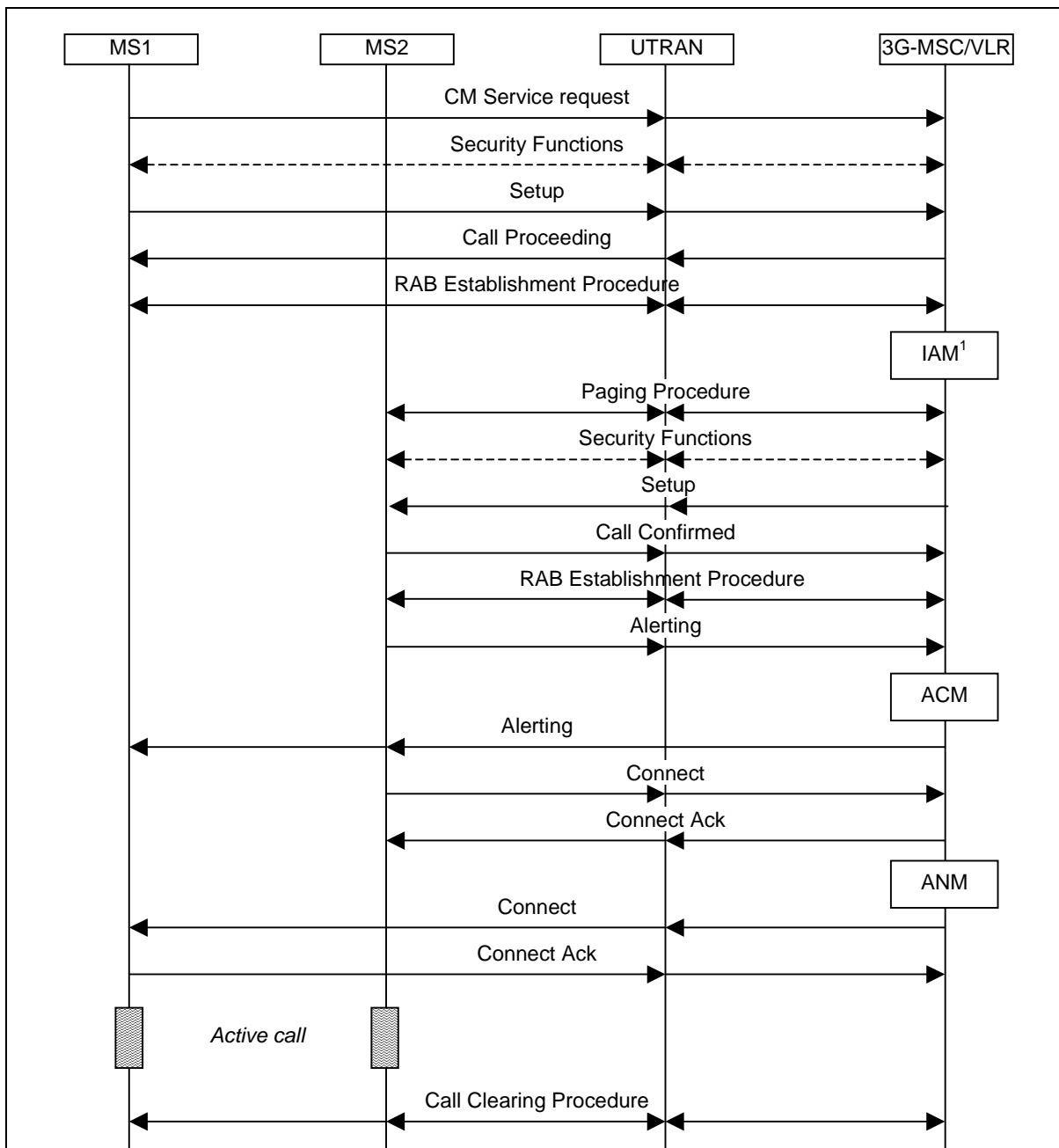
NOTES:

The connected subaddress is delivered to the calling user when it is provisioned to the called user.

¹ In the diagram is not reported the possible message exchange between the GMSC and the HLR in the GSM network.

REFERENCES: [1] §9.3.5; [9] §3; [10] §3.

| | |
|---|---|
| <i>Supplementary Services and SMS – Line Identification</i> | |
| SS_LI_124: COLR IN A CALL BETWEEN UMTS USERS | |
| OBJECTIVE: | This test aims to demonstrate completion of a call between two UMTS users when the supplementary service COLR is provisioned to the terminating party. |
| INTERFACES: | IuCS. |
| PRECONDITIONS: | 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. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <ol style="list-style-type: none">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. |
| EXPECTED RESULTS: | <ol style="list-style-type: none">1. The message exchange to check is as follows: |



2. Check the following fields in the message:

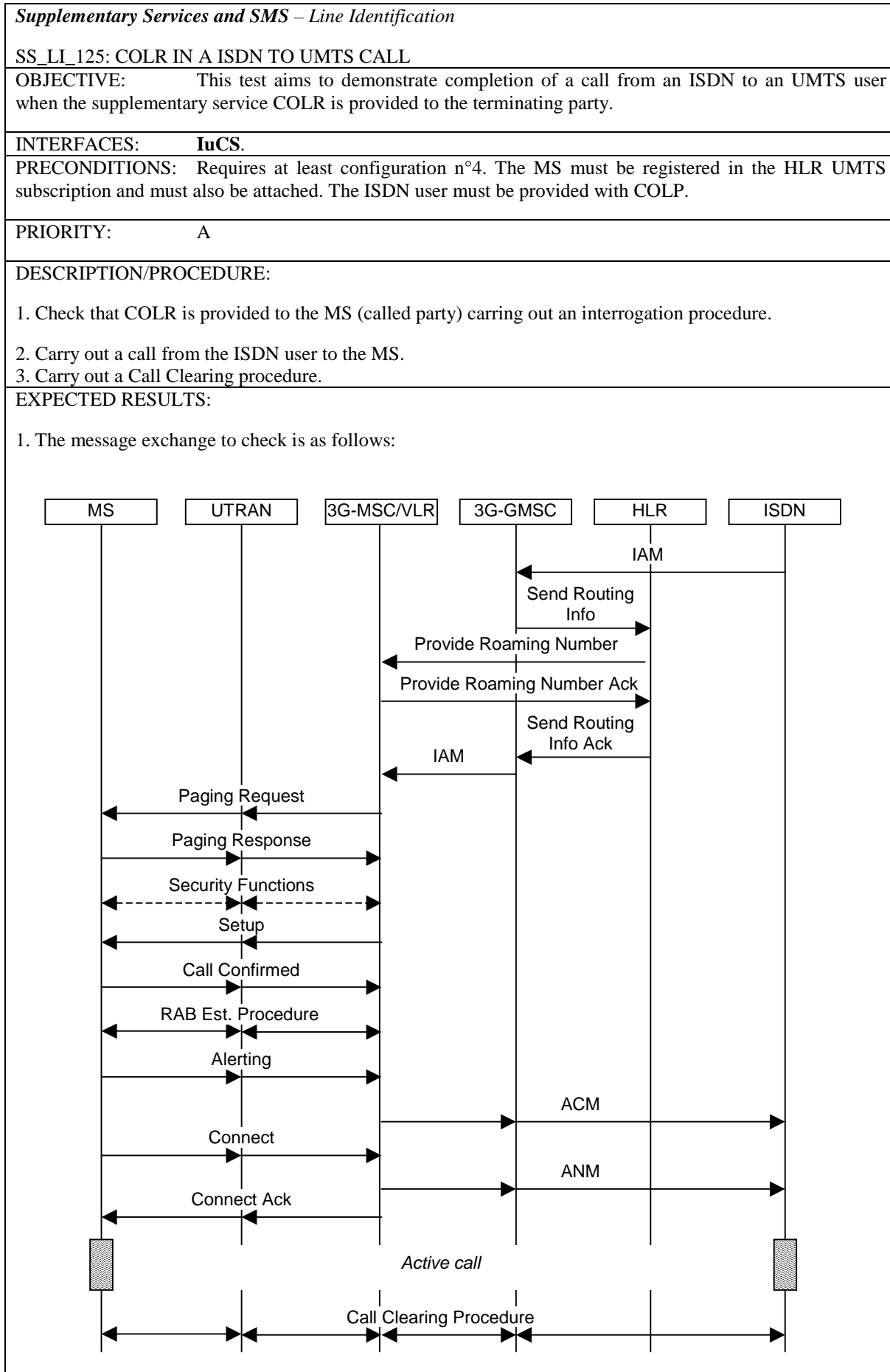
Connect(to MS1): Connected number (SI=NP, PI=restricted).

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

NOTES:

¹. If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSC take place.

REFERENCES: [1] §9.3.5; [9] §4; [10] §4.



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.

NOTES:

REFERENCES: [1] §9.3.5; [9] §4; [10] §4.

| | |
|---|--|
| <i>Supplementary Services and SMS – Line Identification</i> | |
| SS_LI_126: COLR IN A GSM TO UMTS CALL | |
| OBJECTIVE: | This test aims to demonstrate completion of a call from a GSM to an UMTS user when the supplementary service COLR is provisioned to the terminating party. |
| INTERFACES: | IuCS. |
| PRECONDITIONS: | Requires at least configuration n°5. The MS1 and MS2 must be registered in the HLR respectively with GSM and UMTS subscription and must also be attached. The GSM user must be provided with COLP. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 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. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: | |
| | |
| <ol style="list-style-type: none"> 2. Check the following fields in the message: Connect(to MS1): connected number (SI=NP, PI=restricted). | |

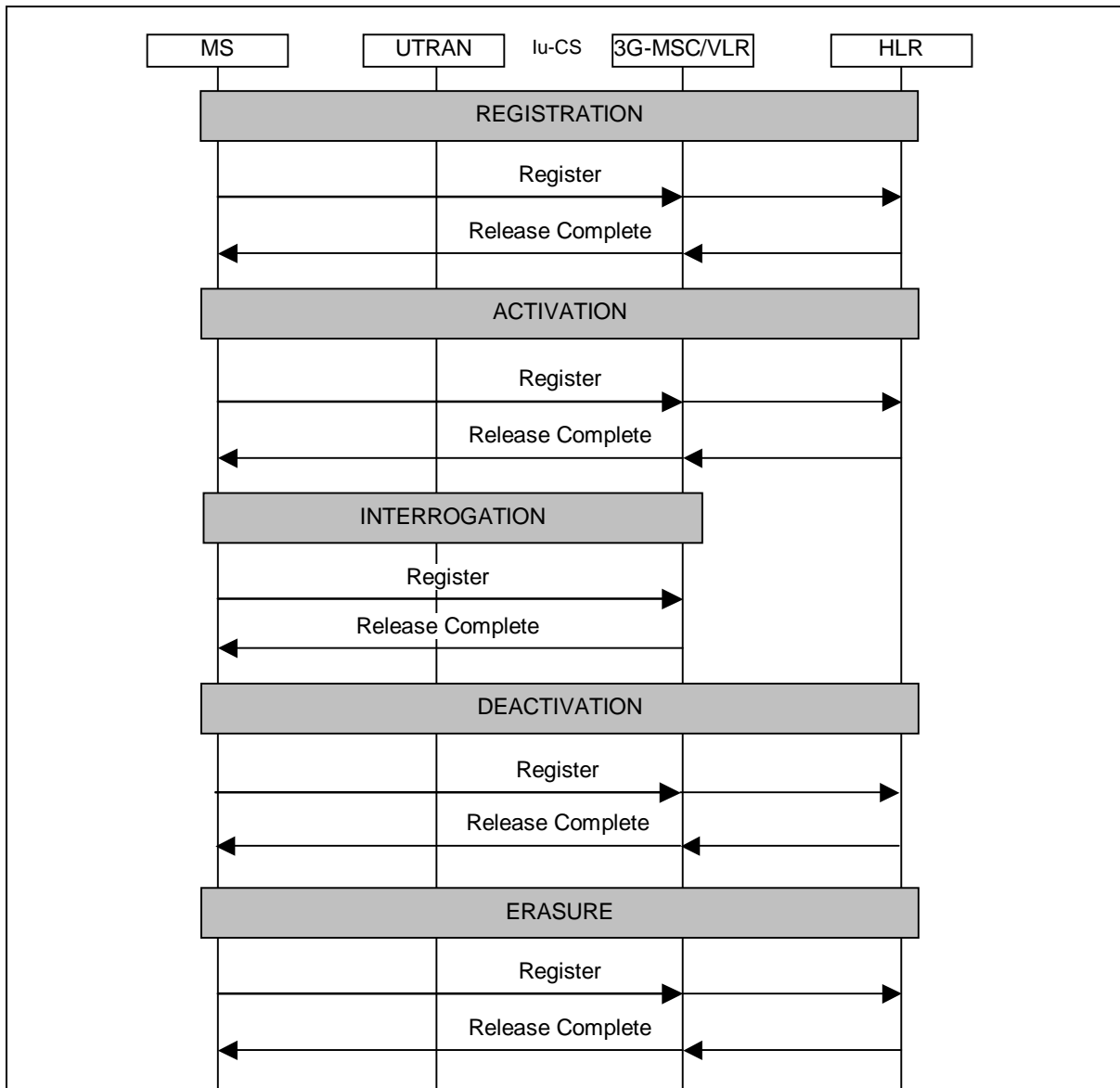
3. Check that the line identity of the connected party is not received by the calling party and that the call is successful.

NOTES:

¹ In the diagram is not reported the possible message exchange between the GMSC and the HLR in the UMTS network.

REFERENCES: [1] §9.3.5; [9] §4; [10] §4.

| | |
|--|--|
| <i>Supplementary Services and SMS – Call Forwarding</i> | |
| SS_CF_201: PROCEDURE FOR CF SUPPLEMENTARY SERVICES | |
| OBJECTIVE: | This test aims to demonstrate completion of registration, activation, interrogation, deactivation and erasure procedure for CF supplementary services. |
| INTERFACES: | IuCS, D. |
| 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 each CF supplementary service (i.e. CFU, CFB, CFNRy, CFNRc): | |
| <ol style="list-style-type: none"> 1. Registration; 2. Activation; 3. Interrogation; 4. Deactivation; 5. Erasure. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: | |



2. Check the following fields in the messages:

Registration

Register: Facility(Invoke = RegisterSS(SS-Code¹, ForwardedToNumber, NoReplayConditionTime²));

Release Complete: Facility(ReturnResult = RegisterSS (SS-Status, ForwardedToNumber));

After the registration procedure check that the following informations are registered in the network:

- the forwarder to number;
- information about calls (basic service group) that should be forwarded;

Activation

Register: Facility(Invoke = ActivateSS(SS-Code));

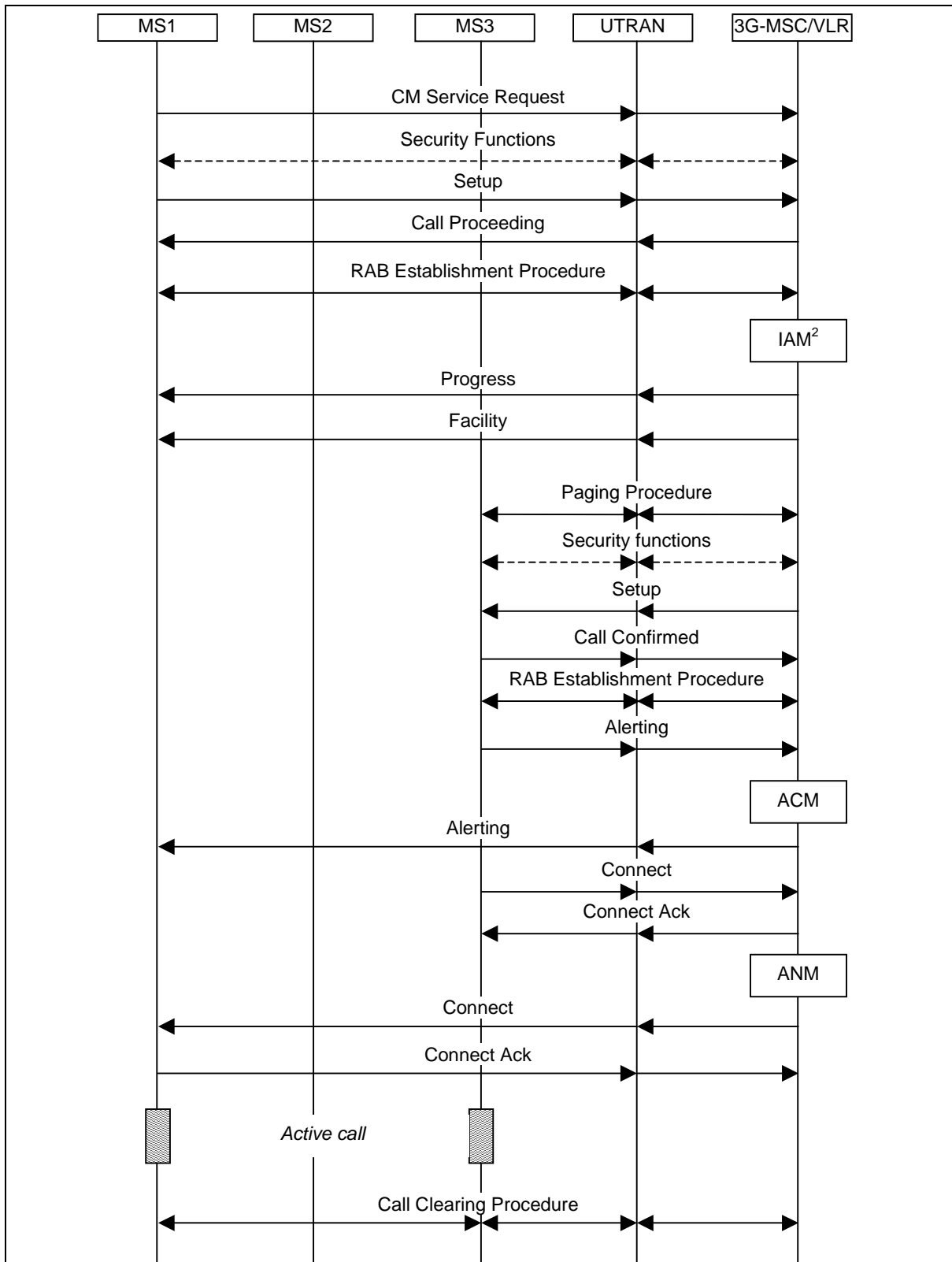
Release Complete: Facility(ReturnResult = ActivateSS(SS-Code, SS-Status));

Interrogation

Register: Facility(Invoke=InterrogateSS(SS-Code¹, ForwardToNumber, NoReplayConditionTime))

| | |
|---|---|
| <p>Deactivation</p> <p>Erasure</p> | <p>Release Complete: Facility(Return Result=InterrogateSS(SS-Status));</p> <p>Register: Facility(Invoke = DeactivateSS(SS-Code));</p> <p>Release Complete: Facility(ReturnResult = DeactivateSS(SS-Code, SS-Status));</p> <p>Register: Facility(Invoke = EraseSS(SS-Code));</p> <p>Release Complete: 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>NOTES:</p> <p>¹. The field SS-Code depends to the CF supplementary service that has to be tested (i.e. CFU, CFB, CFNRy, CFNRc).</p> <p>². The field "NoReplayConditionTime" is required only in case of CFNRy.</p> | |
| <p>REFERENCES: [11], [12].</p> | |

| | |
|---|---|
| <i>Supplementary Services and SMS – Call Forwarding</i> | |
| SS_CF_211: CFU IN A CALL BETWEEN UMTS USERS | |
| OBJECTIVE: | This test aims to demonstrate completion of a call between UMTS users when supplementary service CFU is activated to the called party. |
| INTERFACES: | IuCS. |
| PRECONDITIONS: | Requires at least configuration n°4 ¹ . The MS must be registered in the HLR with UMTS subscription and must also be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 1. Carry out a CFU registration/activation procedure by MS2 with MS3 as forwarded party. 2. Carry out an interrogation procedure by MS2 for CFU supplementary service. 3. Check that HLR shall store for MS2: <ul style="list-style-type: none"> • 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 CS call from MS1 to MS2. 5. Carry out a Call clearing procedure. 6. Carry out a CFU deactivation/erasure procedure by MS2. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 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.

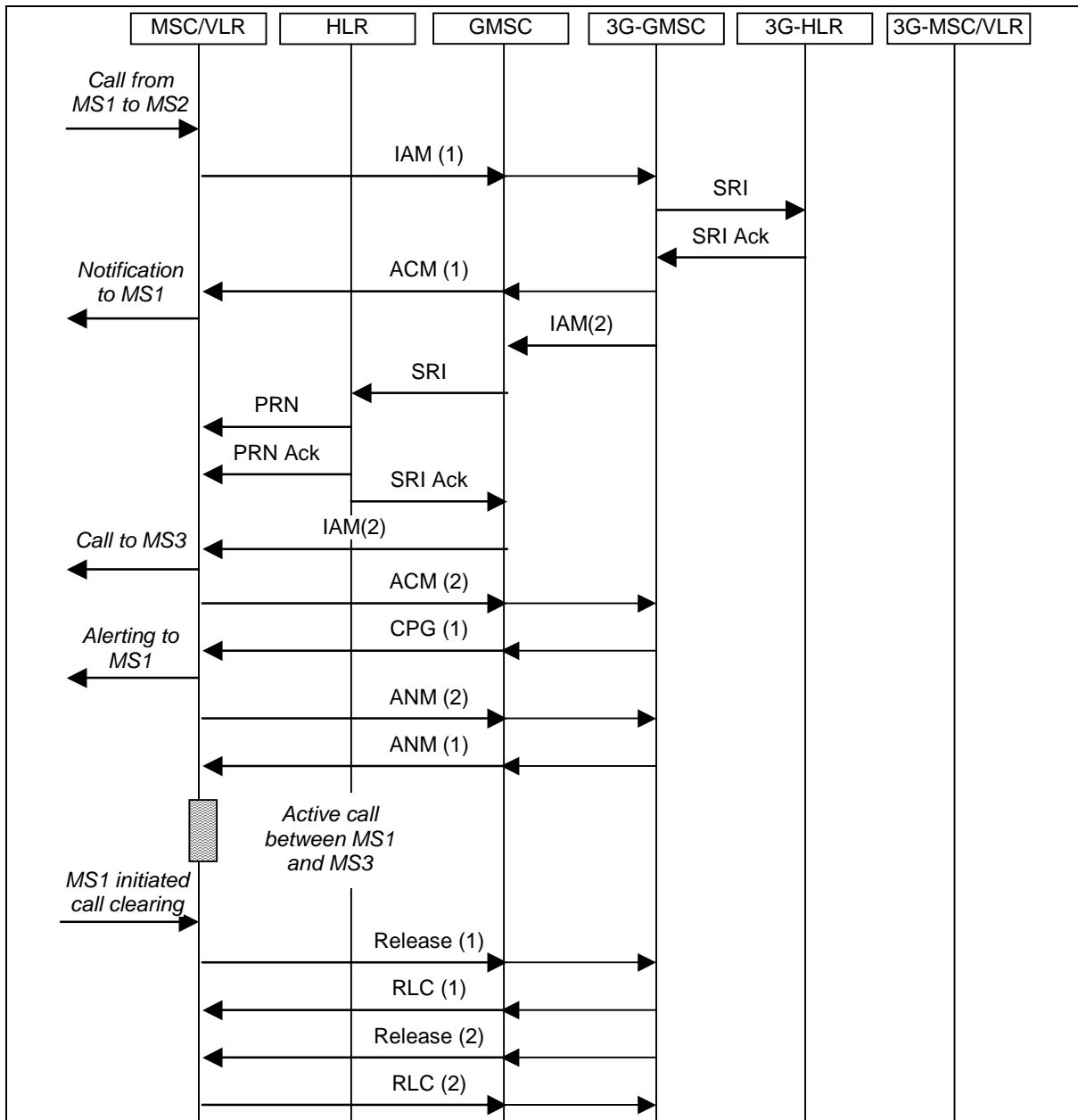
NOTES:

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

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

REFERENCES: [1] §9.3; [11] §1.

| | |
|---|--|
| <i>Supplementary Services and SMS – Call Forwarding</i> | |
| SS_CF_212: CFU IN A GSM TO UMTS CALL | |
| OBJECTIVE: | This test aims to demonstrate completion of a call from a GSM to an UMTS user when supplementary service CFU is activated from UMTS to GSM network. |
| INTERFACES: | IuCS, ISUP. |
| PRECONDITIONS: | Requires at least configuration n°4 ¹ . 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 the MS must be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <p>1. Carry out a CFU registration/activation procedure by MS2 with MS3 as forwarded party.</p> <p>2. Carry out a CFU interrogation procedure by MS2.</p> <p>3. Check that HLR shall store for MS2:</p> <ul style="list-style-type: none"> • the subscription option “notification to the calling party” with the value ‘ notification’; • the registration parameter “forward-to number” (MS3) for each basic service group; <p>4. Carry out a call from MS1 to MS2.</p> <p>5. Carry out a Call clearing procedure.</p> <p>6. Carry out a CFU deactivation/erasure procedure.</p> |
| EXPECTED RESULTS: | <p>1. The message exchange to check is as follows:</p> |



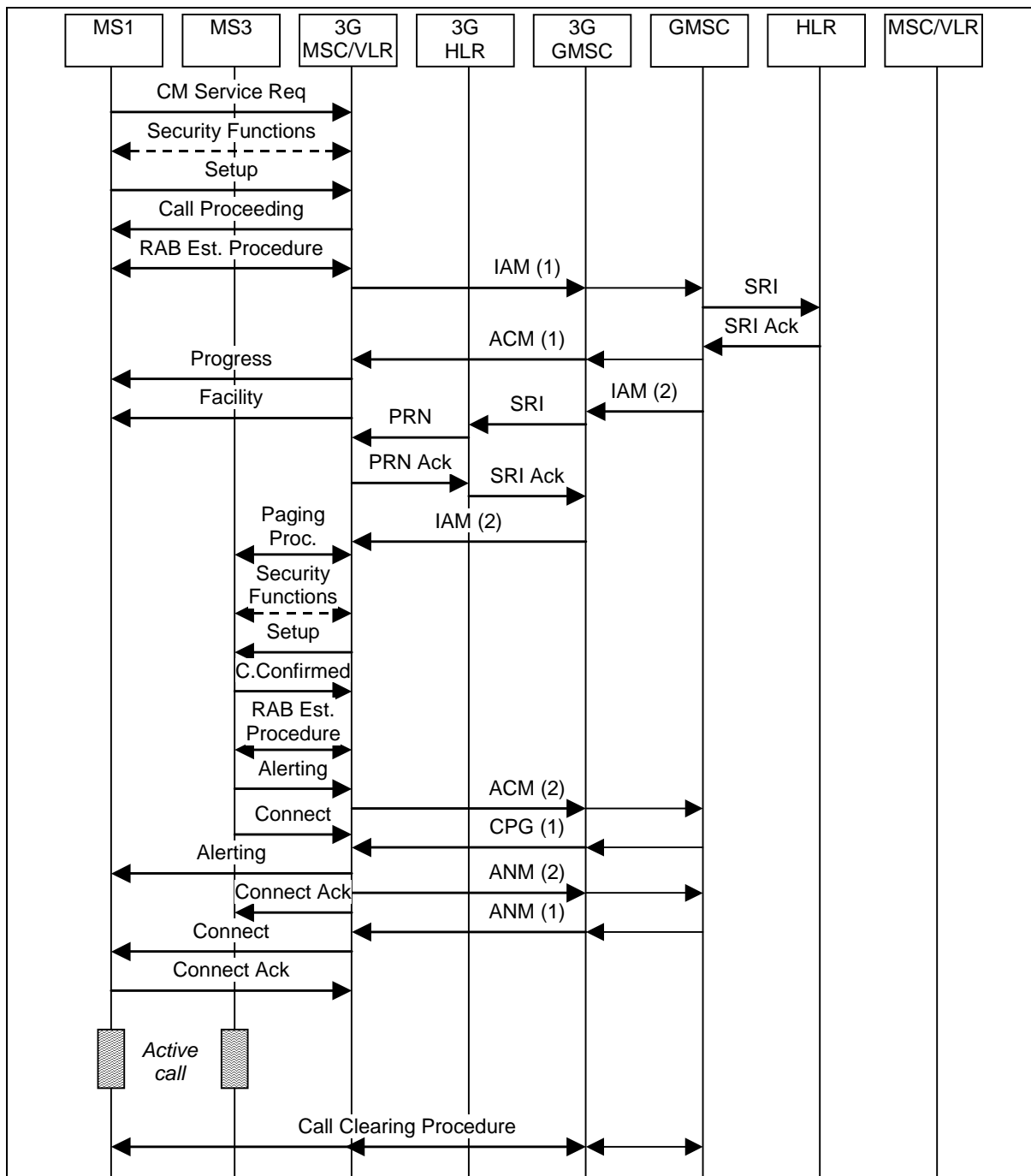
2. Check the following fields in the messages:
 - ACM(1):** Redirection number, Call diversion information, Generic Notification indicator;
 - CPG(1):** Event Information(Alerting).
3. Check that the call is forwarded to MS3 and that it is successfully completed.

