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Key words: Digital cellular telecommunications system, Global System for Mobile communications (GSM), GSM/EDGE radio access network (GERAN)

**GLOBAL SYSTEM FOR
MOBILE COMMUNICATIONS**

Digital cellular telecommunications system (Phase 2+);
GSM/EDGE RAN release 2000 (GERAN release 2000) Project scheduling and open issues for GERAN;
(GSM 10.99, Version 0.0.6)

ETSI

Contents

Foreword

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

This PT-PD describes the schedules of the GSM/EDGE radio access network (GERAN) standardisation process, points out important milestones 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.

Scope

The purpose of this document is to describe the schedule of the GSM/EDGE radio access network (GERAN) standardisation process and to view it's current state 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. GERAN is a term used to describe a GSM and EDGE based 200 kHz radio access network. The GERAN is based on GSM/EDGE release 99, and covers all new features for GSM Release 2000 and subsequent releases, with full backward compatibility to previous releases. This document focuses in the standardization activities around the issues of:

- IP Multimedia (real-time end-to-end IP)

- Alignment with UMTS/UTRAN architecture, bearer services and QoS handling

- Spectrum efficiency and performance improvements (multiplexing scenario 1-2 as described in the system concept document)

- Specification flexibility for future enhancements

which are seen as the essential parts of the GERAN release 2000 and have been identified by SMG2. Other activities are handled in separate project plans and are not covered here.

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.

Abbreviations

EDGE Enhanced data rates for GSM Evolution

GERAN   GSM/EDGE radio access network

COMPACT   Deployment of services in spectrum below 1 MHz

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 EDGE specification rapporteurs should make sure that this document always reflects the latest status of work.

Latest versions of the material are 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/smg2/geran/*.

- The new GERAN specifications.
- GERAN meeting reports, most input and all output documents from the former ad-hoc.

In */Tech-Org/smg/Document/smg2/geran/CR/*

- The change request to existing specifications.

Email distribution lists:

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http://www.lsoft.com/scripts/wl.exe?SL1=SMG2GERAN&H=LIST.ETSI.FR

General

The GERAN work item(s) will provide a platform to provide the four UMTS bearer classes: conversational, streaming, interactive and background. This includes IP end to end voice and multimedia services. According to the current plans GERAN will be standardized in two releases:

Release 2000:

- IP Multimedia (real-time end-to-end IP)

  - Support for simultaneous, multiple radio access bearers with different QoS profiles

  - New protocol stack to support the four radio access bearer classes

    - conversational (including optimized voice service using AMR)

    - streaming

    - interactive

    - background

  - Development / adaptation of a PDCP-based protocol

  - Development / adaptation of a RLC/MAC protocol, including an evaluation of:

    - Separation of the RLC and MAC

    - Fast resource allocation procedures

  - Optimized physical layer design for radio bearers (with a priority on voice for existing and future AMR modes)

  - Development of a control plane protocol stack

    - Hand over for the PS domain

      - Design of new control channels for hand over signalling

      - Design of new hand over procedures

      - Design of new messages and measurements

- Apart from the above radio interface related changes, hand over has to be supported in the remainder of the network and is RAN controlled.

- Development of other RR signaling procedures and support for MM

    - e.g. on attach and access procedures, as well as broadcast messages.

- <mark>Alignment with UMTS/UTRAN architecture, bearer services and QoS handling</mark>

    - The same type of services as offered by UTRAN should be offered with GERAN
        - Alignment of bearer classes with UTRAN
        - Alignment of QoS mechanism with UTRAN.
    - Common RAN – CN interface and functional split for UTRAN and GERAN
    - Support of inter system hand over

- <mark>Spectrum efficiency and performance improvements (multiplexing scenario 1-2 as described in the system concept document)</mark>

- <mark>Specification flexibility for future enhancements</mark>

Release 2001:

It is proposed to perform a feasibility study during 2000 for performance enhancements (e.g. statistical multiplexing, interference cancellation, space time coding) for 2001 with a decision date at the November SMG2 meeting. If different proposals on the same enhancements are suggested, it is expected that those will merge during the feasibility study, so that in November a clear picture of what enhancements to include in release 2001 can be given.

The feasibility study will be reviewed in the August GERAN meeting checking on which "hooks" make sense to be incorporated into release 2000 for the sake of an efficient forward compatibility to release 2001.

Requirements

The radio requirements for GERAN have been approved and are attachted to appendix 2.

