SLOVENSKI STANDARD
SIST ETS 300 607-3 E9:2003

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Digital cellular telecommunications system (Phase 2) (GSM); Mobile Station (MS)
conformance specification; Part 3: Layer 3 (L3) Abstract Test Suite (ATS) (GSM 11.10-3
version 4.23.1)

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ICS:

33.070.50	Globalni sistem za mobilno telekomunikacijo (GSM)	Global System for Mobile Communication (GSM)

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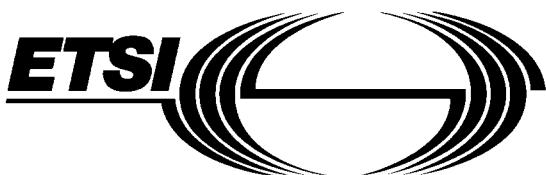
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GLOBAL SYSTEM FOR MOBILE COMMUNICATIONS

Digital cellular telecommunications system (Phase 2);
Mobile Station (MS) conformance specification;
Part 3: Layer 3 (L3) Abstract Test Suite (ATS)
(GSM 11.10-3 version 4.23.1)

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Foreword

This European Telecommunication Standard (ETS) has been produced by the Special Mobile Group (SMG) of the European Telecommunications Standards Institute (ETSI).

This ETS describes the technical characteristics and methods of test for Mobile Stations (MSs), operating in the 900 MHz and 1 800 MHz frequency band (GSM 900 and DCS 1 800) within the digital cellular telecommunications system.

This ETS corresponds to GSM technical specification GSM 11.10-3 version 4.23.0.

This part of the ETS (Part 3), contains Tree and Tabular Combined Notation (TTCN) for Layer 3, signalling for MS supporting Enhanced Full Rate Speech, and cell selection conformity specifications for which Mobile Stations, within the digital cellular telecommunications system (Phase 2), are tested for compliance.

The graphical form ATS

The electronic forms of the graphical representation (TTCN.GR format) corresponding to the ATS for Layer 3 are contained in the file L3-4n0.ps (Layer 3), EF-4n0.ps (Enhanced Full Rate), CS-4n0.ps (Cell Selection) and DB-4n0.ps (Dual Band)[1] on the diskettes included as a part of this ETS (Part 3).

The machine processable ATS

The electronic forms of the machine processable files (TTCN.MP format) corresponding to the ATS for Layer 3 are contained in the file L3-4n0.mp (Layer 3), EF-4n0.mp (Enhanced Full Rate), CS-4n0.mp (Cell Selection) and DB-4n0.mp (Dual Band)[1] on the diskettes included as a part of this ETS (Part 3).

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ETS 300 607 consists of three parts, which have the following ETS numbers and titles:

SIST ETS 300 607-3 E9:2003

ETS 300 607-1   Digital cellular telecommunications system (Phase 2);
                         Mobile Station (MS) conformance specification;
                         Part 1: Conformance specification
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                         Reference: GSM 11.10-1.
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ETS 300 607-2   Digital cellular telecommunications system (Phase 2);
                         Mobile Station (MS) conformance specification;
                         Part 2: Protocol Implementation Conformance Statement (ICS)
                         proforma specification

                         Reference: GSM 11.10-2.

**ETS 300 607-3   Digital cellular telecommunications system (Phase 1);
                         Mobile Station (MS) conformance specification;
                         Part 3: Layer 3 (L3) Abstract Test Suite (ATS)**

                         Reference: GSM 11.10-3.

Transposition dates	
Date of adoption of this ETS:	18 December 1998
Date of latest announcement of this ETS (doa):	31 March 1999
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	30 September 1999
Date of withdrawal of any conflicting National Standard (dow):	30 September 1999

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1)   These files are located in an archive file named 6073_E9.ZIP. Other file formats are available on request.

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1 Scope

This European Telecommunication Standard (ETS) specifies the Abstract Test Suite (ATS) and partial IXIT proforma for the Network Layer (Layer 3) at the mobile radio interface of the GSM or DCS (Phase 2) mobile stations (MS) conforming to the ETSs for the Radio Resource management, the Mobility Management, the circuit-switched Call Control, the Supplementary Services and Short Message Services for the digital cellular telecommunications systems (Phase 2).

The ISO standards for the methodology of conformance testing are used as the basis for the test specifications.

