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Digitalni celiļ ni telekomunikacijski sistem (faza 2+) ï Specifikacija vmesnika naroļ niģki identifikacijski modul-mobilna oprema (SIM-ME) (GSM 11.11, razliļ ica 5.6.1)

Digital cellular telecommunications system (Phase 2+) (GSM); Specification of the Subscriber Identity Module - Mobile Equipment (SIM - ME) interface (GSM 11.11 version 5.6.1)

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GLOBAL SYSTEM FOR MOBILE COMMUNICATIONS

Digital cellular telecommunications system (Phase 2+); Specification of the Subscriber Identity Module - Mobile Equipment (SIM - ME) interface (GSM 11.11 version 5.6.1)

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Contents

Foreword

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

This ETS defines the interface between the Subscriber Identity Module (SIM) and the Mobile Equipment (ME) for use during the network operation phase of GSM as well as those aspects of the internal organization of the SIM which are related to the network operation phase, within the digital cellular telecommunications system (Phase 2/Phase 2+).

This ETS is a GSM technical specification version 5 and is part of the 1996 release of the GSM Technical Specifications.

The specification from which this ETS has been derived was originally based on CEPT documentation, hence the presentation of this ETS may not be entirely in accordance with the ETSI/PNE Rules.

Transposition dates	
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Introduction

This ETS includes some references to features which are part of the 1997 release of the GSM Technical specifications. Those affected passages in the text contain a note drawing attention the fact. The following table lists the 1997 release features. Features not mentioned in this table can be considered to be part of the original 1996 release.

Feature	Release	subclauses affected
Extended Language Preference	1997	10.1.2, 10.3.1, figure 8, 11, 11.2.1, 10.2.9 and Annex C

1 Scope

This European Telecommunication Standard (ETS) defines the interface between the Subscriber Identity Module (SIM) and the Mobile Equipment (ME) for use during the network operation phase of GSM as well as those aspects of the internal organization of the SIM which are related to the network operation phase. This is to ensure interoperability between a SIM and an ME independently of the respective manufacturers and operators. The concept of a split of the Mobile Station (MS) into these elements as well as the distinction between the GSM network operation phase, which is also called GSM operations, and the administrative management phase are described in the GSM 02.17 [6].

This ETS defines:

- the requirements for the physical characteristics of the SIM, the electrical signals and the transmission protocols;
- the model which shall be used as a basis for the design of the logical structure of the SIM;
- the security features;
- the interface functions;
- the commands;
- the contents of the files required for the GSM application;
- the application protocol.

Unless otherwise stated, references to GSM also apply to DCS 1800.

This ETS does not specify any aspects related to the administrative management phase. Any internal technical reallocation of either the SIM or the ME are only specified where these reflect over the interface. This ETS does not specify any of the security algorithms which may be used.

This ETS defines the SIM/ME interface for GSM Phase 2. While all attempts have been made to maintain phase compatibility, any issues that specifically relate to Phase 1 should be referenced from within the relevant Phase 1 specification.

2 Normative references

This European Telecommunication Standard (ETS) incorporates, by dated or 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] GSM 01.02: "Digital cellular telecommunications system (Phase 2+); General description of a GSM Public Land Mobile Network (PLMN)".

[2] GSM 01.04 (ETR 350): "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".

[3] GSM 02.07 (ETS 300 906): "Digital cellular telecommunications system (Phase 2+); Mobile Stations (MS) features".

[4] GSM 02.09 (ETS 300 920): "Digital cellular telecommunications system; Security aspects".

[5] GSM 02.11 (ETS 300 921): "Digital cellular telecommunications system; Service accessibility".

[6] GSM 02.17 (ETS 300 922): "Digital cellular telecommunications system; Subscriber Identity Modules (SIM) Functional characteristics".

[7] GSM 02.24 (ETS 300 923): "Digital cellular telecommunications system; Description of Charge Advice Information (CAI)".