Functional description

The concept proposal for the GERAN is available as a first draft in 03.51, the GERAN stage 2 description. For normative information review the specifications named in the sections below.

Technical realisation and amendments

Documentation Structure Overview

With the introduction of GERAN in GSM phase 2+ the bearer concept of UMTS is being introduced. Therefore GERAN will be introduced mainly in the existing specifications and stage descriptions. When it comes to the protocol layers and connection to the core network a few new specifications might be necessary to be introduced.

Phased Introduction of Capability

In order to allow a fast introduction of GERAN in the specifications, GERAN has been split in two phases. Release 2000 will establish the new bearer classes and provide basic voice over IP capability, release 2001 will provide larger peroformance enhancements.

Work item status

TSG plenary

22-23 Aug 00	Adhoc on release planning R00 and beyond

S1

S2

S3

2nd Aug 00	GERAN security discussion

S4

Aug 00	Selection of wideband coder

GERAN

Feb 2000, 21st - 22nd	SMG2/SMG12/S2 GERAN Workshop with decision on external and internal interfaces. GERAN will support Iu ps, Gb and A. Iu r/x will be standardized. Iu b won't be standardized.
Feb 2000, 23rd – 25th	SMG2 EDGE WS with discussion on user and control plane concept. Some progress on protocol modes for user plane and system concept.
Apr 2000, 3-7 April	SMG2 approved reference architecture assumption
May 2000, 8-12 May	SMG2 EDGE WS with discussion of concept and stage 2 description
Aug 2000, 7-11 Aug	GERAN Adhoc on release 2000 and beyond #1
Sept 2000, 28 Aug-1-Sept	TSG GERAN #1
Oct 2000, 9-13	GERAN Adhoc on release 2000 and beyond #2

N1

N2

N3

Approvals Time Frame for GERAN

This section will list new specifications and change requests for GERAN.

Time frame for different STCs

Release 2000

Estimated road map of the GERAN release 2000 standard:

Start_Date	Finish_Date	Name	Scope	Input	Output
21 Feb 2000	22 Feb 2000	GERAN WS	Decision on GERAN	Architecture papers	Architecture decision to which extend the Gb and Iu ps interface
23 Feb 2000	25 Feb 2000	EDGE WS#13	Concept papers on PDCP, RLC/MAC, Physical layer	Concept papers	Updated concapt paper
6 March 2000	9 March 2000	SA2#12	TR v 1.0.0. Review R00 Stage 1 description. Continue Project Plan work. Finilize definition of R00 documents. Based on the TR, start the CR process for S2's technical specifications.		
15 March 2000	17 March 2000	SA#7	R00 Stage 1 stable.		
3 April 2000	7 April 2000	SMG2 #35	Concept. Confirmation of architecture assumption		
8 May 2000	11 May 2000	EDGE WS #14	Stage 2 for R00, Progress on cencept		
22 May 2000	26 May 2000	SA2#13	Work on TR discontinued. Finalize Project Plan work. Finalize definition of R00 documents. Continue the CR process.		
22 May 2000	26 June, 2000	SMG2 #36	Stage 2 draft CRs GERAN R00		
21 June 2000	23 June 2000	SA#8	R00 Stage 2 at least 80% complete. Project Plan approved. Definition of R00 documents approved.		
26 June 2000	28 June 2000	SMG#32			
7 August, 2000	11 August, 2000	GERAN WS #3	Stage 3 for R00		
4 September 2000	8 September 2000	SA2#14	Finalize R00 Stage 2 work.		
27 September 2000	29 September 2000	SA#9	R00 work approved.		
9 October, 2000	13 October, 2000	GERAN WS #4	Stage 3 for R00		
13 November 2000	17 November 2000	SA2#15	Start R01 work.		
13 December	15 December	SA#10	R00 approved.		

2000	2000				

Release 2001

For release 2001 currently a feasibility study is performed, which will be concluded for the November SMG2 meeting.

Start_Date	Finish_Date	Name	Scope	Input	Output

New Specifications

GSM No.	TDOC	CR	Subject	CR Comp. Resp.	STC	Completion Date
03.51			**GERAN overall description**	S. Gillaume Nokia	**GERAN**	**Nov 00**

✔	Approved	✝	Set on hold	→ #29 Send to SMG #29	~~CR0000A000~~ CR has been cancelled

Change Requests (GERAN release 2000)

Here all change requests being handled on STC level are listed.