NOTES:
¹. In this test are required at least three subscribers.
 REFERENCES: [11] §1; [20] §4.

| | |
|--|--|
| Supplementary Services and SMS – Call Forwarding | |
| SS_CF_213: CFU IN AN ISDN TO UMTS CALL | |
| OBJECTIVE: | This test aims to demonstrate completion of a call from an ISDN to an UMTS user when supplementary service CFU is activated from UMTS to ISDN network. |
| INTERFACES: | IuCS, ISUP. |
| PRECONDITIONS: | Requires at least configuration n°4 ¹ . The MS2 must be registered in the HLR with UMTS subscription and must also be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 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"> • the subscription option “notification to the calling party” with the value ‘ notification’; • the registration parameter “forward-to number” (user3) for each basic service group; 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. | |
| EXPECTED RESULTS: | |
| 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->>GMSC: IAM(1) GMSC->>HLR: SRI HLR->>GMSC: SRI Ack GMSC->>ISDN: ACM (1) Note over ISDN: Notification to user1 Note over ISDN: Call to user3 ISDN->>GMSC: IAM (2) GMSC->>HLR: ACM (2) HLR->>ISDN: CPG (1) Note over ISDN: Alerting to user1 ISDN->>GMSC: ANM (2) GMSC->>HLR: ANM (1) Note over ISDN: Active call between ISDN users Note over GMSC, HLR: Call Clearing Procedure </pre> | |

| |
|--|
| <p>2. Check the following fields in the messages:</p> <p style="padding-left: 40px;">ACM(1): Redirection Number, Call Diversion Information, Generic notification indicator;</p> <p style="padding-left: 40px;">CPG(1): Event Information(Alerting).</p> <p>3. Check that the call redirection is notified to the calling side (user1).</p> <p>4. Check that the call is forwarded to user3 and that it is successfully completed.</p> |
| <p>NOTES:</p> <p>¹. In this test are required at least three subscribers.</p> |
| <p>REFERENCES: [11] §1, [20] §4.</p> |

| | |
|---|--|
| <i>Supplementary Services and SMS – Call Forwarding</i> | |
| SS_CF_214: CFU IN A UMTS TO GSM CALL | |
| OBJECTIVE: | This test aims to demonstrate completion of a call from an UMTS user (MS1) to a GSM user (MS2) when supplementary service CFU is activated toward another UMTS user (MS3). |
| INTERFACES: | IuCS, ISUP. |
| PRECONDITIONS: | Requires at least configuration n°5 ¹ . The MS2 must be registered in the HLR with GSM subscription, instead the MS1 and MS3 must be registered in the HLR with UMTS subscription. All the MS must be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <ol style="list-style-type: none"> 1. Ensure that the CFU supplementary service is activated for MS2 with the subscription option “notification to the calling party”=‘ notification’; 2. Carry out a call from MS1 to MS2. 3. Carry out a Call clearing procedure. |
| EXPECTED RESULTS: | <ol style="list-style-type: none"> 1. The message exchange to check is as follows: |



2. Check the following fields in the messages:

ACM(1): Redirection number, Call diversion information, Generic Notification indicator;

CPG(1): Event Information(Alerting).

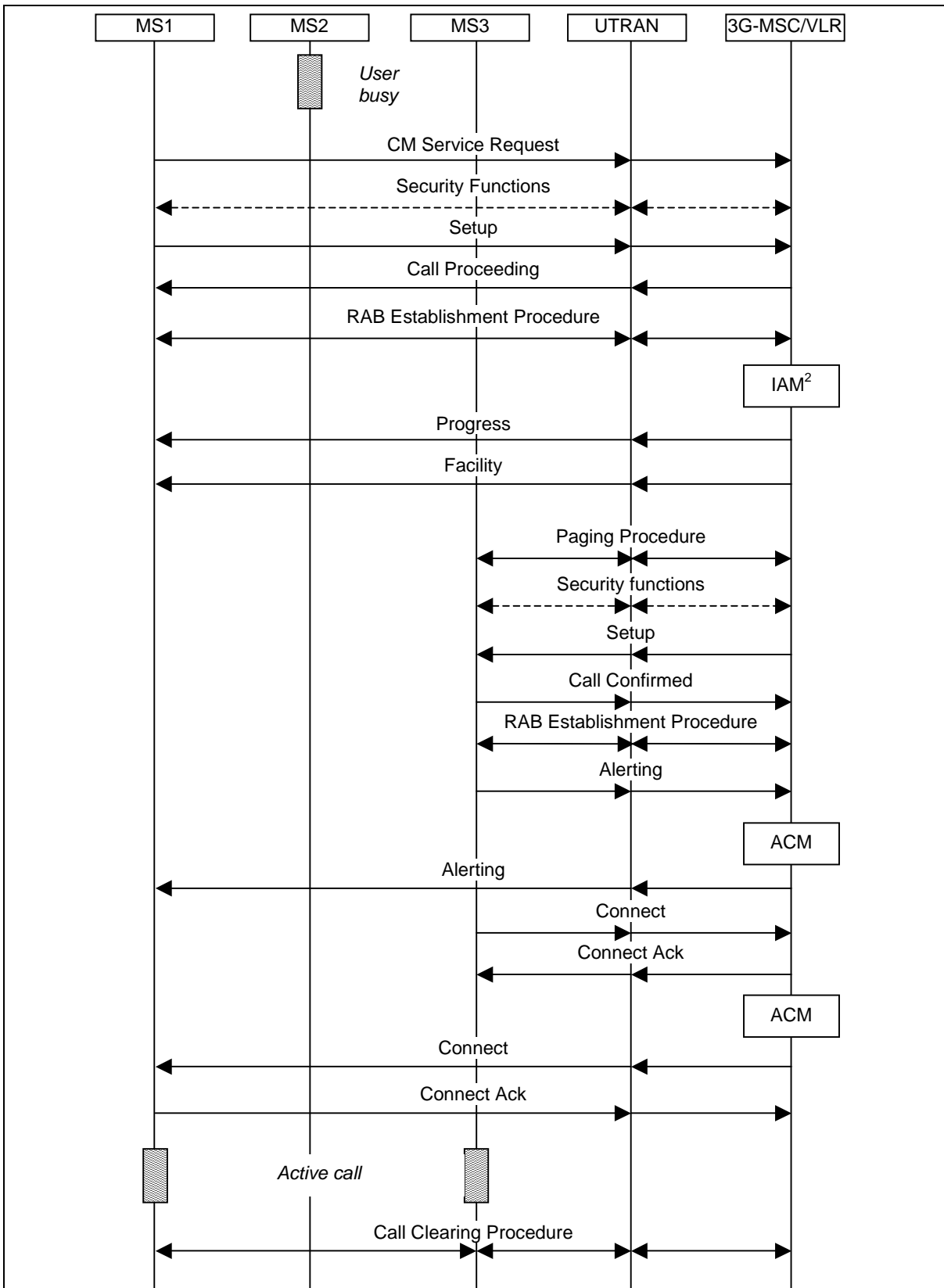
3. Check that the call is forwarded to MS3 and that it is successfully completed.

NOTES:

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

REFERENCES: [11] §1; [20] §4.

| | |
|---|---|
| <i>Supplementary Services and SMS – Call Forwarding</i> | |
| SS_CF_221: CFB WITH NDUB IN A CALL BETWEEN UMTS USERS | |
| OBJECTIVE: | 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. |
| INTERFACES: | IuCS. |
| PRECONDITIONS: | Requires at least configuration n°4 ¹ . The MS must be registered in the HLR with UMTS subscription and must also be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 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 CS call. 5. Carry out a 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. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 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.

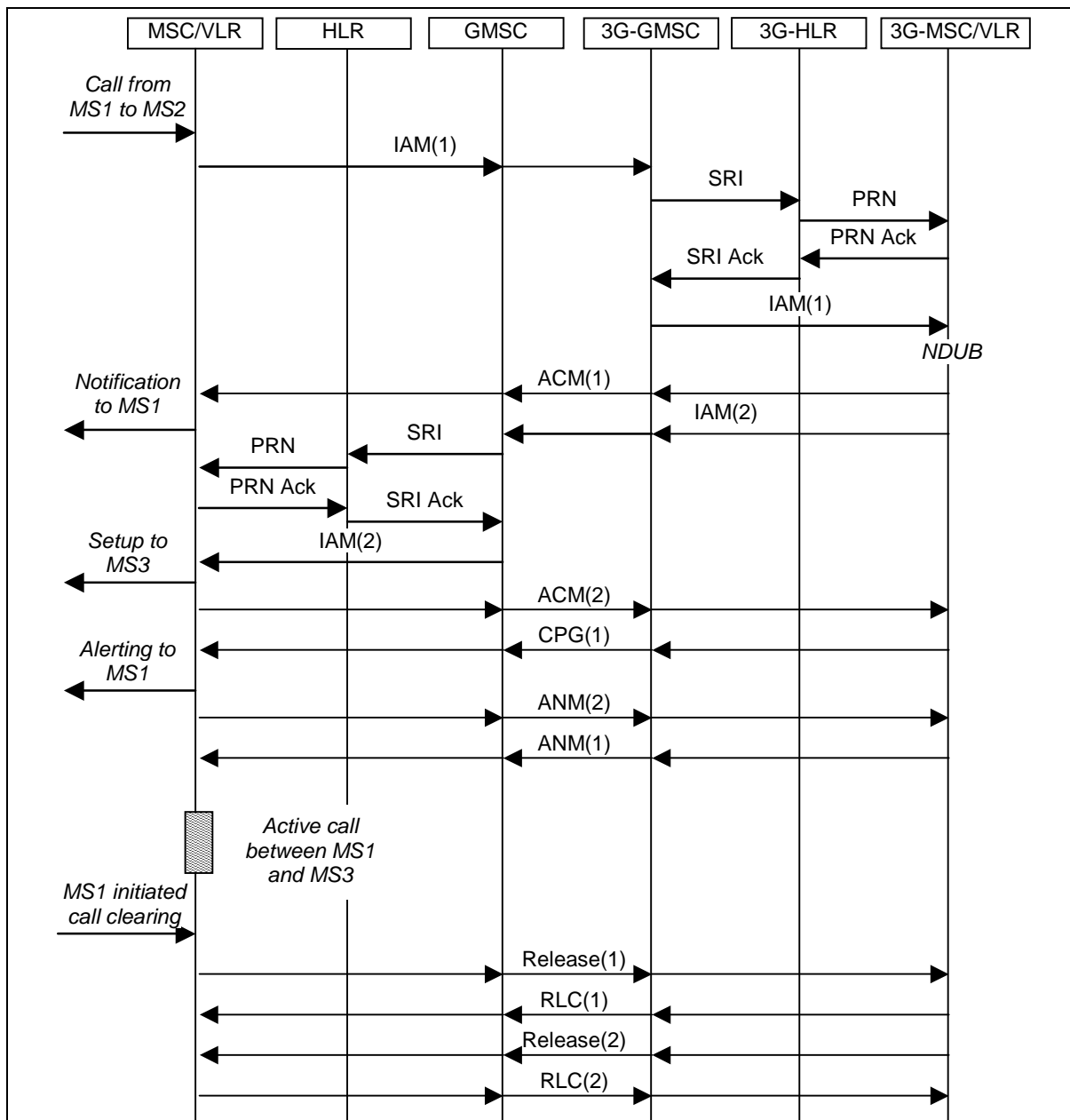
NOTES:

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

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

REFERENCES: [1] §9.3; [11] §2.

| | |
|---|---|
| <i>Supplementary Services and SMS – Call Forwarding</i> | |
| SS_CF_222: CFB WITH NDUB IN A GSM TO UMTS CALL | |
| OBJECTIVE: | This test aims to demonstrate completion of a call from a GSM to an UMTS user when supplementary service CFB, with network determined user busy, is activated to the called party. |
| INTERFACES: | IuCS, ISUP. |
| PRECONDITIONS: | Requires at least configuration n°4 ¹ . The MS1 and MS3 must be registered in the HLR with GSM subscription; instead the MS2 must be registered with UMTS subscription. All the MS must be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 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. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: | |



2. Check the following fields in the messages:

ACM(1): Redirection number, Call diversion information, Generic Notification indicator;

CPG(1): Event Information(Alerting).

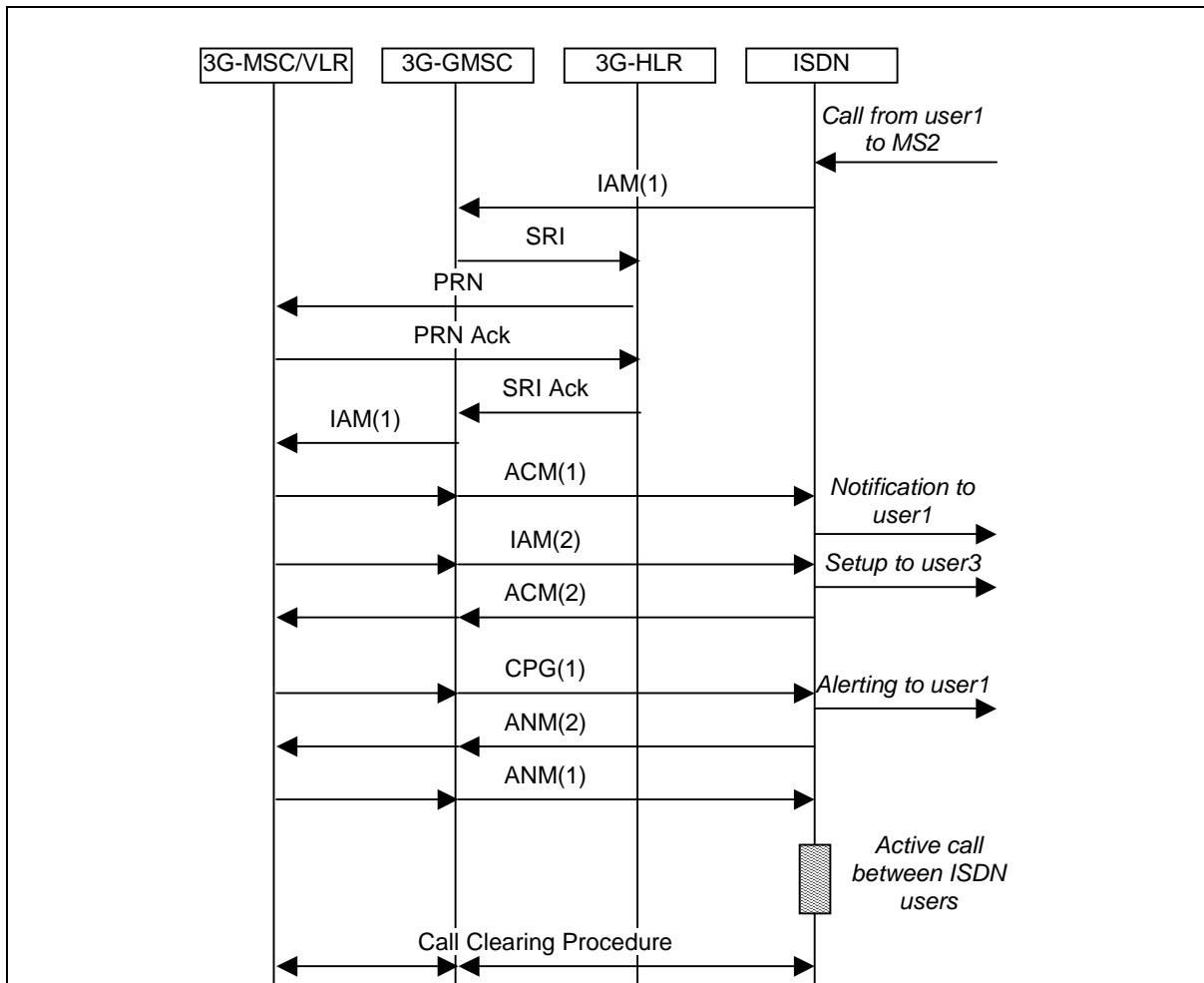
3. Check that the call is forwarded to MS3 and that the call is successfully completed.

NOTES:

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

REFERENCES: [11] §2, [20] §4.

| | |
|--|--|
| <i>Supplementary Services and SMS – Call Forwarding</i> | |
| SS_CF_223: CFB WITH NDUB IN A ISDN TO UMTS CALL | |
| OBJECTIVE: | 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. |
| INTERFACES: | IuCS, ISUP. |
| PRECONDITIONS: | Requires at least configuration n°4 ¹ . The MS2 must be registered in the HLR with UMTS subscription and must also be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 1. Carry out a CFB registration/activation procedure by MS2 with user3 as forwarded party. 2. Carry out a CFB interrogation procedure by MS2. 3. Check that HLR shall store for MS2: <ul style="list-style-type: none"> • the subscription option “notification to the calling party” with the value ‘ notification’; • the subscription option “notification to the forwarding party” with the value ‘ notification’; • the registration parameter “forward-to number” (user3) for each basic service group; 4. Involve MS2 in a CS call. 5. Carry out a CS call from user1 to MS2(busy). 6. Carry out a Call clearing procedure. 7. Clearing the call in which MS2 is involved. 8. Carry out a CFB deactivation/erasure procedure by MS2. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: | |



2. Check the following fields in the messages:

ACM(1): Redirection Number, Call Diversion Information, Generic notification indicator;

CPG(1): Event Information(Alerting).

3. Check that the call redirection is notified to the calling side (user1).

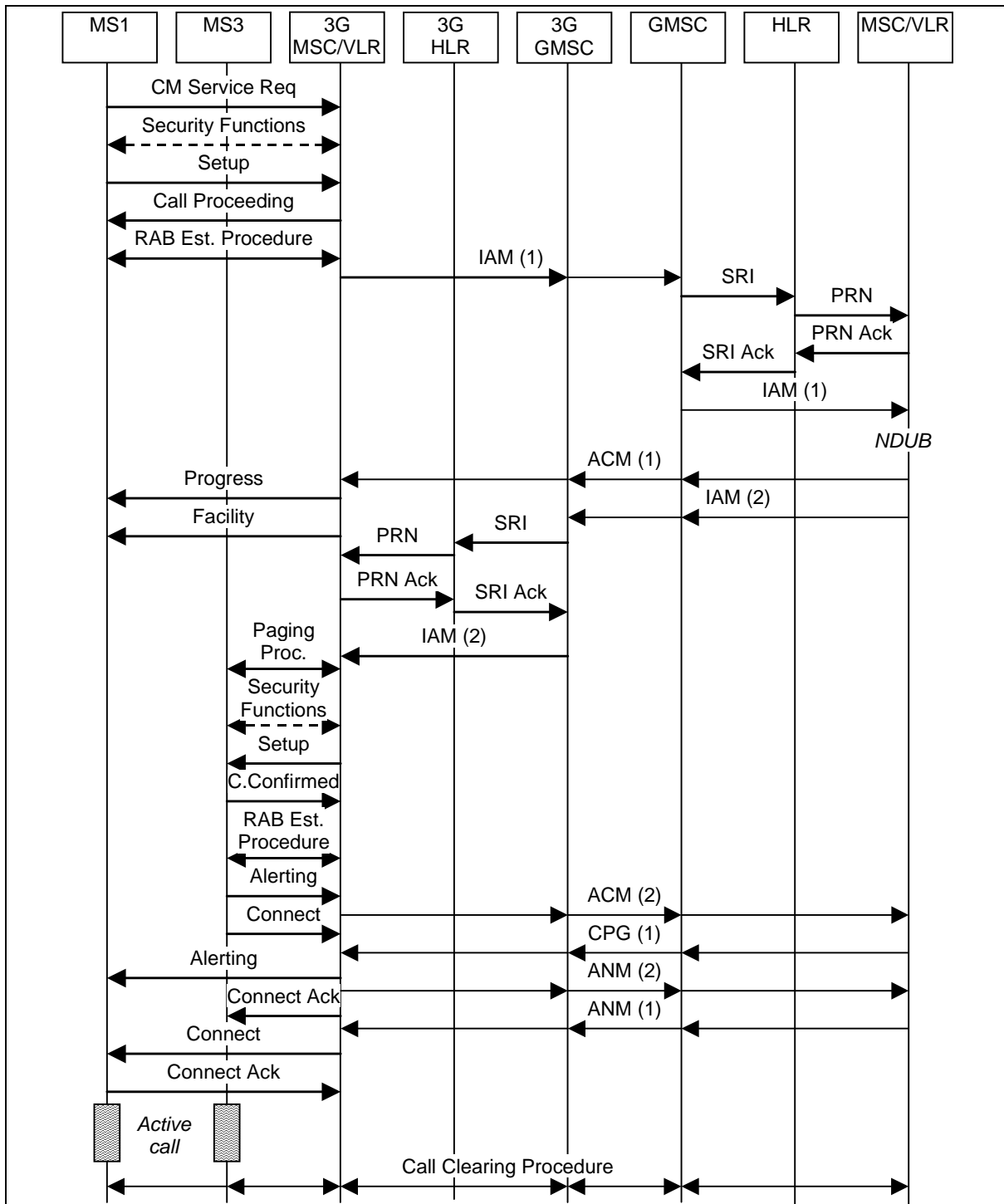
4. Check that the call is forwarded to user3 and that the call is successfully completed.

NOTES:

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

REFERENCES: [11] §2, [20] §4.

| | |
|---|--|
| <i>Supplementary Services and SMS – Call Forwarding</i> | |
| SS_CF_224: CFB WITH NDUB IN A UMTS TO GSM CALL | |
| OBJECTIVE: | This test aims to demonstrate completion of a call from an 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 an UMTS user (MS3). |
| INTERFACES: | InCS, ISUP. |
| PRECONDITIONS: | Requires at least configuration n°5 ¹ . The MS1 and MS3 must be registered in the HLR with UMTS subscription; instead the MS2 must be registered with GSM subscription. All the MS must be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <p>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’.</p> <p>2. Involve MS2 in a call.</p> <p>3. Carry out a CS call from MS1 to MS2 (while it’s busy).</p> <p>4. Carry out a Call clearing procedure by MS1.</p> |
| EXPECTED RESULTS: | <p>1. The message exchange to check is as follows:</p> |

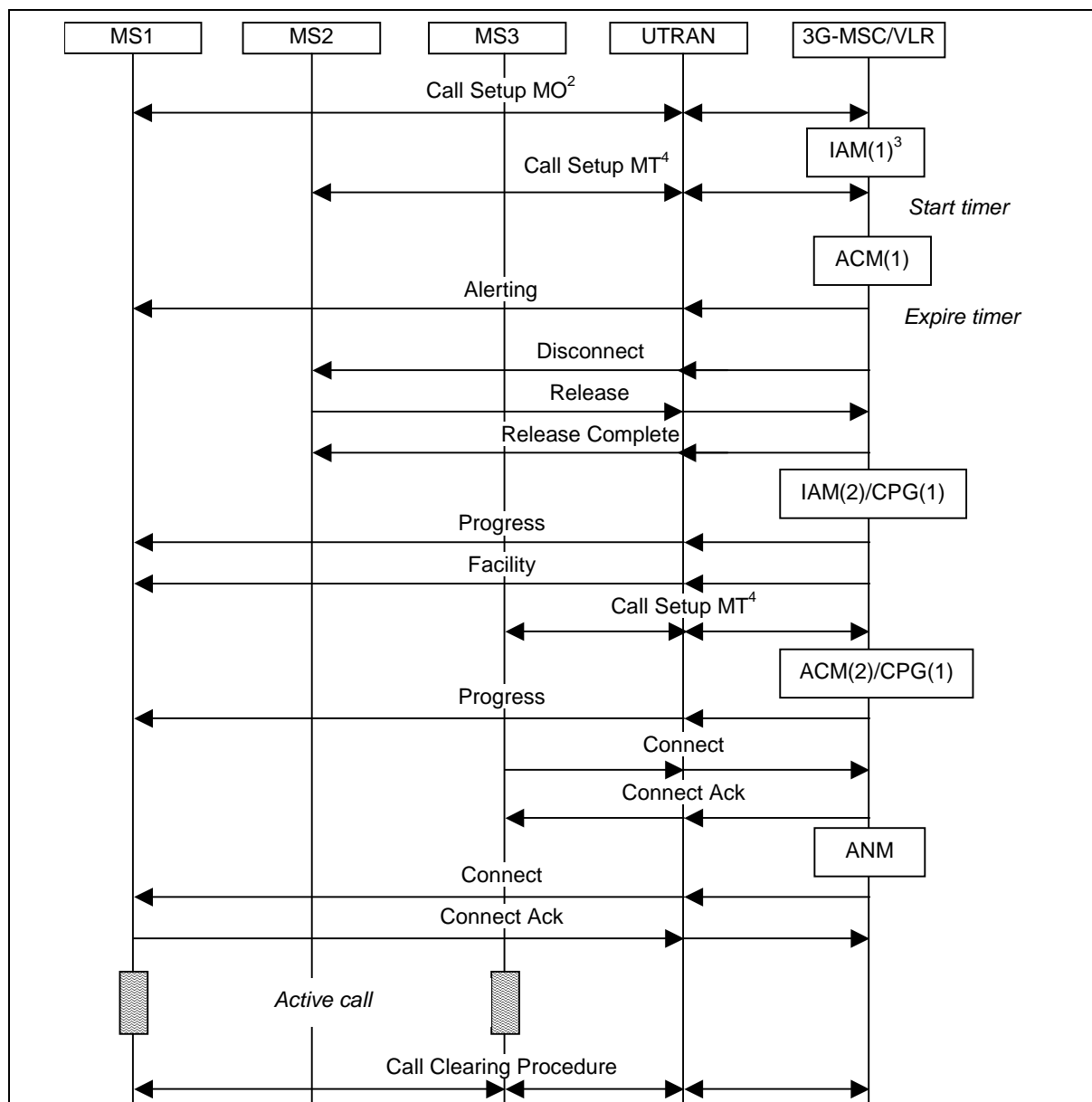


- 2. Check the following fields in the messages:
ACM(1): Redirection number, Call diversion information, Generic Notification indicator;
CPG(1): Event Information(Alerting).
- 3. Check that the call is forwarded to MS3 and that it is successfully completed.

