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Digitalni celiļ ni telekomunikacijski sistem (faza 2+) ï Sploġne zahteve za medsebojno delovanje javnega kopenskega mobilnega omreġja (PLMN) in digitalnega omreġja z integriranimi storitvami (ISDN) ali javnega komutiranega telefonskega omreġja (PSTN) (GSM 09.07, razliļ ica 5.3.1)

Digital cellular telecommunications system (Phase 2+) (GSM); General requirements on interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN) (GSM 09.07 version 5.3.1)

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Digital cellular telecommunications system (Phase 2+); General requirements on interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN) (GSM 09.07 version 5.3.1)

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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 identifies the Mobile-services Switching Centre/Interworking functions (MSC/IWFs) and requirements to support interworking between:

i) PLMN and PSTN
ii) PLMN and ISDN

within the digital cellular telecommunications system.

The contents of this ETS are subject to continuing work within SMG and may change following formal SMG approval. Should SMG modify the contents of this ETS, it will then be resubmitted for OAP by ETSI with an identifying change of release date and an increase in version number as follows:

Version 5.x.y

where:

- y the third digit is incremented when editorial only changes have been incorporated in the specification;

- x the second digit is incremented for all other types of changes, i.e. technical enhancements, corrections, updates, etc.

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1 Scope

This European Telecommunication Standard (ETS) identifies the Mobile-services Switching Centre/Interworking Functions (MSC/IWFs) and requirements to support interworking between:

a) PLMN and PSTN
b) PLMN and ISDN

It is not possible to treat ISDN and PSTN as one type of network, even when both ISDN and PSTN subscribers are served by the same exchange because of the limitations of the PSTN subscribers access i.e. analogue connection without D-channel signalling.

Within this ETS, the requirements for voice and non-voice (data) calls are considered separately.

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.

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[1] CCITT Recommendation G.711: "Pulse code modulation (PCM) of voice frequencies".

[2] CCITT Recommendation I.460: "Multiplexing, rate adaption and support of existing interfaces".

[3] CCITT Recommendation V.25: "Automatic answering equipment and/or parallel automatic calling equipment on the general switched telephone network including procedures for disabling of echo control devices for both manually and automatically established calls".

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[4] CCITT Recommendation V.42bis: "Data compression procedure for Data Circuit–terminating Equipment (DCE) using error correcting procedures".

[5] CCITT Recommendation V.110: "Support of Data Terminal Equipments (DTEs) with V-Series interfaces by an Integrated Services Digital Network (ISDN)".

[6] ETS 300 102-1 Edition 1 (1990): "Integrated Services Digital Network (ISDN); User-network interface layer 3 Specifications for basic call control".

[7] ETS 300 121: "Integrated Services Digital Network (ISDN); Application of the ISDN User Part (ISUP) of CCITT Signalling System No.7 for international ISDN interconnections (ISUP version 1)".

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

[9] GSM 02.01: "Digital cellular telecommunications system (Phase 2+); Principles of telecommunication services supported by a GSM Public Land Mobile Network (PLMN)".

[10] GSM 02.02 (ETS 300 904): "Digital cellular telecommunications system (Phase 2+); Bearer Services (BS) supported by a GSM Public Land Mobile Network (PLMN)".

[11] GSM 02.03 (ETS 300 905): "Digital cellular telecommunications system (Phase 2+); Teleservices supported by a GSM Public Land Mobile Network (PLMN)".

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[12] GSM 02.04 (ETS 300 918): "Digital cellular telecommunications system (Phase 2+); General on supplementary services".

[13] GSM 02.81: "Digital cellular telecommunications system (Phase 2+); Line identification supplementary services - Stage 1".

[14] GSM 02.82: "Digital cellular telecommunications system; Call Forwarding (CF) supplementary services - Stage 1".

[15] GSM 02.83: "Digital cellular telecommunications system; Call Waiting (CW) and Call Holding (HOLD) supplementary services - Stage 1".

[16] GSM 02.84: "Digital cellular telecommunications system; MultiParty (MPTY) supplementary services - Stage 1".

[17] GSM 02.85: "Digital cellular telecommunications system; Closed User Group (CUG) supplementary services - Stage 1".