2 Normative references

This ETS incorporates by dated and undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

[1]   ISO/IEC 9646-1: "Information Technology-OSI- Conformance Testing Methodology and Framework, Part 1: General Concepts".

[2]   ISO/IEC 9646-2: "Information Technology-OSI- Conformance Testing Methodology and Framework, Part 2: Abstract Test Suite Specification".

[3]   ISO/IEC 9646-3: "Information Technology-OSI- Conformance Testing Methodology and Framework, Part 3: The Tree and Tabular Combined Notation".

[4]   ISO/IEC 9646-5: "Information Technology-OSI- Conformance Testing Methodology and Framework, Part 5: Requirements on test laboratories and clients for the conformance assessment process".

[5]   ISO/IEC 8824: "Information Technology-OSI- Specification of Abstract Syntax Notation One (ASN.1)".

[6]   ISO/IEC 8825: "Information Technology-OSI- Specification of Basic Encoding Rules for Abstract Syntax Notation One (ASN.1)".

[7]   ITU-T Recommendation Q.773: "Specifications of Signalling System No.7; Transaction capabilities formats and encoding".

[8]   ETS 300 287: "Integrated Services Digital Network (ISDN); Signalling System No.7, Transaction Capabilities Application Part (TCAP) version 2".

[9]   ETS 300 406 (January 1995): "Methods for Testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".

[10]   GSM 02.02 Version 4.2.2: "Digital cellular telecommunication system (Phase 2); Bearer Services (BS) supported by a GSM Public Land Mobile Network (PLMN)".

[11]   GSM 02.03 Version 4.3.1: "Digital cellular telecommunication system (Phase 2); Teleservices supported by a GSM Public Land Mobile Network (PLMN)".

[12]   GSM 02.06 Version 4.5.2: "Digital cellular telecommunication system (Phase 2); Types of Mobile Stations (MS)".

[13]   GSM 02.07 Version 4.8.2: "Digital cellular telecommunication system (Phase 2); Mobile Station (MS) features".

[14] GSM 02.30 Version 4.13.0: "Digital cellular telecommunication system (Phase 2); Man-Machine Interface (MMI) of the Mobile Station (MS)".

[15] GSM 03.03 Version 4.9.0: "Digital cellular telecommunication system (Phase 2); Numbering, addressing and identification".

[16] GSM 03.09 Version 4.6.0: "Digital cellular telecommunications system (Phase 2); Handover procedures".

[17] GSM 03.10 Version 4.3.1: "Digital cellular telecommunications system (Phase 2); GSM Public Land Mobile Network (PLMN) connection types".

[18] GSM 03.11 Version 4.10.1: "Digital cellular telecommunication system (Phase 2); Technical realization of supplementary services".

[19] GSM 03.12 Version 4.4.2: "Digital cellular telecommunications system (Phase 2); Location registration procedures".

[20] GSM 03.14 Version 4.1.1: "Digital cellular telecommunications system (Phase 2); Support of Dual Tone Multi-Frequency signalling (DTMF) via the GSM system".

[21] GSM 03.22 Version 4.11.0: "Digital cellular telecommunication system (Phase 2); Functions related to Mobile Station (MS) in idle mode".

[22] GSM 03.40 Version 4.13.0: "Digital cellular telecommunication system (Phase 2); Technical realization of the Short Message Service (SMS) Point to Point (PP)".

[23] GSM 03.41 Version 4.11.0: "Digital cellular telecommunication system (Phase 2); Technical realization of Short Message Service Cell Broadcast (SMSCB)".

[24] GSM 04.01 Version 4.0.4: "Digital cellular telecommunications system (Phase 2); Mobile Station - Base Station System (MS - BSS) interface General aspects and principles".

[25] GSM 04.03 Version 4.1.1: "Digital cellular telecommunications system (Phase 2); Mobile Station - Base Station System (MS - BSS) interface Channel structures and access capabilities".

[26] GSM 04.04 Version 4.0.4: "Digital cellular telecommunication system (Phase 2); layer 1 General requirements".

[27] GSM 04.05 Version 4.0.3: "Digital cellular telecommunication system (Phase 2); Data Link (DL) layer General aspects".

[28] GSM 04.06 Version 4.4.0: "Digital cellular telecommunication system (Phase 2); Mobile Station - Base Station System (MS - BSS) interface Data Link (DL) layer specification".