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

REFERENCES: [11] §2; [20] §4.

| | |
|---|---|
| <i>Supplementary Services and SMS – Call Forwarding</i> | |
| SS_CF_231: CFNRy IN AN UMTS TO UMTS CALL | |
| OBJECTIVE: | This test aims to demonstrate completion of a call between UMTS users when supplementary service CFNRy is activated to the called party. |
| INTERFACES: | IuCS. |
| PRECONDITIONS: | Requires at least configuration n°4 ¹ . The MS must be registered in the HLR with UMTS subscription and must also be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 1. Carry out a CFNRy registration/activation procedure by MS2 with MS3 as forwarded party, and with the no replay condition timer of 10 sec. 2. Carry out a CFNRy interrogation procedure by MS2. 3. Check that HLR shall store for MS2: <ul style="list-style-type: none"> • the subscription option “notification to the calling party” with the value ‘ notification’; • the registration parameter “forward-to number” (MS3) for each basic service group; • the registration parameter “no replay condition timer” for each basic service group. 4. Carry out a CS call from MS1 to MS2. 5. Carry out a Call Clearing procedure by MS1. 6. Carry out a CFNRy deactivation/erasure procedure by MS2. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: | |



2. Check the following fields in the messages:

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

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

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

NOTES:

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

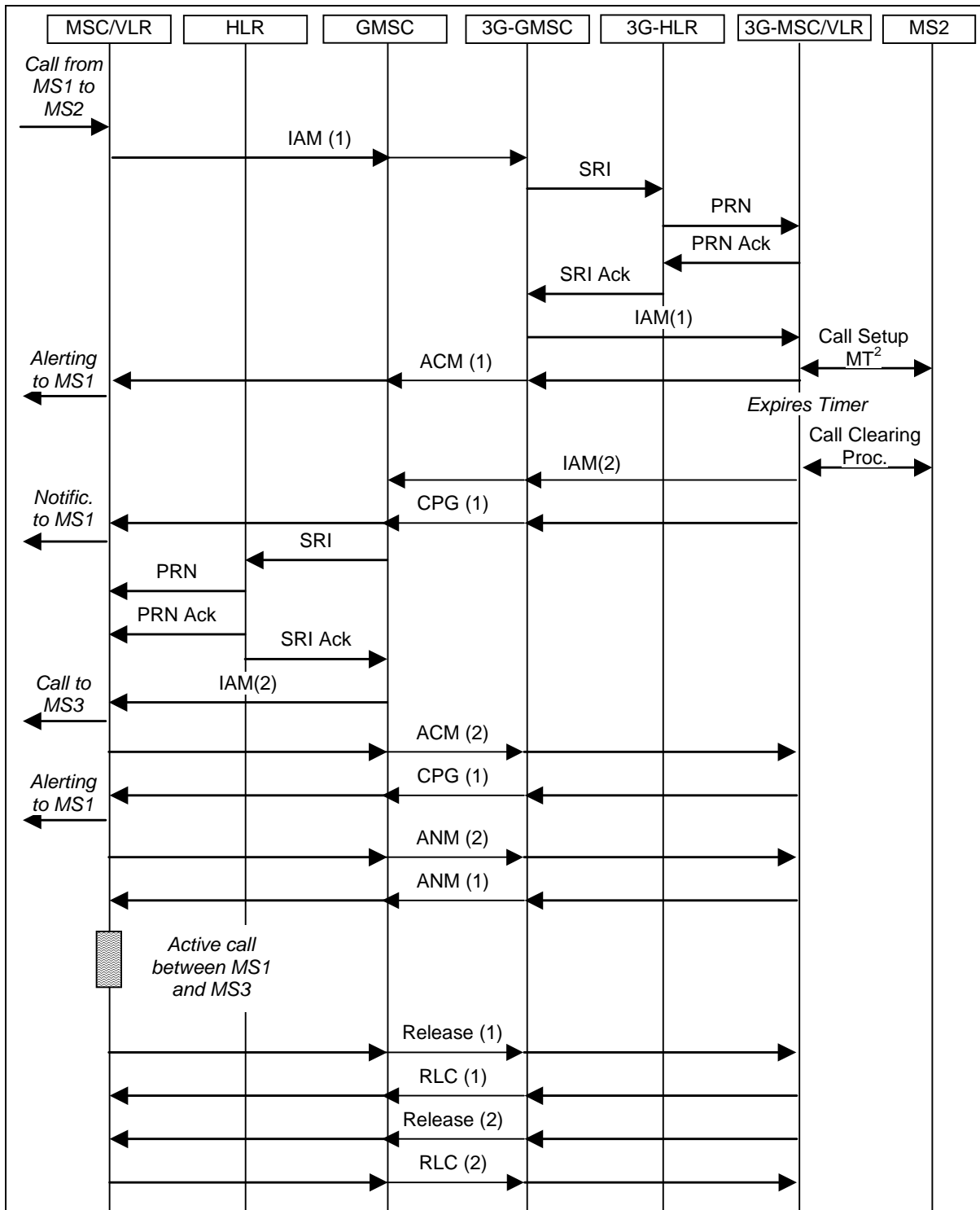
². In the Call Setup MO are included the following messages: CM Service Request, Setup, Call Proceeding, RAB Establishment Procedure messages and Alerting.

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

⁴. In the Call Setup MT are included the following messages: Paging Procedure messages, Setup, Call Confirmed, RAB Establishment Procedure messages and Alerting.

REFERENCES: [1] §9.3; [11] §3.

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

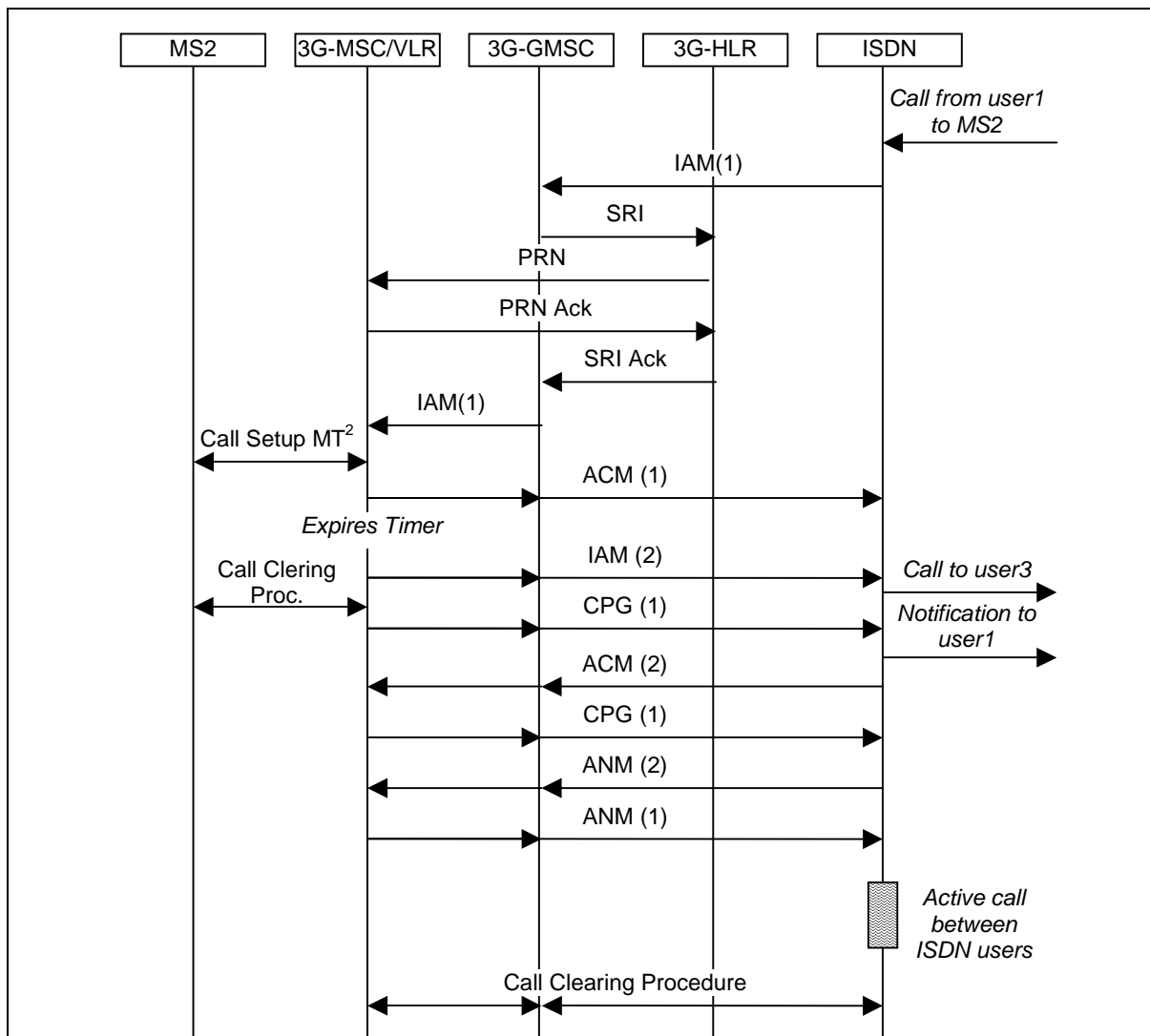
NOTES:

¹ In this test are required at least three subscribers.

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

REFERENCES: [11] §3, [20] §4.

| | |
|---|---|
| <i>Supplementary Services and SMS – Call Forwarding</i> | |
| 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 ¹ . The MS must be registered in the HLR with UMTS subscription, the MS must also be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 1. Carry out a CFNRy registration/activation procedure by MS2 with user3 as forwarded party, and with a no replay condition timer of 10 sec. 2. Carry out a CFNRy interrogation procedure by MS2. 3. Check that HLR shall store for MS2: <ul style="list-style-type: none"> • 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: | |
| <ol style="list-style-type: none"> 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.

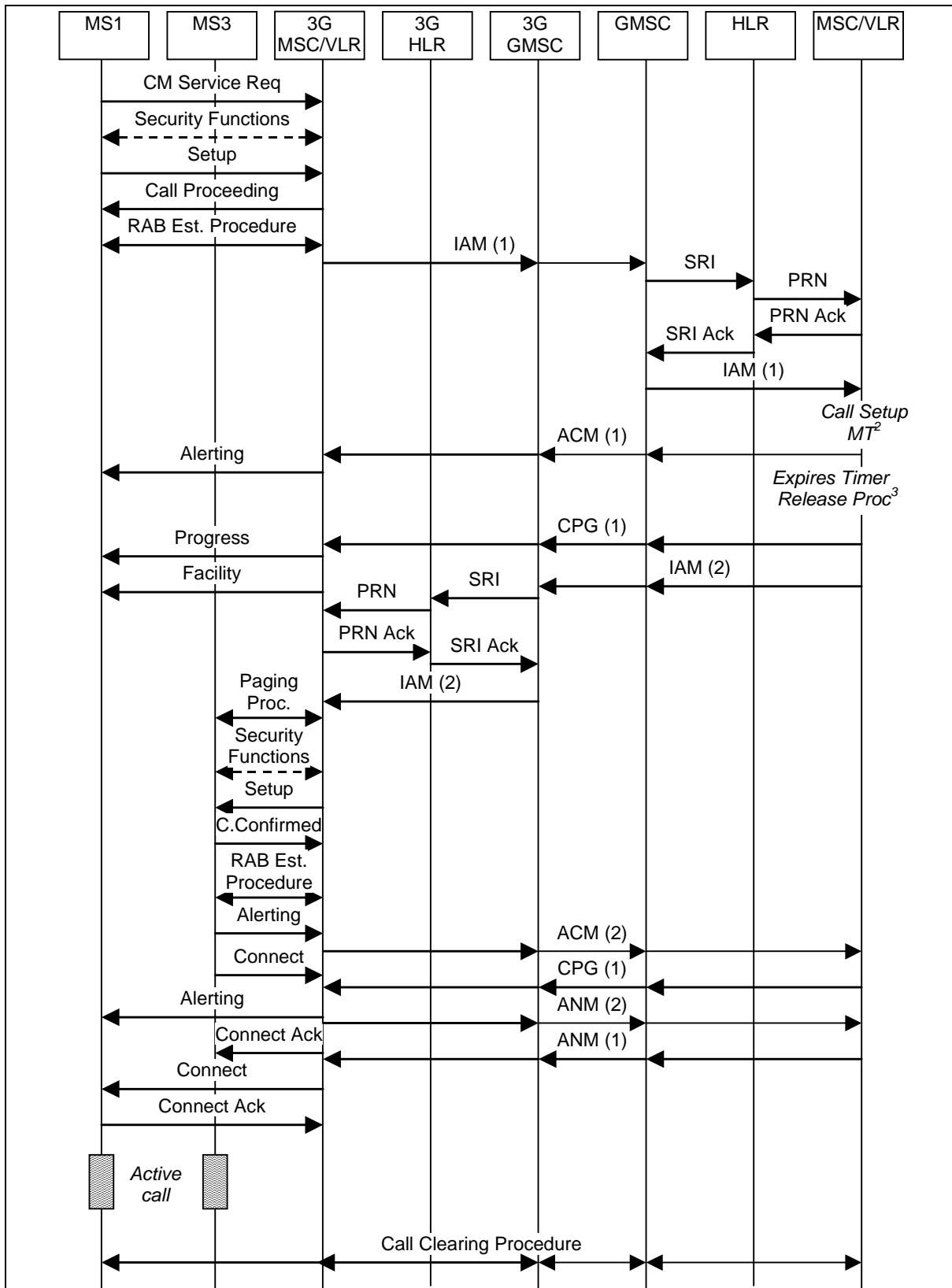
NOTES:

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

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

REFERENCES: [11] §3, [20] §4.

| | |
|---|--|
| <i>Supplementary Services and SMS – Call Forwarding</i> | |
| SS_CF_234: CFNRy IN A UMTS TO GSM CALL | |
| OBJECTIVE: | This test aims to demonstrate completion of an UMTS to GSM call when CFNRy supplementary service is activated to the called party. |
| INTERFACES: | IuCS, ISUP. |
| PRECONDITIONS: | Requires at least configuration n°5 ¹ . The MS1 and MS3 must be registered in the HLR with UMTS subscription, instead the MS2 must be registered with GSM subscription. All the MS must be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <p>1. Ensure that MS2 has activated the CFNRy supplementary service with MS3 as forwarded party, with a no replay condition timer of 10 sec, and with the subscription option “notification to the calling party”=‘notification’;</p> <p>2. Carry out a CS call from MS1 to MS2.</p> <p>3. Carry out a Call Clearing procedure by MS1.</p> |
| EXPECTED RESULTS: | <p>1. The message exchange to check is as follows:</p> |



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).

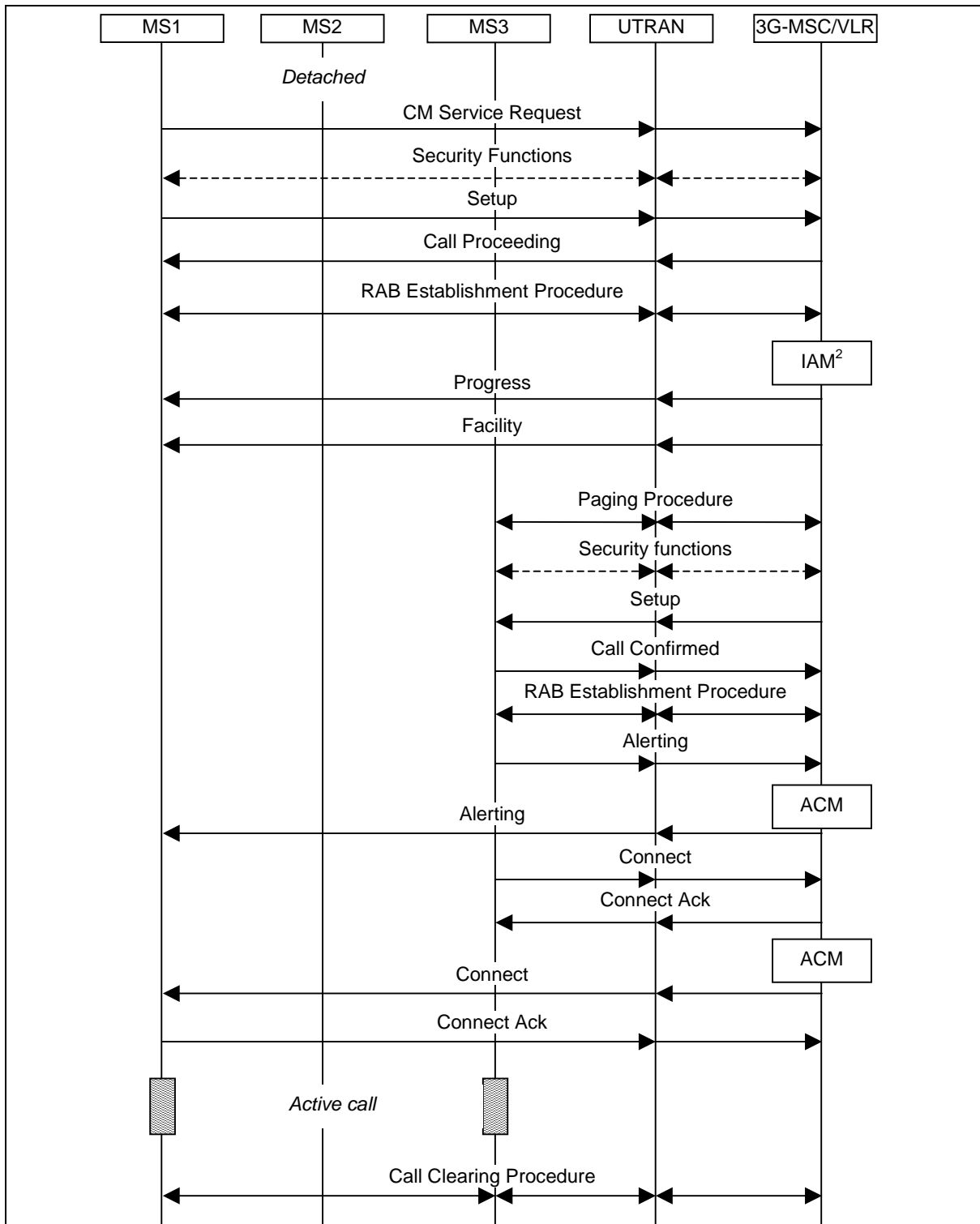
3. Check that the call is forwarded to MS3 and that it is successfully completed.

NOTES:

- ¹. In this test are required at least four subscribers.
- ². In the Call Setup MT are included the following messages: Paging Procedure messages, Security Functions messages, Setup, Call Confirmed, Channel Allocation messages and Alerting.
- ³. In the Release Procedure are included the following messages: Disconnect, Release and Release Complete.

REFERENCES: [11] §3; [20] §4.

| | |
|---|--|
| <i>Supplementary Services and SMS – Call Forwarding</i> | |
| SS_CF_241: CFNRc IN A CALL BETWEEN UMTS USERS | |
| OBJECTIVE: | This test aims to demonstrate completion of a call between UMTS users when the CFNRc supplementary service is activated to the called party. |
| INTERFACES: | IuCS. |
| PRECONDITIONS: | Requires at least configuration n°4 ¹ . The user must be registered in the HLR with UMTS subscription and must also be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 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: <ul style="list-style-type: none"> • 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: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: | |



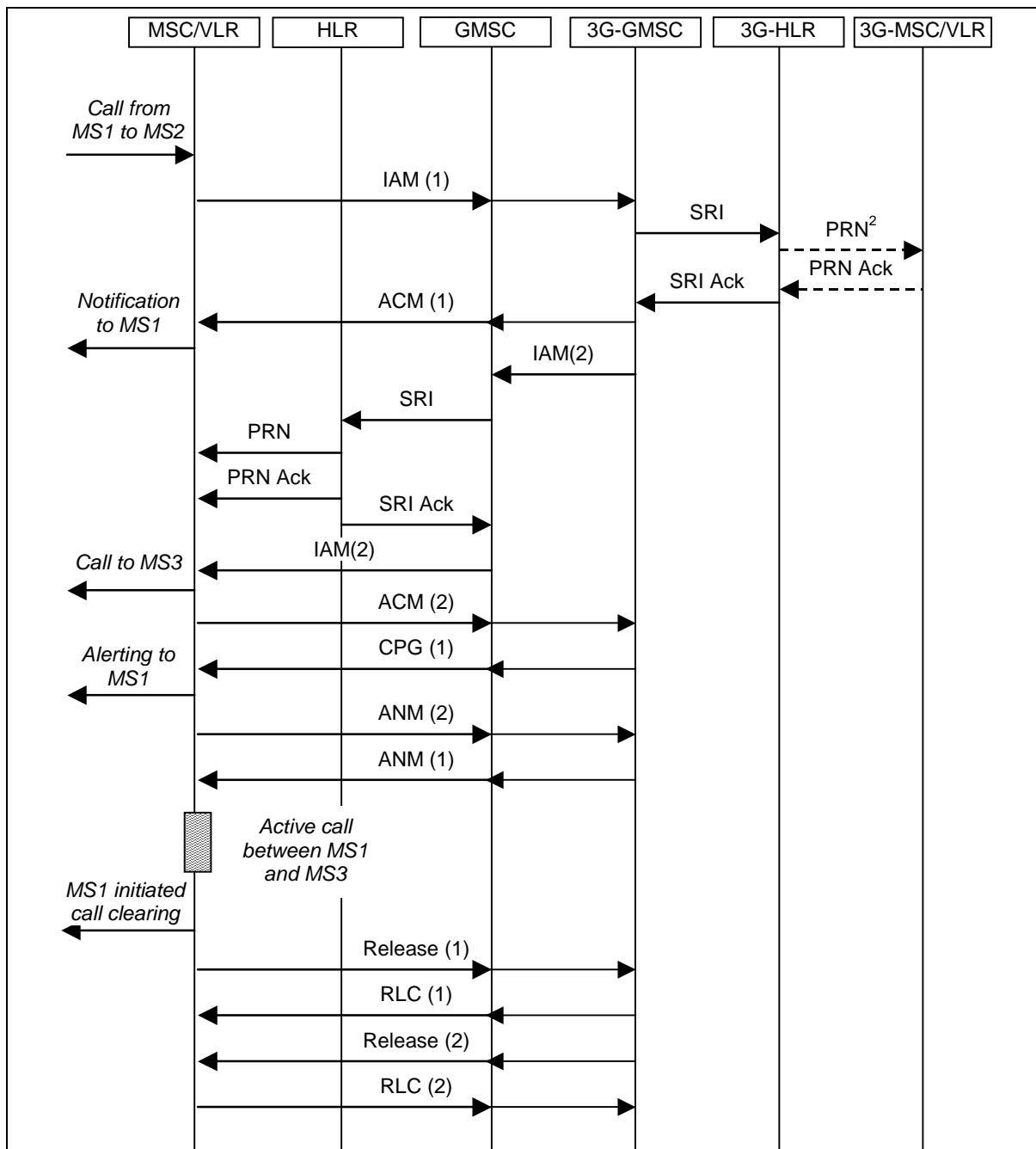
1. Check the following fields in the messages:
Setup (MT): Facility(Invoke=NotifySS(CFNRC, SS-Notification)), Redirecting party BCD number(SI, PI, LI);
Facility: Facility(Invoke=NotifySS(CFNRC, SS-Notification)).

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

NOTES:
¹. In this test are required at least three subscribers.
². If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSC take place.

REFERENCES: [1] §9.3; [11] §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 ¹ . The MS1 and MS3 must be registered in the HLR with GSM subscription, instead, the MS2 must be registered with UMTS subscription. All the MS must be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <p>1. Carry out a CFNRc registration/activation procedure by MS2 with MS3 as forwarded party.</p> <p>2. Carry out a CFNRc interrogation procedure by MS2.</p> <p>3. Check that HLR shall store for MS2:</p> <ul style="list-style-type: none"> • the subscription option “notification to the calling party” with the value ‘ notification’; • the registration parameter “forward-to number” (MS3) for each basic service group; <p>4. Carry out a detach procedure by MS2.</p> <p>5. Carry out a CS call from MS1 to MS2.</p> <p>6. Carry out a call clearing procedure.</p> <p>7. Carry out a CFNRc deactivation/erasure procedure by MS2.</p> |
| EXPECTED RESULTS: | <p>1. The message exchange to check is as follows:</p> |



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).

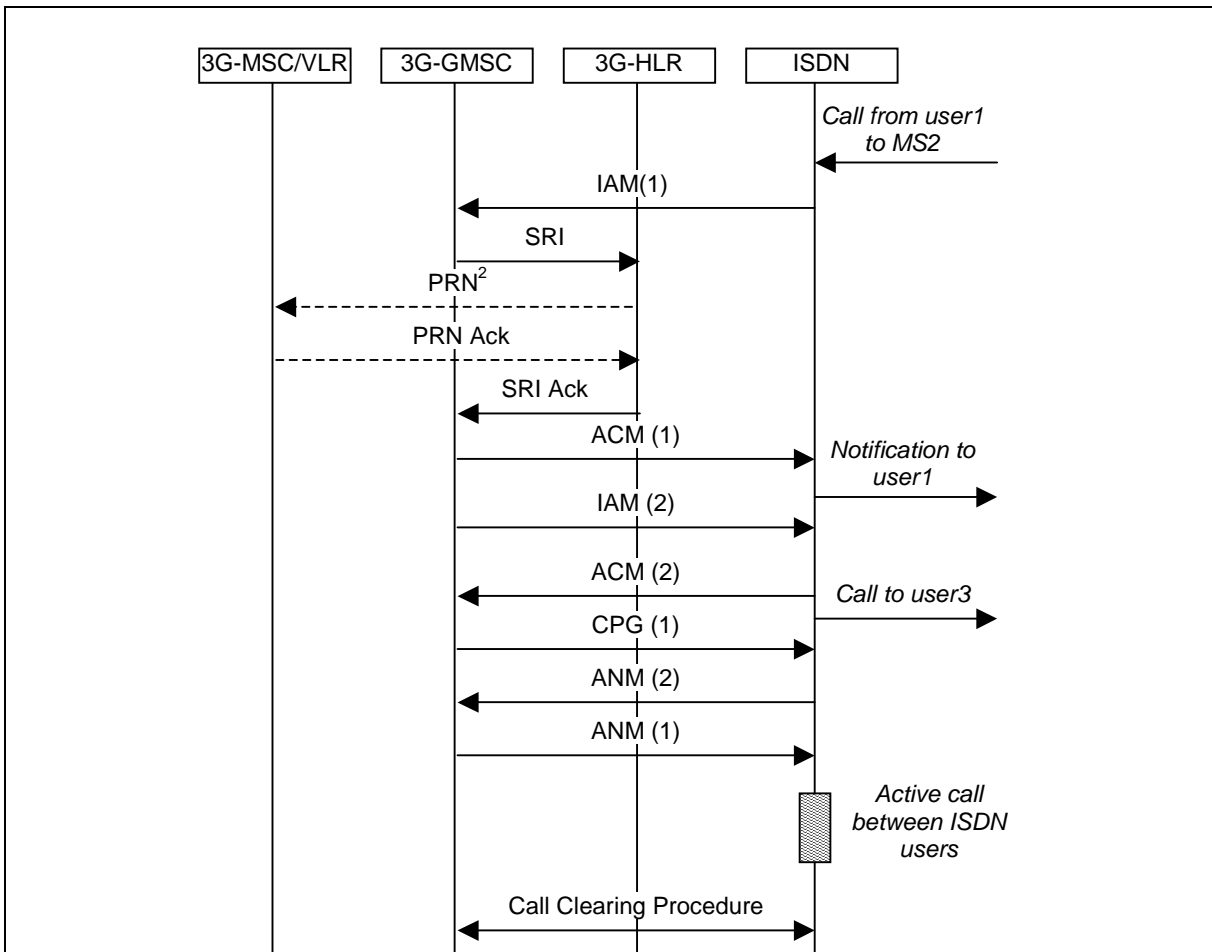
3. Check that the call is forwarded to MS3 and that is successfully completed.