[18] GSM 02.86: "Digital cellular telecommunications system; Advice of Charge (AoC) supplementary services - Stage 1".

[19] GSM 02.88: "Digital cellular telecommunications system; Call Barring (CB) supplementary services - Stage 1".

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

[21] GSM 03.08: "Digital cellular telecommunications system (Phase 2+); Organization of subscriber data".

[22] GSM 03.11 (ETS 300 928): "Digital cellular telecommunications system; Technical realization of supplementary services".

[23] GSM 03.45 (ETS 300 931): "Digital cellular telecommunications system; Technical realization of facsimile group 3 transparent".

[24] GSM 03.46: "Digital cellular telecommunications system; Technical realization of facsimile group 3 non-transparent".

[25] GSM 03.50 (ETS 300 903): "Digital cellular telecommunications system (Phase 2+); Transmission planning aspects of the speech service in the GSM Public Land Mobile Network (PLMN) system".

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

[27] GSM 04.21 (ETS 300 945): "Digital cellular telecommunications system; Rate adaption on the Mobile Station - Base Station System (MS - BSS) interface".

[28] GSM 04.22 (ETS 300 946): "Digital cellular telecommunications system (Phase 2+); Radio Link Protocol (RLP) for data and telematic services on the Mobile Station - Base Station System (MS - BSS) interface and the Base Station System - Mobile-services Switching Centre (BSS - MSC) interface".

[29] GSM 07.01 (ETS 300 913): "Digital cellular telecommunications system (Phase 2+); General on Terminal Adaptation Functions (TAF) for Mobile Stations (MS)".

[30] GSM 07.02 (ETS 300 914): "Digital cellular telecommunications system (Phase 2+); Terminal Adaptation Functions (TAF) for services using asynchronous bearer capabilities".

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[31] GSM 07.03 (ETS 300 915): "Digital cellular telecommunications system (Phase 2+); Terminal Adaptation Functions (TAF) for services using synchronous bearer capabilities".

[32] GSM 07.05: "Digital cellular telecommunications system (Phase 2+); Use of Data Terminal Equipment - Data Circuit terminating Equipment (DTE - DCE) interface for Short Message Service (SMS) and Cell Broadcast Service (CBS)".

[35] GSM 08.20: "Digital cellular telecommunications system; Rate adaption on the Base Station System - Mobile-services Switching Centre (BSS - MSC) interface".

[36] GSM 08.60 (ETS 300 737): "Digital cellular telecommunications system (Phase 2+); Inband control of remote transcoders and rate adaptors for Enhanced Full Rate (EFR) and full rate traffic channels".

[37] GSM 09.02 (ETS 300 974): "Digital cellular telecommunications system (Phase 2+); Mobile Application Part (MAP) specification".

[38] GSM 09.03: "Digital cellular telecommunications system; Signalling requirements on interworking between the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN) and the Public Land Mobile Network (PLMN)".

[39] GSM 09.05: "Digital cellular telecommunications system; Interworking between the Public Land Mobile Network (PLMN) and the Packet Switched Public Data Network (PSPDN) for Packet Assembly/Disassembly facility (PAD) access".

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[40] GSM 09.06 (ETS 300 975): "Digital cellular telecommunications system (Phase 2+); Interworking between a Public Land Mobile Network (PLMN) and a Packet Switched Public Data Network/Integrated Services Digital Network (PSPDN/ISDN) for the support of packet switched data transmission services".

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compatibility information: This term subsumes the entirety of Bearer Capability, Low Layer Compatibility, High Layer Compatibility, Progress Indicator and Address Information conveyed out-of-band prior to call establishment for the support of compatibility checking and terminal/function/service selection at the ISDN-type user-network interface.

protocol identifier: Information defining the specific protocols utilized for the support of data transfer by a terminal.

progress indicator: Information supplied to indicate to the terminal that network interworking has taken place.

out-of-band parameter exchange: Information exchanged via an associated or non-associated signalling link e.g. SS No 7.

PSTN: Subscriber to network interface supports only analogue terminals.