[29] GSM 04.07 Version 4.3.1: "Digital cellular telecommunication system (Phase 2); Mobile radio interface signalling layer 3 General aspects".

[30] GSM 04.08 Version 4.22.0: "Digital cellular telecommunication system (Phase 2); Mobile radio interface layer 3 specification".

[31] GSM 04.10 Version 4.10.1: "Digital cellular telecommunication system (Phase 2); Mobile radio interface layer 3 Supplementary services specification General aspects".

[32]   GSM 04.11 Version 4.10.0: "Digital cellular telecommunication system (Phase 2); Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface".

[33]   GSM 04.12 Version 4.6.0: "Digital cellular telecommunication system (Phase 2); Short Message Service Cell Broadcast (SMSCB) support on the mobile radio interface".

[34]   GSM 04.80 Version 4.11.1: "Digital cellular telecommunication system (Phase 2); Mobile radio interface layer 3 supplementary services specification; Formats and coding".

[35]   GSM 04.81 Version 4.4.1: "Digital cellular telecommunication system (Phase 2); Line identification supplementary services - Stage 3".

[36]   GSM 04.82 Version 4.9.1: "Digital cellular telecommunication system (Phase 2); Call Forwarding (CF) supplementary services - Stage 3".

[37]   GSM 04.83 Version 4.6.1: "Digital cellular telecommunication system (Phase 2); Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 3".

[38]   GSM 04.84 Version 4.3.2: "Digital cellular telecommunication system (Phase 2); MultiParty (MPTY) supplementary services - Stage 3".

[39]   GSM 04.85 Version 4.1.1: "Digital cellular telecommunications system (Phase 2); Closed User Group (CUG) supplementary services - Stage 3".

[40]   GSM 04.86 Version 4.5.2: "Digital cellular telecommunication system (Phase 2); Advice of Charge (AoC) supplementary services - Stage 3".

[41]   GSM 04.88 Version 4.7.1: "Digital cellular telecommunication system (Phase 2); Call Barring (CB) supplementary services - Stage 3".

[42]   GSM 04.90 Version 4.1.1: "Digital cellular telecommunication system (Phase 2); Unstructured supplementary services operation - Stage 3".

[43]   GSM 05.01 Version 4.6.0: "Digital cellular telecommunications system (Phase 2); Physical layer on the radio path General description".

[44]   GSM 05.02 Version 4.9.1: "Digital cellular telecommunication system (Phase 2); Multiplexing and multiple access on the radio path".

[45]   GSM 05.03 Version 4.5.1: "Digital cellular telecommunication system (Phase 2); Channel coding".

[46]   GSM 05.04 Version 4.0.3: "Digital cellular telecommunication system (Phase 2); Modulation".

[47]   GSM 05.05 Version 4.22.1: "Digital cellular telecommunication system (Phase 2); Radio transmission and reception".

[48]   GSM 05.08 Version 4.21.1: "Digital cellular telecommunication system (Phase 2); Radio subsystem link control".

[49]   GSM 05.10 Version 4.9.0: "Digital cellular telecommunication system (Phase 2); Radio subsystem synchronisation".

[50]   GSM 07.01 Version 4.10.0: "Digital cellular telecommunication system (Phase 2); General on Terminal Adaptation Functions (TAF) for Mobile Stations (MS)".

[51]   GSM 08.08 Version 4.12.0: "Digital cellular telecommunications system (Phase 2); Mobile-services Switching Centre - Base Station System (MSC - BSS) interface Layer 3 specification".

[52]   GSM 08.58 Version 4.9.0: "Digital cellular telecommunications system (Phase 2); Base Station Controller - Base Transceiver Station (BSC - BTS) interface Layer 3 specification".

[53]   GSM 09.02 Version 4.18.0: "Digital cellular telecommunication system (Phase 2); Mobile Application Part (MAP) specification".

[54]   GSM 11.10-1 Version 4.23.0: "Digital cellular telecommunications system (Phase 2); Mobile Station (MS) conformance specification; Part 1: Conformance specification".

[55]   GSM 11.10-2 Version 4.15.0: "Digital cellular telecommunications system (Phase 2); Mobile Station (MS) conformance specification; Part 2: Protocol Implementation Conformance Statement (PICS) Proforma specification".