NOTES:

- ¹. In this test are required at least three subscribers.
- ². The Provide Roaming Number procedure occurs only if MS2 is deregistered in the HLR.

REFERENCES: [11] §4; [20] §4.

| | |
|---|--|
| <i>Supplementary Services and SMS – Call Forwarding</i> | |
| SS_CF_243: CFNRc IN AN ISDN TO UMTS CALL | |
| OBJECTIVE: | This test aims to demonstrate completion of an ISDN to UMTS call when CFNRc supplementary service is activated to the celled party. |
| INTERFACES: | IuCS, ISUP. |
| PRECONDITIONS: | Requires at least configuration n°4 ¹ . The MS must be registered in the HLR with UMTS subscription, and must also be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 1. Carry out a CFNRc registration/activation procedure by MS2 with user3 as the forwarded party. 2. Carry out a CFNRc interrogation procedure by MS2. 3. Check that HLR shall store for MS2: <ul style="list-style-type: none"> • the subscription option “notification to the calling party” with the value ‘ notification’; • the registration parameter “forward-to number” (user3) for each basic service group; 4. Carry out a detach procedure by MS2. 5. Carry out a CS call from user1 to MS2. 6. Carry out a call clearing procedure. 7. Carry out a CFNRc deactivation/erasure procedure by MS2. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: | |

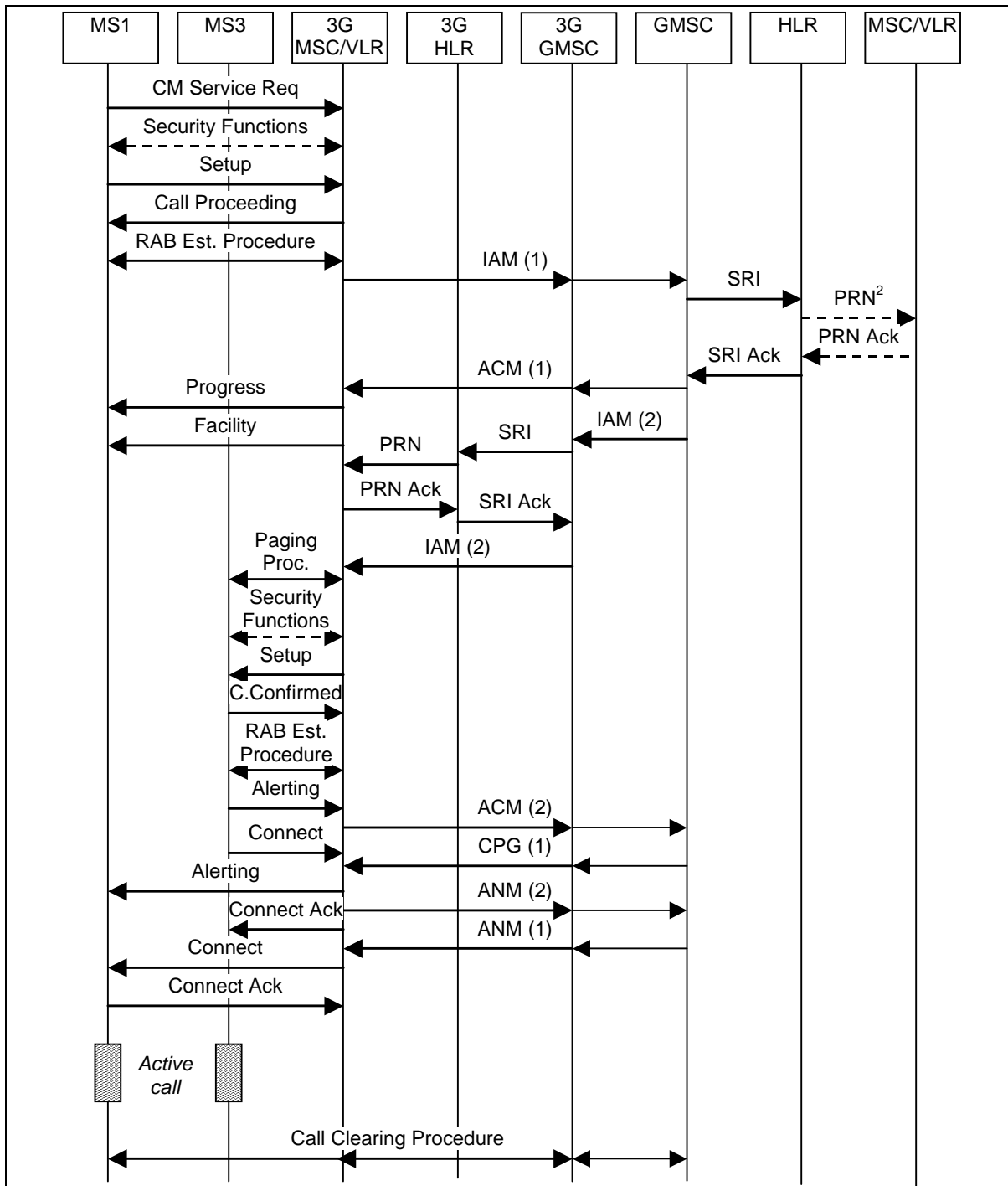


- 2. Check the following fields in the messages:
ACM(1): Optional Backward Call Indicator(‘call diversion may occur’); Generic notification indicator;
CPG(1): Event Information(Alerting).
- 3. Check that the call is forwarded to MS3 and that is successfully completed.

NOTES:
¹. In this test are required at least three subscribers.
². The Provide Roaming Number procedure occurs only if MS2 is deregistered in the HLR.

REFERENCES: [11] §4; [20] §4.

| | |
|---|--|
| <i>Supplementary Services and SMS – Call Forwarding</i> | |
| SS_CF_244: CFNRc IN A UMTS TO GSM CALL | |
| OBJECTIVE: | This test aims to demonstrate completion of an UMTS to GSM call when CFNRc supplementary service is activated to the called party. |
| INTERFACES: | IuCS, ISUP. |
| PRECONDITIONS: | Requires at least configuration n°5 ¹ . The MS1 and MS3 must be registered in the HLR with UMTS subscription, instead, the MS2 must be registered with GSM subscription. All the MS must be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <ol style="list-style-type: none"> 1. Ensure that MS2 has activated the CFNRc supplementary service with MS3 as forwarded party and with the subscription option “notification to the calling party”=‘ notification’; 2. Carry out a detach procedure by MS2. 3. Carry out a CS call from MS1 to MS2. 4. Carry out a Call Clearing procedure by MS1. |
| EXPECTED RESULTS: | <ol style="list-style-type: none"> 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.

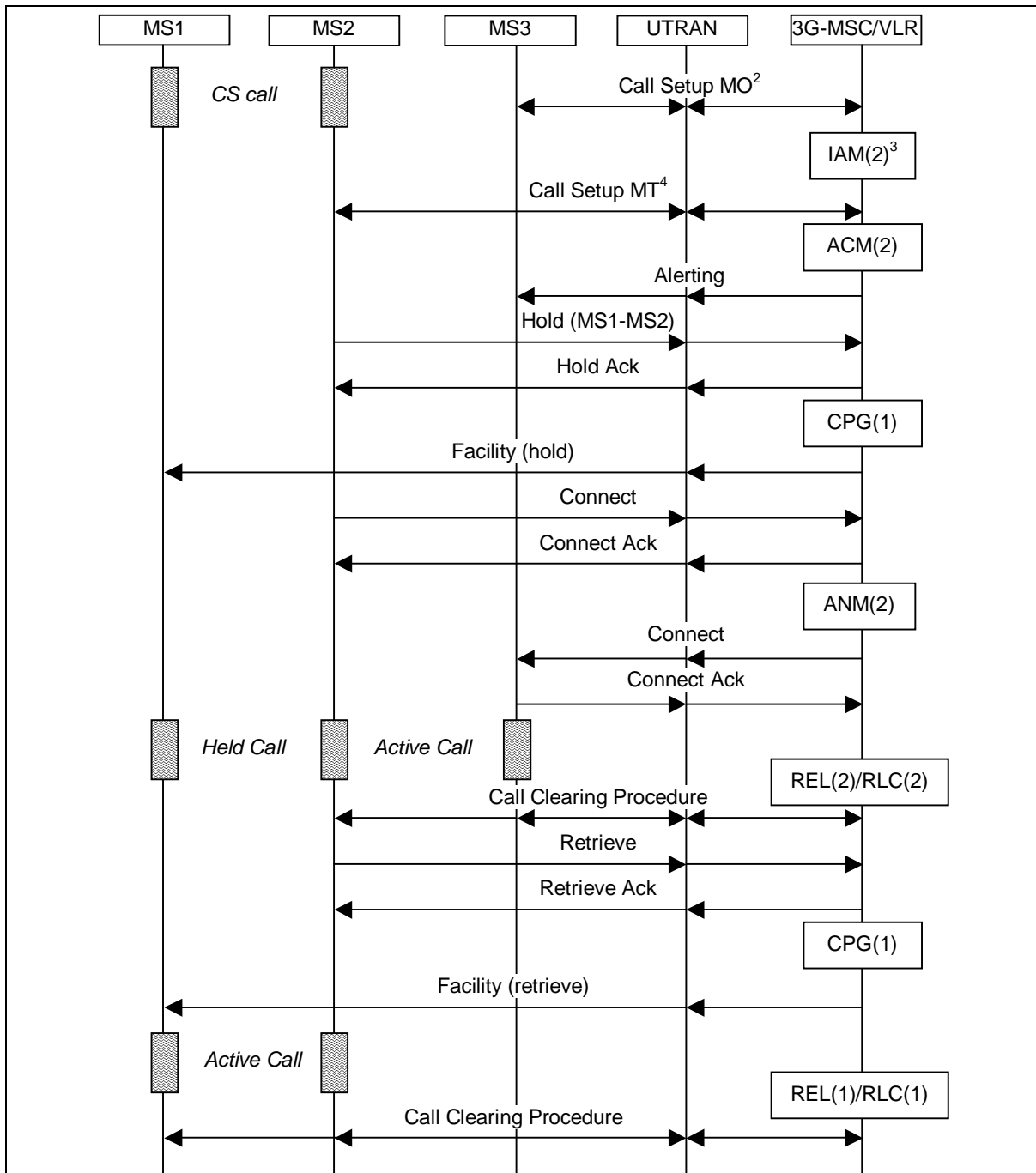
NOTES:
¹. In this test are required at least three subscribers.
². The Provide Roaming Number procedure occurs only if MS2 is deregistered in the HLR.

REFERENCES: [11] §4; [20] §4.

| | |
|--|--|
| <i>Supplementary Services and SMS – Call Waiting and Call Hold</i> | |
| 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: | IuCS, D. |
| 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 ¹ supplementary service: | |
| <ol style="list-style-type: none"> 1. Activation; 2. Interrogation; 3. Deactivation; | |
| EXPECTED RESULTS: | |
| 1. The message exchange to check is as follows: | |
| <pre> sequenceDiagram participant MS participant UTRAN participant Iu-CS participant VLR as 3G-MSC/VLR participant HLR Note over MS, UTRAN, Iu-CS, VLR, HLR: ACTIVATION MS->>VLR: Register VLR->>MS: Release Complete Note over MS, UTRAN, Iu-CS, VLR, HLR: INTERROGATION MS->>VLR: Register VLR->>MS: Release Complete Note over MS, UTRAN, Iu-CS, VLR, HLR: DEACTIVATION MS->>VLR: Register VLR->>MS: Release Complete </pre> | |
| 2. Check the following fields in the messages: | |
| Activation | <p>Register: Facility(Invoke = ActivateSS(CW));</p> <p>Release Complete: Facility(ReturnResult = ActivateSS);</p> |
| Interrogation | <p>Register: Facility(Invoke=InterrogateSS(CW)</p> <p>Release Complete: Facility(Return Result=InterrogateSS);</p> |

| |
|---|
| Deactivation |
| <p style="text-align: center;">Register: Facility(Invoke = DeactivateSS(CW));</p> <p style="text-align: center;">Release Complete: Facility(ReturnResult = DeactivateSS).</p> |
| 3. Check that in the network the supplementary service is deactivated for the MS. |
| NOTES: |
| ¹ . 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]. |

| | |
|--|---|
| <i>Supplementary Services and SMS – Call Waiting and Call Hold</i> | |
| 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 ¹ . The MS must be registered in the HLR with UMTS subscription and must also be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 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: | |
| <ol style="list-style-type: none"> 1. The messages exchange to check is as follows: | |



2. Check the following fields in the messages:

Call Confirmed: Cause="user busy";

Alerting(MT)⁵: Facility(Invoke=NotifySS(CW, Call Waiting Indicator));

Facility(hold): Facility(Invoke=NotifySS(HOLD, CallOnHold-Indicator));

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 MS2 successful retrieves the call held (MS1) and that the call between MS3 and MS2 is successful terminated.

NOTES:

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

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

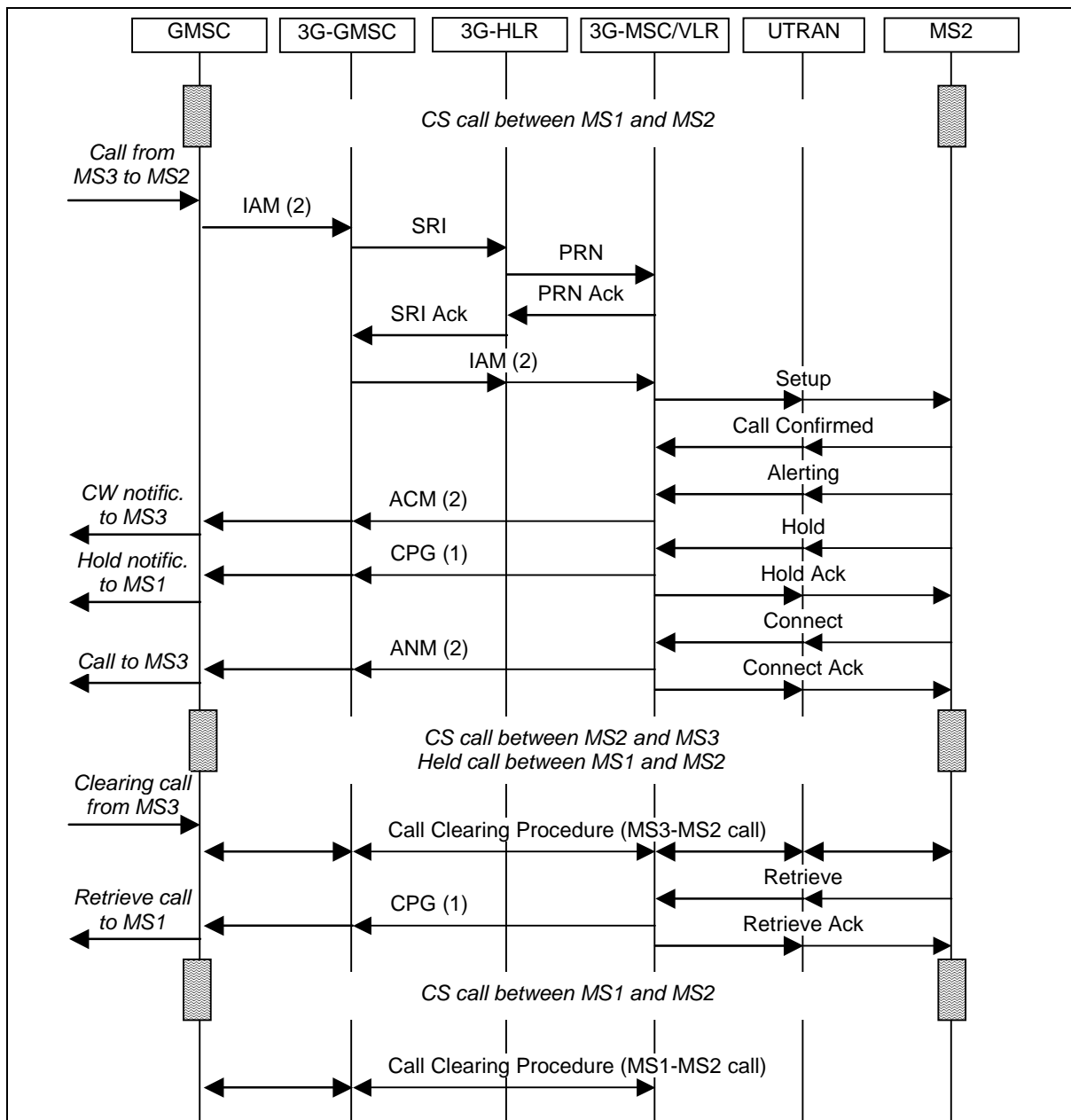
³. If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSC take place.

⁴. In the Call Setup MT are included the following messages: Setup, Call Confirmed and Alerting.

⁵. If in the alerting message sent to the network by the MS2 the SI is non-zero then a notification of the active supplementary service is send to the MS3 in the alerting message or in a facility message.

REFERENCES: [1] §9.3; [12] §1.

| | |
|--|---|
| Supplementary Services and SMS – Call Waiting and Call Hold | |
| SS_CWH_312: CW AND HOLD IN A GSM TO UMTS CALL | |
| OBJECTIVE: | This test aims to demonstrate the function of CW and call HOLD supplementary services in a call that involves UMTS and GSM users. |
| INTERFACES: | IuCS; ISUP. |
| PRECONDITIONS: | Requires at least configuration n°4 ¹ . The MS1 and MS3 must be registered in the HLR with GSM subscription, instead, the MS2 must have an UMTS subscription. All the MS must be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <p>1. Carry out a CW activation procedure by MS2.</p> <p>2. Carry out a CW interrogation procedure by MS2.</p> <p>3. Carry out a call from MS1 to MS2.</p> <p>4. Carry out a call from MS3 to MS2 when the call MS1-MS2 is still active.</p> <p>5. Carry out an HOLD procedure by MS2 for the call with MS1.</p> <p>6. Complete the MS2-MS3 call.</p> <p>7. Carry out a retrieve procedure for the held call (MS2-MS1).</p> <p>8. Carry out a call clearing procedure for the MS2-MS1 call.</p> |
| EXPECTED RESULTS: | <p>1. The messages exchange to check is as follows:</p> |



2. Check the following fields in the messages:

Call Confirmed: Cause="user busy";

ACM(2): Generic Notification Indicator;

Alerting/Facility(MT)²: Facility(Invoke=NotifySS(CW, Call Waiting Indicator));

CPG(1): Generic Notification Indicator;

Facility(hold): Facility(Invoke=NotifySS(HOLD, CallOnHold-Indicator);

CPG(1)²: Generic Notification Indicator;

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).

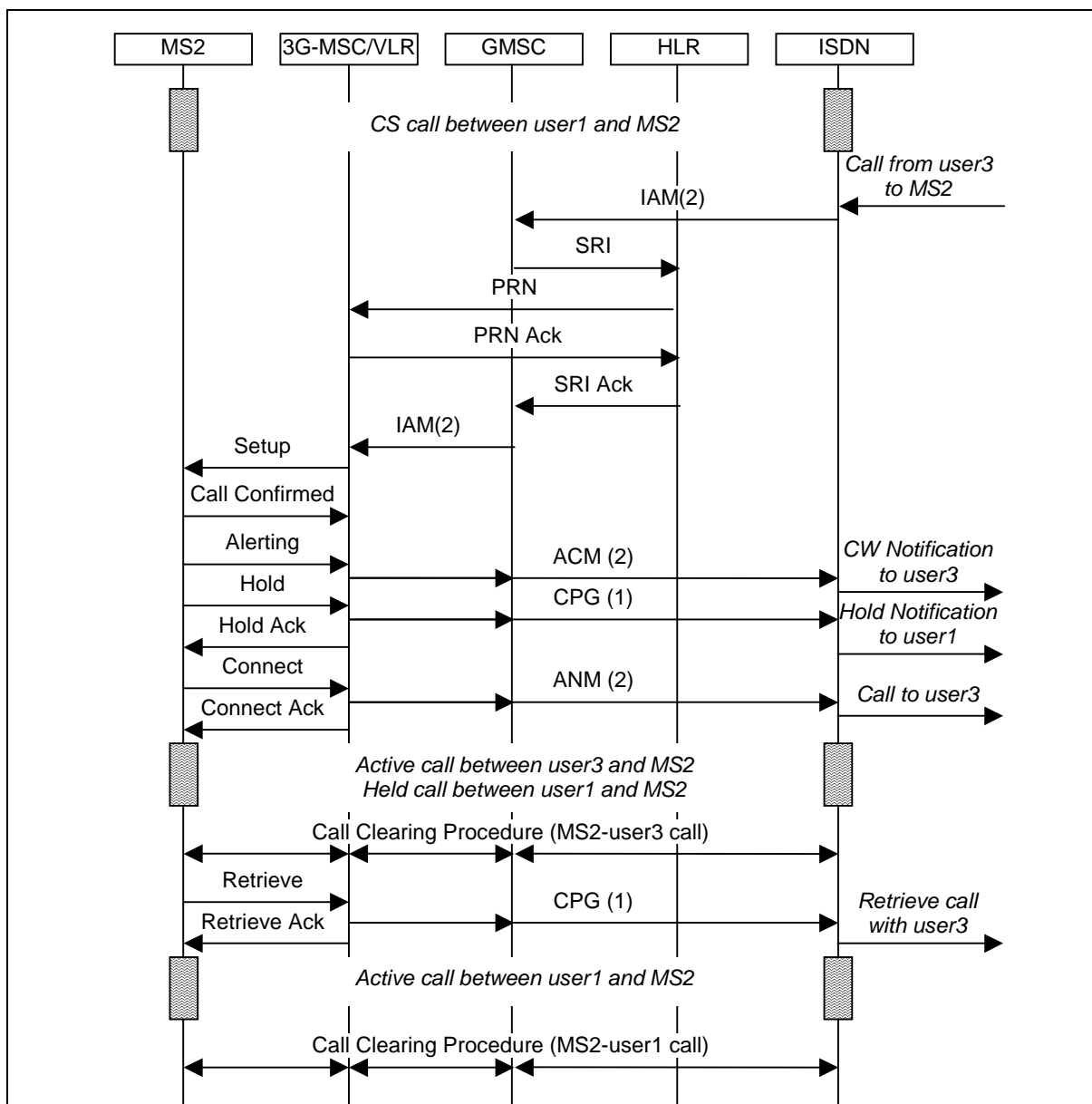
NOTES:

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

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

REFERENCES: [1] §9.3; [12] §1, [20] §4.

| | |
|--|---|
| <i>Supplementary Services and SMS – Call Waiting and Call Hold</i> | |
| SS_CWH_313: CW AND HOLD IN AN ISDN TO UMTS CALL | |
| OBJECTIVE: | This test aims to demonstrate the function of CW and HOLD supplementary services in a call that involves ISDN and UMTS users. |
| INTERFACES: | IuCS, ISUP. |
| PRECONDITIONS: | Requires at least configuration n°4 ¹ . The MS must be registered in the HLR with UMTS subscription and must also be attached. User1 and user3 must be ISDN subscribers. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <p>1. Carry out a CW activation procedure by MS2.</p> <p>2. Carry out a CW interrogation procedure by MS2.</p> <p>3. Carry out a call from user1 to MS2.</p> <p>4. Carry out a call from user3 to MS2 when the call user1-MS2 is still active.</p> <p>5. Carry out an HOLD procedure by MS2 for the call with user1.</p> <p>6. Complete the MS2-user3 call.</p> <p>7. Carry out a retrieve procedure for the held call (MS2-user1).</p> <p>8. Carry out a call clearing procedure for the MS2-user1 call.</p> |
| EXPECTED RESULTS: | <p>1. The messages exchange to check is as follows:</p> |



2. Check the following fields in the messages:

Call Confirmed: Cause="user busy";

ACM(2): Generic Notification Indicator;

CPG(1): Generic Notification Indicator;

CPG(1): Generic Notification Indicator;

3. Check that MS2 held the call with user1 and connects with the waiting call (user3).

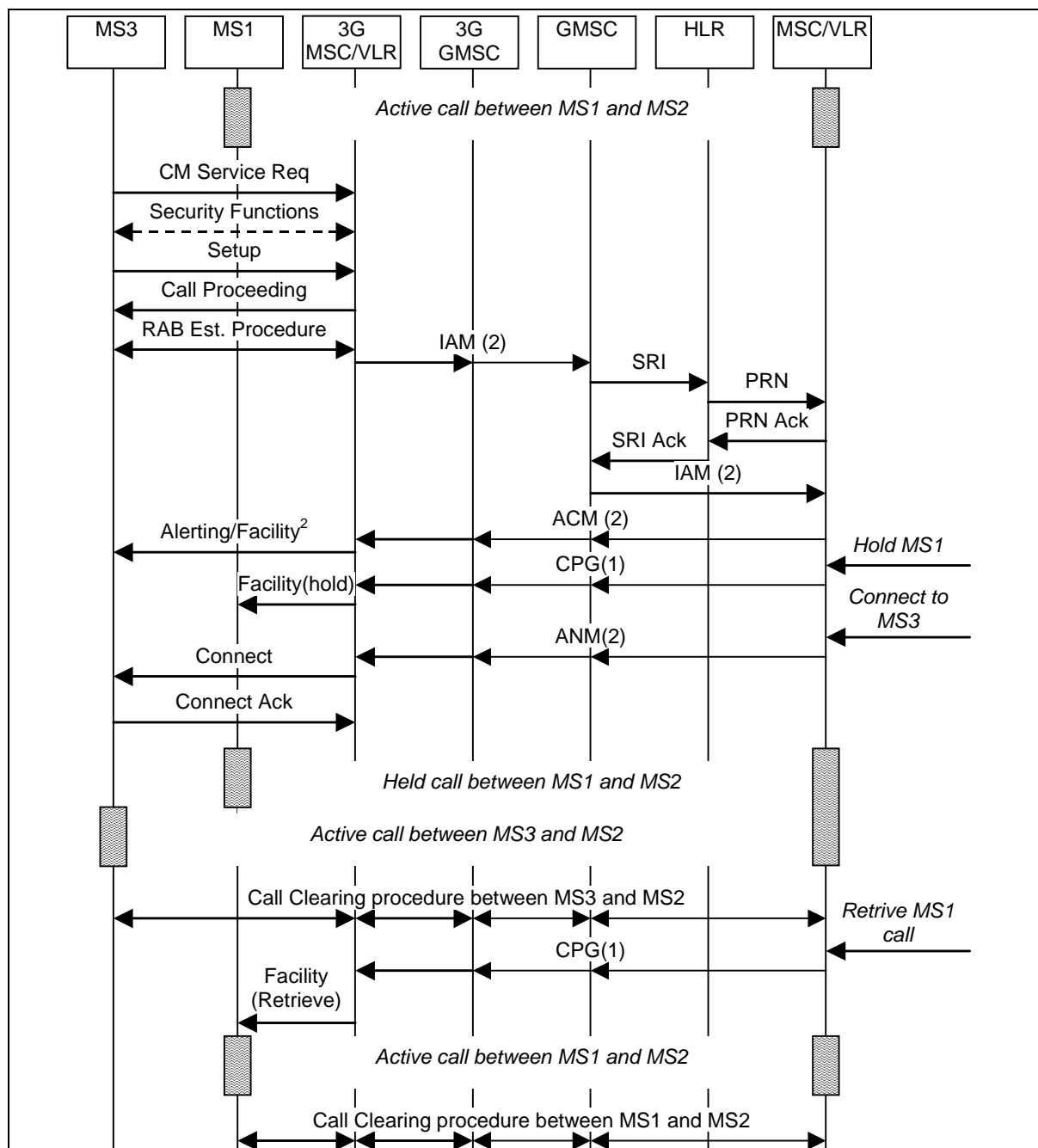
4. Check that after the successful call between MS2 and user3, the MS2 successful retrieves the call held (with user1).

