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PT SMG

Permanent Document

GSM 10.60

Version: 5.~~43~~.0~~20~~

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GLOBAL SYSTEM FOR MOBILE COMMUNICATIONS

Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS) Project scheduling and open issues; (GSM 10.60 Version: 5.~~43~~.0~~2~~)

ETSI

European Telecommunications Standards Institute

ETSI PT SMG Secretariat

Postal address: F-06921 Sophia Antipolis CEDEX - FRANCE
Office address: 650 Route des Lucioles - Sophia Antipolis - Valbonne - FRANCE

Tel.: +33 4 92 94 42 66 - Fax: +33 4 93 65 28 17

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1. Foreword

This Project Team Special Mobile Group (PT SMG) Permanent Document has been produced by PT SMG and PT80V (GPRS) for the SMG Technical Committee of the European Telecommunications Standards Institute (ETSI).

This PT-PD describes the schedules of the General Packet Radio Service (GPRS) standardization process and open issues that are still under work. It also lists the necessary amendments to the GSM/DCS phase 2+ specifications for the technical realisation of the work item.

This PT-PD is an informative document resulting from ETSI TC-SMG studies which are not appropriate for European Telecommunication Standard (ETS), Interim European Telecommunication Standard (I-ETS) or ETSI Technical Report (ETR) status.

2. Scope

The purpose of this document is to describe the schedules of the General Packet Radio Service (GPRS) standardization process and open issues that are still under discussion. It also lists the new standards and necessary amendments to the GSM/DCS phase 2+ specifications for the technical realisation of the function.

The new standards and Change Requests (CR) necessary for GPRS are listed in clause 8.

2.1 References

This ETS incorporates by dated and undated reference, provisions from other publications. These 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 02.60: “Digital cellular telecommunication system; Stage 1 Service Description of the General Packet Radio Service (GPRS)”.

[2] GSM 03.60: “Digital cellular telecommunication system; Stage 2 Service Description of the General Packet Radio Service (GPRS)”.

[3] GSM 03.64: “Digital cellular telecommunication system; Stage 2 Description of the General Packet Radio Service (GPRS) Radio Interface (Um)”.

[4] GSM 03.61: “Stage 2 Description of GPRS, Point to Multipoint - Multicast (PTM-M)”

[5] GSM 03.62: “Stage 2 Description of GPRS, Point to Multipoint - Groupcall (PTM-G)”

2.2 Abbreviations

GSM GPRS abbreviations are contained within 02.60. The GPRS abbreviations used within other GSM standards documents will be included within GSM 01.04.

2.3 Support of specification work

This document is a ‘living document’ and permanently updated by PT SMG. Proposals for change shall be forwarded to PT SMG (editor direct contact details are on the last page), where the latest version can be obtained at any time. The GPRS specification rapporteurs should make sure that this document always reflects the latest status of work.

Latest versions of the material are intended to be made available to interested parties within SMG. Specification and Change Request rapporteurs should ensure the latest versions of their material is made available for review and comment by the following mechanisms:

ETSI FTP Server (docboc.etsi.fr or docbox.etsi.org):

in */Tech-Org/smg/Document/smg3/gprs/*.

- The draft GPRS specifications. (Once specifications are approved see */Tech-Org/smg/Document/smg/specs/Phase2pl/* where all current version approved specifications are maintained)
- SMG2/3 GPRS meeting reports, most input and all output documents from the former ad-hoc.

in *../CR/*

- The change request to existing specifications.

Email distribution lists: (handled by listserv@list.etsi.fr)

JOINT_SMG2+3+4_GPRS - for announcements of meetings, new versions of specifications, and meeting output summaries

SMG2_GPRS - for SMG2 GPRS technical and detailed discussions, distribution of proposed CRs.

SMG3_GPRS - for SMG3 GPRS technical and detailed discussions, distribution of proposed CRs.

SMG4_GPRS - for SMG4 GPRS technical and detailed discussions, distribution of proposed CRs.

SMG3_WPC_GPRS - for SMG3 WPC GPRS technical and detailed discussions.

3. General

See Stage 1 [1] and Stage 2 [2, 3, 4, 5] documents for a general description of the General Packet Radio Service (GPRS).

In brief:

GPRS uses a packet switched technique to transfer data in an efficient manner optimising the use of network resources. The allocation of channels is flexible: from 1 to 8 timeslots can be allocated, resources are shared by the active users, up and downlink are reserved separately. Applications based on standard data protocols (TCP/IP, X.25) are supported. Additionally specific point to point and point to multipoint services are supported, for applications such as traffic telematics and UIC train control.

GPRS is designed to support from intermittent/bursty data transfers through to occasional transmission of large volumes of data. Four different quality of service (QoS) are supported. GPRS is designed for fast reservation to begin transmission of packets, typically 0,5 to 1 seconds.

Both GPRS only mobiles and dual mode GPRS/GSM mobiles are supported.

4. Requirements

See in particular Stage 1 [1] and Stage 2 [2, 3, 4, 5] documents for GPRS requirements.

5. Functional description

See Stage 1 [1] and Stage 2 [2, 3, 4, 5] documents.

6. Technical realisation and amendments

6.1 Documentation Structure Overview

The following is an overview of the principle GSM standards which together specify GPRS. Section 8 following (entitled GPRS Specifications) details the full list of GSM standards effected.

Stage 1:

02.60
General GPRS Overview

Stage 2:

03.60 General System Description and Network Architecture	03.64 Radio Architecture Description	03.61 Point to Multipoint - Multicast	03.62 Point to Multipoint - Group Call

New Stage 3:

04.60 RLC/MAC Radio Protocol	04.64 LLC	04.65 SNDCP	04.61 PTM-M Services	04.62 PTM-G Services
	07.60 User Interworking	09.61 External Network Interworking		09.60 Gn & Gp Interfaces
08.18 BSSGP The Gb Interface	08.16 Gb Network Service	08.14 Gb Layer 1	09.18 Gs Layer 3	09.16 Gs Layer 2

Modified present Stage 3:

05.xx (.01,.02,.03, .05,.08,.10) Radio Interface	04.08 MAC, RLC Layer 3 Mobility Management			09.02 Gr and Gd additions to MAP
08.58 & .60 Abis and TRAU frame changes	04.034 to.07 GPRS, system and scheduling information	03.20 and others Security aspects	03.22 Idle Mode procedures	11.10, TBR-19 MS Test
11.2X BSS Test	11.11 SIM additions	12.xx O&M additions		

New Ciphering:

Stage 0 Lawful Interception	01.61 Ciphering Requirements	SAGE Algorithm

6.2 Phased Introduction of Capability

Given the substantial amount of effort associated with the GPRS work item, and the pressures of the time schedules being attempted, there is a need to prioritise the work being undertaken. This need was acknowledged by SMG Plenary #20, and so a two phased approach is proposed.

The first phase of standards specified will provide a functional GPRS service.

The second phase will complete the standardisation to meet all the GPRS requirements.

6.2.1 Phase 1 GPRS

- The primary **bearer** service priority is **PTP**

The first **interfaces** needed to support basic GPRS service, and hence detailed as primary priority are:

- User Interworking (for PTP TCP/IP) via a simple access mechanism.
- X.25 support via X.28 from MS to GGSN; X.25 from GGSN to external PDNs.

Internal Network Interfaces:

- **Gn** - GSN backbone network
- **Gb** - BSS to SGSN
- **Gr** - SGSN to HLR
- **Gp** - PLMN to PLMN (ie roaming)
- **Gs** - SGSN to MSC (not thought to be a large amount of work)

- External Reference point **Gi** for connecting via **TCP/IP** and **X.25**
- Identities
- Security Issues - for PTP and roaming
- Charging Issues, (architecture, level of standardization, information to be collected, protocols, CDR structure, charging policies)
- Operator Call Barring and Termination, Operator Call Screening

- PTM radio interface issues - these are required to ensure that PTM is fully supported in the future. The network side of PTM will however be a secondary priority.
- anonymous access (nearly finalised, expected to be ready for phase 1)

- Support of SMS over GPRS - considered to be a useful service at introduction. It is also felt that this can be incorporated without excessive additional effort, given the work carried out to date. Though this would be only MO and MT-SMS, not SMS-CB.