GSM No.	TDOC	CR	Subject	CR Comp. Resp.	STC	Completion Date

✔	Approved	✝	Set on hold	→ #29 Send to SMG #29	~~CR0000A000~~ CR has been cancelled

Possible CRs required (GERAN release 2000)

The darkened fields indicate, that these CR's are already handled and approved by the responsible STC. The textured fields indicate, that the work on these CRs have been started on workshop or STC level.

Note, this list is a first draft and has to be reviewed in more detail.

Name	Title	Resp. STC	Target SMG	Resource_Names	Changes
CR Stage 1					
22.100	UMTS phase I	S1			Minor: Include GERAN as radio access
22.101	UMTS service principles	S1			Minor, if any
22.105	Service and capabilities	S1			Minor: Review if all requirements also apply for GERAN
22.034	Highspeed circuit switched data – Stage 1	S1			Minor: Modification for transparent bearers?
22.976	Report on Services for release 2000?				
CR Stage 2					
23.002	Network architecture	S2			Small: Inclusion of the GERAN architecture
23.034	Highspeed circuit switched data – Stage 2	S2			Minor: Modification for transparent bearers?
23.060	GPRS stage 2	S2			
03.51	GERAN overall description	SMG2		Nokia, Guillaume Sebire	Major: Protocol modes and mapping on the physical layer,

					GERAN RAB requirements, sim to 03.60, 03.64
23.107	Quality of service, Concept and Architecture	S2			Minor: Modification to include also GERAN
23.110	UMTS Access stratum	S2			Minor: Generalize to include GERAN
23.821	Service principles?	S2			
CR Stage 3					
02.07	Mobile station capability				
24.008 CC	Mobile radio interface layer 3 specification	N1			Minor, if any
24.008 MM	Mobile radio interface layer 3 specification	N1			Medium
24.008 SM	Mobile radio interface layer 3 specification	N1			Minor, if any
04.04	Layer one: General requirements			Siemens, Jean-Michel Traynard	Major?
04.18 RR	Mobile radio interface layer 3 specification	SMG2WPA		Nokia, Shkumbin Hamiti	Major: Handover, RR enhancements Or alternatively 25.331
04.60	"General Packet Radio Service; MS – BSS interface; Radio Link Control/Medium Access Control (RLC/MAC) protocol"	SMG2WPA		Lucent, Al Sacuta Siemens, Jean-Michel Traynard (MAC)	Major: MAC procedures RLC procedures RR enhancements Block formats New messages Should we have a new spec for RLC, with separated MAC
25.323	Description of the Packet Data Conversion protocol (PDCP)	R2		Motorola, Sandji Gubde	Minor, if any
25.331	UMTS RR	R2			Adopt and modify for GERAN use? Or 04.18 RR
25.411	UTRAN Iu interface Layer 1	R3			1)
25.412	UTRAN Iu interface signalling transport	R3			1)
25.413	UTRAN Iu interface RANAP signalling	R3			1)
25.414	UTRAN Iu interface data and transport signalling	R3			1)
25.415	UTRAN Iu interface user plane protocol	R3			1)
25.420-25.427	UTRAN Iu r Interface	R3			Depending on the scope of Iu x the Iu r specs have to be modified or alternatively a new spec has to be created
05.01	Physical layer on the radio path General description	SMG2WPB		Ericsson, Klas Sjerling	
05.02	Multiplexing and multiple access on the radio path	SMG2WPB		Nortel, Peter Barney	Major: New channel combinations and mapping of logical channels
05.03	Channel coding	SMG2WPB		Ericsson, David Bladsjö	Major: Coding, Puncturing and interleaving for new bearers
05.05	Radio receiver performance	SMG2WPB		Ericsson. Mats Samuelsson	Major: Receiver performance due to new coding and puncturing schemes. Need to specify all?
05.08	Radio subsystem link control	SMG2WPB		Nortel, David	Minor: New measurements?