NOTES:

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

REFERENCES: [1] §9.3; [12] §1.,[20] §4.

| | |
|--|--|
| <i>Supplementary Services and SMS – Call Waiting and Call Hold</i> | |
| SS_CWH_314: CW AND HOLD IN A UMTS TO GSM CALL | |
| OBJECTIVE: | This test aims to demonstrate the function of CW and call HOLD supplementary services in a call that involves UMTS and GSM users. |
| INTERFACES: | IuCS; ISUP. |
| PRECONDITIONS: | Requires at least configuration n°5 ¹ . The MS1 and MS3 must be registered in the HLR with UMTS subscription, instead, the MS2 must have a GSM subscription with CW and call Hold supplementary services activated. All the MS must be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <p>1. Carry out a call from MS1 to MS2.</p> <p>2. Carry out a call from MS3 to MS2 when the call MS1-MS2 is still active.</p> <p>3. Carry out an HOLD procedure by MS2 for the call with MS1.</p> <p>4. Complete the MS2-MS3 call.</p> <p>5. Carry out a retrieve procedure for the held call (MS2-MS1).</p> <p>6. Carry out a call clearing procedure for the MS2-MS1 call.</p> |
| EXPECTED RESULTS: | <p>1. The messages exchange to check is as follows:</p> |



2. Check the following fields in the messages:

ACM(2): Generic Notification Indicator;

Alerting/Facility(MT)²: Facility(Invoke=NotifySS(CW, Call Waiting Indicator));

CPG(1): Generic Notification Indicator;

Facility(hold): Facility(Invoke=NotifySS(HOLD, CallOnHold-Indicator));

CPG(1)²: Generic Notification Indicator;

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).

NOTES:

- ¹. In this test are required at least three subscribers.
- ². If in the alerting message send to the network by the MS2 the SI is non-zero then a notification of the active supplementary service is send to the MS3 in the alerting message or in a facility message.

REFERENCES: [1] §9.3; [12] §1, [20] §4.

| | |
|---|--|
| <i>Supplementary Services and SMS – Multy Party</i> | |
| SS_MPTY_401: MPTY CALL BETWEEN UMTS USERS | |
| OBJECTIVE: | This test aims to demonstrate the function of the MPTY supplementary service in a call between UMTS subscribers. |
| INTERFACES: | IuCS. |
| PRECONDITIONS: | Requires at least configuration n°4 ¹ . The MS must have an UMTS subscription in the HLR and must also be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 1. Carry out a call from MS1 to MS2. 2. Carry out a call from MS1 to MS3 after having held the call with MS2. 3. Carry out a MPTY call by MS1 to MS2 and MS3. 4. Release the multycall from MS1. | |
| EXPECTED RESULTS: | |
| 1. The messages exchange to check is as follows: | |
| | |
| 2. Check the following fields in the messages: | |
| Facility(MPTY): Facility(Invoke=BuildMPTY); | |
| Facility(HOLD,MPTY): Facility(Invoke=NotifySS(HOLD, CallOnHold-Indicator), Invoke=NotifySS(MTPY, MTPYindicator)); | |

Facility(MPTY): Facility(Invoke=NotifySS(MTPY, MTPYindicator));

Facility(Result): Facility(Return Result);

3. Check that the multiparty call is successful.

NOTES:

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

REFERENCES: [1] §9.3; [13].

| | |
|--|---|
| <i>Supplementary Services and SMS – Multy Party</i> | |
| SS_MPTY_402: MPTY CALL BETWEEN UMTS AND GSM USERS | |
| OBJECTIVE: | This test aims to demonstrate the function of a MPTY call between two UMTS users and a GSM user. |
| INTERFACES: | IuCS, ISUP. |
| PRECONDITIONS: | Requires at least configuration n°4 ¹ . The MS1 and MS2 must have an UMTS subscription in the HLR, instead, the MS3 must have a GSM subscription. All the MS must be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 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. | |
| EXPECTED RESULTS: | |
| 1. The messages exchange to check is as follows: | |
| <pre> sequenceDiagram participant MS1 participant MS2 participant VLR as 3G-MSC/VLR participant GMSC as 3G-GMSC participant GSMSC as GMSC Note over MS1, MS2: MS1-MS2 call Hold Note over MS1, MS2: MPTY call Note over MS1, MS2: MPTY call Note over MS1, MS2: Disconnect (to MS2) Note over MS1, MS2: Release Note over MS1, MS2: Release Complete Note over MS1, MS2: Disconnect (to MS3) Note over MS1, MS2: Release Note over MS1, MS2: Release Complete MS1->>VLR: Facility VLR->>MS2: Facility VLR->>VLR: CPG(1)² VLR->>GMSC: CPG(2) GMSC->>GSMSC: Notification to MS3 GSMSC->>VLR: REL(1)/RLC(1) VLR->>MS1: REL(1)/RLC(1) VLR->>VLR: REL(2) VLR->>GMSC: REL(2) GMSC->>GSMSC: Call Clearing to MS3 GSMSC->>VLR: REL(2) VLR->>MS1: REL(2) VLR->>VLR: REL(2) </pre> | |
| 2. Check the following fields in the messages: | |
| Facility(by MS1): Facility(Invoke=BuildMPTY); | |
| Facility(to MS2): Facility(Invoke=NotifySS(HOLD, CallOnHold-Indicator), | |

Invoke=NotifySS(MTPY, MTPYindicator));

CPG(2): Generic Notification Indicator=Conference established;

3. Check that the multiparty call is successful.

NOTES:

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

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

REFERENCES: [1] §9.3; [13]; [20] §4.

| | |
|---|--|
| <i>Supplementary Services and SMS – Multy Party</i> | |
| SS_MPTY_403: MPTY CALL BETWEEN UMTS AND ISDN USERS | |
| OBJECTIVE: | This test aims to demonstrate the function of a MPTY call between two UMTS users and an ISDN user. |
| INTERFACES: | IuCS, ISUP. |
| PRECONDITIONS: | Requires at least configuration n°4 ¹ . The MS1 and MS2 must have an UMTS subscription in the HLR, and must also be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 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 user. 4. Release the multycall from MS1. | |
| EXPECTED RESULTS: | |
| 1. The messages exchange to check is as follows: | |
| <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 MS1->>VLR: Facility VLR->>GMSC: CPG(1)² GMSC->>ISDN: CPG(2) ISDN->>VLR: Notification to user3 VLR->>MS1: Facility VLR->>MS2: Facility Note over MS1, MS2: MPTY call MS1->>VLR: Disconnect (to MS2) VLR->>GMSC: REL(1)/RLC(1) GMSC->>ISDN: REL(2) ISDN->>VLR: Call Clearing to user3 VLR->>MS1: Release Complete VLR->>MS2: Release Complete VLR->>GMSC: REL(2) GMSC->>ISDN: REL(2) ISDN->>VLR: Call Clearing to user3 VLR->>MS1: Release Complete VLR->>MS2: Release Complete </pre> | |
| 2. Check the following fields in the messages: | |
| Facility(by MS1): Facility(Invoke=BuildMPTY); | |
| Facility(to MS2): Facility(Invoke=NotifySS(HOLD, CallOnHold-Indicator), | |

Invoke=NotifySS(MTPY, MTPYindicator));

CPG(2): Generic Notification Indicator=Conference established.

3. Check that the multiparty call is successful.

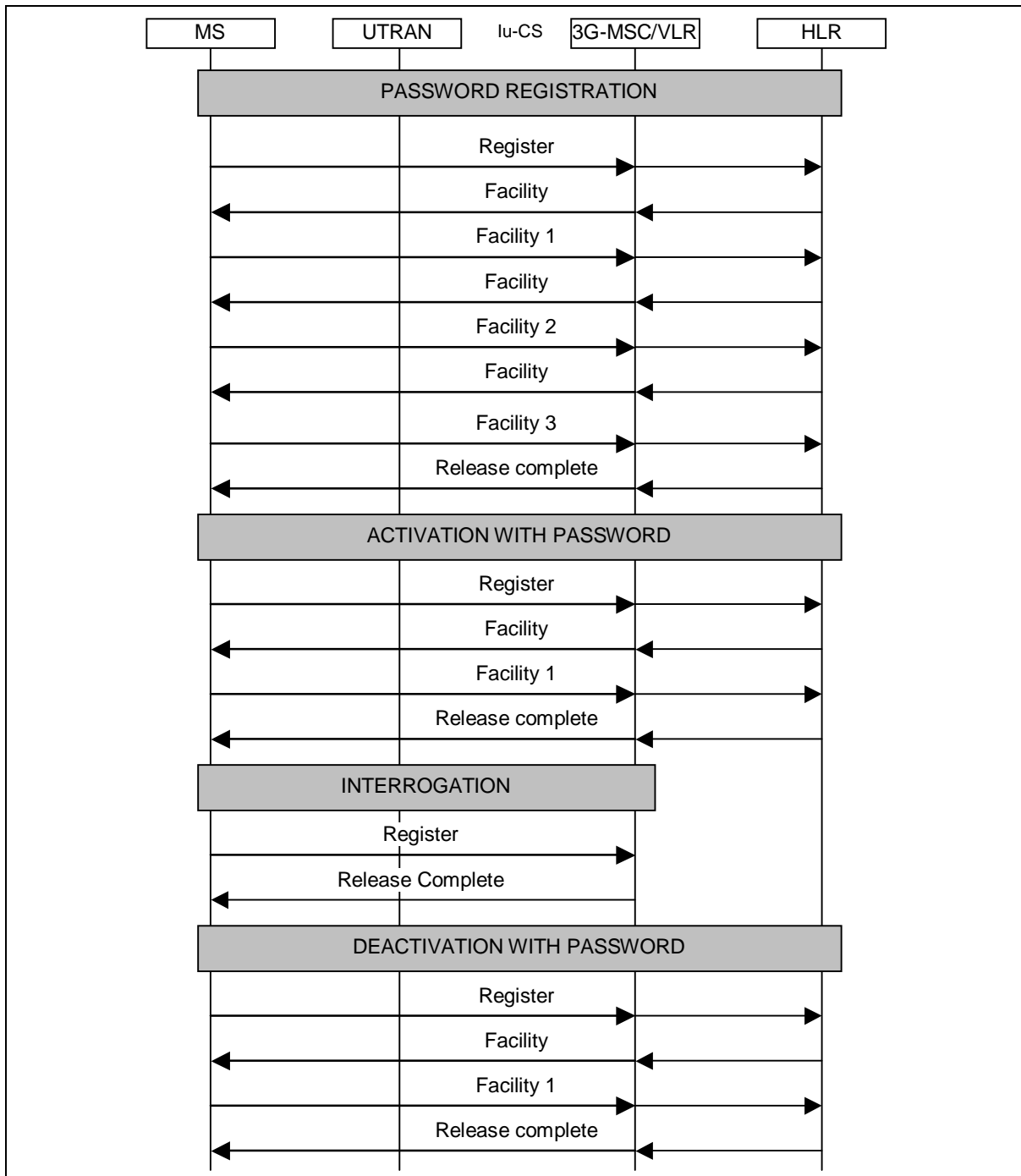
NOTES:

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

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

REFERENCES: [1] §9.3; [13], [20] §4.

| | |
|--|---|
| <i>Supplementary Services and SMS – Call Barring</i> | |
| SS_CB_501: PROCEDURE FOR CB SUPPLEMENTARY SERVICES | |
| OBJECTIVE: | This test aims to demonstrate completion of password registration, activation, interrogation and deactivation procedures for CB supplementary services. |
| INTERFACES: | IuCS, D. |
| PRECONDITIONS: | Requires at least configuration n°1. The MS must have an UMTS subscription in the HLR with the option “control of barring service: by user using password”. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <p>Carry out by the MS the following procedures for each CB supplementary services (i.e. BAOC, BAIC):</p> <ol style="list-style-type: none">1. Password registration;2. Activation with password;3. Interrogation;4. Deactivation with password. |
| EXPECTED RESULTS: | <ol style="list-style-type: none">1. The message exchange to check is as follows: |



2. Check the following fields in the messages:

Password Registration

Register: Facility(Invoke = Register Password (SS-Code));

Facility: Facility(Invoke = GetPassword);

Facility 1: Facility(ReturnResult = GetPassword “old password”);

Facility 2: Facility(ReturnResult = GetPassword “new password”);

Facility 3: Facility(ReturnResult = GetPassword “new password”);

Release Complete: Facility(ReturnResult = RegisterPassword “new password”).

Activation with password

Register: Facility(Invoke = ActivateSS(SS-Code));

Facility: Facility(Invoke = GetPassword);

Facility 1: Facility(ReturnResult = GetPassword “password”);

Release Complete: Facility(ReturnResult = ActivateSS(SS-Code)).

Interrogation

Register: Facility(Invoke = InterrogateSS(SS-Code));

Release Complete: Facility(ReturnResult = InterrogateSS(SS-Code)).

Deactivation with password

Register: Facility(Invoke = DeactivateSS(SS-Code));

Facility: Facility(Invoke = GetPassword);

Facility 1: Facility(ReturnResult = GetPassword “password”);

Release Complete: Facility(ReturnResult = DeactivateSS(SS-Code)).

NOTES:

REFERENCES: [14] §6.

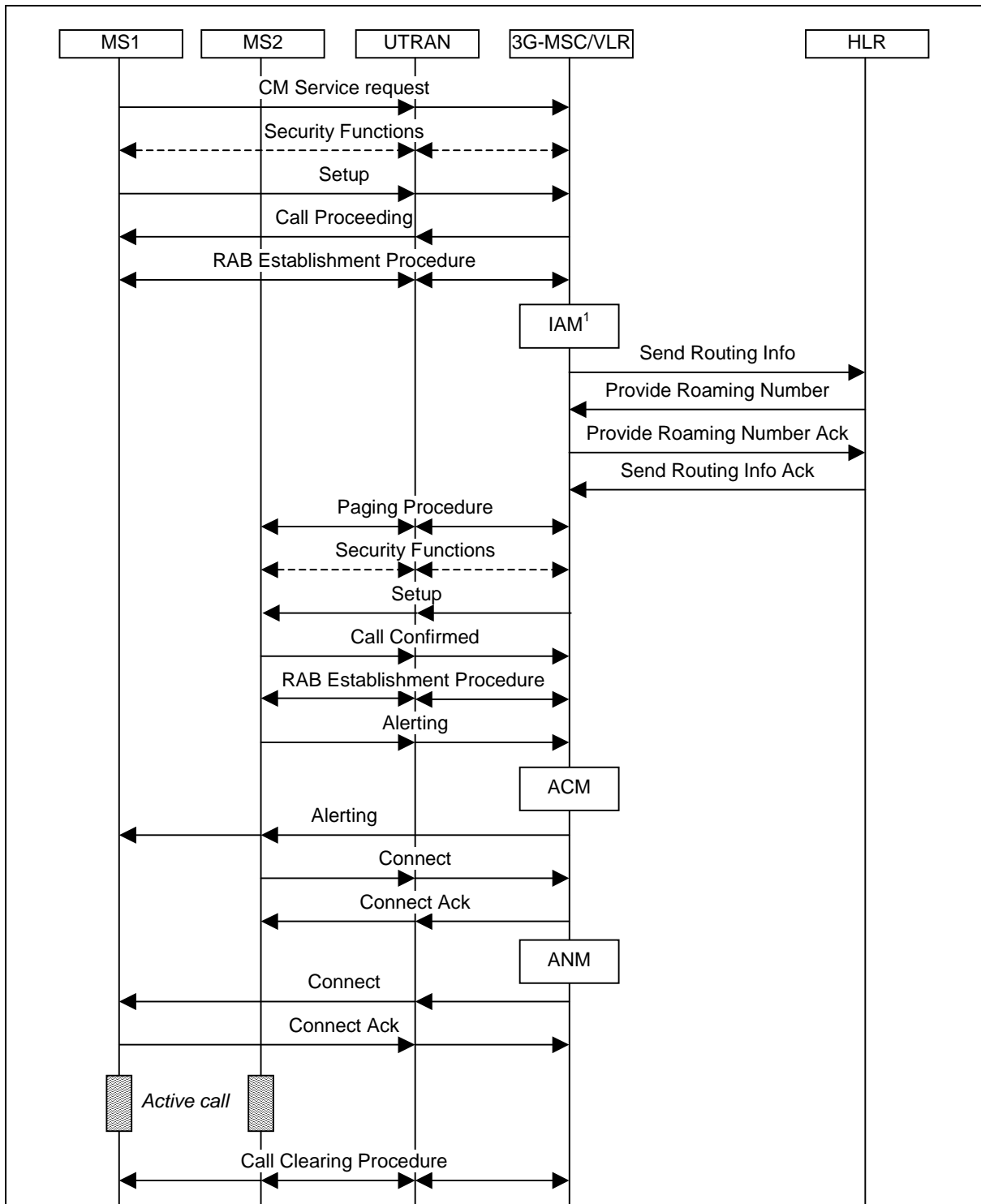
| | |
|---|---|
| <i>Supplementary Services and SMS – Call Barring</i> | |
| SS_CB_511: BAOC BY UMTS USER | |
| OBJECTIVE: | This test aims to demonstrate the functions of BAOC supplementary service. |
| INTERFACES: | IuCS. |
| PRECONDITIONS: | Requires at least configuration n°4. The MS must have an UMTS subscription in the HLR, and must also be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 1. Carry out a password registration for BAOC by MS1. 2. Check that the following subscription options are stored in the HLR for MS1: <ul style="list-style-type: none"> • control of barring services by subscriber using password; • call barring password; • wrong password attempts counter. 3. Carry out, by MS1, a BAOC activation procedure for calls relating to all basic service group. 4. Carry out a call by MS1 to MS2. 5. Carry out a deactivation procedure by MS1. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: <div> <pre> sequenceDiagram participant MS1 participant MS2 participant UTRAN participant MSC as 3G-MSC/VLR Note over MS2, UTRAN: CM Service Request Note over UTRAN, MSC: Security Functions Note over MS2, UTRAN: Security Functions Note over UTRAN, MSC: Setup Note over UTRAN, MSC: Disconnect Note over MS2, UTRAN: Disconnect Note over UTRAN, MSC: Release Note over UTRAN, MSC: Release Complete Note over MS2, UTRAN: Release Complete </pre> </div> 2. Check the following fields in the messages: <p>Disconnect:: Cause=('Operator determined barring'), Facility (Invoke= NotifySS(SS-Code)).</p> 3. Check that the call is rejected. 4. Check that after the deactivation procedure the call is successful. | |
| NOTES: | |
| REFERENCES: | [1] §9.3; [14], [15]. |

| <i>Supplementary Services and SMS – Call Barring</i> | |
|--|---|
| SS_CB_512: BAIC FOR UMTS USER | |
| OBJECTIVE: | This test aims to demonstrate the function of BAIC supplementary service. |
| INTERFACES: | IuCS. |
| PRECONDITIONS: | Requires at least configuration n°4. The MS must have an UMTS subscription in the HLR, and must also be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 1. Carry out, by MS1, a password registration procedure for BAIC. 2. Check that the following subscription option are stored in the HLR for MS1: <ul style="list-style-type: none"> • control of barring services by subscriber using password; • call barring password; • wrong password attempts counter. 3. Carry out a BAIC activation procedure by MS1. 4. Carry out a call by MS2 to MS1. 5. Carry out a deactivation procedure by MS1. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: <div> <pre> sequenceDiagram participant MS1 participant MS2 participant UTRAN participant MSC as 3G-MSC/VLR Note over MSC: IAM¹ Note over MSC: REL/RLC MS2->>MSC: CM Service Request MSC-->>MS2: Security Functions MS2->>MSC: Setup MSC-->>MS2: Call Proceeding MS2->>UTRAN: RAB Establishment Procedure MS2->>UTRAN: Call Clearing Procedure Note over MSC: IAM¹ Note over MSC: REL/RLC MSC->>MS1: IAM¹ MS1->>MSC: REL/RLC </pre> </div> | |
| <ol style="list-style-type: none"> 2. Check the following fields in the messages: <ul style="list-style-type: none"> Disconnect²: Cause=(‘Call barred’), Facility(Invoke = NotifySS(SS-Code)); 3. Check that the call is rejected. 4. Check that after the deactivation procedure the call is successful. | |
| NOTES: | |
| ¹ . If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSC take place. | |

². The Disconnect message is included in the Call Clearing Procedure.

REFERENCES: [1] §9.3; [14], [15].

| | |
|---|---|
| <i>Supplementary Services and SMS – User-to-User Signalling</i> | |
| SS_UUS_601: UUS1 BETWEEN UMTS USERS | |
| OBJECTIVE: | This test aims to demonstrate the functions of USS1 supplementary service when explicitly activated in a call between two UMTS users. |
| INTERFACES: | IuCS. |
| PRECONDITIONS: | Requires at least configuration n°4. The MS must have an UMTS subscription in the HLR, and must also be attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | 1. Carry out by MS1 an implicit 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;
Setup(MT):User-user;
Alerting: Facility²(Return result), User-user³;
Connect: User-user³.
3. Check that the call and the transfer of information, between the two mobile, are successful.

NOTES:

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

¹. If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSC take place.

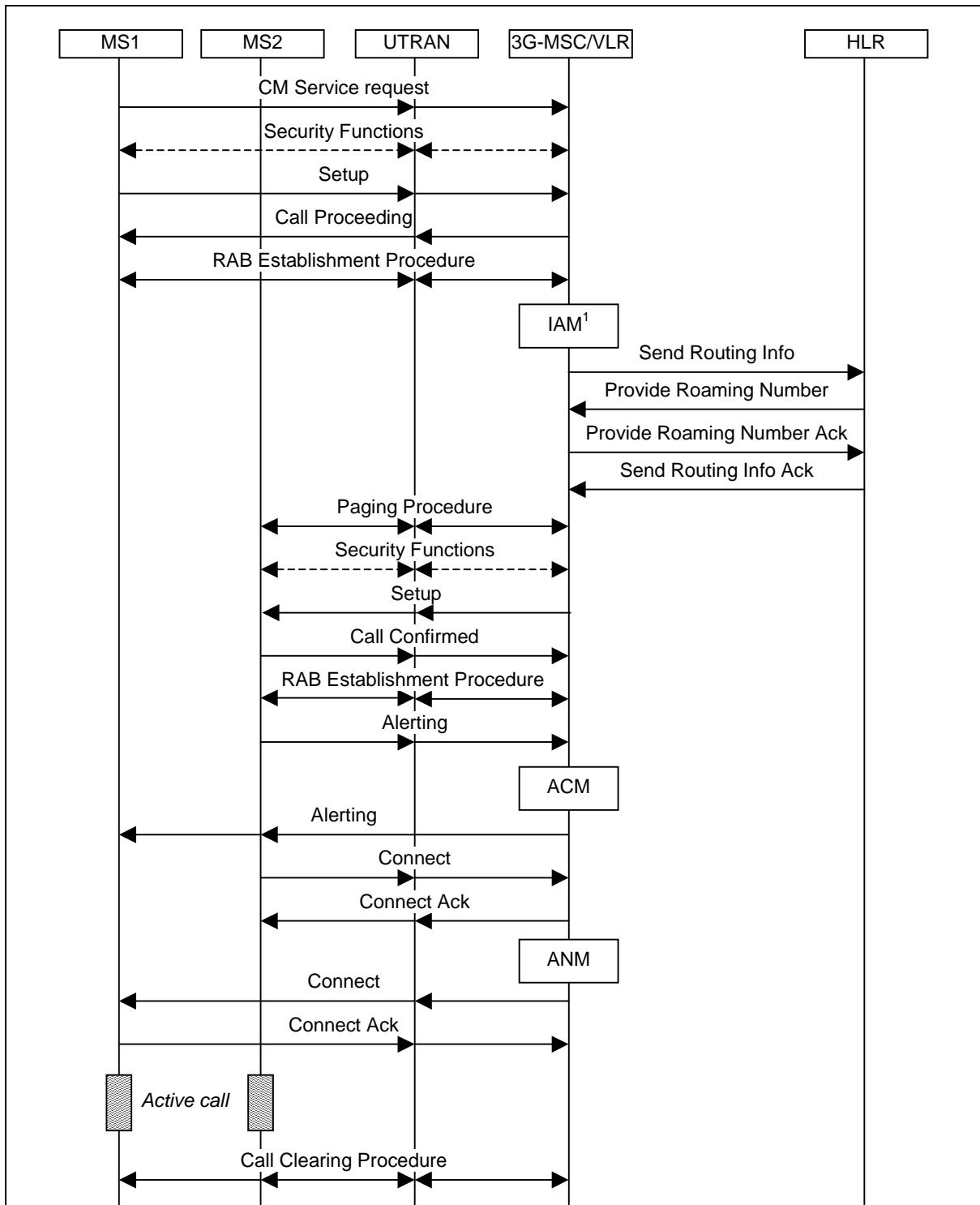
². The Return result in the facility information element may be sent either in the Alerting or in the Connect message.

³. The field User-user is optional in the call control messages from the called party.

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

| | |
|--|--|
| <i>Supplementary Services and SMS – User-to-User Signalling</i> | |
| 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 an UMTS user. |
| INTERFACES: | IuCS, ISUP. |
| PRECONDITIONS: | Requires at least configuration n°4. The MS1 must have an UMTS subscription in the HLR, instead, the MS2 must have a GSM subscription. Both the MS 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: | |
| <pre> sequenceDiagram participant MS1 participant UTRAN participant VLR as 3G-MSC/VLR participant GMSC as 3G-GMSC participant GMSC as GMSC MS1->>VLR: CM Service Request VLR-->>MS1: Security Functions VLR->>MS1: Setup MS1->>VLR: Call proceeding VLR->>MS1: RAB Establishment Procedure VLR->>GMSC: IAM GMSC->>VLR: ACM GMSC->>VLR: ANM VLR->>MS1: Alerting VLR->>MS1: Connect MS1->>VLR: Connect Ack VLR->>GMSC: Call setup to MS2 VLR->>GMSC: Call clearing to MS2 VLR->>MS1: Call Clearing Procedure </pre> | |
| 2. Check the following fields in the messages: | |
| Setup(MO): User-user; | |
| IAM: User to user information; | |
| Setup(MT): User-user ¹ ; | |
| Alerting: User-user ¹ ; | |
| Connect: User-user ¹ . | |
| 3. Check that the call and the transfer of information, between the two mobiles, are successful. | |
| NOTES: | |
| Some networks may support the transmission of UUI with a maximum length of only 32 octets per message for service 1. | |
| ¹ . The field User-user is optional in the call control messages from the called party. | |
| REFERENCES: | [1] §9.3; [22] §4.1; [23] §5.2.1; [24] §1.1.8. |

| | |
|--|--|
| <i>Supplementary Services and SMS – Subaddressing</i> | |
| SS_SUB_701: SUBADDRESSING IN A CALL BETWEEN UMTS USERS | |
| OBJECTIVE: | This test aims to demonstrate completion of a speech call between two MS when the SUB supplementary service is activated to the terminating party. |
| INTERFACES: | IuCS. |
| PRECONDITIONS: | Requires at least configuration n°4. Both the MS must be registered in the HLR with UMTS subscription and must also be attached. The MS2 (called party) must have provisioned the SUB supplementary service. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <ol style="list-style-type: none">1. Carry out a call from MS1 to MS2.2. Carry out a Call Clearing procedure by the MS1. |
| EXPECTED RESULTS: | <ol style="list-style-type: none">1. The message exchange to check is as follows: |



2. Check the following fields in the messages:

Setup(MO): Called party BCD Number, Called party subaddress;

Setup(MT): Called party subaddress.

