ETSI TR 101 643 V7.0.0 (1999-08)

Technical Report

Digital cellular telecommunications system (Phase 2+); General network interworking scenarios (GSM 09.01 version 7.0.0 Release 1998)

Reference
RTR/SMG-030901Q7 (f7o03i04.PDF)

Keywords
Digital cellular telecommunications system,
Global System for Mobile communications (GSM)

ETSI

Postal address
F-06921 Sophia Antipolis Cedex - FRANCE

Office address
650 Route des Lucioles - Sophia Antipolis
Valbonne - FRANCE
Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16
Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Internet
secretariat@etsi.fr
Individual copies of this ETSI deliverable
can be downloaded from
http://www.etsi.org
If you find errors in the present document, send your
comment to: editor@etsi.fr

Contents

Intellectual Property Rights 4
Foreword 4
1 Scope 5
2 References 5
3 Abbreviations 6
4 Interworking requirements 7
4.1 Definitions of interworking 7
4.2 Interworking between networks 7
4.2.1 Signalling requirements for Call Control 7
4.2.2 Inter PLMN signalling requirements 7
4.3 Service interworking 7
4.4 Supplementary service interworking 7
5 Introduction to GSM 09.xx-series 8
5.1 GSM 09.02: Mobile Application Part specification 8
5.2 GSM 09.03: Signalling requirements on interworking between the ISDN or PSTN and the PLMN 8
5.3 GSM 09.04: Interworking between the PLMN and the CSPDN 8
5.4 GSM 09.05: Interworking between the PLMN and the PSPDN for Packet Assembly/Disassembly (PAD) access 8
5.5 GSM 09.06: Interworking between a PLMN and a PSPDN/ISDN for the support of Packet Switched Data Transmission services 9
5.6 GSM 09.07: General requirements on interworking between the PLMN and the ISDN or PSTN 9
5.7 GSM 09.09: Detailed signalling interworking within the PLMN and with the PSTN/ISDN 9
5.8 GSM 09.10: Information element mapping between MS-BSS/BSS-MSC signalling procedures and the Mobile Application Part 10
5.9 GSM 09.11: Signalling interworking for supplementary services 10
5.10 GSM 09.90: Interworking between phase 1 infrastructure and phase 2 mobile stations 10
History 11

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available **free of charge** from the ETSI Secretariat. Latest updates are available on the ETSI Web server (http://www.etsi.org/ipr).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

This Technical Report (TR) has been produced by the Special Mobile Group (SMG).

The present document describes General network interworking scenarios within the digital cellular telecommunications system (Phase 2+).

The present document is an informative document resulting from SMG studies which are related to the Digital cellular telecommunications system.

The contents of the present document is subject to continuing work within SMG and may change following formal SMG approval. Should SMG modify the contents of the present document it will be re-released with an identifying change of release date and an increase in version number as follows:

Version 7.x.y

where:

- 7 indicates Release 1998 of GSM Phase 2+
- x the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- y the third digit is incremented when editorial only changes have been incorporated in the specification.

1 Scope

The present document serves as an introduction to the GSM 09.xx-series.

In clause 4, the technical requirements for Public Land Mobile Network (PLMN) interworking are introduced, and in clause 5 there is a summary of the contents of the GSM 09.xx-series.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.
- For this Release 1998 document, references to GSM documents are for Release 1998 versions (version 7.x.y).

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

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

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

[4] GSM 03.11: "Digital cellular telecommunications system; Technical realization of supplementary services".

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

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

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

[8] GSM 09.03: "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)".

[9] GSM 09.04: "Digital cellular telecommunications system (Phase 2+);; Interworking between the Public Land Mobile Network (PLMN) and the Circuit Switched Public Data Network (CSPDN)".

[10] GSM 09.05: "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".

[11] GSM 09.06: "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".

[12] GSM 09.07: "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)".

[13] GSM 09.08: "Digital cellular telecommunications system (Phase 2+); Application of the Base Station System Application Part (BSSAP) on the E-interface".

[14] GSM 09.10: "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)"

[15] GSM 09.11: "Digital cellular telecommunications system (Phase 2+); Signalling interworking for supplementary services".

[16] GSM 09.90: "Digital cellular telecommunications system (Phase 2+); Interworking between Phase 1 infrastructure and Phase 2+ Mobile Stations (MS)".

[17] CCITT Recommendation I.130 (1988): "Methods for the characterization of telecommunication service supported by an ISDN and network capabilities of an ISDN".

[18] CCITT Recommendation I.130 (1988): "Methods for the characterization of telecommunication service supported by an ISDN and network capabilities of an ISDN".

[19] CCITT Recommendation I.200 (series): "Guidance to the I.200-series of Recommendations".

[20] CCITT Recommendation I.500 (series): "General Structure of the ISDN interworking Recommendations".

3 Abbreviations

In addition to those below, abbreviations used in the present document are listed in GSM 01.04.

