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PREFATORY NOTE

ETSI has constituted stable and consistent documents which give specifications for the implementation of the European Cellular Telecommunications System. Historically, these documents have been identified as "GSM recommendations".

Some of these recommendations may subsequently become Interim European Telecommunications Standards (I-ETTs) or European Telecommunications Standards (ETTs), whilst some continue with the status of ETSI-GSM Technical Specifications. These ETSI-GSM Technical Specifications are for editorial reasons still referred to as GSM recommendations in some current GSM documents.

The numbering and version control system is the same for ETSI-GSM Technical Specifications as for "GSM recommendations".

1. Introduction.	2
1.1 Scope.	2
1.2 Abbreviations.	2
2. Interworking requirements.	3
2.1 Definitions of Interworking.	3
2.2 Interworking between Networks	4
2.2.1 Signalling Requirements for Call Control	4
2.2.2 Inter PLMN Signalling Requirements	4
2.3 Service Interworking.	4
2.4 Supplementary Service Interworking	5
3. Introduction to GSM 09.xx series of Recs.	5
3.1 GSM 09.02. Mobile Application Part Specification.	5
3.2 GSM 09.03. Signalling Requirements on Interworking between the ISDN or PSTN and the PLMN.	6
3.3 GSM 09.04. Interworking Between the PLMN and the CSPDN	6
3.4 GSM 09.05. Interworking between the PLMN and the PSPDN for PAD Access.	7
3.5 GSM 09.06. Interworking Between a PLMN and a PSPDN/ISDN for the Support of Packet Switched Data Transmission (bearer) Services	7
3.6 GSM 09.07. General Requirements on Interworking between the PLMN and the ISDN or PSTN.	7
3.7 GSM 09.09. Detailed Signalling Interworking within the PLMN and with the PSTN/ISDN.	8
3.8 GSM 09.10. Information Element Mapping between MS-BSS/BSS-MSC Signalling Procedures and the Mobile Application Part.	8

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1. INTRODUCTION.

1.1 Scope.

This Rec. serves as an introduction to the GSM Rec. within the 09.xx series.

In section 2 the technical requirements for PLMN Interworking are introduced, and in section 3 there is a summary of the content of each Rec. in the 09.xx series.

1.2 Abbreviations.

In this Rec. the following abbreviations are used:

BSS	Base Station System
CSPDN	Circuit Switched Public Data Network
EIR	Equipment Identity Register
GMSC	Gateway Mobile-services Switching Centre
GSM	Groupe Special Mobile
IMEI	International Mobile station Equipment Identity
HLR	Home Location Register
ISDN	Integrated Services Digital Network
ISP	Intermediate Service Part
IWF	Interworking Function
ISUP	ISDN User Part
MAP	Mobile Application Part
MHS	Message Handling System
MS	Mobile Station
MSC	Mobile-services Switching Centre
MTP	Message Transfer Part

PAD	Packet Assembly/Disassembly facility
PLMN	Public Land Mobile Network
PSPDN	Packet Switched Public Data Network
PSTN	Public Switched Telephone Network
SCCP	Signalling Connection Control Part
SS#7	Signalling System no. 7
TC	Transaction Capabilities
TCAP	Transaction Capabilities Application Part
TUP	Telephone User Part
VLR	Visitor Location Register

2. INTERWORKING REQUIREMENTS.

2.1 Definitions of Interworking.

Within the scope of CCITT I.500 series of Rec. the term interworking is used to express interactions between networks, between end systems, or between parts thereof, with the aim of providing an end-to-end communication. The interactions required rely on functions and on the means to select these functions which include the conversion of physical and electrical states and the mapping of protocols. These functions are referred to as interworking functions (IWF). An IWF may be implemented in the PLMN, ISDN, in the other types of network, at the user's premises, through a third-party service provider, or in some combination of these.

The IWFs needed are a result of service requirements for interworking, contained in the GSM 02-series and in the CCITT I.200 series recommendations.

2.2 Interworking between Networks

Network Interworking is required whenever a PLMN and a non-PLMN together are involved to provide an end to end connection and may be required in instance of a PLMN to PLMN connection. (GSM 09.07) Although the GSM PLMN is not an integrated part of the ISDN network it is the intention to provide ISDN similar services to its subscribers, as defined in GSM 02.01. Those services imply Interworking requirements to following networks:

- Between GSM PLMN and PSTN/ISDN.
- Between GSM PLMN and CSPDN.
- Between GSM PLMN and PSPDN.
- Between GSM PLMNs.

2.2.1 Signalling Requirements for Call Control

For network interworking, signalling requirements have to be defined. Existing call control signalling procedures (e.g. SS#7, ISUP, TUP when interworking with ISDN) will be used between the PLMN and other types of network.

2.2.2 Inter PLMN Signalling Requirements

For the support of services to mobiles roaming between different PLMNs it is required to provide the means for the conveyance of MAP messages. (e.g. the support of SS#7 MTP, SCCP and TC).

2.3 Service Interworking.

Service Interworking is required when the Teleservices at the calling and called terminals are different (e.g. Teletex Interworking with facsimile). No service Interworking has been identified as a requirement of the GSM system for PSTN/ISDN network based services. (GSM 02. series)

2.4 Supplementary Service Interworking

The supplementary services are described in GSM 02.04.