3   Definitions and abbreviations

3.1   Definitions

For the purposes of this ETS, the following definitions apply:

Abstract Test Suite (ATS): Refer to ISO/IEC 9646-1 [1].

Implementation Under Test (IUT): Refer to ISO/IEC 9646-1 [1].

Partial Protocol Implementation eXtra Information for Testing (IXIT): Refer to ISO/IEC 9646-1 [1].

Point of Controls and Observations (PCO): Refer to ISO/IEC 9646-1 [1].

Protocol Implementation Conformance Statement (ICS): Refer to ISO/IEC 9646-1 [1].

System Under Test (SUT): Refer to ISO/IEC 9646-1 [1].

3.2   Abbreviations

For the purposes of this ETS, the following abbreviations apply:

ATS   Abstract Test Suite
BI   Invalid Behaviour tests
BO   Inopportune Behaviour tests
BV   Valid Behaviour tests
CA   CApability tests
EDP-N   Event Detection Point - Notification
EDP-R   Event Detection Point - Request
ETS   European Telecommunication Standard
FE   Functional Entity
FSM   Finite State Machine
ICS   Implementation Conformance Statement
IUT   Implementation Under Test
IXIT   Implementation eXtra Information for Testing
PDU   Protocol Data Unit
SUT   System Under Test
TP   Test Purpose
TSS   Test Suite Structure

Further abbreviations used within GSM related ETS may be found in ETR 100.

Abbreviations for test case group names may be found in figure 1 and 2.

4 Test Suite Structure (TSS)

4.1 Test suite naming convention

The test group identifier for each group and subgroup is built according to the scheme in figure 1.

Identifier:	L3<c><s><g0><g1><g2><nn>
<c> = category:	BIT BIT, Basic Interconnection tests (not used) CA CA, Capability tests (not used) BV BV, Valid Behaviour tests BI-BO BI and BO, Invalid and Inopportune Behaviour tests
<g0> = group:	IN Initial tests ID Idle mode tests RR Radio Resource management MM Mobility Management CC Call Control SP Structured Procedures SS Supplementary services LLF Lower Layer Failures UUE Unknown, Unforeseen or erroneous Elements
<g1> = group:	CR Channel Request AT IMSI detach and IMSI attach SMT Sequenced MM / CC message transfer EC Establishment Cause IA Immediate assignment PG Test of paging MR Test of measurement report ASS Test of the channel HO Test of handover FR Test of frequency redefinition CMM Test of the channel mode modify procedure CY Test of ciphering mode setting CM Test of classmark CHR Test of channel release START Test of starting time IDAU Identification and authentication LU Location updating CON MM connection CCSMO State Machine Verification, Mobile Originating Call CCSMT State Machine Verification, Mobile Terminating Call SMICF State machine verification, In Call Functions CRE Call Re-establishment UUS User to user signalling UPD Unknown protocol discriminator TIS TI and skip indicator UMT Undefined or unexpected message type UIE Unforeseen information elements in the non-imperative NMIE Non-semantical mandatory IE errors CNR Unknown IE, comprehension not required SB Spare bits

```
<g2> = group:            AC    Handover / successful / active call
                         CUE   Handover / successful / call under establishment
                         FSY   Handover / successful / active call / finely synchronized
                         PRS   Pre-synchronized handovers
                         PRF   Protocol failures
                         ACC   Location updating / accepted
                         REJ   Location updating / rejected
                         ABN   Location updating / abnormal cases
                         REL   Location updating / release
                         PER   Location updating / periodic
                         HPER  Location updating / periodic HPLMN search
                         IWAT  Location updating / interworking of attach and periodic
                         EST   MM connection / establishment
                         EXP   MM connection / expiry
                         NWAB        MM connection / abortion by the network
                         FRQP  MM connection / follow-on request pending
                         U0    Mobile Originating Call U0 State
                         U0.1  Mobile Originating Call U0.1 MM Connection pending
                         U1    Mobile Originating Call U1 State
                         U3    Mobile Originating Call U3 State
                         U4    Mobile Originating Call U4 State
                         U10   Mobile Originating Call U10 State
                         U11   Mobile Originating Call U11 State
                         U12   Mobile Originating Call U12 State
                         U19   Mobile Originating Call U19 State
                         U0    Mobile Terminating Call U0 State
                         U6    Mobile Terminating Call U6 State
                         U9    Mobile Terminating Call U9 State
                         U7    Mobile Terminating Call U7 State
                         U8    Mobile Terminating Call U8 State
                         DTMF  State machine verification, In Call Functions / transfer
                         CHC   State machine verification, In Call Functions /
                         TICM  State machine verification, In Call Functions / in-
                         OICM  State machine verification, In Call Functions / in-
```

Figure 1: Test group identifier naming convention scheme

4.2 Suite Overview

Figure 2 shows the structure of the test suites for L3.