[8] GSM 02.30 (ETS 300 907): "Digital cellular telecommunications system (Phase 2+); Man-Machine Interface (MMI) of the Mobile Station (MS)".

[9] GSM 02.86: "Digital cellular telecommunications system; Advice of charge (AoC) Supplementary Services - Stage 1".

[10] GSM 03.03 (ETS 300 927): "Digital cellular telecommunications system (Phase 2+); Numbering, addressing and identification".

[11] GSM 03.20 (ETS 300 929): "Digital cellular telecommunications system; Security related network functions".

[12] GSM 03.38 (ETS 300 900): "Digital cellular telecommunications system (Phase 2+); Alphabets and language-specific information".

[13] GSM 03.40 (ETS 300 901): "Digital cellular telecommunications system (Phase 2+); Technical realization of the Short Message Service (SMS) Point-to-Point (PP)".

[14] GSM 03.41 (ETS 300 902): "Digital cellular telecommunications system (Phase 2+); Technical realization of Short Message Service Cell Broadcast (SMSCB)".

[15] GSM 04.08 (ETS 300 940): "Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 specification".

[16] GSM 04.11 (ETS 300 942): "Digital cellular telecommunications system (Phase 2+); Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface".

[17] GSM 09.91 (ETR 360): "Digital cellular telecommunications system; Interworking aspects of the Subscriber Identity Module - Mobile Equipment (SIM - ME) interface between Phase 1 and Phase 2".

[18] CCITT Recommendation E.118: "The international telecommunication charge card".

[19] CCITT Recommendation E.164: "Numbering plan for the ISDN era".

[20] CCITT Recommendation T.50: "International Alphabet No. 5". (ISO 646: 1983, Information processing - ISO 7-bits coded characters set for information interchange).

[21] ISO/IEC 7810 (1995): "Identification cards - Physical characteristics".

[22] ISO/IEC 7811-1 (1995): "Identification cards - Recording technique - Part 1: Embossing".

[23] ISO/IEC 7811-3 (1995): "Identification cards - Recording technique - Part 3: Location of embossed characters on ID-1 cards".

[24] ISO 7816-1 (1987): "Identification cards - Integrated circuit(s) cards with contacts, Part 1: Physical characteristics".

[25] ISO 7816-2 (1988): "Identification cards - Integrated circuit(s) cards with contacts, Part 2: Dimensions and locations of the contacts".

[26] ISO/IEC 7816-3 (1989): "Identification cards - Integrated circuit(s) cards with contacts, Part 3: Electronic signals and transmission protocols".

[27] GSM 11.14: "Digital cellular telecommunications system (Phase 2+); Specification of the SIM Application Toolkit for the Subscriber Identity Module - Mobile Equipment (SIM - ME) interface".

[28] GSM 11.12 (ETS 300 641): "Digital cellular telecommunications system (Phase 2); Specification of the 3 Volt Subscriber Identity Module - Mobile Equipment (SIM - ME) interface".

[29] GSM 02.22: "Digital cellular telecommunications system (Phase 2+); Personalization of GSM Mobile Equipment (ME) Mobile functionality specification".

[30] ISO 639 (1988): "Code for the representation of names of languages".

3 Definitions, abbreviations and symbols

3.1 Definitions

For the purposes of this ETS, the following definitions apply. For further information and definitions refer to GSM 01.02 [1].

access conditions: A set of security attributes associated with a file.

application: An application consists of a set of security mechanisms, files, data and protocols (excluding transmission protocols).

application protocol: The set of procedures required by the application.

card session: A link between the card and the external world starting with the ATR and ending with a subsequent reset or a deactivation of the card.

current directory: The latest MF or DF selected.

current EF: The latest EF selected.

data field: Obsolete term for Elementary File.

Dedicated File (DF): A file containing access conditions and, optionally, Elementary Files (EFs) or other Dedicated Files (DFs).

directory: General term for MF and DF.

Elementary File (EF): A file containing access conditions and data and no other files.

file: A directory or an organized set of bytes or records in the SIM.

file identifier: The 2 bytes which address a file in the SIM.