6.2.2 Phase 2 GPRS

- PTM-M
- PTM-G
- supplementary services
- additional user interworking (eg Synchronous X.25 to the MS)
- additional external network interfaces (other packet networks, modem and ISDN interworking)

7. Approvals Time Frame for GPRS

SMG plenary has emphasised the importance of time in the standardisation process for GPRS. At SMG#20 in October 1996, a time schedule for completion of the GPRS standards (Stage 1 and 2 descriptions) was stated, with standardisation work to be completed by SMG#22. The intent of the parties involved in GPRS ~~i~~was that the Stage 3 descriptions of GPRS, which covers the phase 1 implementation, would~~ill~~ be completed for GSM Release '97 (SMG#24). This includes both the new GPRS standards and the CRs to existing GSM specifications. The completion of GPRS with the phase 2 GPRS work is intended for GSM Release '98. At SMG#24 the work was around 75% complete, with the remainder planned to be finalised for SMG#25. Publication of these specifications as standards is thus awaiting the full set being complete, at SMG#25.

For a new standard, it must be presented to SMG for information prior to the meeting at which it is presented for approval. This of course implies that the responsible STC has approved the specification for forwarding to SMG prior to this each time. Thus all GPRS Stage 1 and 2 specifications (those which form the phase 1 GPRS release - 02.60, 03.60, 03.64) must be *forwarded* for information at least by SMG#21, and *finalised* within the STCs by June 1996, ready for SMG#22. For the stage 3 standards, they need to be presented for information to SMG#22. Although there are two SMG plenaries scheduled for the end of 1997, one is intended to be primarily dedicated to UMTS and so only one is likely to review GPRS documents.

For CRs on existing standards, at least two meetings of the appropriate SMG groups (STCs) are likely to be required: one to examine the draft CR and suggest appropriate ways of introducing the information into the specification, and a second to approve the revised CR. After this it can be presented directly to SMG plenary.~~ Thus the CRs must be *finalised* before September 1997, and should be begun *immediately.*~~

None of these time frames have sufficient leeway to still be met if any standards or CRs are rejected by SMG plenary, or referred back for further study. Thus all delegates are **strongly encouraged** to ensure that GPRS information is distributed internally within their companies, and that their SMG delegates have resolved any issues with the standards and CRs in the STCs prior to the plenary.

7.1 Approvals within STCs

(Note: Full details are shown in clause 8.)

SMG1 **LATE!** CRs to 02.11
- GSM 02.60 approved at SMG#21. Publication approval at SMG#23.
- CRs to existing Stage 1 specifications should be undertaken for completion at SMG#22.
- CRs to 02.04 to add GPRS to MSP. (MSP~~late!~~ shifted to release 98).
- CRs to 02.11 for Service Accessibility. **(late!).**

SMG2 **LATE!** CRs to 04.07 04.08)
- SMG2 consider the following to be the outstanding issues: MS classmark 4 info in RA Update Request;

- GSM 03.64 (Radio Architecture) Stage 2. Approved at SMG#22. ~~Some final t~~Tidy up CRs in process. Editorial realignment required after 05-series CRs are approved.
- GSM 04.60 RLC/MAC. This new stage specification is created, rather than placing all the detail in 04.08. Creation at this late stage means that it will **not be approved by December**, but only at SMG#25. ***Critical Path*** **(late!).** SMG#23~~4~~ noted the timeplan. For information SMG#24.
- CRs to 05-series to cover the RF details of GPRS.~~ For information to the STCs by June (late), approval in September ready for SMG#23. ***Critical Path.***~~ **Most** draft CRs approved at SMG#23. Tidy up CRs in process. Version 6 specifications created to handle this content. GSM 05.05 simulation result for PRACH outstanding. A small number of enhancements are in discussion, i.e. use of SDCCH and a continuous timing update improvement, that may lead to a small number of CRs. No major impact on the specifications is foreseen.
- CRs to 03-series. ~~For info by June~~ **(late!)**~~, approval for SMG#23.~~ ~~**Some** d~~Draft CRs started.

- CRs to 05-series. ~~For info by June (**late!**), a~~Approval at~~for~~ SMG#243.~~**Only some draft CRs started.**~~
- New Specifications for Gb interface: 08.1X.
08.18 is the layer 3 specification (related to 08.08). 08.16 is Network Service~~layer 2~~; 08.14 is layer 1. For Information SMG#23 (October 1997), approval SMG#24 (December 97)

SMG3

LATE! 03.01, 03.12 (location registration), 03.22 (idle mode); RLC/MAC (CRs to 04.07 04.08)
- SMG3 consider GPRS mostly complete at SMG#25. The following are the outstanding issues: Suspend and resume procedures; SIM data modification over the radio interface.

~~- For SMG3, we note in particular the need for approval at the working party level before SMG3 plenary. To complete SMG3 items, this may mean additional working party meetings focussed solely on prior to November 1997.~~
- GSM 03.60 stage 2 Network Architecture. Approved at SMG#22. Some final tidy up CRs in process.
- GSM 03.61 stage 2 for PTM-M. GPRS Phase 2 item. Only required for 1998.
- GSM 03.62 stage 2 for PTM-G. GPRS Phase 2 item. Only required for release 1998.
- GSM 04.64 LLC in SMG3 WPA. Approved October 1997 (SMG#23).
- GSM 04.65 SNDCP in SMG3 WPA. Approved October 1997 (SMG#23).
~~- BSSGP in SMG3 . To be Ready for approval by December 1997. On track. Was formerly called GSM 08.64 and presented as such to SMG#22 for information. Again for information to SMG#23 with revised title.~~
- GSM 09.60 Tunneling Protocol in SMG3 WPC/SA. ~~To be Ready for a~~Approval ~~by~~ December 1997. ~~On track.~~ For information SMG#22.
- CRs to 04.08 for MAC and RLC in SMG3 WPA. Draft by June, finalised by September. ***Critical Path.*** ~~Some d~~Draft CRs started, but **late!**
- CRs to other SMG3 specifications. Draft by June, finalised by September. ***Critical Path.*** Most started, and seen as drafts in working parties, but **late!.**
- New Specifications for Gs interface: 09.1x.
09.18 is the layer 3 specifications (related to 08.08). 09.16 is layer 2. For Information SMG#23 (October 1997), will only be ready SMG#25 (Feb 97).~~ **late!**~~

SMG4

- SMG4 has already begun arranging GPRS ad-hoc meetings in order to support the work and timescales. With the bulk of phase 1 work completed, phase 2 issues are about to be taken up.
- GSM 07.60 MS Interworking. For information at SMG#22. Approved October 1997 (SMG#23).
- GSM 09.61 PDN Interworking. For information at SMG#22. Approved October 1997 (SMG#23).
- CRs to other SMG4 specifications. To be finalised by November in STCs. On track.
~~- over still requires some resolution. Agreement in principle has been reached.~~

SMG10

- Security issues are ***Critical Path***.~~ It is proposed that security experts are added to PT80V adhoc, or an SMG10 adhoc, to formally advance this work, probably via separate meetings. Additional SMG10 meetings for this may also be likely. Delegates are urged to seek security expertise within their company that can be applied to this problem and meet the timeframe. **Critical.**~~ On track.
- GSM 01.61 GPRS ciphering requirements. For information at SMG#22. Approved October 1997 (SMG#23). SAGE work on algorithm design can begin. Funding for SAGE work offered by MoU. Schedule of the ciphering algorithm design: It seems that it will be around 6 months from the first SAGE meeting (13 of November), ie completion April 1998.

SMG6

- These Billing and OAM issues have been begun. Note that the Stage 2 description (GSM 03.60) for these issues is at present nearly empty, all details will be in stage 3. SMG6 GPRS work group has started its work (summer 1997).
- The following priorities have been set for the target date of June '98 (Release 97):
Priority 1: architecture; level of standardization;

Priority 2: information to be collected; protocols; CDR structure;
Priority 3: charging policies;
If sufficient time allows the following could also be undertaken:
Priority 4: method for content charging;
Priority 5: AoC / prepaid support - Purpose: end user charging info.
- O&M and Subscriber Management and other issues will also be discussed, but ready specifications are not expected in this timescale (June '98, i.e. GPRS rel. '97).