3. Check that call establishment and call clearing procedures are performed correctly, and ensure that in the active state the speech transfer on the traffic channel is performed correctly.

NOTES:

¹. If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction

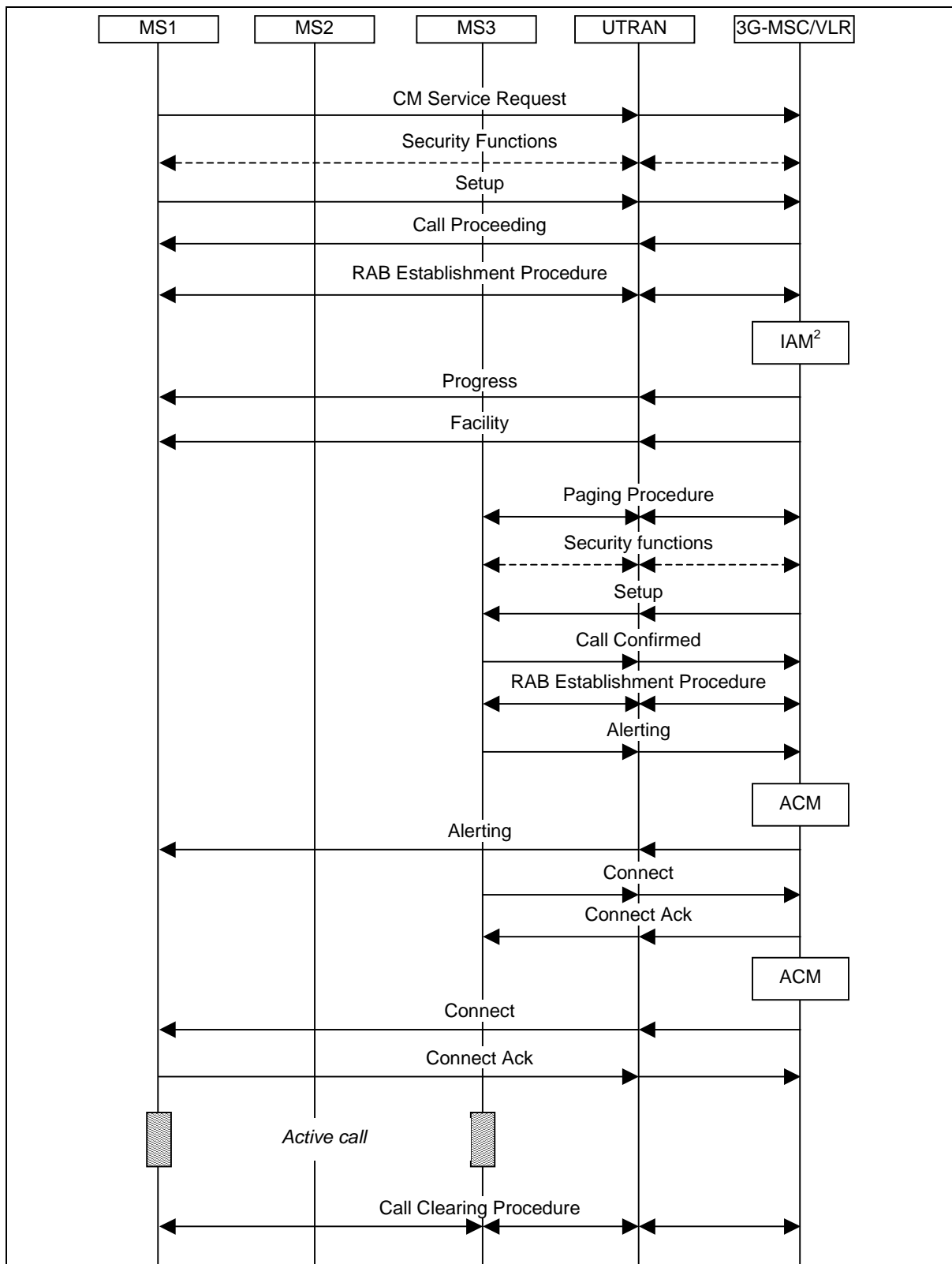
between the two 3G-MSC take place.

REFERENCES: [1] §9.3.23.

| | |
|---|--|
| <i>Supplementary Services and SMS – Subaddressing</i> | |
| SS_SUB_702: SUBADDRESSING IN A GSM TO UMTS CALL | |
| OBJECTIVE: | This test aims to demonstrate completion of a speech call from a GSM to an UMTS subscriber when the SUB supplementary service is activated to the terminating party. |
| INTERFACES: | IuCS, ISUP. |
| PRECONDITIONS: | Requires at least configuration n°5. The MS1 must have an UMTS subscription in the HLR with SUB supplementary service provisioned, instead MS2 must have a GSM subscription. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 1. Carry out a MO call from MS2 to MS1 ensuring that the setup MO includes the field 'called party subaddress'. 2. Carry out a Call Clearing procedure. | |
| EXPECTED RESULTS: | |
| 1. The message exchange to check is as follows: | |
| <pre> sequenceDiagram participant MS1 participant UTRAN participant VLR as 3G-MSC/VLR participant GMSC as 3G-GMSC participant GMSC as GMSC Note over GMSC: Call setup to MS1 GMSC->>VLR: IAM VLR->>MS1: Paging Procedure MS1->>VLR: Security Functions VLR->>MS1: Setup MS1->>VLR: Call Confirmed VLR->>MS1: RAB Establishment Procedure MS1->>VLR: Alerting VLR->>GMSC: Connect GMSC->>VLR: ACM VLR->>MS1: Connect MS1->>VLR: Connect Ack VLR->>GMSC: ANM GMSC->>MS1: Call clearing to MS2 Note over MS1, VLR: Call Clearing Procedure </pre> | |
| 2. Check the following fields in the messages: | |
| IAM: Access Transport Parameter(Called party Subaddress); | |
| Setup: Called party subaddress. | |
| 3. Check that the call is successful. | |
| NOTES: | |
| REFERENCES: | [1] §9.3.23; [20] §4; [25] §8. |

| | |
|---|--|
| Supplementary Services and SMS – Subaddressing | |
| SS_SUB_703: SUBADDRESSING IN A ISDN TO UMTS CALL | |
| OBJECTIVE: | This test aims to demonstrate completion of a speech call from an ISDN to an UMTS user when the SUB supplementary service is activated to the terminating party. |
| INTERFACES: | IuCS, ISUP. |
| 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: | |
| <ol style="list-style-type: none"> 1. Carry out a speech call by the ISDN user to the MS ensuring that the setup (MO) includes the field ‘called party subaddress’. 2. Carry out a Call Clearing procedure. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. The message exchange to check is as follows: | |
| <pre> sequenceDiagram participant MS participant UTRAN participant VLR as 3G-MSC/VLR participant GMSC as 3G-GMSC participant ISDN Note over ISDN: Call setup to MS ISDN->>GMSC: GMSC->>VLR: IAM VLR->>MS: Paging Procedure VLR->>MS: Security Functions VLR->>MS: Setup MS->>VLR: Call Confirmed VLR->>MS: RAB Establishment Procedure VLR->>MS: Alerting VLR->>MS: Connect MS->>VLR: Connect Ack VLR->>GMSC: ACM VLR->>GMSC: ANM GMSC->>ISDN: ANM Note over MS, VLR: Active call between MS and user1 Note over ISDN: Call clearing to user1 ISDN->>GMSC: GMSC->>VLR: Call Clearing Procedure VLR->>MS: </pre> | |
| <ol style="list-style-type: none"> 2. Check the following field in the message: <ul style="list-style-type: none"> IAM: Access Transport Parameter(Called party Subaddress); Setup: Called party subaddress. 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. | |
| NOTES: | |
| REFERENCES: | [1] §9.3.23; [20] §4; [25] §8. |

| | |
|--|---|
| <i>Supplementary Services and SMS – Interaction between Supplementary Services</i> | |
| SS_INT_801: CFU-CLIP-COLP IN A UMTS-UMTS CALL | |
| OBJECTIVE: | This test aims to demonstrate the interactions between CFU CLIP and COLP during a call between UMTS subscribers. |
| INTERFACES: | IuCS. |
| PRECONDITIONS: | Requires at least configuration n°4 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: | <ol style="list-style-type: none"> 1. Carry out a CS call from MS1 to MS2. 2. Carry out a Call clearing procedure. |
| EXPECTED RESULTS: | <ol style="list-style-type: none"> 1. The message exchange to check is as follows: |



2. Check the following fields in the messages:

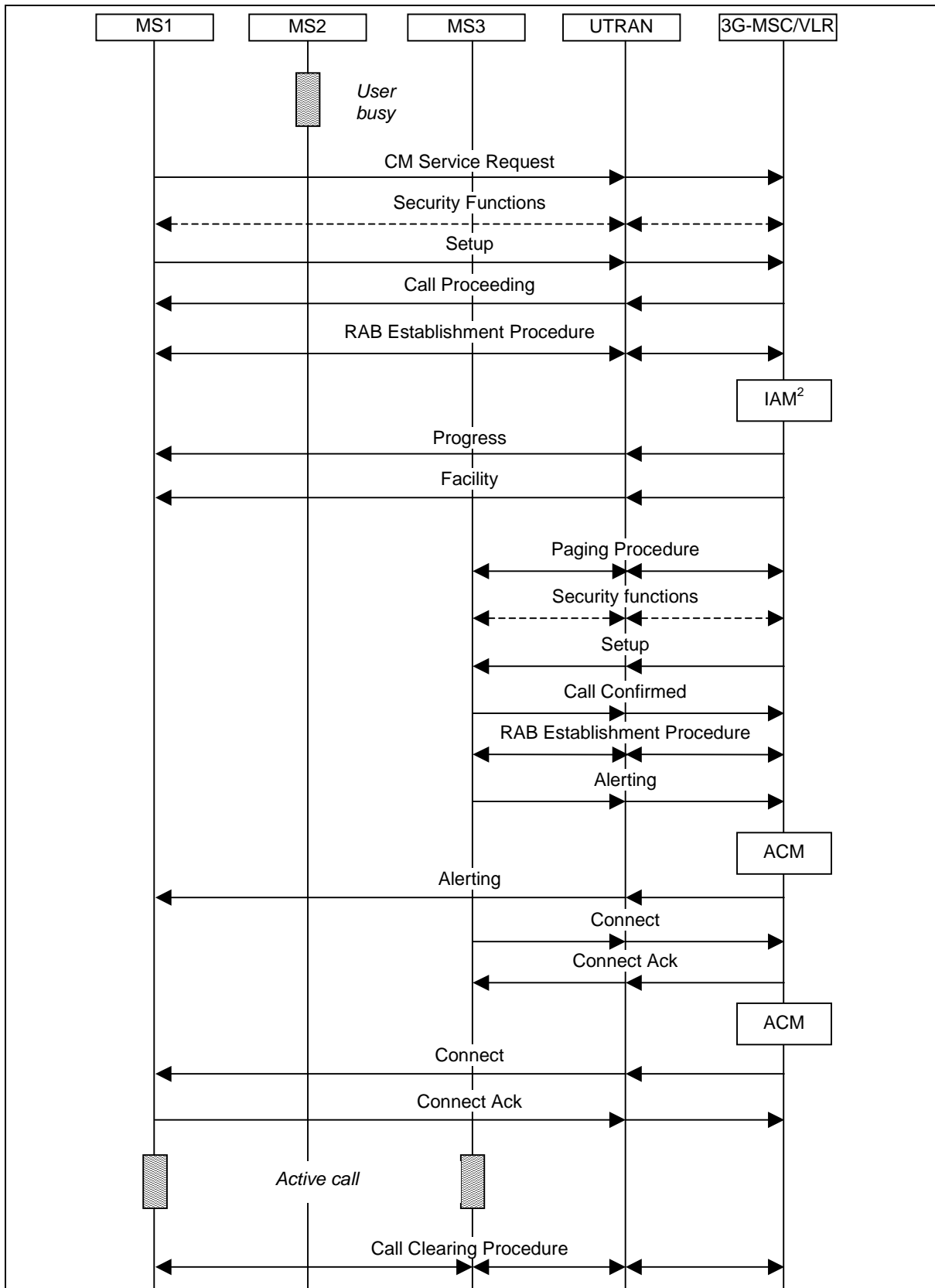
Facility: Facility(Invoke=NotifySS(CFU, SS-Notification)).

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. |
| NOTES: ¹ . In this test are required at least three users. ² . If the two users are in different 3G-MSA areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSA take place. |
| REFERENCES: [1] §9.3; [11] §1. |

| | |
|--|---|
| <i>Supplementary Services and SMS – Interaction between Supplementary Services</i> | |
| SS_INT_802: CFB-CLIP-COLP IN A CALL BETWEEN UMTS USERS | |
| OBJECTIVE: | This test aims to demonstrate interactions between CFB CLIP and COLP supplementary services when activated during a call between UMTS users. |
| INTERFACES: | IuCS. |
| PRECONDITIONS: | Requires at least configuration n°4 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 CFB (NDUB) and the forwarded party (MS3) must be provided with CLIP. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <ol style="list-style-type: none"> 1. Carry out a call from MS1 to MS2. 2. Carry out a Call clearing procedure. |
| EXPECTED RESULTS: | <ol style="list-style-type: none"> 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), Calling Number (MS1);

Connect(MT): Connected number(MS3).

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

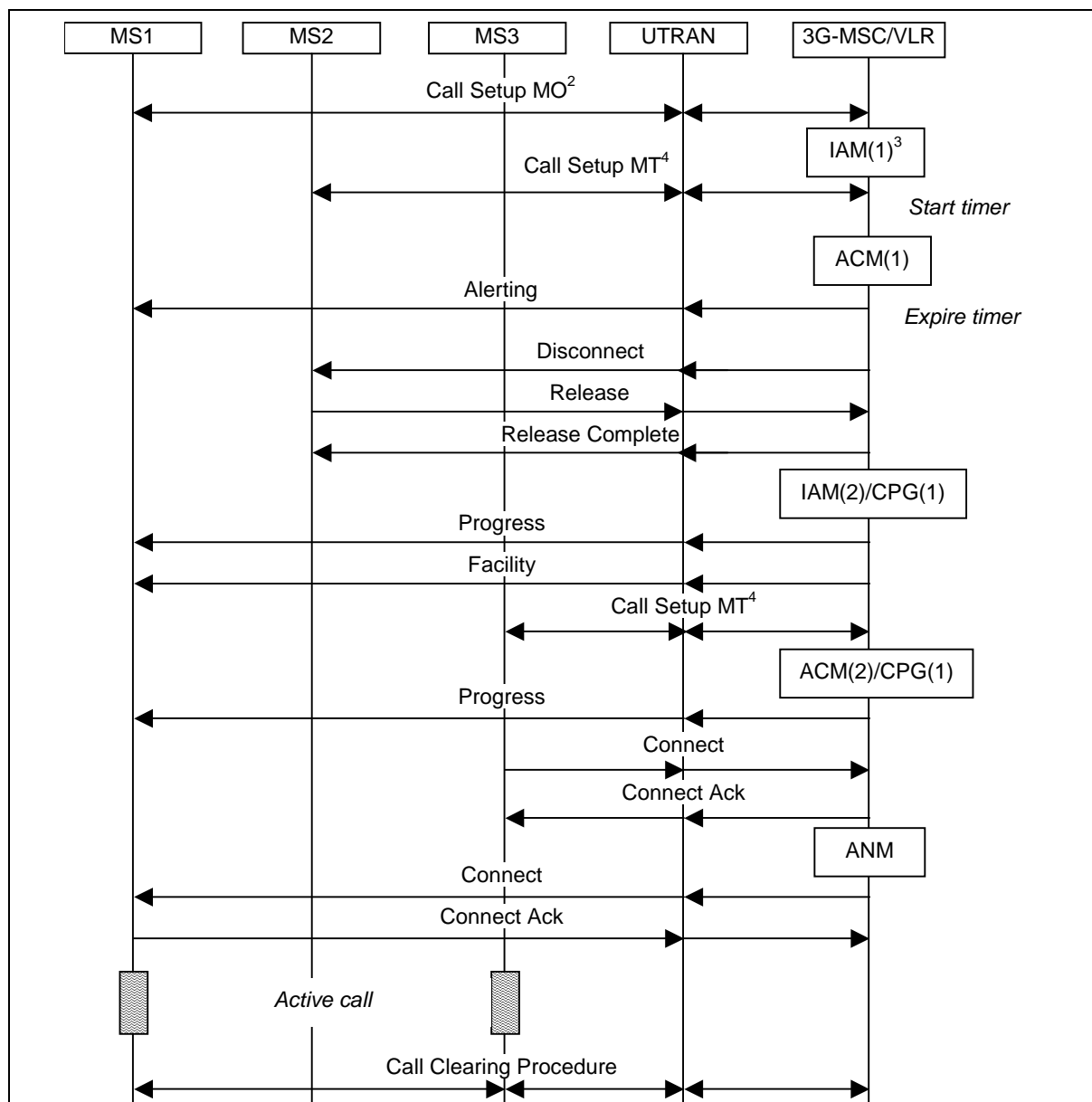
NOTES:

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

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

REFERENCES: [1] §9.3; [11] §2.

| | |
|--|--|
| <i>Supplementary Services and SMS – Interaction between Supplementary Services</i> | |
| SS_INT_803: CFNRy-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 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: | <ol style="list-style-type: none"> 1. Carry out a call from MS1 to MS2. 2. Carry out a Call clearing procedure. |
| EXPECTED RESULTS: | <ol style="list-style-type: none"> 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), Calling Number(MS1);

Connect(MT): Connected number(MS3).

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

NOTES:

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

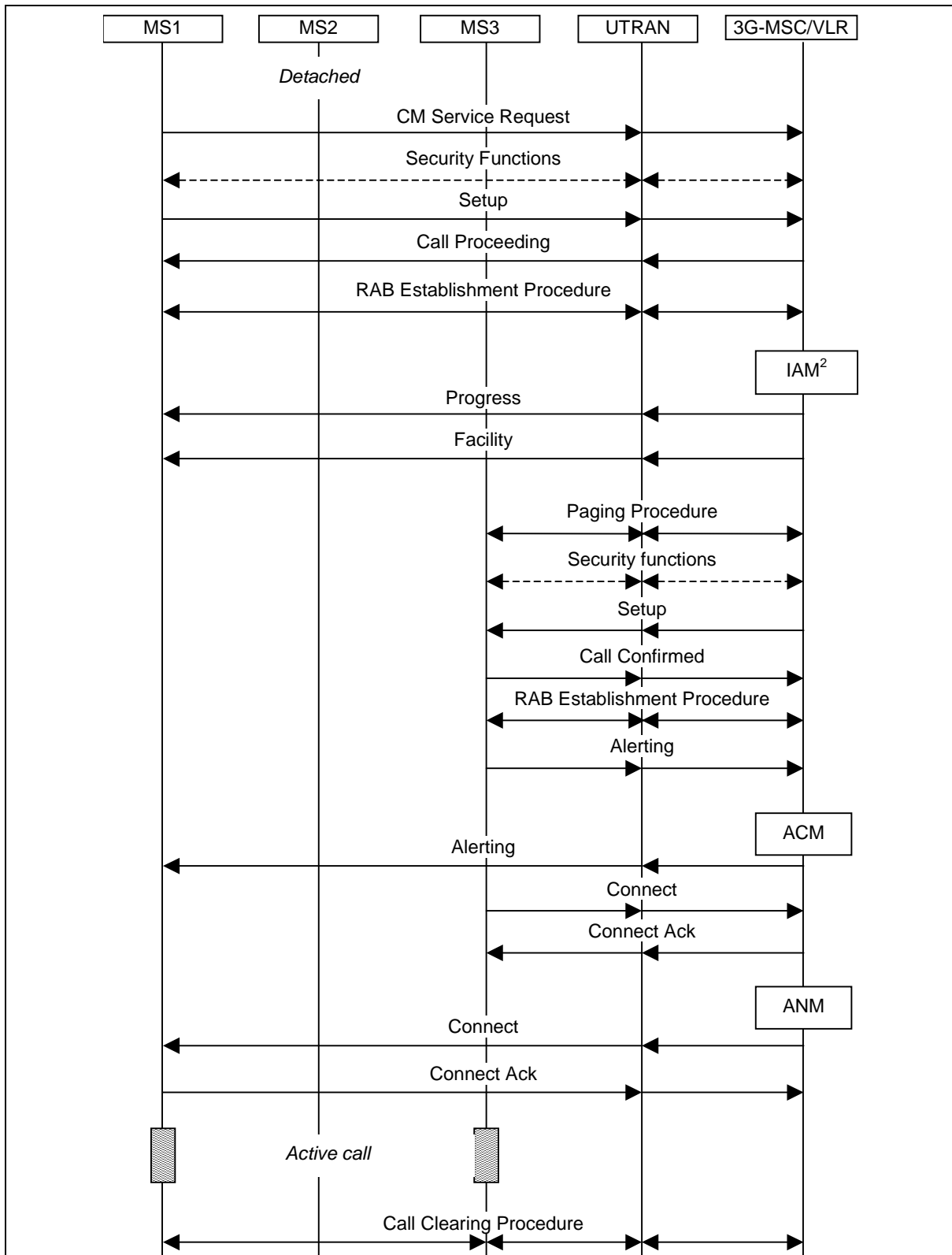
². In the Call Setup MO are included the following messages: CM Service Request, Setup, Call Proceeding, RAB Establishment Procedure messages and Alerting.

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

⁴. In the Call Setup MT are included the following messages: Paging Procedure messages, Setup, Call Confirmed, RAB Establishment Procedure messages and Alerting.

REFERENCES: [1] §9.3; [11] §3.

| | |
|--|--|
| <i>Supplementary Services and SMS – Interaction between Supplementary Services</i> | |
| SS_INT_804: CFNRc-CLIP-COLP IN A CALL BETWEEN UMTS USERS | |
| OBJECTIVE: | This test aims to demonstrate interactions between CFNRc CLIP and COLP supplementary services when activated during a call between UMTS users. |
| INTERFACES: | IuCS. |
| PRECONDITIONS: | Requires at least configuration n°4 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. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <ol style="list-style-type: none"> 1. Carry out a call from MS1 to MS2. 2. Carry out a Call clearing procedure. |
| EXPECTED RESULTS: | <ol style="list-style-type: none"> 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).

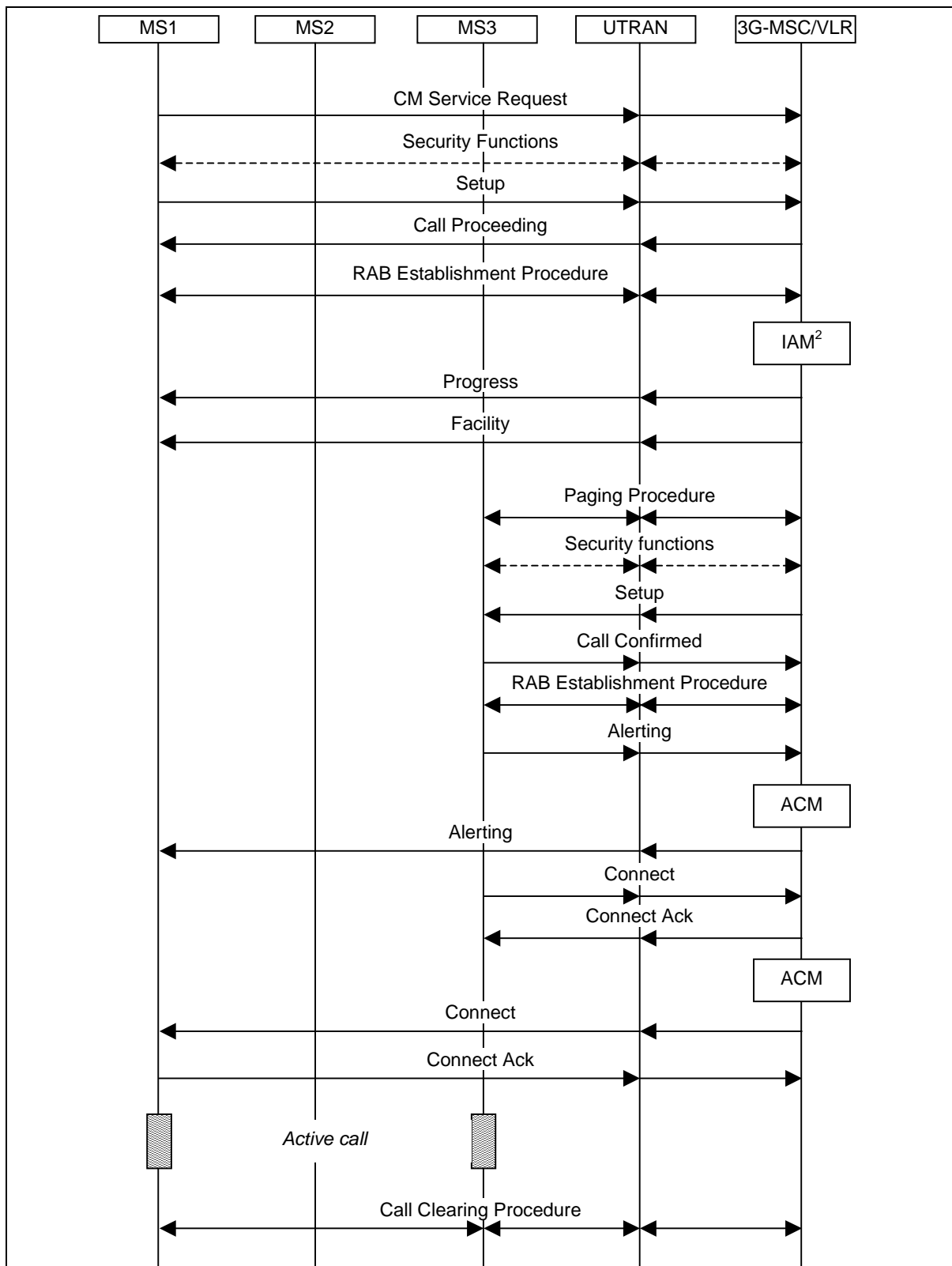
2. Check that the call is forwarded to MS3 and that is successfully completed.

NOTES:

- ¹. In this test are required at least three users.
- ². If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSC take place.

REFERENCES: [1] §9.3; [11] §4.

| | |
|--|---|
| <i>Supplementary Services and SMS – Interaction between Supplementary Services</i> | |
| SS_INT_805: CFU-CLIR-COLR IN A UMTS-UMTS CALL | |
| OBJECTIVE: | This test aims to demonstrate the interactions between CFU and the LI supplementary services during a call between UMTS subscribers. |
| INTERFACES: | IuCS. |
| PRECONDITIONS: | Requires at least configuration n°4 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 and CLIR, the called party (MS2) must be provided with CFU and the forwarded party (MS3) must be provided with CLIP and COLR. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 1. Carry out a CS call from MS1 to MS2. 2. Carry out a Call clearing procedure. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 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).