BSS	Base Station System
CSPDN	Circuit Switched Public Data Network
EIR	Equipment Identity Register
GSM	Global System for Mobile communications
HLR	Home Location Register
ISDN	Integrated Services Digital Network
IWF	Interworking Function
ISUP	ISDN User Part
MAP	Mobile Application Part
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
SS7	Signalling System No 7
TC	Transaction Capabilities
TUP	Telephone User Part
VLR	Visitor Location Register

4 Interworking requirements

4.1 Definitions of interworking

Within the scope of CCITT I.500-series of recommendations 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 (IWFs). An IWF may be implemented in the PLMN, Integrated Services Digital Network (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.xx-series and in the CCITT I.200-series of recommendations.

4.2 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 Public Switched Telephone Network (PSTN/ISDN);
- Between GSM PLMN and Circuit Switched Public Data Network (CSPDN);
- Between GSM PLMN and Packet Switched Public Data Network (PSPDN);
- Between GSM PLMNs.

4.2.1 Signalling requirements for Call Control

For network interworking, signalling requirements have to be defined. Existing call control signalling procedures (e.g. Signalling System No 7 (SS7), ISDN User Part (ISUP), Telephone User Part (TUP) when interworking with ISDN) will be used between the PLMN and other types of network.

4.2.2 Inter PLMN signalling requirements

For the support of services to mobile stations roaming between different PLMNs it is required to provide the means for the conveyance of Mobile Application Part (MAP) messages (e.g. the support of SS7 Message Transfer Part (MTP), Signalling Connection Control Part (SCCP) and Transaction Capabilities (TC)).

4.3 Service interworking

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

4.4 Supplementary service interworking

The supplementary services are described in GSM 02.04 and in GSM 02.8x and 02.9x-series.

The way of providing supplementary service interworking between PLMNs and other CEPT networks is treated in GSM 03.11 and in GSM 03.8x and 03.9x-series, where each supplementary service IWF is described.

5 Introduction to GSM 09.xx-series

5.1 GSM 09.02: Mobile Application Part specification

In GSM 09.02 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 (HLR);
- Visitor Location Register (VLR);
- Mobile-services Switching Centre (MSC);
- Base Station System (BSS);
- Gateway MSC;
- Equipment Identity Register (EIR).

GSM 09.02 describes the requirements for the signalling system and the procedures needed at the application level in order to fulfil these signalling needs.

5.2 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 GSM 09.03.

The general signalling requirements are split into requirements for the mobile network and requirements for the fixed network.

Interworking with PSTN for call set-up is treated, i.e. interworking with Telephone User Part (TUP) of SS7.

5.3 GSM 09.04: Interworking between the PLMN and the CSPDN

The IWFs are identified and the requirements to support interworking between a GSM PLMN and a CSPDN are treated.

GSM 09.04 covers two methods of interworking:

- PLMN to CSPDN direct;
- PLMN to CSPDN via ISDN.

5.4 GSM 09.05: Interworking between the PLMN and the PSPDN for Packet Assembly/Disassembly (PAD) access

The IWFs are identified and the requirements to support interworking between GSM PLMN and PSTN for PAD access are treated.

PAD access is divided into Basic PAD access and Dedicated PAD access.

As regards Basic PAD access two types of network configuration (related to the location of the user) are defined, Home PAD access and Visited PAD access.

Dedicated PAD access is defined as shortest possible connection to a 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 listed in annexes of GSM 09.05.

5.5 GSM 09.06: Interworking between a PLMN and a PSPDN/ISDN for the support of Packet Switched Data Transmission services

GSM 09.06 identifies the interworking functions and requirements in the interworking between a GSM PLMN and a PSPDN/ISDN for the support of Packet Switched data transmission (bearer) services.

Two types of services can be supported by a GSM PLMN:

- basic packet mode services;
- dedicated packet mode services.

5.6 GSM 09.07: General requirements on interworking between the PLMN and the ISDN or PSTN

GSM 09.07 deals with the requirements to support interworking between GSM PLMN and PSTN and between GSM PLMN and ISDN, i.e. identifying the necessary IWFs.

The interworking is split into:

- interworking with PSTN for speech calls;
- interworking with PSTN for data calls;
- interworking with PSTN for dual series calls;
- interworking with ISDN for speech calls;
- interworking with ISDN for data calls;
- interworking with ISDN for dual series calls.

5.7 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, 08.08 and 09.02 is treated. Interworking with the fixed network is described using TUP or ISUP of SS7. 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.

5.8 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.

5.9 GSM 09.11: Signalling interworking for supplementary services

GSM 09.11 is providing a detailed specification for interworking between the A-interface protocol and the Mobile Application Part for handling of supplementary services.

Call related supplementary services interworking and call independent supplementary services interworking are treated separately.

5.10 GSM 09.90: Interworking between phase 1 infrastructure and phase 2 mobile stations

GSM 09.90 clarifies how interworking can be obtained between phase 2 mobile stations and phase 1 infrastructure. The objective is to obtain this without changing the consolidated set of phase 1 specifications. GSM 09.90 specifies the necessary amendments to the phase 1 infrastructure so that an acceptable service is offered to mobile stations of phase 2, guaranteeing that a phase 2 mobile station obtains all phase 1 services.

The necessary changes are outlined as well as the necessary controls and clarifications with regard to phase 1 implementation, which should be performed to the different interfaces in phase 1 infrastructure before phase 2 mobiles are offered service.

History

Document history		
V7.0.0	August 1999	Publication

ISBN 2-7437-3372-1
Dépôt légal : Août 1999