L3 ATS									
BV								BI/O	
IN	ID	RR	MM	CC	SP	SS	SMS	LLF	UUE

Figure 2: Test suite structure of the L3 tests

4.3 Test groups

4.3.1 Valid Behaviour tests (BV)

Predefined state transitions are considered as valid. The test purposes in the valid behaviour test subgroup cover the verification of the normal and exceptional procedures of the various Finite State Machines (FSMs), i.e. a valid behaviour test is a test where the message sequence and the message contents are considered as valid.

4.3.2 Invalid Behaviour/Inopportune Behaviour tests (BI-BO)

This test sub group verifies that the Implementation Under Test (IUT) is able to react properly having received an invalid Protocol Data Unit (PDU) or in the case an inopportune protocol event occurs. An invalid PDU is defined as a syntactically incorrect message. An inopportune event is syntactically correct but occurs when it is not expected, e.g. a correctly coded operation is received in a wrong state (the IUT may respond Error UnexpectedComponentSequence).

4.4 Test Step Structure

4.4.1 Preambles

The preamble is defined for each test purpose.

4.4.2 Postambles

After each test case the IUT shall be brought to the state as defined in the postamble for each test purpose.

5 Test Purposes (TP)

For each conformance requirement a Test Purpose (TP) is defined. The test purposes are specified in the ATS Dynamic part (annex A).

5.1 TP and test case naming convention

In order clearly to map the conformance requirements specified in the prETS 300 607-1 and TTCN test cases in the ATS, the section numbers in the prETS 300 607-1 are used as test case names.

The identifier of each TP is identical to the name of the implemented TTCN test case.

"Test Purpose Identifier" = "Test Case Name" = TPI = TC_NN_A_B_C_D_E, where NN, A, B, C, D and E are digits used in the corresponding section numbers of prETS 300 607-1. For example, the test case name TC_26_5_6_2 is the TTCN specification corresponding to the conformance requirements in the section 26.5.6.1.2 in the prETS 300 607-1. In case where the section has been implemented in more than one test case sub numbering has been introduced. For example, the section 26.7.4.2.4 of prETS 300 607-1, Location updating/rejected/national roaming testing is split into 5 test cases. The corresponding TCs are identified as TC_26_7_4_2_4_1, TC_26_7_4_2_4_2, TC_26_7_4_2_4_3, TC_26_7_4_2_4_4 and TC_26_7_4_2_4_5, respectively.

6 Abstract test method and test configurations

The distributed test method applies to the L3 MS testing. The test method uses a lower tester and a Man-Machine Interface (MMI) as an upper tester at the SUT.

6.1 Test system model

The model of the L3 test system is based on the original protocol architecture at the air interface. The test system consists conceptually of a lower tester LT, the L3 test programme (executable test suite), a L2 radio link emulator, a management functional unit, the L1 service provider and a TRx set (see figure 1).
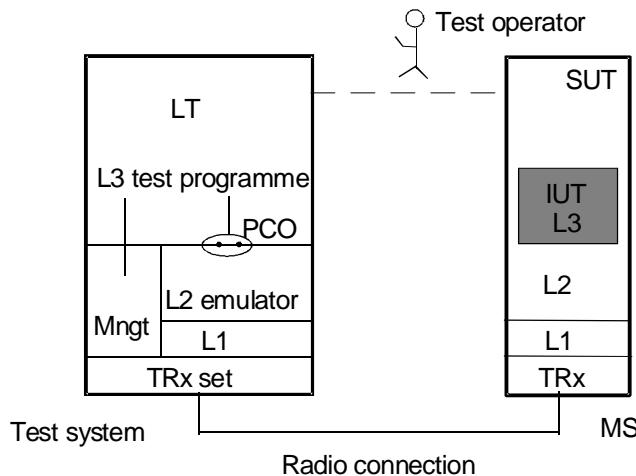

Figure 3: Test system and distributed test method