SMG7, SMG8

- Issues are unlikely to be resolved within the SMG#24 timeframe. Much of the SMG7 and 8 work can only be carried out once the stage 3 description CRs into other groups are finalised. If the target date of SMG#23 is met for the core GPRS work, it could still be possible to complete this in GSM Release '97. Type Approval is always a time limiting factor for commercial service introduction! Identification of what testing and type approval will be required is ***Critical Path***. **NO RAPPORTEURS AS YET!**

SMG9 - Has indicated it sees no problem in implementing fields for the SIM to support GPRS. Work to be completed for Release '97 -slightly late January~~December~~ 1998~~7~~ (SMG#24).

8. GPRS Specifications

8.1 New Specifications

New specifications						
GSM No. **01.61**	Title: GPRS ciphering algorithm requirements	Prime rsp. STC: **SMG10**	2ndary rsp. STC(s):	presented for information at SMG#	approved at SMG#	Comments
Current Version 5.0.0	Rapporteur/Company (1 or more) VANNESTE Geneviève / SIEMENS ATEA			SMG#22	SMG#23	
GSM No. **02.60**	Title: General Packet Radio Service; Service Description Stage 1	Prime rsp. STC: **SMG1**	2ndary rsp. STC(s):	presented for information at SMG#	approved at SMG#	Comments 2 CRs at SMG#24
Current Version 5.2~~1~~.0	Rapporteur/Company (1 or more) Alan Conrad / DeTeMobil			SMG#20	SMG#21	
GSM No. **03.60**	Title: General Packet Radio Service; Service Description; Stage 2	Prime rsp. STC: **SMG3 SA**	2ndary rsp. STC(s):	presented for information at SMG#	approved at SMG#	Comments 8 ~~21~~ CRs at SMG#2~~54~~
Current Version 5.2~~1~~.0	Rapporteur/Company (1 or more) Hans Petter Naper / Motorola			SMG#21	SMG#22	
GSM No. **03.61**	Title: General Packet Radio Service; Point to Multipoint Multicast Service Description; Stage 2	Prime rsp. STC: **SMG3 SA**	2ndary rsp. STC(s): SMG3 WPC	presented for information at SMG#	approved at SMG#	Comments Phase 2 GPRS feature
Current Version 0.7.1	Rapporteur/Company (1 or more) Jürgen Baumann / DeTeMobil			target: SMG#24	target: SMG#25	
GSM No. **03.62**	Title: General Packet Radio Service Point to Multipoint - Groupcast Stage 2 Description	Prime rsp. STC: **SMG3 SA**	2ndary rsp. STC(s): SMG3 WPC	presented for information at SMG#	approved at SMG#	Comments Phase 2 GPRS feature
Current Version -none	Rapporteur/Company (1 or more) *none*			target: SMG#25	target: SMG#26	
GSM No. **03.64**	Title: General Packet Radio Service; Overall Description of the GPRS Radio Interface; Stage 2	Prime rsp. STC: **SMG2**	2ndary rsp. STC(s):	presented for information at SMG#	approved at SMG#	Comments Check if editorial alignment needed after
Current Version 5.2~~1~~.0	Rapporteur/Company (1 or more) Jari Hämäläinen / Nokia			SMG#21	SMG#22	05 series CRs approved. CRs at SMG#2~~54~~
GSM No. **04.60**	Title: General Packet Radio Service; MS - BSS interface; Radio Link Control/Medium Access Control (RLC/MAC) protocol	Prime rsp. STC: **SMG2 WPA**	2ndary rsp. STC(s):	presented for information at SMG#	approved at SMG#	Comments Material not in 04.08 since it would be too confusing
Current Version *2~~0.00~~.0*	Rapporteur/Company (1 or more) Jeffery Smolinkse / Motorola ~~(details - see Annex 4)~~			~~target:~~ SMG#24	target: SMG#25	~~Note: Late for phase 1 approval~~

New specifications						
GSM No. **04.61**	Title: General Packet Radio Service Point to Multipoint - Multicast Stage 3 Description	Prime rsp. STC: **SMG3**	2ndary rsp. STC(s): SMG4	presented for information at SMG#	approved at SMG#	Comments Phase 2 GPRS feature
Current Version -*none*	Rapporteur/Company (1 or more) *none*			target: SMG#25	target: SMG#26	Not yet started
GSM No. **04.62**	Title: General Packet Radio Service Point to Multipoint - Groupcast Stage 3 Description	Prime rsp. STC: **SMG3**	2ndary rsp. STC(s): SMG4	presented for information at SMG#	approved at SMG#	Comments Phase 2 GPRS feature
Current Version -*none*	Rapporteur/Company (1 or more) *none*			target: SMG#25	target: SMG#26	Not yet started
GSM No. **04.64**	Title: Mobile Station-Serving GPRS Support Node Logical Link Control Layer Specification	Prime rsp. STC: **SMG3 WPA**	2ndary rsp. STC(s): Annex A SMG10	presented for information at SMG#	approved at SMG#	Comments
Current Version 5.1~~0~~.0	Rapporteur/Company (1 or more) ~~Pierre Dupont,~~ Hans Petter Naper / Motorola			SMG#22	SMG#23	6 CRs at SMG#2~~54~~
GSM No. **04.65**	Title: General Packet Radio Service; Subnetwork Dependent Convergence Protocol (SNDCP)	Prime rsp. STC: **SMG3 WPA**	2ndary rsp. STC(s):	presented for information at SMG#	approved at SMG#	Comments
Current Version 5.1~~0~~.0	Rapporteur/Company (1 or more) Jari Hämäläinen / Nokia			SMG#22	SMG#23	~~49~~ CRs at SMG#2~~54~~
GSM No. **07.60**	Title: General requirements on Mobile Stations supporting GPRS	Prime rsp. STC: **SMG4**	2ndary rsp. STC(s):	presented for information at SMG#	approved at SMG#	Comments
Current Version 5.1~~0~~.0	Rapporteur/Company (1 or more) Graham Heaton / Vodafone			SMG#22	SMG#23	CRs at SMG#25
GSM No. **08.14**	Title: BSS - SGSN interface; Gb Interface Layer 1	Prime rsp. STC: **SMG2 (WPA)**	2ndary rsp. STC(s):	presented for information at SMG#	approved at SMG#	Comments
Current Version 5~~2~~.0.0	Rapporteur/Company (1 or more) Serge Baudet / Alcatel			SMG#23	~~target:~~ SMG#24	
GSM No. **08.16**	Title: BSS - SGSN interface; Gb Network Service	Prime rsp. STC: **SMG2 (WPA)**	2ndary rsp. STC(s):	presented for information at SMG#	approved at SMG#	Comments equivalent to 08.06
Current Version 5~~2~~.0.0	Rapporteur/Company (1 or more) Serge Baudet / Alcatel			SMG#23	~~target:~~ SMG#24	7 CRs at SMG#25

New specifications						
GSM No. **08.18** (was 08.64)	Title: BSS - SGSN interface; Gb Interface; BSS- SGSN GPRS Protocol (BSSGP); Layer 3	Prime rsp. STC: **SMG2 (WPA)**	2ndary rsp. STC(s):	presented for information at SMG#	approved at SMG#	Comments equivalent to 08.08 (Formerly 08.64)
Current Version 5~~2~~.0.0	Rapporteur/Company (1 or more) Phil Ghilchrist / Motorola			SMG#22 and again at SMG#23	~~target:~~ SMG#24	~~FFS issue on flow control~~ CRs at SMG#25
GSM No. **09.16**	Title: SGSN-MSC; Gs Interface Layer 2	Prime rsp. STC: **SMG3 (WPA)**	2ndary rsp. STC(s): SMG3 (WPC)	presented for information at SMG#	approved at SMG#	Comments late. Outstanding issue with location updating procedures
Current Version 2~~1.01~~.0	Rapporteur/Company (1 or more) David Sanchez-Ariz / Vodafone			SMG#23	target: SMG#25	
GSM No. **09.18**	Title: SGSN-MSC; Gs Interface Layer 3	Prime rsp. STC: **SMG3 (WPA)**	2ndary rsp. STC(s):	presented for information at SMG#	approved at SMG#	Comments equivalent to 09.08/ 08.08
Current Version 2~~1.02~~.0~~0~~	Rapporteur/Company (1 or more) David Sanchez-Ariz / Vodafone			SMG#23	target: SMG#25	late. See 09.16
GSM No. **09.60**	Title: General Packet Radio Service; GPRS Tunneling Protocol across the Gn and Gp Interface	Prime rsp. STC: **SMG3 WPC**	2ndary rsp. STC(s):	presented for information at SMG#	approved at SMG#	Comments
Current Version 5~~2~~.0.0	Rapporteur/Company (1 or more) Stefan Toth / Ericsson			SMG#22	~~target:~~ SMG#24	6 CRs at SMG#25
GSM No. **09.61**	Title: General requirements on interworking between the Public Land Mobile Network supporting GPRS and Packet Data Networks (PDN)	Prime rsp. STC: **SMG4**	2ndary rsp. STC(s):	presented for information at SMG#	approved at SMG#	Comments
Current Version 5.0.0	Rapporteur/Company (1 or more) Graham Heaton / Vodafone			SMG#22	SMG#23	CRs at SMG#25

