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Digital cellular telecommunications system (Phase 2) (GSM); Network architecture (GSM 03.02)

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## Foreword

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

This ETS defines the possible network architecture of a Public Land Mobile Network (PLMN) within the Digital cellular telecommunications system (Phase 2).

This ETS corresponds to GSM Technical Specification (GSM-TS) GSM 03.02 version 4.2.1.

Reference is made within this ETS to GSM-TSs (note).

Reference is also made within this ETS to GSM xx.xx. series. The specifications in the series can be identified, with their full title, within the normative reference Clause of this ETS by the first two digits of their GSM reference number e.g. GSM 09.xx-series, refers to GSM 09.01, GSM 09.02 etc.

**NOTE:** TC-SMG has produced documents which give the technical specifications for the implementation of the Digital cellular telecommunications system. Historically, these documents have been identified as GSM Technical Specifications (GSM-TSs). These TSs may have subsequently become I-ETTs (Phase 1), or ETSS (Phase 2), whilst others may become ETSI Technical Reports (ETRs). GSM-TSs are, for editorial reasons, still referred to in current GSM ETSS.

<b>Transposition dates</b>	
Date of adoption of this ETS:	4 October 1996
Date of latest announcement of this ETS (doa):	29 February 1997
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## 1 Scope

The purpose of this third edition European Telecommunication Standard (ETS) is to present the possible architectures of the mobile system. Clause 3 of this ETS contains a definition of the different functional entities needed to support the mobile service. In clause 4, the configuration of a PLMN is described as well as the organization of the functional entities; the configuration presented is the most general in order to cope with all the possible implementations which can be imagined in the different countries. To illustrate that purpose, some examples of possible configurations are presented. Clause 5 of this ETS contains a brief description of the interfaces involved which shows the principle of the organization considered.

### 1.1 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] GSM 01.04 (ETR 100): "Digital cellular telecommunications system (Phase 2); Abbreviations and acronyms".
- [2] GSM 02.16 (ETS 300 508): "Digital cellular telecommunications system (Phase 2); International Mobile station Equipment Identities (IMEI)".
- [3] GSM 03.03 (ETS 300 523): "Digital cellular telecommunications system (Phase 2); Numbering, addressing and identification".
- [4] GSM 03.04 (ETS 300 524): "Digital cellular telecommunications system (Phase 2); Signalling requirements relating to routing of calls to mobile subscribers".
- [5] GSM 03.08 (ETS 300 526): "Digital cellular telecommunications system (Phase 2); Organization of subscriber data".
- [6] GSM 03.09 (ETS 300 527): "Digital cellular telecommunications system (Phase 2); Handover procedures".
- [7] GSM 03.12 (ETS 300 530): "Digital cellular telecommunications system (Phase 2); Location registration procedures".
- [8] GSM 03.20 (ETS 300 534): "Digital cellular telecommunications system (Phase 2); Security related network functions".
- [9] GSM 04.02 (ETS 300 551): "Digital cellular telecommunications system (Phase 2); GSM Public Land Mobile Network (PLMN) access reference configuration".
- [10] GSM 08.01 (ETS 300 587-1): "Digital cellular telecommunications system (Phase 2); Base Station System - Mobile-services Switching Centre (BSS - MSC) interface; General aspects".