GSM or DCS 1800 application: Set of security mechanisms, files, data and protocols required by GSM or DCS 1800.

GSM session: That part of the card session dedicated to the GSM operation.

IC card SIM: Obsolete term for ID-1 SIM.

ID-1 SIM: The SIM having the format of an ID-1 card (see ISO 7816-1 [24]).

Master File (MF): The unique mandatory file containing access conditions and optionally DFs and/or EFs.

normal GSM operation: Relating to general, CHV related, GSM security related and subscription related procedures.

padding: One or more bits appended to a message in order to cause the message to contain the required number of bits or bytes.

plug-in SIM: A Second format of SIM (specified in clause 4).

proactive SIM: A SIM which is capable of issuing commands to the ME. Part of SIM Application Toolkit (see clause 11).

record: A string of bytes within an EF handled as a single entity (see clause 6).

record number: The number which identifies a record within an EF.

record pointer: The pointer which addresses one record in an EF.

root directory: Obsolete term for Master File.

SIM application toolkit procedures: Defined in GSM 11.14 [27].

3.2 Abbreviations

For the purpose of this ETS, the following abbreviations apply, in addition to those listed in GSM 01.04 [2]:

A3	Algorithm 3, authentication algorithm; used for authenticating the subscriber
A5	Algorithm 5, cipher algorithm; used for enciphering/deciphering data
A8	Algorithm 8, cipher key generator; used to generate K_c
A38	A single algorithm performing the functions of A3 and A8
ACM	Accumulated Call Meter
ADN	Abbreviated Dialling Number
ADM	Access condition to an EF which is under the control of the authority which creates this file
ALW	ALWays
AoC	Advice of Charge
APDU	Application Protocol Data Unit
ATR	Answer To Reset
BCCH	Broadcast Control CHannel
BCD	Binary Coded Decimal
BDN	Barred Dialling Number
BTS	Base Transmitter Station
CB	Cell Broadcast
CBMI	Cell Broadcast Message Identifier
CCITT	The International Telegraph and Telephone Consultative Committee (now also known as the ITU Telecommunications Standardization sector)
CCP	Capability/Configuration Parameter
CHV	Card Holder Verification information; access condition used by the SIM for the verification of the identity of the user
CLA	CLAss
CNL	Co-operative Network List
DCK	De-personalization Control Keys
DCS	Digital Cellular System
DF	Dedicated File (abbreviation formerly used for Data Field)
DTMF	Dual Tone Multiple Frequency
ECC	Emergency Call Code
EF	Elementary File
ETSI	European Telecommunications Standards Institute
eMLPP	enhanced Multi-Level Precedence and Pre-emption Service
etu	elementary time unit
FDN	Fixed Dialling Number
GSM	Global System for Mobile communications
HPLMN	Home PLMN

IC	Integrated Circuit
ICC	Integrated Circuit(s) Card
ID	IDentifier
IEC	International Electrotechnical Commission
IMSI	International Mobile Subscriber Identity
ISO	International Organization for Standardization
Kc	Cryptographic key; used by the cipher A5
Ki	Subscriber authentication key; the cryptographic key used by the authentication algorithm, A3, and cipher key generator, A8
LAI	Location Area Information; information indicating a cell or a set of cells
lgth	The (specific) length of a data unit
LND	Last Number Dialled
LSB	Least Significant Bit
MCC	Mobile Country Code
ME	Mobile Equipment
MF	Master File
MMI	Man Machine Interface
MNC	Mobile Network Code
MS	Mobile Station
MSISDN	Mobile Station international ISDN number
MSB	Most Significant Bit
NET	NETwork
NEV	NEVer
NPI	Numbering Plan Identifier
PIN/PIN2	Personal Identification Number / Personal Identification Number 2 (obsolete terms for CHV1 and CHV2, respectively)
PLMN	Public Land Mobile Network
PTS	Protocol Type Select (response to the ATR)
PUK/PUK2	PIN Unblocking Key / PIN2 Unblocking Key (obsolete terms for UNBLOCK CHV1 and UNBLOCK CHV2, respectively)
RAND	A RANDom challenge issued by the network
RFU	Reserved for Future Use
SDN	Service Dialling Number
SIM	Subscriber Identity Module
SMS	Short Message Service
SRES	Signed RESponse calculated by a SIM
SSC	Supplementary Service Control string
SW1/SW2	Status Word 1 / Status Word 2
TMSI	Temporary Mobile Subscriber Identity
TON	Type Of Number
TP	Transfer layer Protocol
TPDU	Transfer Protocol Data Unit
TS	Technical Specification
UNBLOCK CHV1/2	value to unblock CHV1/CHV2
VBS	Voice Broadcast Service
VGCS	Voice Group Call Service
VPLMN	Visited PLMN