ISDN: Subscriber to network interface supports digital or analogue terminals, plus a standardized user to network associated signalling system and a standardized internetwork signalling system.

autobauding type 1: This information element value may be contained in the setup or call confirm messages from the MS in association with a non transparent data service. This implies that the MSC/IWF may select any speed and modem type according to what it can negotiate with the remote modem on the PSTN/ISDN. The maximum speed to be used by the MSC/IWF is the user speed indicated in the setup/call confirm message.

multi self selecting speed modem: This term applies to V series modems capable of handling one or more lower speeds as a fall back position. When such a modem is requested in the call setup or call confirm message from the MS in association with a non transparent service, the MSC/IWF may select any of the speeds supported according to the negotiation with the remote modem on the PSTN/ISDN. In this instance the maximum starting negotiation speed to be used by the MSC/IWF is the one indicated by the user speed in the setup/call confirm message.

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3.2 Abbreviations

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In addition to the following, abbreviations used in this ETS are listed in GSM 01.04 [8].

ADPCM	Adaptive Differential Pulse Coded Modulation
DP	Dial Pulse
ITC	Information Transfer Capability
LE	Local Exchange
NT	Network Termination
PABX	Private Automatic Branch Exchange
SPC	Stored Program Control
SS No.7	Signalling System No.7
TE	Terminal Equipment
TA	Terminal Adaptor
TUP	Telephone User Part (of Signalling System No.7)
DSS1	Digital Subscriber Signalling 1
UNI	User Network Interface

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4 Introduction

General Network Interworking Scenarios are described in GSM 09.01. Since the numbering plan for the ISDN era (E.164) includes the numbering plan for the telephone network (E.163), it is not possible to distinguish by the number whether a given subscriber is a PSTN or ISDN subscriber. Further, in some countries both PSTN and ISDN subscribers will be connected to the same exchange, so the only difference for this type of combined network will be in the nature of the customer access. In this document a PSTN is considered to support only an analogue interface towards the subscriber. An ISDN shall be considered to support digital interface towards the subscriber. In addition, the ISDN is considered to support a standardized outband signalling protocol both between the subscriber and the network and within the network, i.e. DSS1 and ISUP, thus enabling the generation and transport of Compatibility Information for compatibility checking and terminal/function/service selection at the user-network interface as well as for MSC/IWF selection.

There now exist networks which do not fall into either of these categories in that they provide for digital connectivity from subscriber to subscriber through the network. The subscribers have access to a wide range of services by a limited set of standard multi-purpose user network interfaces. However, these networks do not support the standardized inter-exchange signalling protocol throughout, in that they are e.g. using TUP or National User Part (NUP). These types of network support 64 kbit/s connections, so in service support are comparable to ISDN, however, the signalling system provided may not support transport of all Compatibility Information allowed for in the standardized ISDN signalling. This document will therefore identify interworking to PSTN and ISDN on the principle of the network characteristics as identified in the previous paragraph. The aforementioned existing networks then constitute one particular case in the ISDN interworking scenarios. These cases will be itemized when the implication of the various degrees of exhaustiveness of the Compatibility Information - delivered via the ISDN - used for deducting a GSM Basic Service needs to be set forth.

When two dissimilar networks are required to interwork in order to support a communication between two subscribers, one on each network, a number of Interworking Functions (MSC/IWFs) are required to support the communication. Some of these are related to the differences in signalling and are dealt with in GSM 09.03.

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Examples of other aspects of interworking are:

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a) the need or otherwise of echo control devices;
b) the need or otherwise of modem pools and network-based rate adaptation.

For the purposes of determining the required MSC/IWFs, it is necessary, however, to consider separately each type of interworking (i.e. PLMN-ISDN and PLMN-PSTN) since, in the worst case, "PSTN" could refer to an essentially analogue network with electromechanical switching not controlled by software and without common-channel signalling.

Some facilities associated with alternate speech and data may not be available with version 1 of the MAP (GSM 09.02). Version 1 of the Mobile Application Part (MAP) does not support transfer between the HLR and VLR, and VLR and VMSC of multiple bearer capabilities. In addition, version 1 of the MAP does not support in-call modification and channel mode modification following an inter-MSC handover.

5 Not used