- [11] GSM 08.02 (ETS 300 587-2): "Digital cellular telecommunications system (Phase 2); Base Station System - Mobile-services Switching Centre (BSS - MSC) interface; Interface principles".
- [12] GSM 08.04 (ETS 300 588): "Digital cellular telecommunications system (Phase 1); Base Station System - Mobile-services Switching Centre (BSS - MSC) interface; Layer 1 specification".
- [13] GSM 08.06 (ETS 300 589): "Digital cellular telecommunications system (Phase 2); Signalling transport mechanism specification for the Base Station System - Mobile-services Switching Centre (BSS - MSC) interface".
- [14] GSM 08.08 (ETS 300 590): "Digital cellular telecommunications system (Phase 2); Mobile Switching Centre - Base Station System (MSC - BSS) interface; Layer 3 specification".
- [15] GSM 08.20 (ETS 300 591): "Digital cellular telecommunications system (Phase 2); Rate adaption on the Base Station System - Mobile-services Switching Centre (BSS - MSC) interface".
- [16] GSM 08.51 (ETS 300 592): "Digital cellular telecommunications system (Phase 2); Base Station Controller - Base Transceiver Station (BSC - BTS) interface; General aspects".
- [17] GSM 08.52 (ETS 300 593): "Digital cellular telecommunications system (Phase 2); Base Station Controller - Base Transceiver Station (BSC - BTS) interface; Interface principles".
- [18] GSM 08.54 (ETS 300 594): "Digital cellular telecommunications system (Phase 2); Base Station Controller (BSC) to Base Transceiver Station (BTS) interface; Layer 1 structure of physical circuits".
- [19] GSM 08.56 (ETS 300 595): "Digital cellular telecommunications system (Phase 2); Base Station Controller (BSC) to Base Transceiver Station (BTS); Layer 2 specification".
- [20] GSM 08.58 (ETS 300 596): "Digital cellular telecommunications system (Phase 2); Base Station Controller (BSC) to Base Transceiver Station (BTS) interface; Layer 3 specification".
- [21] GSM 08.60 (ETS 300 597): "Digital cellular telecommunications system (Phase 2); Inband control of remote transcoders and rate adaptors".
- [22] GSM 08.61 (ETS 300 598): "Digital cellular telecommunications system (Phase 2); Inband control of remote transcoders and rate adaptors (half rate)".
- [23] GSM 09.02 (ETS 300 599): "Digital cellular telecommunications system (Phase 2); Mobile Application Part (MAP) specification".
- [24] GSM 09.03 (ETS 300 600): "Digital cellular telecommunications system (Phase 2); Signalling requirements on interworking between the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN) and the Public Land Mobile Network (PLMN)".
- [25] GSM 09.04 (ETS 300 601): "Digital cellular telecommunications system (Phase 2); Interworking between the Public Land Mobile Network (PLMN) and the Circuit Switched Public Data Network (CSPDN)".

- [26] GSM 09.05 (ETS 300 602): "Digital cellular telecommunications system (Phase 2); Interworking between the Public Land Mobile Network (PLMN) and the Packet Switched Public Data Network (PSPDN) for Packet Assembly/Disassembly facility (PAD) access".
- [27] GSM 09.06 (ETS 300 603): "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".
- [28] GSM 09.07 (ETS 300 604): "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)".
- [29] GSM 09.10 (ETS 300 605): "Digital cellular telecommunications system (Phase 2); Information element mapping between Mobile Station - Base Station System and BSS - Mobile-services Switching Centre (MS - BSS - MSC); Signalling procedures and the Mobile Application Part (MAP)".
- [30] GSM 09.11 (ETS 300 606): "Digital cellular telecommunications system (Phase 2); Signalling interworking for supplementary services".

## 2 Definitions and abbreviations

In addition to the abbreviations given in the remainder of this clause others are listed in GSM 01.04.

### 2.1 Location register

To establish a call to a mobile station the network must know where this mobile station is located. This information is stored in a function named location register.

#### 2.1.1 Home Location Register (HLR)

The Home Location Register (HLR) is the location register to which a mobile subscriber is assigned for record purposes such as subscriber information.

#### 2.1.2 Visitor Location Register (VLR)

The Visitor Location Register (VLR) is the location register, other than the HLR, used by an MSC to retrieve information for, e.g. handling of calls to or from a roaming mobile station currently located in its area.

### 2.2 Authentication Centre (AuC)

The Authentication Centre (AuC) is an entity which stores data for each mobile subscriber to allow the International Mobile Subscriber Identity (IMSI) to be authenticated and to allow communication over the radio path between the mobile station and the network to be ciphered. The AuC transmits the data needed for authentication and ciphering via the HLR to the VLR and MSC which need to authenticate a mobile station.

The procedures used for authentication and ciphering are described more fully in GSM 03.20.

### 2.3 Equipment Identity Register (EIR)

The Equipment Identity Register (EIR) in the GSM system is the logical entity which is responsible for storing in the network the International Mobile Equipment Identities (IMEIs), used in the GSM system.

The equipment is classified as "white listed", "grey listed", "black listed" or it may be unknown as specified in GSM 02.16 and GSM 09.02.