				Choukroun	
05.09	Link Adaptation	SMG2WPB		Nortel, Peter Barney	Depends on AMR usage
26.101	AMR	SMG2WPB		Nortel, Peter Barney	Depending on IETF payload
11.10	Mobile test spec	SMG7			Testing of RF parameters
11.21	BTS test spec	SMG2 WPC			Testing of BTS RF parameters

1) Depending on what is planned for UTRAN R00

Possible CRs required (GERAN release 2001)

The darkened fields indicate, that these CR's are already handled and approved by the responsible STC.
The textured fields indicate, that the work on these CRs have been started on workshop or STC level

Name	Title	Resp. STC	Target SMG	Resource_Names	Changes

A-1 GERAN related documents

* SMG2 GERAN WS #1, 21-22 Feb 2000, Uppsala

Filename	Title	Source	Agenda
2g00-001	Draft Agenda	SMG2 chairman	2
2g00-002	Proposal for an Inter RAN Signaling Interface (Iux)	AT&T	4
2g00-003	GSM/EDGE RAN Architecture for R00	Lucent Technologies	4.1
2g00-004	GERAN Handover and Reselection with 3G Core-WITHDRAWN	Lucent Technologies	6
2g00-005	Support of Legacy GPRS Terminals in GERAN R00	Lucent Technologies	4.3
2g00-006	Functional Split between GERAN and Core Network for R00 Iu-ps	Lucent Technologies	4.1
2g00-007	GSM/EDGE RAN – evolution of the 200 KHz radio access network	Ericsson	4.1
2g00-008	Comparison between PDCP and SNDCP/LLC	Ericsson	4.1
2g00-009	GERAN Architecture for R2000	Nokia	4.1
2g00-010	Interoperability of GERAN with other systems	Nokia	6
2g00-011	Location Services in GERAN	Nokia	4.3
2g00-012	GERAN Handover Requirements	AT&T	6
2g00-013	Deciding Between an Iups' and an evolved Gb for the GERAN to Core Network Interface	T-Mobil	4.2
2g00-014	Gb+ or Iu-PS?	Vodafone	4.2
2g00-015	GERAN concepts and requirements	Nortel Networks	4.1
2g00-016	GERAN radio interface	Nortel Networks	4.1
2g00-017	GERAN network architecture	Nortel Networks	4.2
2g00-018	3GPP "All-IP" vision - Long and short term (Outcome of 3GPP TSG-SA "All-IP" workshop)	TSG-SA workshop	3
2g00-019	Some requirements for the GERAN to CN packet switched domain interface	AT&T, T-Mobil, Vodafone Airtouch, Mannesmann Mobilfunk, France Telecom, E-plus	4.2
2g00-020	DRAFT requirements and agreements for the GERAN to CN packet switched domain	Drafting group	4
2g00-021	Requirements and agreements for the GERAN to CN packet switched domain	GERAN workshop	4

* SMG2 EDGE WS #13, 23-25 Feb 2000, Uppsala

Filename	Title	Source	Agenda
2e00-001	Minutes of meeting from the EDGE workshop in Uppsala	Secretary	2
2e00-002	Minutes of meeting from the EDGE workshop in Amsterdam, The Netherlands	Secretary	3
2e00-003	10.59, V1.21.0	Rapporteur	5
2e00-004	GERAN project plan, 10.xx, V0.0.1	Rapporteur	5
2e00-005	Withdrawn	Agilent Technologies	6.1.1
2e00-006	GERAN RTFACCH: Conversational Traffic Class (Transparent RTP/UDP/IP Mode)	Nortel	6.2.2
2e00-007	GERAN RTFACCH: Conversational Traffic Class (Non-Transparent RTP/UDP/IP Mode)	Nortel	6.2.2
2e00-008	GERAN RTFACCH: Streaming Traffic Class (Non-Transparent RTP/UDP/IP Mode)	Nortel	6.2.2
2e00-009	System Concept Document	AT&T	6.2.1
2e00-010	GERAN Handover Requirements	AT&T	6.2.1
2e00-011	Requirements for 8PSK HR Voice Bearers	AT&T	6.2.1
2e00-012	Withdrawn	AT&T	6.3.1
2e00-013	GSM/EDGE RAN user plane bearers and protocols	Ericsson	6.2.2
2e00-014	Guidelines for the feasibility study on performance enhancements	Ericsson	6.3.1
2e00-015	Comparison between PDCP and SNDCP/LLC	Ericsson	6.2.2
2e00-016	Intra-Radio Block Flow Multiplexing for GSM/EDGE RAN	Ericsson	6.2.2
2e00-017	Nominal Error Rate for BTS and MS	Ericsson	6.1.1
2e00-018	Radio link performance with EDGE repeaters	Ericsson	6.1.1
2e00-019	CR:Modulation accuracy for EDGE repeaters	Ericsson	6.1.1
2e00-020	CR: Transmitter /receiver performance for EDGE	Ericsson	6.1.1
2e00-021	CR: Nominal Error Rate performance for 8-PSK	Ericsson	6.1.1
2e00-022	Withdrawn	Ericsson	6.1.1
2e00-023	CR 04.60 : Order of FBI/TI and E bits in RLC/MAC headers	Motorola	6.1.2
2e00-024	CR 04.60 : GPRS and EGPRS TBF modes for a single MS	Motorola	6.1.2