8.2 Change Requests for GPRS Phase 1

Note: The following list is the current set of changes that are required for GPRS phase 1. This list will continue to be refined as GPRS is further developed. Incomplete entries or entries in *italics* signify work that should be carried out, but which has not yet been started. Target dates show when drafting work must be completed in order to have the CR ready for the appropriate WP, STC and hence TC-SMG meeting. The Tdoc number indicated in brackets indicates which TC-SMG plenary document contained the change request.

Note: Change Requests to refine the new GPRS specifications are dealt with within the appropriate STCs. They are not detailed in this document, and can be found by referring to the appropriate STC meeting reports and/or the specification editors.

Affected existing specifications					
GSM No.	CR	Subject	CR rapporteur/company	STC	Completion Date / Target Date
01.04		GPRS Abbreviations		**PT12**	*/December 1997*
02.04		**MSP and GPRS**	Ian Crawford / Vodafone	**SMG 1**	***/November 1997***
02.11		**Service Accessibility** (relates to 03.22)	Frank Mademann/ Siemens	**SMG 1** SMG2/SMG3	***/November 1997***
02.33		**Legal Interception**	Serge Haumont/ Nokia	**SMG10**	/February 1998
03.01		GPRS Network Functions *(see Tdoc SMG3 GPRS 97G074)*	Hans Lindgren/ Ericsson	**SMG3 WPA**	/November 1997
03.02	**A005 *r*4**	Changes for GPRS regarding Network Archtecture	Anders Abbor/ Ericsson	**SMG3 SA**	December 1997 (SMG#24 1086/97)
03.03	**A003 *r*65**	**GPRS Identities, IMSI**	Hans Petter Naper / Motorola~~Anders Abbor/ ERICSSON~~	**SMG3 SA** /SMG4	March/~~January~~ 1998 (SMG#25 /98)
03.07	**A001**	GPRS Restorarion Procedures	Johannes Falck/ Ericsson	**SMG3 WPC**	October 1997 (SMG#23 691/97)
03.07	**A002**	~~-~~Restorarion Procedures for GPRS~~additions (on hold at WPC)~~		**SMG3 WPC**	March/~~January~~ 1998 (SMG#25 /98)
03.08	**A008**	GPRS Subscriber Data *[NOTE: see A011 and A012]*	Stefan Toth/ Ericsson	**SMG3 WPC**	October 1997 (SMG#23 691/97)
03.08	**A009 r2**	GPRS Subscriber Data additions		**SMG3 WPC**	replaced by A012 ~~/January 1998~~
03.08	**A011**	Deletion of CR 03.08-A008: Organisation of subscriber data	03.08 rapporteur	**SMG3 WPC**	March 1998 (SMG#25 /98)
03.08	**A012 r2**	Network access mode and GPRS data *[Note: Encompasses A008 material]*		**SMG3 WPC**	March 1998 (SMG#25 /98)
03.12	**A001 *r*1**	GPRS Location registration Procedures	Lars Tedenvall/ Ericsson	**SMG3 SA**	/January 1998
03.16	**A009**	GPRS Subscriber Data Management *[Expand to HLR/SGSN/VLR issues? Or new Spec?]*	Stefan Toth/ Ericsson	**SMG3 WPC**	October 1997 (SMG#23 691/97)
03.16	**A010 r1**	Handling of GPRS ~~Subscriber~~ Data ~~Management additions~~		**SMG3 WPC**	March/~~January~~ 1998 (SMG#25 /98)
03.18	**A013 r7**	Changes to Non-GPRS paging procedures for GPRS	/ Vodafone	**SMG3 WPC**	March 1998 (SMG#25 /98)
03.18	**A015 r1**	GPRS		**SMG3 WPC**	/January 1998
03.20	**A006r1**	GPRS interaction with existing security mechanism	Hannu Kari, Serge Haumont/ Nokia	**SMG10 / SMG3 /SMG2**	October 1997 (SMG#23 778/97)
03.20	**A007r1**	GPRS security	Hannu Kari, Serge Haumont/ Nokia	**SMG10 / SMG3 /SMG2**	October 1997 (SMG#23 778/97)
03.22	**A016**	Extensions to the scope of idle mode procedures for GPRS. *(ie:Cell Selection; GPRS Cell Reselection; Idle mode procedures)*	Frank Mademann/ Siemens	**SMG2 (WPB~~A~~)**/ SMG3 WPA	/November 1997
03.33		**Legal Interception**	Serge Haumont/ Nokia	**SMG10**	/~~February~~ June 1998
03.40	**A063**	Technical Realisation of SMS PTP		**SMG4 /** SMG3	October 1997 (SMG#23 706/97)
04.03	**A005r2**	Introduction of GPRS	Sven Ekemark/ Ericsson	**SMG2 (WPB)**	December 1997 (SMG#24 946/97)