3.3 Symbols

Vcc	Supply voltage
Vpp	Programming voltage
'0' to '9' and 'A' to 'F'	The sixteen hexadecimal digits

4 Physical characteristics

Two physical types of SIM are specified. These are the "ID-1 SIM" and the "Plug-in SIM".

The physical characteristics of both types of SIM shall be in accordance with ISO 7816-1,2 [24, 25] unless otherwise specified. The following additional requirements shall be applied to ensure proper operation in the GSM environment.

4.1 Format and layout

The information on the exterior of either SIM should include at least the individual account identifier and the check digit of the IC Card Identification (see clause 10, EF_{ICCID}).

4.1.1 ID-1 SIM

Format and layout of the ID-1 SIM shall be in accordance with ISO 7816-1,2 [24, 25].

The card shall have a polarization mark (see GSM 02.07 [3]) which indicates how the user should insert the card into the ME.

The ME shall accept embossed ID-1 cards. The embossing shall be in accordance with ISO/IEC 7811 [22, 23]. The contacts of the ID-1 SIM shall be located on the front (embossed face, see ISO/IEC 7810 [21]) of the card.

NOTE: Card warpage and tolerances are now specified for embossed cards in ISO/IEC 7810 [21].

4.1.2 Plug-in SIM

The Plug-in SIM has a width of 25 mm, a height of 15 mm, a thickness the same as an ID-1 SIM and a feature for orientation. See figure A.1 in normative annex A for details of the dimensions of the card and the dimensions and location of the contacts.

Annexes A.1 and A.2 of ISO 7816-1 [24] do not apply to the Plug-in SIM.

Annex A of ISO 7816-2 [25] applies with the location of the reference points adapted to the smaller size. The three reference points P1, P2 and P3 measure 7,5 mm, 3,3 mm and 20,8 mm, respectively, from 0. The values in table A.1 of ISO 7816-2 [25] are replaced by the corresponding values of figure A.1.

4.2 Temperature range for card operation

The temperature range for full operational use shall be between -25°C and +70°C with occasional peaks of up to +85°C. "Occasional" means not more than 4 hours each time and not over 100 times during the life time of the card.

4.3 Contacts

4.3.1 Provision of contacts

ME: Contacting elements in the ME in positions C4 and C8 are optional, and are not used in the GSM application. They shall present a high impedance to the SIM card in the GSM application. If it is determined that the SIM is a multi-application ICC, then these contacts may be used. Contact C6 need not be provided for Plug-in SIMs.

SIM: Contacts C4 and C8 need not be provided by the SIM, but if they are provided, then they shall not be connected internally in the SIM if the SIM only contains the GSM application. Contact C6 shall not be bonded in the SIM for any function other than supplying Vpp.

4.3.2 Activation and deactivation

The ME shall connect, activate and deactivate the SIM in accordance with the Operating Procedures specified in ISO/IEC 7816-3 [26].

For any voltage level, monitored during the activation sequence, or during the deactivation sequence following soft power-down, the order of the contact activation/deactivation shall be respected.

NOTE 1: Soft Power switching is defined in GSM 02.07 [3].