3. Check that the Setup(MT) doesn't contain the LI of MS1 and that the Connect(MT) doesn't contain the LI of MS3.

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

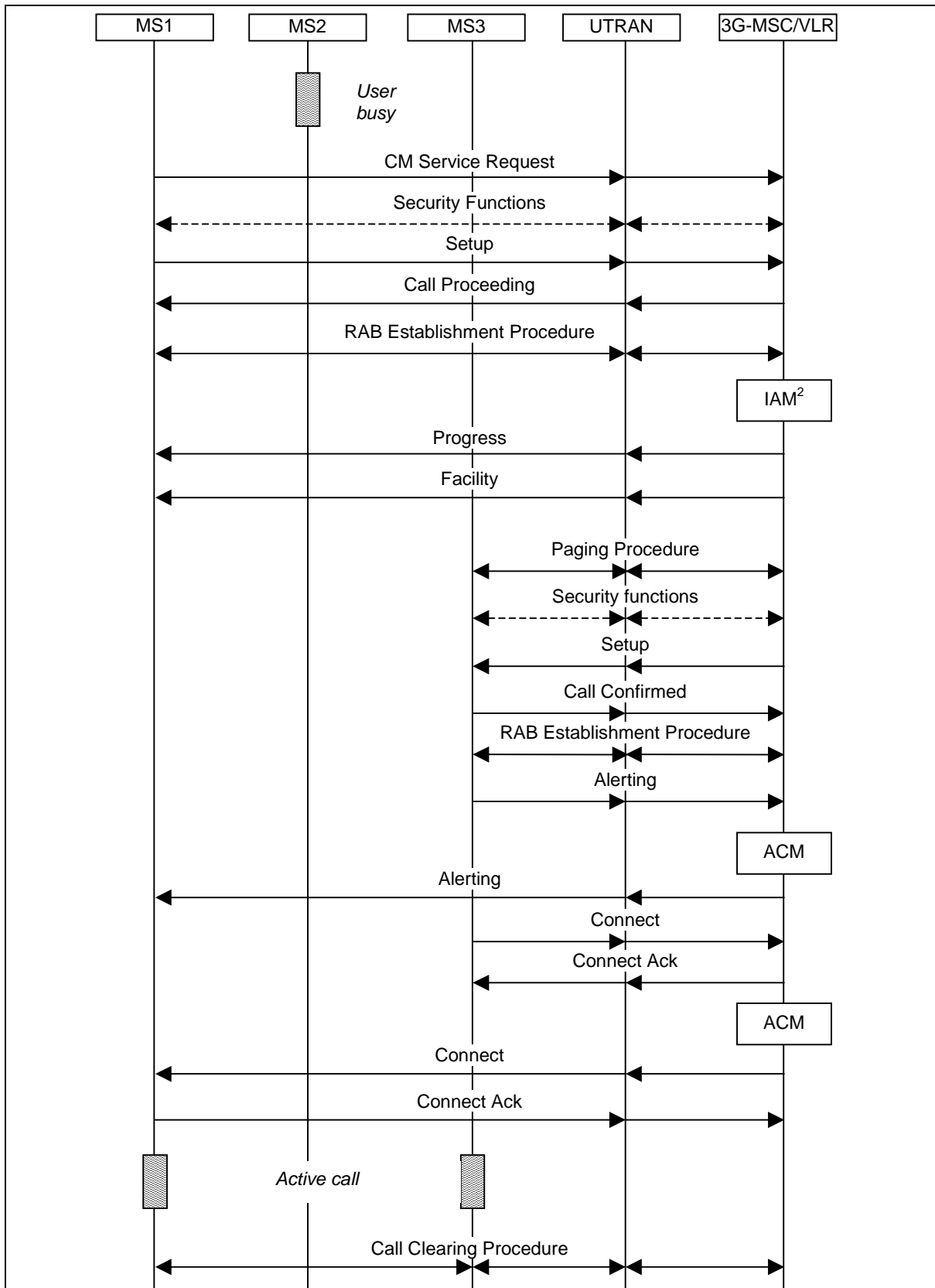
NOTES:

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

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

REFERENCES: [1] §9.3; [11] §1.

| | |
|--|---|
| <i>Supplementary Services and SMS – Interaction between Supplementary Services</i> | |
| SS_INT_806: CFB-CLIR-COLR IN A CALL BETWEEN UMTS USERS | |
| OBJECTIVE: | This test aims to demonstrate interactions between CFB and LI supplementary services when activated during a call between UMTS users. |
| INTERFACES: | IuCS. |
| PRECONDITIONS: | Requires at least configuration n°4 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. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <ol style="list-style-type: none"> 1. Carry out a call from MS1 to MS2. 2. Carry out a Call clearing procedure. |
| EXPECTED RESULTS: | <ol style="list-style-type: none"> 1. The message exchange to check is as follows: |



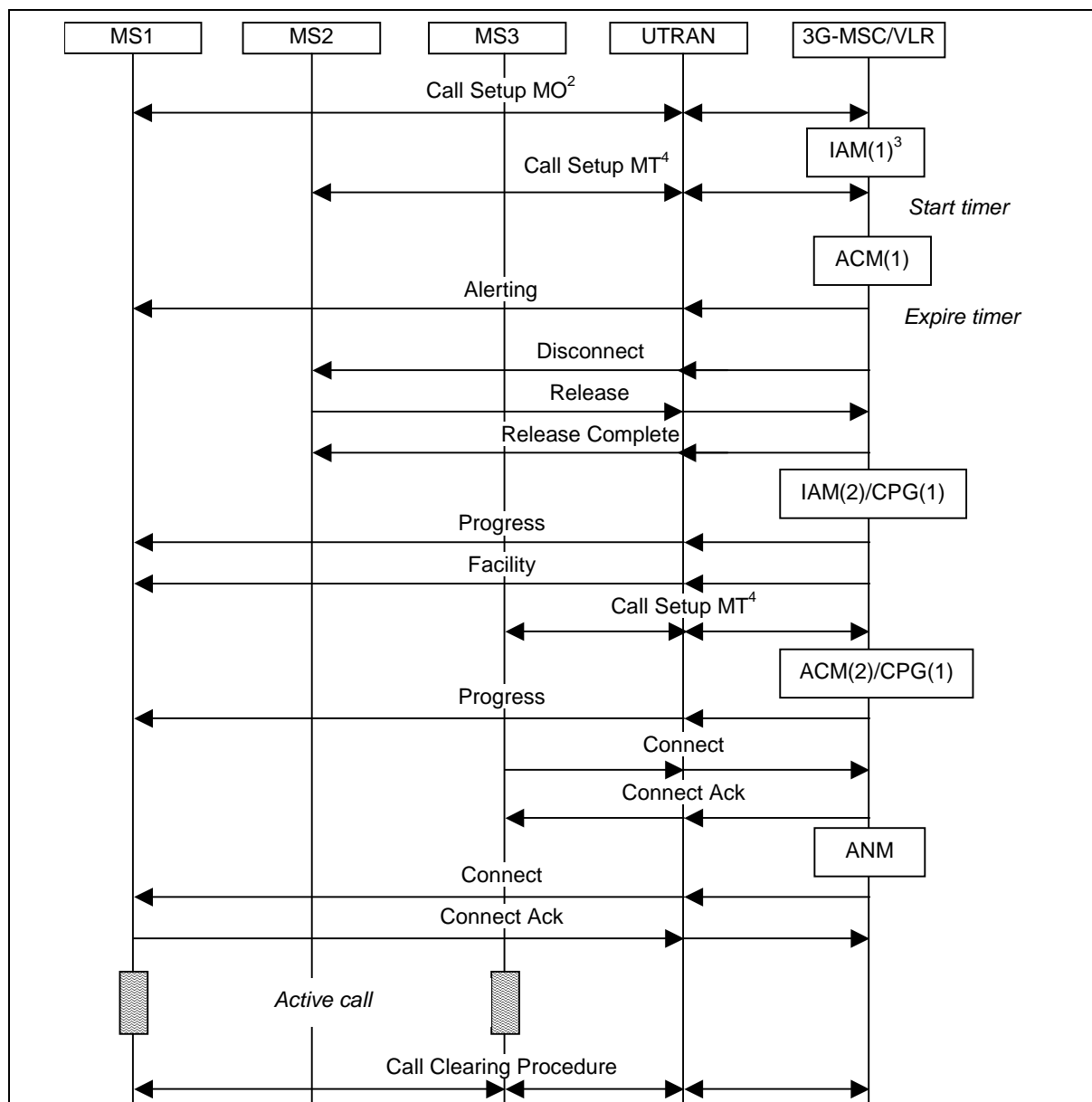
2. Check the following fields in the messages:

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) doesn't contain the LI of MS1 and that the Connect(MT) doesn't contain the LI of MS3. |
| 4. Check that the call is forwarded to MS3 and that the call is successfully completed. |
| NOTES: ¹ . In this test are required at least three users. ² . If the two users are in different 3G-MSC areas then an HLR interrogation and an ISUP messages transaction between the two 3G-MSC take place. |
| REFERENCES: [1] §9.3; [11] §2. |

| | |
|--|--|
| <i>Supplementary Services and SMS – Interaction between Supplementary Services</i> | |
| 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 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: | <ol style="list-style-type: none"> 1. Carry out a call from MS1 to MS2. 2. Carry out a Call clearing procedure. |
| EXPECTED RESULTS: | <ol style="list-style-type: none"> 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) doesn't contain the LI of MS1 and that the Connect(MT) doesn't contain the LI of MS3.

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

NOTES:

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

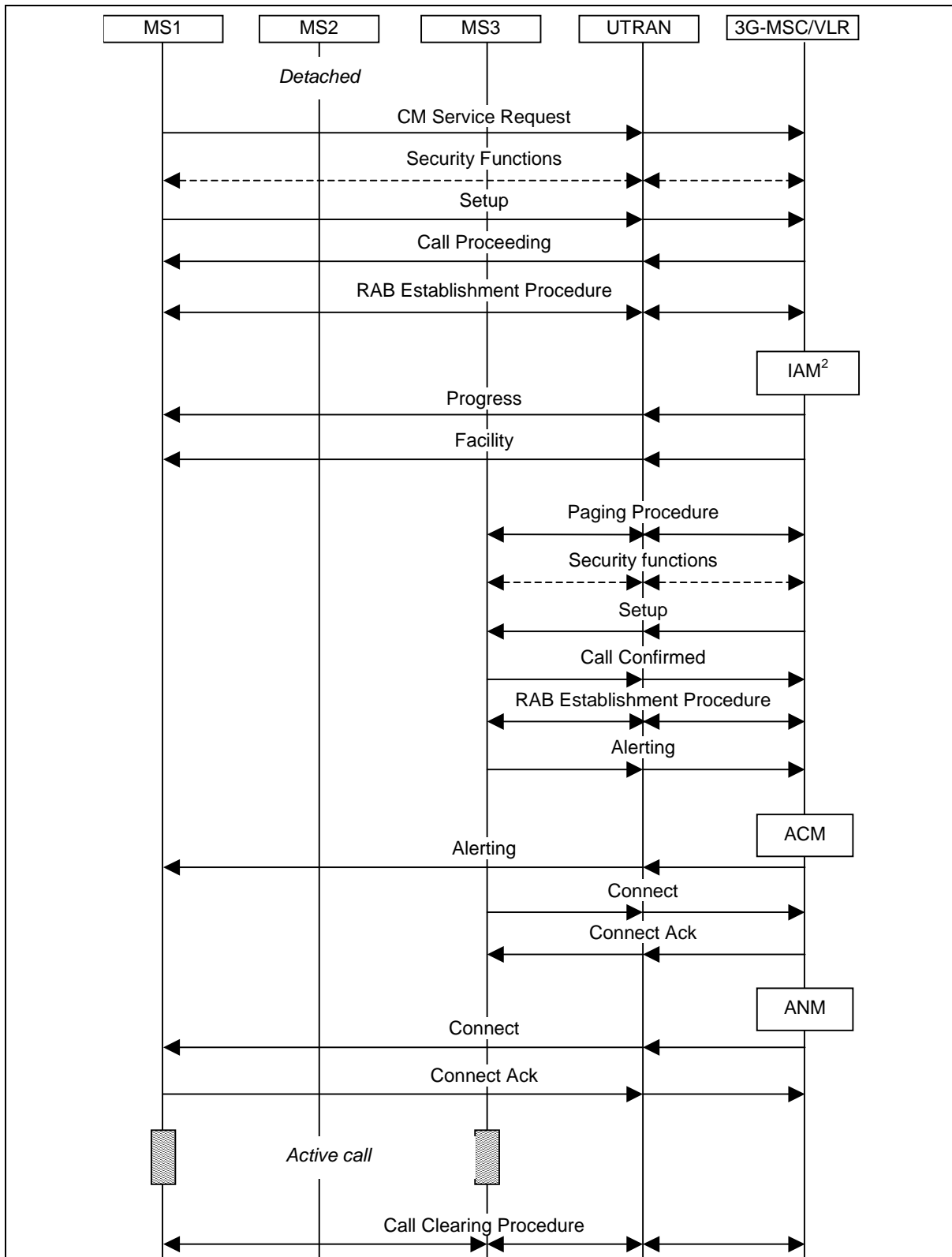
². In the Call Setup MO are included the following messages: CM Service Request, Setup, Call Proceeding, RAB Establishment Procedure messages and Alerting.

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

⁴. In the Call Setup MT are included the following messages: Paging Procedure messages, Setup, Call Confirmed, RAB Establishment Procedure messages and Alerting.

REFERENCES: [1] §9.3; [11] §3.

| | |
|--|--|
| <i>Supplementary Services and SMS – Interaction between Supplementary Services</i> | |
| SS_INT_808: CFNRc-CLIR-COLR IN A CALL BETWEEN UMTS USERS | |
| OBJECTIVE: | This test aims to demonstrate interactions between CFNRc and LI supplementary services when activated during a call between UMTS users. |
| INTERFACES: | IuCS. |
| PRECONDITIONS: | Requires at least configuration n°4 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 and CLIR, the called party (MS2) must be provided with CFNRc and the forwarded party (MS3) must be provided with CLIP and COLR. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <ol style="list-style-type: none"> 1. Carry out a call from MS1 to MS2. 2. Carry out a Call clearing procedure. |
| EXPECTED RESULTS: | <ol style="list-style-type: none"> 1. The message exchange to check is as follows: |



2. 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)).

3. Check that the Setup(MT) doesn't contain the LI of MS1 and that the Connect(MT) doesn't contain the LI of MS3.

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

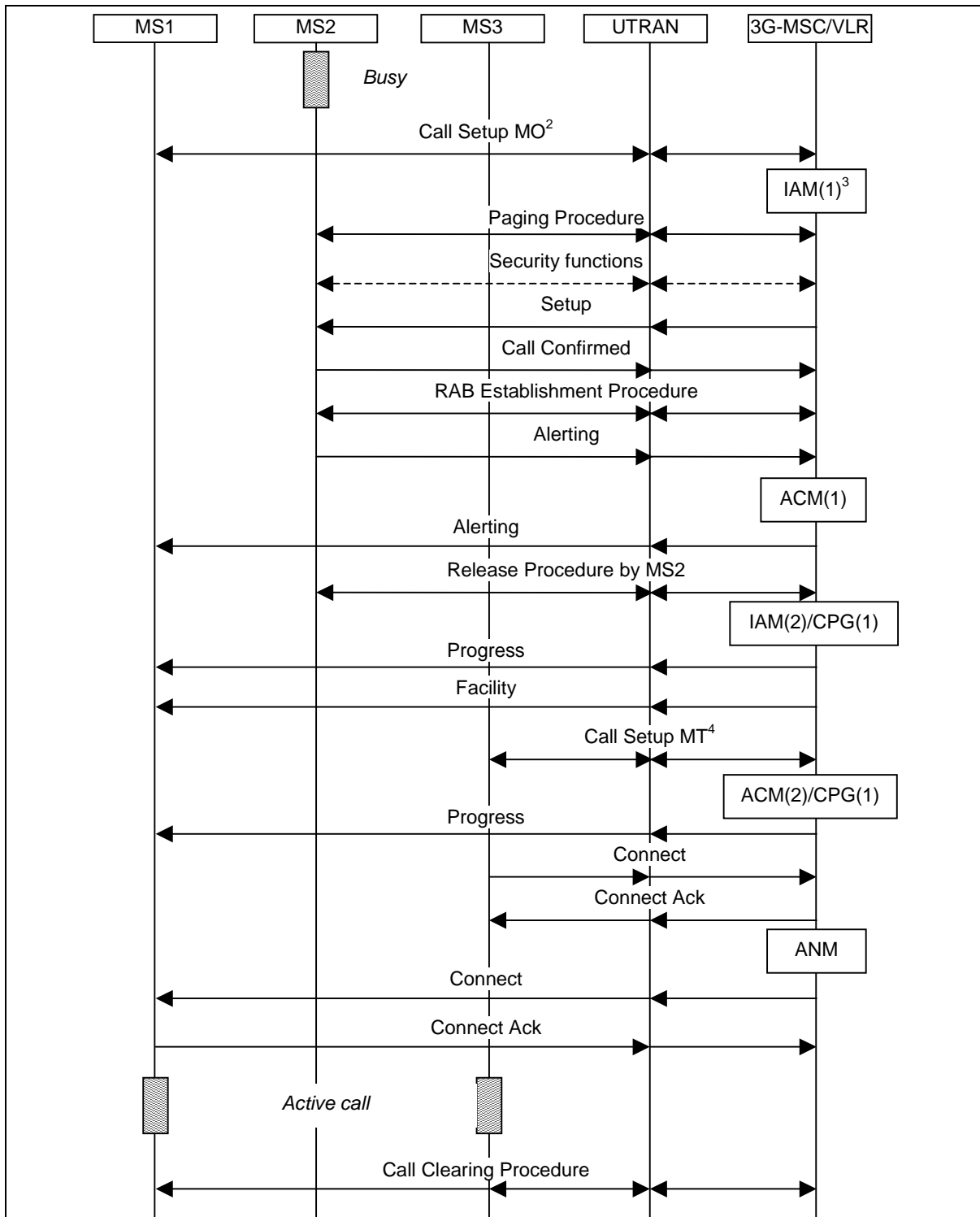
NOTES:

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

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

REFERENCES: [1] §9.3; [11] §4.

| | |
|--|--|
| <i>Supplementary Services and SMS – Interaction between Supplementary Services</i> | |
| SS_INT_809: CFB(UDUB)-CW IN A CALL BETWEEN UMTS USERS | |
| OBJECTIVE: | This test aims to demonstrate interactions between CFB (UDUB) and CW supplementary services when activated during a call between UMTS users. |
| INTERFACES: | IuCS. |
| PRECONDITIONS: | Requires at least configuration n°4 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. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <ol style="list-style-type: none">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 MS2.2. Carry out a Call clearing procedure. |
| EXPECTED RESULTS: | <ol style="list-style-type: none">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.

NOTES:

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

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

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

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

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

| | |
|---|---|
| <i>Supplementary Services and SMS – Short Message Service</i> | |
| SS_SMS_901: SMS BETWEEN UMTS USERS | |
| OBJECTIVE: | This test aims to demonstrate completion of SMS transfer between two UMTS MS. |
| INTERFACES: | IuCS or IuPS , E or Gd. |
| 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->>UTRAN: CM Service Request UTRAN->>3G_SGSN: Security Functions MS1->>UTRAN: MO Message Transfer UTRAN->>3G_SGSN: Forward SM 3G_SGSN->>SMS_IWMSC: Delivery Report 3G_SGSN->>MS1: Delivery Report SMS_IWMSC->>HLR: SRI HLR->>SMS_IWMSC: SRI Ack SMS_IWMSC->>3G_SGSN: Forward SM MS2->>UTRAN: Paging Procedure UTRAN->>3G_SGSN: Security Functions MS2->>UTRAN: MT Message Transfer UTRAN->>3G_SGSN: Delivery Report 3G_SGSN->>SMS_IWMSC: Delivery Report </pre> | |
| 2. Check that the SMS transfer is successful. | |
| NOTES: | |
| REFERENCES: | [16] §10.2 |

| | |
|---|---|
| <i>Supplementary Services and SMS – Short Message Service</i> | |
| SS_SMS_902: SMS FROM UMTS TO GSM | |
| OBJECTIVE: | This test aims to demonstrate completion of SMS transfer from an UMTS to a GSM user. |
| INTERFACES: | IuCS or IuPS , E or Gd. |
| PRECONDITIONS: | Requires at least configuration n°11. The MS1 must be registered in the HLR with UMTS subscription, instead the MS2 must have a GSM 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 3G_SGSN as 3G-SGSN 3G-MSC participant SMS_IWMSC as SMS-IWMSC SMS_GMSC participant HLR participant MSC participant MS2 MS1->>3G_SGSN: CM Service Request 3G_SGSN->>MS1: Security Functions MS1->>3G_SGSN: MO Message Transfer 3G_SGSN->>SMS_IWMSC: Forward SM SMS_IWMSC->>3G_SGSN: Delivery Report SMS_IWMSC->>HLR: SRI HLR->>SMS_IWMSC: SRI Ack SMS_IWMSC->>MSC: Forward SM MSC->>MS2: Paging Procedure MS2->>MSC: Security Functions MSC->>MS2: MT Message Transfer MSC->>SMS_IWMSC: Delivery Report </pre> | |
| 2. Check that the SMS transfer is successful. | |
| NOTES: | |
| REFERENCES: | [16] §10.2. |

| | |
|--|--|
| <i>Supplementary Services and SMS – Short Message Service</i> | |
| SS_SMS_903: SMS FROM GSM TO UMTS | |
| OBJECTIVE: | This test aims to demonstrate completion of SMS transfer from a GSM to an UMTS user. |
| INTERFACES: | IuCS or IuPS , E or Gd. |
| PRECONDITIONS: | Requires at least configuration n°11. The MS1 must be registered in the HLR with GSM subscription, instead the MS2 must have an 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->>MSC: CM Service Request MSC->>MS1: Security Functions MS1->>MSC: MO Message Transfer MSC->>SMS_IWMSC: Forward SM SMS_IWMSC->>MSC: Delivery Report MSC->>3G_HLR: SRI 3G_HLR->>MSC: SRI Ack SMS_IWMSC->>3G_MSC: Forward SM 3G_MSC->>MS2: Paging Procedure MS2->>3G_MSC: Security Functions 3G_MSC->>MS2: MT Message Transfer 3G_MSC->>SMS_IWMSC: Delivery Report </pre> | |
| 2. Check that the SMS transfer is successful. | |
| NOTES: | |
| REFERENCES: | [16] §10.2. |

7.1.4.8. Applications

| | |
|---|---|
| <i>Applications – Standard applications</i> | |
| APP_STD_101: FTP FILE TRANSFER | |
| OBJECTIVE: | This test aims to demonstrate correct function of the FTP protocol on the PS network. |
| INTERFACES: | IuPS , Gn, Gi. |
| PRECONDITIONS: | Requires at least configuration n°7. The MS must be registered with an UMTS subscription. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <ol style="list-style-type: none"> 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: | <ol style="list-style-type: none"> 1. Check that each data transfer is successful. |
| NOTES: | |
| REFERENCES: | |

| | |
|--|--|
| <i>Applications– Standard applications</i> | |
| APP_STD_102: WEB BROWSING | |
| OBJECTIVE: | This test aims to demonstrate the correct function of HTTP protocol on the PS network. |
| INTERFACES: | IuPS , Gn, Gi. |
| 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"> 1. Carry out a PS attach and a PDPC activation with a transparent APN. 2. Run various HTTP applications(web browser) using web pages of various sizes. 3. Measure the time taken for each transfer to perform the download end-to-end. |
| EXPECTED RESULTS: | <ol style="list-style-type: none"> 1. Check that each data transfer is successful. |
| NOTES: | |
| REFERENCES: | |

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

| | |
|--|--|
| <i>Applications– Standard applications</i> | |
| APP_STD_104: WAP SERVICE | |
| OBJECTIVE: | This test aims to demonstrate the correct function of the WAP service. |
| INTERFACES: | IuPS , Gn, Gi. |
| 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">1. Carry out a PS attach and a PDPC activation with the APN configured for the WAP service.2. Run WAP browsing from the MS. |
| EXPECTED RESULTS: | <ol style="list-style-type: none">1. Check that data transfers are successful. |
| NOTES: | |
| REFERENCES: | |