Affected existing specifications

GSM No.	CR	Subject	CR rapporteur/company	STC	Completion Date / Target Date
04.04	**A001r2**	Introduction of GPRS	Sven Ekemark/ Ericsson	**SMG2(WPA)**	December1997 (SMG#24 946/97)
04.07	**A008r5~~1~~**	Inclusion of GPRS services	Arno Spinner/ Ericsson	**SMG3 WPA**	December 1997 (SMG#24 988/97)
04.07	**A011**	Addition of standard L3 message protocol discriminators for GPRS~~GPRS, *additional modifications, especially clause 11*~~	/ Ericsson	**SMG3 WPA**	~~/~~March~~January~~ 1998 (SMG#25 /98)
04.07	**A015r1**	Page response parameter introduction between GMM-LLC-GRR	/ Ericsson	**SMG3 WPA**	March 1998 (SMG#25 /98)
04.07		*GPRS - Use of TLLI*		**SMG3 WPA**	*/April 1998*
04.08	**A250 r6**	GPRS, RRsub-layer~~RR part of~~	Sven Ekemark~~Ingemar Backlund~~/ Ericsson	**SMG3 WPA** **SMG2 WPA**	March 1998 (SMG#25 /98) ~~/January 1998~~
~~**04.08**~~	~~**A236**~~	~~session and part of~~	~~Arno Spinner/ Ericsson~~	~~**SMG3**~~	~~/January 1998~~
~~**04.08**~~	~~**A234**~~	~~Addition of 11-bit Access Request messages~~	~~Ingemar Backlund/ Ericsson~~	~~**SMG3**~~ ~~**SMG2**~~	~~/January 1998~~
04.08	**A265 r5**	Inclusion of GPRS session and mobility management procedures into GSM 04.08	Goetz Brasche, Ingemar Backlund/ Ericsson	**SMG3 WPA** **SMG2 WPA**	March 1998 (SMG#25 /98)
04.08	**A273**	Network controlled allocation of GPRS resource	Chris Pudney/Vodafone	**SMG3 WPA** **SMG2 WPA**	March 1998 (SMG#25 /98)
04.08	**A???**	GPRS and Dedicated Control Channels	Chris Pudney/Vodafone	**SMG3 WPA** **SMG2 WPA**	March 1998 (SMG#25 /98)
04.08		*Changes to MM from MS driven suspend*		**SMG3 WPA** **SMG2 WPA**	*/April 1998*
04.11	**A081r2**	PTP SMS over GPRS for Radio Interface~~SMS in~~	Nigel Holland/ BT	**SMG3 WPA** **SMG4**	~~/Novembe~~March 1998~~7~~ (SMG#25 /98)
05.01	**A010r1**	Introduction of GPRS		**SMG2 (WPB)**	December 1997 (SMG#24 1002/97)
05.01	**A013**	Renaming of GPRS RR states	Bengt Persson/ Ericsson	**SMG2 (WPB)**	March 1998 (SMG#25 /98)
05.02	**A019r1**	Mapping of Packet Data Logical Channels onto Physical Channels; Multiframe Structure for PDCH	Evelyne Le Strat/ Nortel	**SMG2 (WPB)**	October 1997 (SMG#23 640/97)
05.02	**A020r1**	Corrections and clarifications to GPRS		**SMG2 (WPB)**	December 1997 (SMG#24 1003/97)
05.02	**A021**	Multislot classes for GPRS		**SMG2 (WPB)**	December 1997 (SMG#24 1003/97)
05.02	**A022r1**	System Information for GPRS on BCCH		**SMG2 (WPB)**	December 1997 (SMG#24 1003/97)
05.02	**A023r2**	Alignment of 51- and 52-multiframe PCCCH		**SMG2 (WPB)**	December 1997 (SMG#24 1003/97)
05.02	**A025**	Corrections to the GPRS sleep mode		**SMG2 (WPB)**	March 1998 (SMG#25 /98)
05.02	**A026 r1**	Clarification of multislot classes		**SMG2 (WPB)**	March 1998 (SMG#25 /98)
05.02	**A027**	Clarification of multislot classes		**SMG2 (WPB)**	March 1998 (SMG#25 /98)
05.02	**A031**	Number of PBCCH channels	Bengt Persson/ Ericsson	**SMG2 (WPB)**	/Mar 1998
05.02	**A034**	Indication of PACCH logical channel type	Bengt Persson/ Ericsson	**SMG2 (WPB)**	March 1998 (SMG#25 /98)
05.02	**A035**	Renaming of GPRS RR states		**SMG2 (WPB)**	March 1998 (SMG#25 /98)
05.02	**A036**	USF granularity for dynamic allocation		**SMG2 (WPB)**	March 1998 (SMG#25 /98)
05.03	**A011 r1**	Introduction of GPRS	Bengt Persson/ Ericsson	**SMG2 (WPB)**	October 1997 (SMG#23 640/97)
05.05	**A060 r2**	GPRS Radio Interface issues	Bengt Persson/ Ericsson, Davide Sorbara/CSELT	**SMG2 (WPB)**	October 1997 (SMG#23 640/97)
05.05	**A063 r2**	Reference performance for GPRS		**SMG2 (WPB)**	December 1997 (SMG#24 1004/97)
05.05	**A065 r3**	Repeater Systems using Frequency Shift		**SMG2 (WPB)**	March 1998 (SMG#25 /98)
05.05		*Simulation result for PRACH*		***SMG2 (WPB)***	*/March 1998*

Affected existing specifications

GSM No.	CR	Subject	CR rapporteur/company	STC	Completion Date / Target Date
05.08	**A010 r2~~3~~**	Cell Reselection	Bengt Persson/ Ericsson	**SMG2 (WPB)**	October 1997 (SMG#23 640/97)
05.08	**A043**	Channel quality report in GPRS		**SMG2 (WPB)**	December 1997 (SMG#24 1005/97)
05.08	**A045 r1**	RF power level control duringconfiguration change procedure		**SMG2 (WPB)**	March 1998 (SMG#25 /98)
05.08	**A046 r1**	Improvements to GPRS power control		**SMG2 (WPB)**	March 1998 (SMG#25 /98)
05.08	**A047**	Cell re-selection in GPRS	Bengt Persson/ Ericsson	**SMG2 (WPB)**	/Mar 98
05.08	**A050**	Measurement reports in GPRS		**SMG2 (WPB)**	March 1998 (SMG#25 /98)
05.08	**A051**	GPRS Cell Re-selection	Bengt Persson/ Ericsson	**SMG2 (WPB)**	/Mar 98
05.08	**A053**	Interference measurements for GPRS	Bengt Persson/ Ericsson	**SMG2 (WPB)**	/Mar 98
05.08	**A054**	Renaming of GPRS RR states		**SMG2 (WPB)**	March 1998 (SMG#25 /98)
05.08	**A055 r1**	Transmission on downlink PDCH		**SMG2 (WPB)**	March 1998 (SMG#25 /98)
05.10	**A011 r1**	GPRS Radio Interface issues	Martin Öttl/ Siemens	**SMG2 (WPB)**	October 1997 (SMG#23 640/97)
05.10	**A013**	Clarification of the use of TAI		**SMG2 (WPB)**	March 1998 (SMG#25 /98)
05.10	**A014**	Renaming of GPRS RR states		**SMG2 (WPB)**	March 1998 (SMG#25 /98)
05.10	**A015**	GPRS, Missing Timing Advance Updateson PTCCH		**SMG2 (WPB)**	March 1998 (SMG#25 /98)
05.50	**A005 r1**	Introduction of simulation results for GPRS receiver performance (Note: PRACH portion still required to be added)	CSELT, Ericsson	**SMG2**	December 1997 (SMG#24 1006/97)
07.07	**A041**	GPRS AT command cross reference	/ Ericsson	**SMG4**	October 1997 (SMG#23 706/97)
~~**08.60**~~		~~TRAU frames for~~	~~Martin Öttl/ Siemens~~	~~**SMG2**~~	~~/March 1998~~
09.02	**A105 r9~~3~~**	MAP changes for GPRS *[Gr, Gc and Gd additions to MAP]*	Teemu Mäkinen/ Nokia	**SMG3 WPC**	March/~~November~~ 1998~~7~~ (SMG#25 /98)
~~**09.02**~~		~~still to come….~~		~~**SMG3 WPC**~~	~~*/Januaryr 1998*~~
09.10	**A008 r1**	Addition of the mapping of the Routeing area update procedure in GPRS		**SMG3 WPC**	March 1998 (SMG#25 /98)
11.10		MS Testing		**SMG7**	*/mid 1998*
11.11	**A058 r2**	~~-~~Addition~~s~~ of GPRS data field *(LS to SMG1 on using unchanged SIM) (first draft for information in Tdoc SMG#24 889/97)*		**SMG9**	March/~~January~~ 1998 (SMG#25 /98)
11.2x		BSS Testing		**SMG8**	*/mid 1998*
12.02		Data Administration - GPRS Activation for O&M	Lampinen Jukka/ Nokia	**SMG6**	*/mid 1998*
12.05		GPRS Charging *(draft version available in FTP server as ../smg6/specs/draft/1017_xxx.zip)*	Graham Heaton/ Vodafone	**SMG6**	*/mid 1998(SMG#26)*
12.xx		O&M additions *(draft version available in FTP server as ../smg6/specs/draft/1018_xxx.zip)*	Mark Cataldo/ Lucent	**SMG6**	*/mid 1998*
TBR -19		MS Testing		**SMG7**	*/mid 1998*

8.3 Possible CRs required

Note: The following list is not yet comprehensive nor complete. This list will continue to be refined as GPRS is further developed. Incomplete entries signify activities which have not yet been fully examined, but may be required.

Existing specifications potentially affected					
GSM No.	Specification Title	Subject of CR	rapporteur	STC	Target Date
01.02	General description of a PLMN			**SMG1**	
02.01	Principles of a GSM PLMN			**SMG1**	
02.06	Types of Mobile Stations			**SMG1**	
02.07	MS Features			**SMG1**	
02.09	Security Aspects			**SMG1**	
02.24	Description of Charge Advice			**SMG1**	
02.30	MMI of MS	SMS via GPRS?		**SMG1**	
02.8x	Supplementary Services				
03.05	Technical Performance Objectives	*cross reference only?*		**SMG3 WPC**	
03.10	GSM Connection Types			**SMG4**	
03.11	Technical Realisation of Supplementary services			**SMG3 WPB**	
03.13	CRX			**SMG3 WPA**	
03.30	Radio Network Planning Aspects			**SMG2**	
03.41	Technical Realisation of SMSCB			**SMG4**	
03.85	Closed User Group			**SMG3 WPB**	
03.86	Advice of Charge			**SMG3 WPB**	
04.01	MS-BSS General Aspects			**SMG3 WPA**	
04.02	GSM Access Reference Configuration			**SMG3 WPA**	
04.05	Data Link Layer General Aspects	*cross reference only?*		**SMG2 WPA**	
04.06	MS-BSS Data Link Layer	*cross reference only?*		**SMG2 WPA**	
04.1x		*cross reference only?*		**SMG3**	
04.2x		*cross reference only?*		**SMG4**	
04.8x		*cross reference only?*		**SMG3 WPB**	
07.01	Terminal Adaption Functions for MS	*cross reference only?*		**SMG4**	
07.08	AP Interface			**SMG4**	
08.01		*cross reference only?*		**SMG3 SA**	
08.02		*cross reference only?*		**SMG3 SA**	