The way of providing supplementary service Interworking between PLMNs and other CEPT networks is treated in GSM 03.11, where each supplementary service IWF is described.

3. INTRODUCTION TO GSM 09.XX SERIES OF RECS.

3.1 GSM 09.02. Mobile Application Part Specification.

In this Rec. the configuration of the GSM PLMN is treated, defining the entities of the GSM system, and the interconnection between PLMNs is treated. The entities of the PLMN are listed below:

- Home Location Register.
- Visitor Location Register.
- Mobile-services Switching Centre.
- Base Station System.
- Gateway MSC.
- Equipment Identity Register.

In section 3 - Application and Use of MAP - there is an introduction to the Mobile Application Part and a list of necessary procedures for roaming of a mobile subscriber. Section 4 - Requirements Concerning the Use of SCCP and MAP - describes the requirements concerning the use of SCCP and TCAP. Section 5 - MAP Procedures - covers the MAP procedures, which are as follows:

- Location registration/cancellation.
- Handling of supplementary services.
- Retrieval of subscriber parameters during call set-up.
- Handover.
- Subscriber management.

- Operation and maintenance.
- Fault recovery of location registers.
- Management of international mobile equipment identities (IMEIs).
- Authentication.
- Management of security related functions.

In section 6 - Information Contents - there is an overview of the Application Service Elements - containing a list of parameters, operations, and - application errors with a definition of operations respectively application errors.

In section 7 Format and coding of information elements-are treated. This includes TCAP parameters, MAP parameters, and application parameters.

3.2 GSM 09.03. Signalling Requirements on Interworking between the ISDN or PSTN and the PLMN.

The Signalling aspects of Interworking between ISDN/PSTN and GSM PLMN are treated in this Rec. In section 2 there is a description of the general signalling requirements. They are split into requirements for the mobile network and requirements for the fixed network.

In section 3 Interworking with PSTN for call setup is treated, i.e. Interworking with TUP of SS#7. Section 4 describes the Interworking with ISDN for call set-up.

Section 5 describes the off-air call set-up and its impact on the Interworking with the fixed network.

3.3 GSM 09.04. Interworking Between the PLMN and the CSPDN

The interworking between a PLMN and a CSPDN is treated.

The recommendation covers two methods of interworking:

- PLMN to CSPDN direct
- PLMN to CSPDN via ISDN

3.4 GSM 09.05. Interworking between the PLMN and the PSPDN for PAD Access.

The Interworking between PLMN and PSTN for PAD access is treated, and PAD access is divided into Basic PAD access and Dedicated PAD access.

As regards Basic PAD access two types of network configuration are defined, Home PAD access and Visited PAD access.

Dedicated PAD access is defined as direct access to PAD from a PLMN. Dedicated PAD access treats two types of location of the PAD:

- PAD external to the PLMN.
- PAD internal to the PLMN.

A common set of profiles for the Dedicated PAD access is defined in the subsection dealing with location of the PAD and listed in annex 1, 2, and 3 of GSM 09.05.

3.5 GSM 09.06. Interworking Between a PLMN and a PSPDN/ISDN for the Support of Packet Switched Data Transmission (bearer) Services

This Rec. identifies the interworking functions and requirements in the interworking between a PLMN and a PSPDN/ISDN for the support of Packet Switched data transmission (bearer) services.

3.6 GSM 09.07. General Requirements on Interworking between the PLMN and the ISDN or PSTN.

This Rec. deals with the requirements to support Interworking between PLMN and PSTN and PLMN and ISDN, i.e. identifying the necessary IWFs. The Rec. introduces definitions and terms related to the subject and lists characteristics of the involved networks. The Interworking is split into:

- Service Interworking.
- Network Interworking.

- Signalling Interworking.
- Numbering.
- Supplementary Services Interworking.

The two last sections treat the Interworking to PSTN and ISDN. Both Sections contain Interworking connected to speech calls, data calls, and alternate speech data calls.

3.7 GSM 09.09. Detailed Signalling Interworking within the PLMN and with the PSTN/ISDN.

In GSM 09.09 the signalling Interworking between messages defined in GSM 04.08, GSM 08.08, and 09.02 is treated. Interworking with the fixed network is described using TUP or ISUP of SS#7. In the MSC the signalling messages of the mentioned functions are handled:

- Call establishment.
- Call release.
- Location registration.
- Handover.
- Authentication.

Diagrams show the layer 3 messages between MSC-MS, MSC-BSS, MSC-fixed network, and MAP messages.

3.8 GSM 09.10. Information Element Mapping between MS-BSS/BSS-MSC Signalling Procedures and the Mobile Application Part.

GSM 09.10 gives guidance to information element mapping between information elements of layer-3 messages sent on MS-BSS interface and information elements of MAP messages and treats additional Interworking in the case that the MSC also processes the information.

The Signalling mapping cases are divided into transparent and non transparent operations. The format of the mapping and the illustration of mapping principles in MSC is shown in the subsection dealing with Interworking in the MSC.