7.1.4.9. Billing

| | |
|---|--|
| Billing – 3G-GSNs accounting | |
| BILL_PS_101: ACTIVATION, DEACTIVATION OF PDP CONTEXT | |
| OBJECTIVE: | This test aims to demonstrate correct CDR creation and recording (S-CDR and G-CDR). |
| INTERFACES: | IuPS , Gn, Gi. |
| PRECONDITIONS: | Requires at least configuration n°7. The MS must be PS attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <ol style="list-style-type: none"> 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: | <ol style="list-style-type: none"> 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 CDR are correctly stored in the 3G-SGSN and 3G-GGSN. |
| NOTES: | |
| REFERENCES: | [17] |

| | |
|--|--|
| Billing – 3G-GSNs accounting | |
| BILL_PS_102: QoS NEGOTIATION | |
| OBJECTIVE: | This test aims to demonstrate correct negotiation of the QoS during the creation of the CDR (S-CDR and G-CDR). |
| INTERFACES: | IuPS , Gn, Gi. |
| PRECONDITIONS: | Requires at least configuration n°7. The MS must be PS attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <u>Case 1:</u> | |
| 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. | |
| <u>Case 2:</u> | |
| 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: | |
| <u>Case 1:</u> | |
| 1. Check that the QoS negotiated in the CDR is the same as the one requested by the user. | |
| <u>Case 2:</u> | |
| 2. Check that the QoS negotiated in the CDR is the same as the one subscribed by the user. | |
| NOTES: | |
| REFERENCES: | [17] |

| | |
|-------------------------------------|--|
| Billing – 3G-GSNs accounting | |
| BILL_PS_103: QoS UPDATE | |
| OBJECTIVE: | This test aims to demonstrate correct partial closure of the CDR (S-CDR and G-CDR) and their recording in the 3G-GSN in the event of changes to the QoS by PDPC data. |
| INTERFACES: | IuPS , Gn, Gi. |
| PRECONDITIONS: | Requires at least configuration n°7. La MS must be PS attached and have an active PDPC. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <ol style="list-style-type: none"> 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: | <ol style="list-style-type: none"> 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 CDR have been opened with the same Charging ID and with a higher Sequence Number. 3. Check that the CDR 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. |
| NOTES: | |
| REFERENCES: | [3] § 9.2.3; [17] |

| | |
|-------------------------------------|--|
| Billing – 3G-GSNs accounting | |
| BILL_PS_104: DATA VOLUME LIMIT | |
| OBJECTIVE: | This test aims to demonstrate the correct partial closure of the CDR (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: | IuPS , Gn, Gi. |
| PRECONDITIONS: | Requires at least configuration n°7. The MS must be PS attached and have an active PDPC. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <ol style="list-style-type: none"> 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: | <ol style="list-style-type: none"> 1. Check partial closure of the CDR on reaching the volume limit and their recording in the 3G-GSN. Also check that the PDPC remains active. 2. Check that new CDR are opened with the same Charging ID and with 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. |
| 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] |

| | |
|-------------------------------------|---|
| Billing – 3G-GSNs accounting | |
| BILL_PS_105: TIME LIMIT | |
| OBJECTIVE: | This test aims to demonstrate the correct partial closure of the CDR (S-CDR and G-CDR) and their recording in the 3G-GSN on expiry of the time limit. |
| INTERFACES: | IuPS , Gn, Gi. |
| PRECONDITIONS: | Requires at least configuration n°7. The MS must be PS attached and have an active PDPC. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <ol style="list-style-type: none"> 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: | <ol style="list-style-type: none"> 1. Check partial closure of the CDR 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 CDR 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. |
| NOTES: | The volume limit and time limit are set so that partial closure of the CDR occurs on expiry of the time limit. |
| REFERENCES: | [17] |

| | |
|-------------------------------------|--|
| Billing – 3G-GSNs accounting | |
| BILL_PS_106: TARIFF CHANGE | |
| OBJECTIVE: | This test aims to demonstrate the correct partial closure of the CDR (S-CDR and G-CDR) and their recording in the 3G-GSN following a tariff change. |
| INTERFACES: | IuPS , Gn, Gi. |
| PRECONDITIONS: | Requires at least configuration n°7. The MS must be PS attached and have an active PDPC. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <ol style="list-style-type: none"> 1. Set at least two tariff periods at an interval of around 10 minutes. 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: | <ol style="list-style-type: none"> 1. Check partial closure of the CDR and their recording in the 3G-GSN following each tariff change. Also check that the PDPC remains active. 2. Check that new CDR 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. |
| NOTES: | |
| REFERENCES: | [17] |

| | |
|-------------------------------------|--|
| Billing – 3G-GSNs accounting | |
| BILL_PS_107: INTER SGSN RA UPDATE | |
| OBJECTIVE: | This test aims to demonstrate the correct partial closure of the CDR (S-CDR and G-CDR) and their recording in the 3G-GSN following a change of 3G-SGSN. |
| INTERFACES: | IuPS , Gn, Gi. |
| PRECONDITIONS: | Requires at least configuration n°7. The MS must be PS attached and have an active PDPC. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <ol style="list-style-type: none"> 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: | <ol style="list-style-type: none"> 1. Check partial closure of the CDR 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 CDR are correctly stored in the 3G-GSN and that the volume of data recorded is the same as that effectively transmitted. |
| NOTES: | |
| REFERENCES: | [17] |

| | |
|-------------------------------------|--|
| Billing – 3G-GSNs accounting | |
| BILL_PS_108: ACCURACY OF CDRs | |
| OBJECTIVE: | This test aims to demonstrate the correct compilation of the CDR (S-CDR and G-CDR) and their accuracy in describing the data traffic. |
| INTERFACES: | IuPS , Gn, Gi. |
| PRECONDITIONS: | Requires at least configuration n°7. The MS must be PS attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <ol style="list-style-type: none"> 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: | <ol style="list-style-type: none"> 1. Check that the duration recorded in the CDR 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 CDR. |
| NOTES: | |
| REFERENCES: | [17] |

| | |
|--------------------------------------|--|
| Billing – 3G-GSNs accounting | |
| BILL_PS_109: CDR FORMAT VERIFICATION | |
| OBJECTIVE: | This test aims to demonstrate the correct decoding of the CDR in the billing centres. |
| INTERFACES: | IuPS , Gn, Gi. |
| PRECONDITIONS: | Requires at least configuration n°7. The MS must be PS attached and have an active PDPC. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <ol style="list-style-type: none"> 1. Carry out different types of data transfer (e.g. FTP, http and mail). 2. Deactivate the PDPC of the MS. |
| EXPECTED RESULTS: | <ol style="list-style-type: none"> 1. Check that the structure of the recorded CDR is coherent with ASN.1 format and with that envisaged by specification ETSI [6]. |
| NOTES: | |
| REFERENCES: | [17] |

| | |
|-----------------------------------|---|
| Billing – 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: | IuCS. |
| PRECONDITIONS: | Requires at least configuration n°4. The MS must be CS attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <ol style="list-style-type: none"> 1. Carry out a CS Voice calls from a PSTN user to a UMTS user 2. Release the call. |
| EXPECTED RESULTS: | <ol style="list-style-type: none"> 1. Check the creation of an LM-CDR by the 3G-MSC. 2. Check that the following interesting fields are correctly recorded: <ul style="list-style-type: none"> • Called Party Number, • Calling Party Number, • Chargeable Duration, • Date and Time for Start of Charging, • Disconnecting Party, • Tariff Class. |
| NOTES: | the MSC can generate several CDR for the voice call, in this case check all the partial output with the same “Call Identification Number”. |
| REFERENCES: | |

| | |
|-----------------------------------|---|
| Billing – 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: | IuCS. |
| PRECONDITIONS: | Requires at least configuration n°4 The MS must be CS attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <ol style="list-style-type: none"> 1. Carry out a CS voice call from a UMTS user to a PSTN user 2. Release the call. |
| EXPECTED RESULTS: | <ol style="list-style-type: none"> 1. Check the creation of an ML-CDR by the 3G-MSC. 2. Check that the following interesting fields are correctly recorded: <ul style="list-style-type: none"> • Called Party Number, • Calling Party Number, • Chargeable Duration, • Date and Time for Start of Charging, • Disconnecting Party, Tariff Class. |
| NOTES: | The 3G-MSC can generate several CDR for the same voice call, in this case check all the partial output with the same “Call Identification Number”. |
| REFERENCES: | |

| | |
|-----------------------------------|--|
| Billing – 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: | IuCS. |
| PRECONDITIONS: | Requires at least configuration n°4. Both the MSs must be CS attached. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <ol style="list-style-type: none"> 1. Carry out a CS voice call from an UMTS user to another UMTS user 2. Release the call. |
| EXPECTED RESULTS: | <ol style="list-style-type: none"> 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: <ul style="list-style-type: none"> • Called Party Number, • Calling Party Number, • Chargeable Duration, • Date and Time for Start of Charging, • Disconnecting Party, Tariff Class. |
| NOTES: | The 3G-MSC can generate several CDR for the same voice call, in this case check all the partial output with the same “Call Identification Number”. |
| REFERENCES: | |

7.1.4.10. System stability

| | |
|--|---|
| <i>System stability – Endurance</i> | |
| 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 deconnection procedures for a given call rate. |
| INTERFACES: | IuPS , Gn, Gi. |
| 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. |
| NOTES: | To render the test more significant, a traffic generator may be used. |
| REFERENCES: | |

| | |
|-------------------------------------|--|
| <i>System stability – Endurance</i> | |
| 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: | IuPS , Gn, Gi. |
| 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. |
| NOTES: | |
| REFERENCES: | |

| | |
|--|---|
| <i>System stability – Endurance</i> | |
| 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: | IuPS , Gn, Gi. |
| PRECONDITIONS: | Requires at least configuration n°7. |
| PRIORITY: | B |
| DESCRIPTION/PROCEDURE: | 1. Carry out a data transfer for a large file (> 3Mb). |
| EXPECTED RESULTS: | 1. Check system performance. |
| NOTES: | |
| REFERENCES: | |

7.1.4.11. Quality of Service

| | |
|--|---|
| Quality of Service – Round Trip Delay | |
| 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: | IuPS, Gn, Gi, R¹. |
| PRECONDITIONS: | Requires at least configuration n°7. The MS must be PS attached and have an active PDPC. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 1. Carry out a serie of echo packets (either ICMP or UDP port 7) toward a server placed directly on the Gi interface. 2. Measure the round trip delay as the average of the response times in the serie. It's recommended to perform this test several times with different packet sizes. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 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). | |
| | |
| NOTES: | |
| ¹ 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). | |
| REFERENCES: | |

| | |
|--|--|
| <i>Quality of Service – Throughput</i> | |
| QoS_THR_201: THROUGHPUT MEASUREMENT | |
| OBJECTIVE: | This test aims to measure the Quality of Service of a PS connection in terms of throughput. |
| INTERFACES: | IuPS , Gn, Gi, R ¹ . |
| PRECONDITIONS: | Requires at least configuration n°7. The MS must be PS attached and have an active PDPC. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <ol style="list-style-type: none"> 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). 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. |
| EXPECTED RESULTS: | <ol style="list-style-type: none"> 1. Check that the throughput measured is coherent with the bandwidth used by the MS. |
| NOTES: | ¹ The test is performed by monitoring either the IuPS and/or R interface. |
| REFERENCES: | |

| | |
|------------------------------------|--|
| <i>Quality of Service – Jitter</i> | |
| QoS_JIT_301: JITTER MEASUREMENT | |
| OBJECTIVE: | This test aims to measure The Quality of Service of a PS connection in terms of jitter. |
| INTERFACES: | IuPS , Gn, Gi, R ¹ . |
| PRECONDITIONS: | Requires at least configuration n°7. The MS must be PS attached and have an active PDPC. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <ol style="list-style-type: none"> 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: | <ol style="list-style-type: none"> 1. Check that the jitter measured is compatible with the applications of streaming class. |
| NOTES: | <ol style="list-style-type: none"> ¹. The test is performed by monitoring either the IuPS and/or R interface. |
| REFERENCES: | |

| | |
|--|--|
| <i>Quality of Service – Packet errors</i> | |
| 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: | IuPS , Gn, Gi, R ¹ . |
| PRECONDITIONS: | Requires at least configuration n°7. The MS must be PS attached and have an active PDPC. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 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: | |
| <ol style="list-style-type: none"> 1. Check that the error rates measured are compatible with the applications of streaming class. | |
| NOTES: | |
| ¹ . The test is performed by monitoring either the IuPS and/or R interface. | |
| REFERENCES: | |

| | |
|---|--|
| <i>Quality of Service – Quality of voice</i> | |
| 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: | |
| <ol style="list-style-type: none"> 1. Carry out some voice calls¹ 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 method². | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. Check that the call is successful and that the clarity measured is compatible with the expected one. | |
| NOTES: | |
| <ol style="list-style-type: none"> ¹. This test requires several calls to be statistically relevant. ². The instrument used for these measures and the methods utilized are described in §1.4.3. | |
| REFERENCES: | |

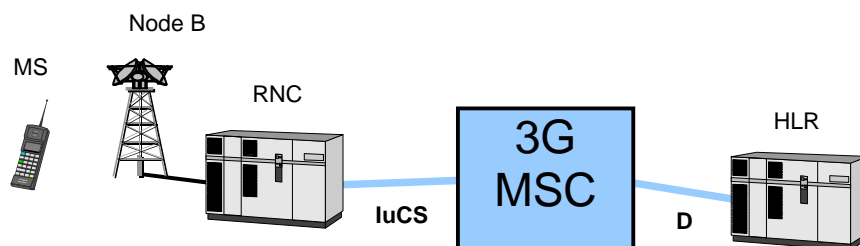
| | |
|--|--|
| <i>Quality of Service – Quality of voice</i> | |
| QoS_CS_502: CLARITY CORE NETWORK | |
| OBJECTIVE: | This test aims to estimate the QoS of a call in terms of clarity in the CoreNetwork (i.e. excluding the radio loss). This test has to be repeated for the following kind of callers: UMTS, GSM, ISDN, PSTN; while the called is always UMTS. |
| INTERFACES: | IuCS |
| PRECONDITIONS: | Requires at least configuration n°4. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 1. Carry out some voice calls¹ 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 method². | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. Check that the call is succesfull and that the clarity measured is compatible with the expected one. | |
| NOTES: | |
| <ol style="list-style-type: none"> ¹. This test requires several calls to be statistically relevant. ². The instrument used for these measures and the methods utilized are described in §1.4.3. | |
| REFERENCES: | |

| | |
|--|---|
| <i>Quality of Service – Quality of voice</i> | |
| 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: | IuCS |
| PRECONDITIONS: | Requires at least configuration n°4. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | <ol style="list-style-type: none"> 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 ¹. |
| EXPECTED RESULTS: | <ol style="list-style-type: none"> 1. Check that the call is succesfull and that the delay measured is compatible with the expected one. |
| NOTES: | ¹ . The instrument used for these measures and the methods utilized are described in §1.4.3. |
| REFERENCES: | |

| | |
|---|--|
| <i>Quality of Service – Quality of voice</i> | |
| 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: | IuCS |
| PRECONDITIONS: | Requires at least configuration n°4. |
| PRIORITY: | A |
| DESCRIPTION/PROCEDURE: | |
| <ol style="list-style-type: none"> 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 ¹. | |
| EXPECTED RESULTS: | |
| <ol style="list-style-type: none"> 1. Check that the call is succesfull and that the delay measured is compatible with the expected one. | |
| NOTES: | |
| ¹ . The instrument used for these measures and the methods utilized are described in §1.4.3. | |
| REFERENCES: | |

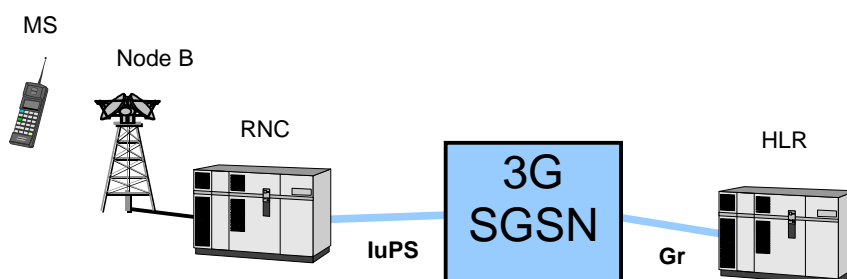
Annex A: Configurations of the system under test

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.



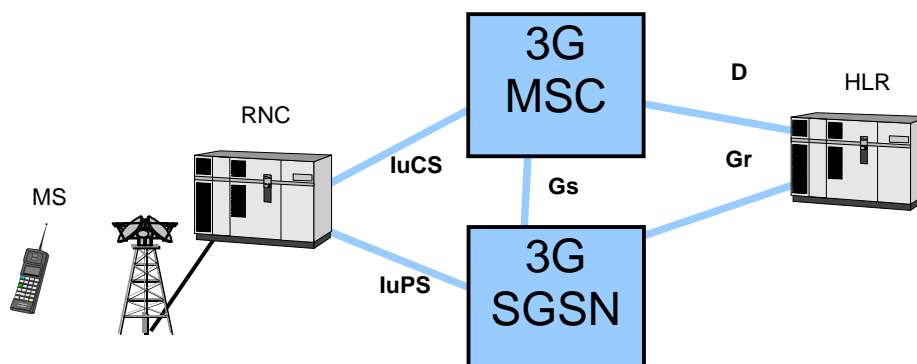
Configuration n° 1

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



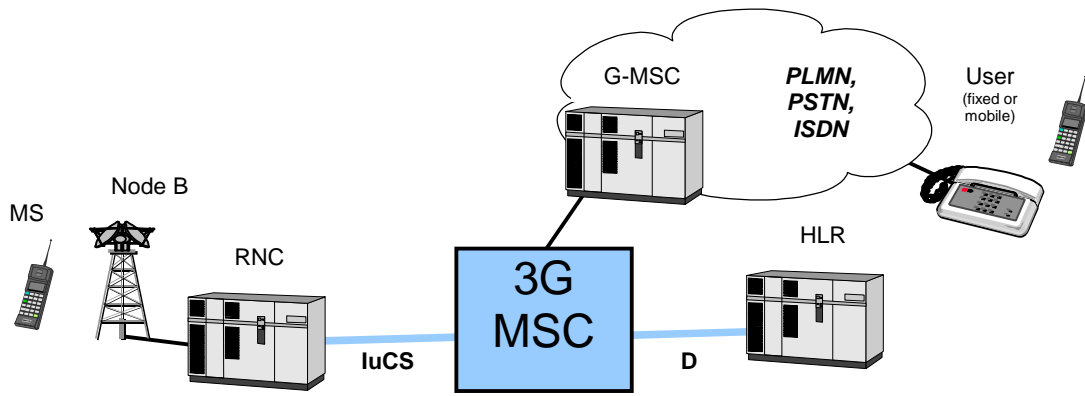
Configuration n° 2

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



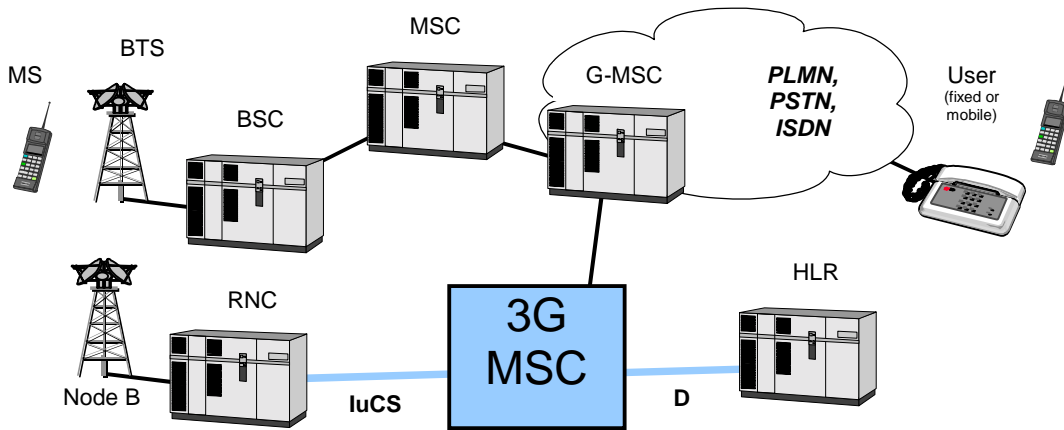
Configuration n° 3

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



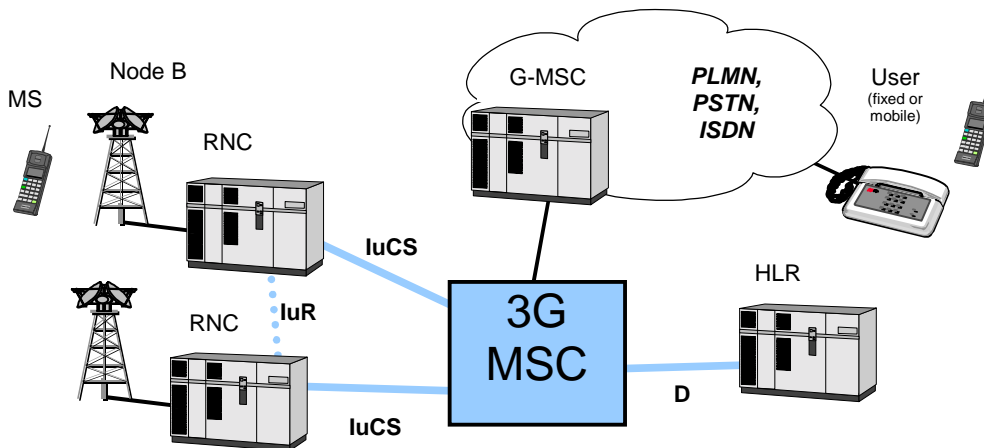
Configuration n° 4

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



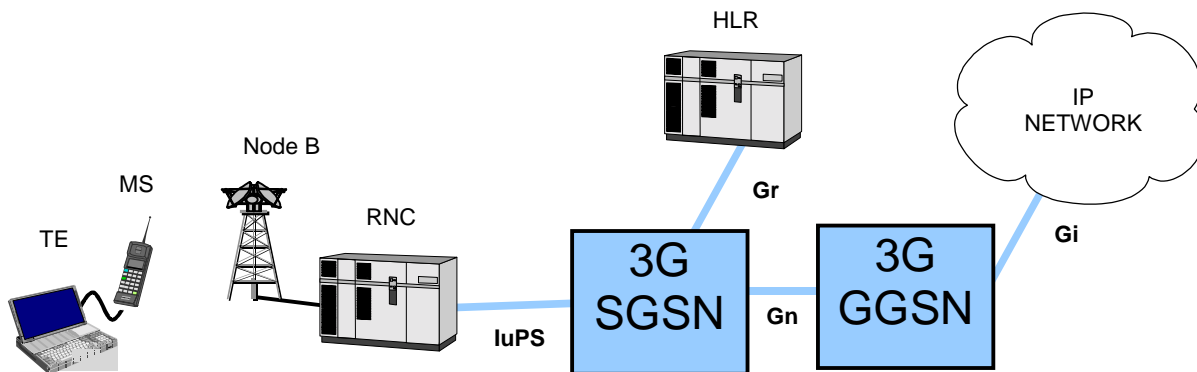
Configuration n° 5

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



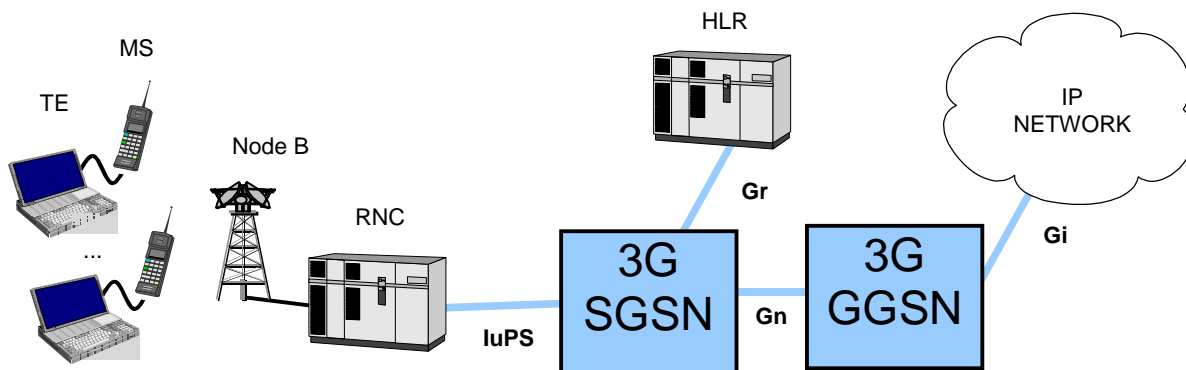
Configuration n° 6

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



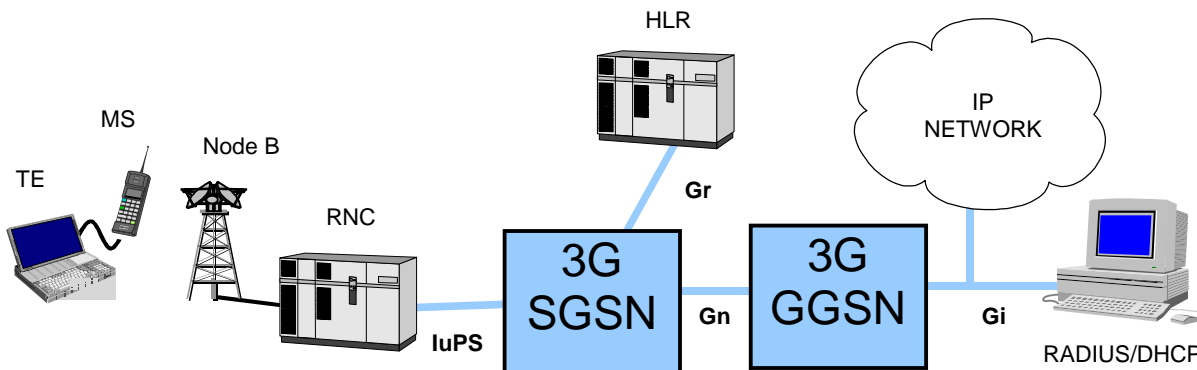
Configuration n°7

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



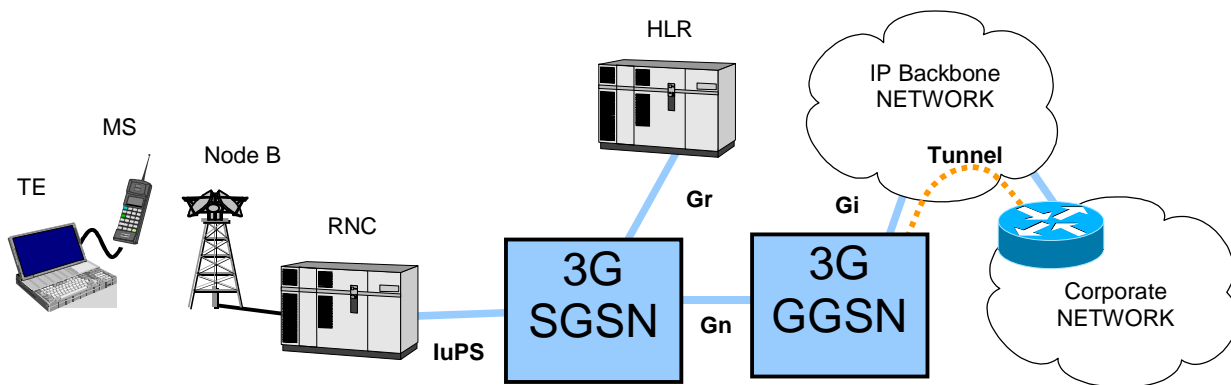
Configuration n°8

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



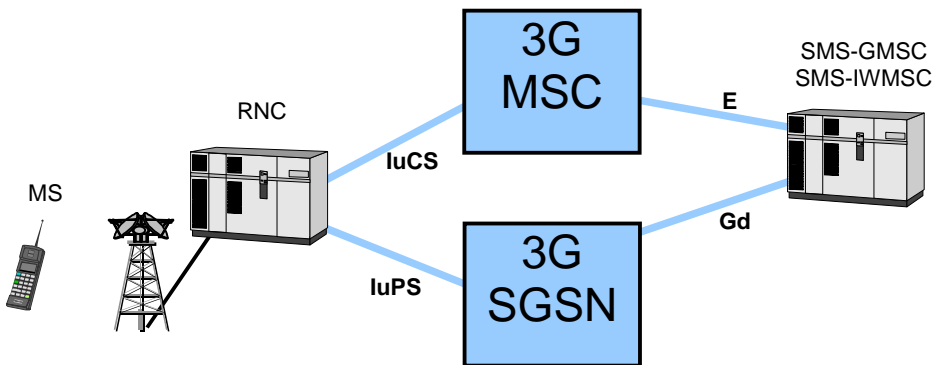
Configuration n°9

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



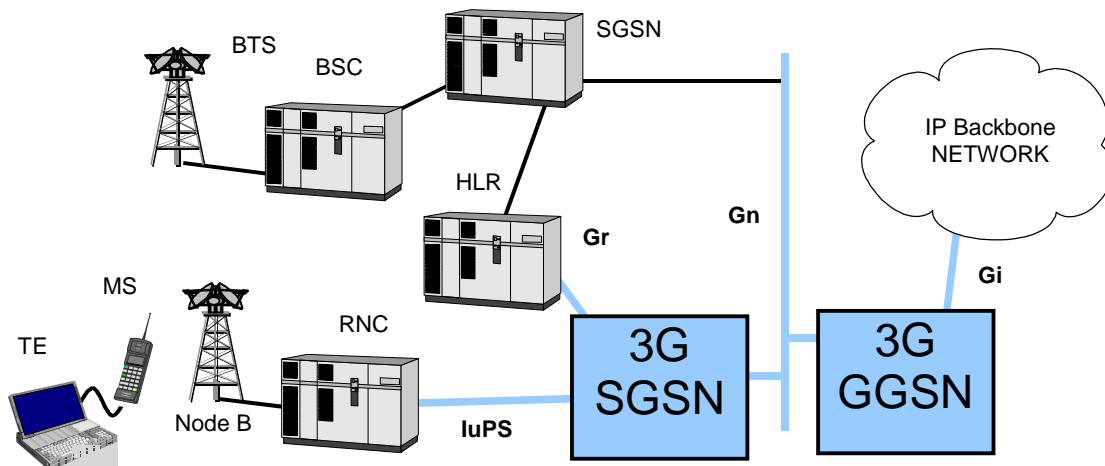
Configuration n°10

(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)

History

This clause shall be the last one in a document. The preceding page break is part of the master location for history clauses which is bookmarked "historytable".

History box entries

| Document history | | |
|-------------------------|--------------|--------------------------|
| Edition 1 | October 2002 | Publication as ETS _____ |