Existing specifications potentially affected					
GSM No.	Specification Title	Subject of CR	rapporteur	STC	Target Date
08.5x	BSC-BTS	*unsure if affected?*		**SMG2 WPA**	
08.6x		Gb Layer 1		**SMG2**	
09.01	General Network interworking	Gs Interface		**SMG3 WPC**	
09.12	ISUP2 (Signalling for ISDN)	Gs Interface		**SMG3 WPC**	
09.04	Interworking with CSPDN	Gs Interface		**SMG3**	
09.0x	Interworking ...	*unsure if affected?*		**SMG4**	
09.10	MAP Information elements	*cross reference only?*		**SMG3 WPC**	
12.04	Performance management	QoS Measurement		**SMG6**	
12.05	Subscriber event data	GPRS Charging issues		**SMG6**	

8.4 GPRS Phase 2 Change Requests

Note: The following list is the current set of changes that are anticipated for GPRS Phase 2. This list will continue to be refined as GPRS is further developed. Incomplete entries or entries in *italics* signify work that should be carried out, but which has not yet been started.

Affected existing specifications					
GSM No.	CR	Subject	CR rapporteur/company	STC	Completion Date / Target Date
01.04		*GPRS Abbreviations*		**PT12**	*/December 1998*
02.04		***MSP and GPRS***	Ian Crawford / Vodafone	**SMG 1**	*/March 1998*
02.11		***Service Accessibility***		**SMG 1** SMG2/SMG3	*/March 1998*
03.03		***GPRS Identities, IMSI***		**SMG3 SA** /SMG4	*/July 1998*
03.08		*GPRS Subscriber Data*		**SMG3 WPC**	*/July 1998*
03.16		*GPRS Subscriber Data Management*		**SMG3 WPC**	*/July 1998*
03.20		*GPRS Security Aspects*		**SMG10 / SMG3 /SMG2**	*/July 1998*
03.40		*SMS PTM*		**SMG4 /** SMG3	*/September 1998*
03.60		*GPRS Phase 2 additions (if required)*		**SMG3 SA**	*/September 1998*
03.64		*GPRS Phase 2 additions (if required)*		**SMG2 WPA**	*/September 1998*
03.97		*MSP Stage 2*	~~Simon Richardson / Vodafone~~	**SMG3 WPB**	*/September 1998*
04.08		*RR part of GPRS*		**SMG2 WPA**	*/December 1998*
04.08		*session and MM part of GPRS*		**SMG3 WPA**	*/December 1998*
04.11		***SMS in GPRS***		**SMG3 SMG4**	*/September 1998*
04.60		*RLC/MAC - GPRS Phase 2*		**SMG3 WPA SMG2 WPA**	*/September 1998*
07.07		*GPRS AT command cross reference*		**SMG4**	*/September 1998*
09.02		*Gr, Gc and Gd additions to MAP*		**SMG3 WPC**	*/September 1998*
11.10		*MS Testing*		**SMG7**	*/mid 1999*
11.11		*SIM Additions*		**SMG9**	*/September 1998*
12.05		*GPRS Charging*		**SMG6**	*/mid 1999*
12.xx		*O&M additions*		**SMG6**	*/mid 1999*
TBR -19		*MS Testing*		**SMG7**	*/mid 1999*

9. Backwards compatibility

The additions and changes caused by the GPRS work item shall not cause backward compatibility problems with GSM phase 2 or pre-GPRS phase 2+ equipment.

The phased completion of GPRS standards shall not cause compatibility problems between the two phases. Sufficient definition of phase 2 GPRS issues is required to ensure appropriate support is included in the phase 1 GPRS specification package.

10. IPR Declarations

The following companies have declared IPR interests in GPRS:

- DeTeMobil
- Ericsson
- Nokia

Details of declared IPR can be found in ETR 314, and by consulting the ETSI legal department.

11. Annex 1 (Informative) - How to Launch GPRS with a minimised incremental cost

One of the criteria for the design of GPRS is the ability to add basic GPRS capability to an existing network while minimising the additional deployment cost. This annex describes the ways in which this is intended to be possible.

1. A single SGSN/GGSN combined functional unit can be used for the entire network. A minimal implementation might consist of one combined SGSN/GGSN device. As demand grows, further SGSNs can be added closer to the high traffic BSSs.

2. A more typical initial implementation may be one GGSN supporting X.25 related services and another providing IP based communications. Operators can choose which protocols they choose to support.

3. BTSs can support basic GPRS services with a software upgrade only. BSCs will require a hardware upgrade to add the connection to the SGSN. MSCs may require a hardware upgrade.

4. Use existing paging and control channels for GPRS, rather than having a dedicated PCCCH. All MSs will support this, though not all manufacturer's networks may be configurable in this way. This wiil mean that GPRS will not have an effect on radio capacity while not in use. Lack of dedicated PCCCH will probably lower the speed of GPRS response and the simultaneous subscriber capacity within a cell. (see also point 8. below)

5. Limit the number of radio channels available to be allocated for GPRS so as to also reduce the potential size of queued mobile data thus reducing requirement for memory in BSC. If there are no dual-radio section mobiles available yet, this should not limit the maximum speed achievable by a GPRS subscriber.

6. The Gs interface can be deleted and thereby MSC developments can be avoided.

7. Roaming interconnect can be arranged through a variety of means - from dial-up, to dedicated GPRS connections.

8. GPRS offers an enhanced data service that places the lowest possible erlang load on the BSS. This minimises BSS investments, and provides GPRS service without additional resources of frequencies or cells. The radio interface can be shared dynamically between speech and data services as a function of service load and operator commercial preference. In particular, the idle timeslots appearing as "gaps" or "bursts" due to circuit switched call termination, setup and blocking can be used for GPRS even though they are not continuously available and therefore cannot be used for circuit-switched services. As an example, with 2% blocking probability, a 1 frequency cell has on average 4 timeslots free during peak hour; and a 4 carrier frequenct cell has an average of 8 timeslots free at any given moment.

Other possibilities which could play a role in easing the deployment cost:

1. The SGSN/GGSN can be designed as a reusable, scaleable device for later developments.

2. Omit inter-PLMN roaming, especially in the case of application specific deployments (such as a private network, teletraffic or UIC), so as to avoid the additional cost of the Border Gateway (BG) and operator negotiations for configuration and generally reduce the cost of security related aspects

3. Configure the network managements aspects so as to be compatible with existing systems. Network management may play a larger role in GPRS than other GSM services.

4. Reduce/optimise size of data to be stored in the HLR. In particular the amount of data can be reduced by only providing one configuration per PDP type.

5. Omit User controlled and subscriber controlled screening. A form of subscriber controlled screening can be performed by default configuration of the GGSN

6. Co-location of SGSN/GGSN with MSC to use network trunks to BSCs.

7. Frame Relay, as specified for the Gb interface, can also carry voice calls. This may allow commonality in the design of a PLMN's backbone network.

12. Annex 2 (Informative) - Network Configuration for a high performance GPRS system

This annex is to describe how GPRS can be implemented in a manner to provide a highest performance system.

1. Hardware upgrade BTSs. Amongst the possibilities this allows is to provide the additional Channel Coding schemes in areas of good radio coverage. These schemes replace the Error correction bits and puncturing with more data bits, yielding up to 21.4k bit/sec per timeslot in the case of CS-4 with no error correction coding. Hardware upgrades may also be required to support multislot operation, and fast allocation and reservation schemes (network manufacturer dependent). BSC and TRAU upgrades will also be required to support the manufacturer-dependant solutions for Abis interface support of the higher channel coding data rates which do not fit in a standard TRAU frame.

2. Dedicated PCCCH allows fast response and high number of GPRS mobiles being supported within a cell.

3. SGSNs can be deployed at the BSC level to provide a highest capacity system.

4. Full implementation of independent GGSN, SGSN and backbone.

5. All necessary developments to all network nodes (BSC, MSC, SGSN) to support the additional interfaces (Gs etc).

6. Multiple network nodes and gateways for resillience.

7. Inclusion of Border Gateway (BG) and roaming agreements, if not previously implemented.

8. Frame Relay was specified for the Gb interface to ensure a speedy and cost controlled introduction of GPRS. This can be migrated to other networks in the future. Some manufacturer's Frame Relay products can be migrated to ATM (FUNI) simply by a software change.

13. Annex 3 (Informative) - Outstanding Issues and Phase 2 Items

This section not yet revised January 1998.

13.1 Outstanding Issues

13.1.1 Tdoc SMG3 WPA 97A170 Discussion paper on LA and RA update procedures

(From the April 1997 GPRS meeting in Sophia Antipolis). Document points out problems if a GPRS MS moves to an area that does not support GPRS. MS should then do IMSI attach via normal GSM channels. This shall be resolved in stage 3 descriptions.

13.1.2 Tdoc SMG3 GPRS 97G018 GSN-GSN and GPRS-GPRS interfaces

(January 1997, Ludwigsburg) Proposes Gx and Gy interfaces. The comments that this level of detail proposed is more suitable for a stage 3 description. Thus the document is noted, and it is suggested that this paper is considered in the drafting of stage 3 material.

13.1.3 Tdoc SMG3 GPRS 97G133 LS from SMG10 on GPRS ciphering algorithm

Open Stage 3 issue: Is it needed to include the all 32 bits of INPUT parameter in every LLC UI-frame? SMG3 were worried about extra overhead in every message. Especially in the signaling messages the 32 bits overhead may result in messages which do not fit anymore in one RLC block but instead two are needed. (see also discussion in April 97 meeting report)

13.1.4 Tdoc SMG3 GPRS 97G138 and 97G139 on SMS in GPRS

Concept Paper and a proposed CR.

More work is certainly needed on this subject. A drafting session was held August 25 and 26 (report is gprs-sms.doc on the ETSI server) which has produced inputs for SMG4 and planned the CRs necessary.

13.1.5 Tdoc SMG3 GPRS 97G196 Quality of service aspects

This discusses the open issue of how to treat the Gs interface. The System Architecture meeting (30 June 1997, Sophia Antipolis) suggested that as a working assumption Gs should be based on an SS7 stack; SSCP connectionless basis. The rejected alternative would be TCAP.

13.1.6 Robust End-to-End Perfomrance

There is no detail in 02.60 about how to behave in a degraded radio environment - that is when packets cannot be delivered within the QoS timeframe. Some application protocols work adequately with overdue packets being discarded. In others (such as X.25) it would be preferable to deliver a late packet. Options to handle this include allowing the operator to specify the treatment of late packets on a QoS and PDP type basis, or adding information to specify handling of late packets. This should be explicitly discussed and decided.

13.1.7 GSM 03.64 Alignment

Editorial session required once 05 series CRs are approved, to realign it with the content of the 05 series, and remove redundancies.

13.1.7 SMG3 WPA Outstanding issues February 1998

- Suspend and resume procedures
- LLC window size
- P-TMSI/TLLI handling

13.2 Phase 2 Issues

13.2.1 Tdoc SMG3 GPRS 97G122 Gb interface: Frame Relay AND FUNI

This paper proposes the use of ATM for the Gb interface for GPRS, (in contrast to the decision made January 1997). It examines a number of issues on the subject (previous paper have also covered some of this ground - 97G016, 97G038). Standardisation of additional interfaces for any interface is a phase 2 issue. Change of interface should be discussed in system architecture if broad agreement has not been reached.

13.2.2 NPDU Size

Discussion at a August drafting session that NPDU size in phase 1 GPRS should be limited to '1600 octets minus protocol overhead' maximum in order to limit memory requirements in handsets and complexity in GGSN and SGSN. The GSNs can thus treat each packet equally and not worry about fragmentation of larger packets. For phase 2 packet size negotiation should be considered.

14. Annex 4 (Informative) - Documentation stucture for GSM 04.60 (RLC/MAC)

has so far grown into a very big and complex document. To make the situation even more complex, the responsibility for the document is split between SMG2 and SMG3 (see Tdoc SMG2 170/97, or Annex L of 04.08), that in connection with the reorganisation within SMG where SMG2 is taking the responsibility for all aspects under the mobility management () layer, while SMG3 retains the layer and up. This is eased somewhat by the creation of GSM 04.60 as described below.

(This annex is entirely new and comes from Tdoc SMG#23 684/97. It replaces the previous Annex D describing the partitioning of work into 04.08, with the decision to create GSM 04.60.)

14.1 Introduction

The document structure for GSM 04.60 shown in the table below was developed and agreed at the GSM 04.60 drafting session held 3-5-Sept-97 in Paris. All known contributors for drafting of text for GSM 04.60 are indicated in the table. NOTE: this has not been updated for SMG#24.

Section	Title	Responsible	Status
1	Scope	Editor	
1.1	Use of logical Channels	Editor	
2.	Normative references	Editor	
3.	Abbreviations, symbols and definitions	Editor	
3.1	Abbreviations	Editor	
3.2	Symbols	Editor	
3.3	Definitions	Editor	
3.3.1	Random Values	Editor	
4.	Layered overview of radio interface		
4.1	Layer Services		
4.2	Layer Functions		
4.2.1	Sequenced message transfer operation on packet data		
4.3	Service Primitives		
4.3.1	Definition of primitives		
4.3.1.1	RLC/MAC-data		
4.3.1.2	RLC/MAC-unitdata		
4.3.1.3	RLC/MAC-paging		
4.3.1.4	RLC/MAC-error		
4.3.1.5	RLC/MAC-status		
4.3.2	Definition of parameters		
4.3.3	Services required from physical layers		
5.	RLC block structure	Motorola	
5.1.	RLC control block	Motorola	
5.1.1	MAC Header	Motorola	
5.1.2	Control message contents	Motorola	
5.2	RLC data block	Motorola	
5.2.1	MAC Header	Motorola	
5.2.2	S/P Bit	Motorola	
5.2.3	Temporary Flow Identifier field	Motorola	
5.2.4	E Bit	Motorola	
5.2.5	Block Sequence Number field	Motorola	
5.2.6	Extension field	Motorola	
5.2.7	RLC Information	Motorola	
6.	RLC/MAC States		
6.1	Correspondence between RLC/MAC States and Mobility Management States		
6.2	Definition of RLC/MAC States		
6.2.1	No State in and Wait State in		
6.2.2	Transfer state		
6.2.3	Measurement Report Reception state		
7.	Optional measurement reports and network		

Section	Title	Responsible	Status
	controlled cell re-selection		
8.	Wait State procedures		
9.	Medium Access Control (MAC) procedures for Temporary Block Flow (TBF) establishment	Ericsson	
9.1	RLC/MAC Addresses	Ericsson	
9.1.1	Uplink State Flag	Ericsson	
9.1.2	Temporary Flow Identity	Ericsson	
9.2	Initial timing advance estimation	Ericsson	
9.3	TBF establishment initiated by the	Ericsson	
9.3.1	Permission to access the network	Ericsson	
9.3.2	TBF establishment using one phase access	Ericsson	
9.3.2.1	Initiation of the packet immediate assignment procedure	Ericsson	
9.3.2.2	Answer from the network	Ericsson	
9.3.2.3	Contention resolution	Ericsson	
9.3.2.4	Abnormal cases	Ericsson	
9.3.3	TBF establishment using two phase access	Ericsson	
9.3.3.1	Packet resource assignment	Ericsson	
9.3.3.2	Contention resolution	Ericsson	
9.3.3.3	Abnormal cases	Ericsson	
9.3.4	Packet access notification procedure	Ericsson	
9.3.5	Packet access reject procedure	Ericsson	
9.4	TBF establishment initiated by the network	Ericsson	
9.4.1	Packet resource assignment	Ericsson	
9.4.2	Abnormal cases	Ericsson	
9.5	Paging procedure for TBF establishment	Ericsson	
9.6	Paging initiation by the network	Ericsson	
9.6.1	Paging initiation using PCCCH	Ericsson	
9.6.2	Paging initiation using	Ericsson	
9.7	Paging response	Ericsson	
9.8	Abnormal cases	Ericsson	
9.9	Packet PTM-M notification procedure	Ericsson	
10.	Medium Access Control (MAC) Procedures in Packet Transfer Mode	Motorola	
10.1	Transfer of RLC Data Blocks	Motorola	
10.1.1	Downlink Packet Transfer	Motorola	
10.1.1.1	Addressing	Motorola	
10.1.1.2	Polling for Packet Ack/Nack	Motorola	
10.1.1.3	Measurement windows	Motorola	
10.1.1.4	Establishment of uplink TBF	Motorola	
10.1.2	Uplink Packet Transfer	Motorola	
10.1.2.1	Dynamic Allocation	Motorola	
10.1.2.2	Extended Dynamic Allocation	Motorola	
10.1.2.2.1	Addressing	Motorola	
10.1.2.2.2	PACCH Location	Motorola	
10.1.2.2.3	Establishment of downlink TBF	Motorola	
10.1.2.3	Fixed Allocation	Motorola	
10.1.2.3.1	Addressing	Motorola	
10.1.2.3.2	PACCH Location	Motorola	
10.1.2.3.3	Inactivity Periods	Motorola	
10.1.2.3.4	Establishment of downlink TBF	Motorola	
10.2	Packet Resource Reassignment Procedure for Uplink	Motorola	
10.2.1	Dynamic Allocation Procedures	Motorola	
10.2.2	Fixed Allocation Procedures	Motorola	
10.3	Packet Resource Reassignment Procedure for Downlink	Motorola	
10.4	TBF Release Procedures	Motorola	
10.4.1	Mobile Initiated Release Procedures	Motorola	

Section	Title	Responsible	Status
10.4.1.1	Mobile Procedures	Motorola	
10.4.1.2	Network Procedures	Motorola	
10.4.2	Network Initiated Release Procedures	Motorola	
10.5	Indication of Notification and Paging Information	Motorola	
10.5.1	Release Notifications	Motorola	
10.5.2	Paging	Motorola	
10.6	Frequency Redefinition Procedure	Motorola	
10.6.1	Abnormal cases	Motorola	
10.7	Classmark Change Procedure	Motorola	
10.8	Classmark interrogation procedure	Motorola	
10.8.1	Classmark interrogation initiation	Motorola	
10.8.2	Classmark interrogation completion	Motorola	
11.	Radio Link Control (RLC) procedures in packet transfer mode	Motorola	
11.1	Procedures and parameters for peer-to-peer operation	Motorola	
11.1.1	Send state variable V(S)	Motorola	
11.1.2	Acknowledge state variable V(A)	Motorola	
11.1.3	Block sequence number BSN	Motorola	
11.1.4	Receive state variable V(R)	Motorola	
11.1.5	Receive state array V(N)	Motorola	
11.1.6	Starting sequence number () and received block bitmap (RBB)	Motorola	
11.1.7	Window Size	Motorola	
11.1.8	RLC Control Messages	Motorola	
11.1.8.1	Packet Ack/Nack for uplink transfer	Motorola	
11.1.8.2	Packet Ack/Nack for downlink transfer	Motorola	
11.1.8.3	Packet Acknowledgement for Ack/Nack	Motorola	
11.1.9	Segmentation of -PDUs into RLC Data Blocks	Motorola	
11.1.10	Re-assembly of -PDUs from RLC Data Blocks	Motorola	
11.2	Operation during MAC/RLC message transfer	Motorola	
11.3	Operation during packet transfer	Motorola	
11.3.1	Unacknowledged mode operation	Motorola	
11.3.2	Acknowledged mode operation	Motorola	
11.3.2.1	Establishment of Temporary Block Flow	Motorola	
11.3.2.2	Operation of uplink Temporary Block Flow	Motorola	
11.3.2.3	Release of uplink Temporary Block Flow	Motorola	
11.3.2.4	Operation of downlink Temporary Block Flow	Motorola	
11.3.2.5	Release of downlink Temporary Block Flow	Motorola	
11.4	Abnormal release cases	Motorola	
12.	PTM-M Data Transfer		
13.	Message functional definitions and contents		
13.1	(message 1)		
13.2	(message 2, etc.)		
13.3	Packet Channel Request message on the		
13.4	Packet Channel Request message on the PRACH		
14.	General message format and information elements coding		
14.1	Overview		
14.2	Message Type		
14.3	Other information elements		
15.	Timers and counters		
15.1	Timers on the side		
15.2	Timers on the network side		
15.3	Other parameters		
16	Annex A - Bibiliography	Editor	
17	History	Editor	

15. History

Document history	
August 1996	First Edition
September 1996	Second Edition
January 1997	Third Edition - Added clauses on documentation structure, Staged (priority) completion of GPRS standards, and approvals time frame. Updated the first 7 clauses. Remaining clauses still require work.
February 1997	Fourth Edition - Removed clauses for which there is insufficient time to update at present: Status of Interfaces, Open Issues, Status of Open Issues, and FFS items. Added clause on IPR, list of GPRS specifications.
14 February 1997	Version 5.0.0 - Version 0.4.0 approved by SMG plenary #21, Paris. Clause 10 added IPR declaration by Nokia. Clause 7 added Phase 2 GPRS date of Release '98.
28 February 1997	Version 5.0.1 - Revised clauses 6.1, 7 & 8. Refined wording in Annex 1. Incorporated February SMG3 SA, SMG10 comments
12 March 1997	Version 5.0.2 - Revised clause 8. Incorporated March SMG3 WPA and WPC comments; Ericsson and Nokia CR rapporteurs;
21 April 1997	Version 5.0.3 - Revised Clause 8, Annex1. Added Annex 3 - Phase 2 reference list.
9 May 1997	Version 5.0.4 - Revised clause 8.
11 May 1997	Version 5.0.5 - Added Annex 3 content; X.25 implemented as X.28 under priorities; SMG 2 comments on 8.2 and 8.3; revised clause 8.2.
1 June 1997	Version 5.1.0 - Presented to SMG#22 for information. Changes to 6.2.1, 8.3, CR person for 09.02; 8.1 version numbers.
1 July 1997	Version 5.1.2 - Revised clause 7, clause 8, in particular adding new specifications for Gs and Gb, added Annex 4 descibing how 04.08 should be modified.
July 1997	Version 5.1.3 - Revised clause 8.1 with agreed specification numbers
25 July 1997	Version 5.1.4 - Added SMG6 details in clause 7 and 6.2.1
August 1997	Version 5.1.5 - Updated specifications and CRs information (Gb, Gs interfaces, 04.60).
September 1997	Version 5.1.6 - Updated specifications and CRs information
September 1997	Version 5.1.7 - Updated specifications and CRs information, and phase 2 outstanding items
September 1997	Version 5.1.8 - Updated specifications and CRs information, and clause 7
September 1997	Version 5.1.9 - Updated after SMG2 WPB &SMG3. Added phase 2 CRs list. Updated Open Issues, specifications, CRs information, and clause 7
October 1997	Version 5.2.0 - Presented to SMG #23 for information. Revised clauses 6, 7 and 8.
October 1997	Version 5.2.1 - Revised according to approvals of SMG #23. Revised cover page, clauses 2, 6, 7 and 8 and Annex D.
December 1997	Version 5.3.0 - Presented to SMG #24 for information. Revised clauses 6, 7 and 8.

Document history	
December 1997	Version 5.3.1 - Revised according to approvals of SMG #24. Clauses 7 and 8.
January 1998	Version 5.3.2 - Updated specifications and CRs information: clauses 7 and 8.
February 1998	Version 5.3.3 - Updated specifications and CRs information: clauses 7 and 8.
February 1998	Version 5.3.4 - Updated specifications and CRs information: clauses 7 and 8.
March 1998	Version 5.3.5 - Updated specifications and CRs information: clauses 7 and 8. Deleted Annex 4 on 04.60 breakdown, since 04.60 is now available.
March 1998	Version 5.4.0 - Presented to SMG #25 for information. Revised clauses 6, 7 and 8.
Rapporteur: John Leske, ETSI / PT80V / CTIN Email: j~~ohn~~.leske@~~etsi.fr~~ctin.adelaide.edu.au Fax:+61-8-8303 4405 (+33.4.93 65 28 17)	