2e00-025	CR 04.60 : Correction in Cell Option CSN-1 description	Motorola	6.1.2
2e00-026	CR 04.60 : Clarification on the handling of BEP_PERIOD2	Motorola	6.1.2
2e00-027	CR 04.18 : COMPACT : impact of new block ordering on SI19	Motorola	6.1.2
2e00-028	CR 05.10 : EGPRS Classic to COMPACT BTS synchronisation	Motorola	6.1.2
2e00-029	GERAN Architecture for R2000	Nokia	6.2.1
2e00-030	INTEROPERABILITY OF GERAN WITH OTHER SYSTEMS	Nokia	6.2.1
2e00-031	Location Services in GERAN	Nokia	6.2.1
2e00-032	Voice over EGPRS Performance under different Operational Scenarios	Nokia	6.2.1
2e00-033	Comments on GERAN simulation parameters	Nokia	6.3.1
2e00-034	Proposed values for 05.05 EGPRS receiver performance (BTS)	Nokia	6.1.1
2e00-035	Proposed values for 05.05 NER receiver performance (BTS)	Nokia	6.1.1
2e00-036	Associated Control Channels for GERAN Radio Access Bearers	Nokia	6.2.1
2e00-037	GERAN PDCP RLC MAC Layers	Nokia	6.2.2
2e00-038	GERAN Radio Access Bearers	Nokia	6.2.2
2e00-039	Shared MAC mode for GERAN	Nokia	6.2.2
2e00-040	MACH: eMbedded Associated Channel	Nokia	6.2.2
2e00-041	CR 04.60 for MS RAC	Nokia	6.1.2
2e00-042	CR 04.18 for EGPRS TBF Establishment on CCCH	Nokia	6.1.2
2e00-043	CR 04.18 for EGPRS on IA Rest Octets IE	Nokia	6.1.2
2e00-044	CR 05.08 for EGPRS LQ Measuremen	Nokia	6.1.2
2e00-045	ECSD BTS RX performance with impairments	Nokia	6.1.1
2e00-046	CR 05.08 for EDGE offset parameter to cell re-selection	Nokia	6.1.2
2e00-047	Withdrawn	Nokia	6.1.2
2e00-048	CR 04.60 - Clarification on bitmap compression in ACK/NACK IE	Motorola	6.1.2
2e00-049	EGPRS Rx and NER performance for BTS	Nortel	6.1.1
2e00-050	Changes to GSM05.05, Annex G	Agilent Technologies	6.1.1
2e00-051	Physical Layer Design Criteria for Voice in RT-EGPRS	Lucent	6.2.3
2e00-052	FACCH design for Half Rate Channels in RT-EGPRS	Lucent	6.2.3
2e00-053	Fixed Allocation vs Dynamic Allocation for Non-Real Time Data Services in EGPRS Phase II: Performance Study	Lucent	6.2.2
2e00-054	Excess Speech Delay for Statistical Multiplexing	Lucent	6.3.1
2e00-055	EDGE Radio Related Performance Enhancing Technologies	Lucent	6.3.1
2e00-056	Burst FACCH design with 8PSK modulation in RT-EGPRS	Lucent	6.2.3
2e00-057	Withdrawn	Lucent	6.2.1
2e00-058	Fast Access MS Identifier in RT-EGPRS	Lucent	6.2.2
2e00-059	Aspects on Unidirectional Radio Channels and Odd/Even Interleaving in RT-EGPRS	Lucent	6.2.2
2e00-060	Further results on the performance of burst-based access and assignment	Lucent	6.3.1
2e00-061	GERAN R2000 Concept Proposal	Lucent	6.2.1
2e00-062	GERAN R2001 Concept Proposal	Lucent	6.3.1
2e00-063	IP/UDP/RTP Header Stripping for Optimised Speech Radio Bearer	Lucent	6.2.2
2e00-064	Withdrawn	Ericsson	6.1.2
2e00-065	Proposed additions to the GERAN concept paper	Ericsson	6.2.1
2e00-066	CR: Corrections to 05.05	Ericsson	6.1.1
2e00-067	Discussion note: On transmit diversity for EDGE	AT&T, Nokia	6.3.1
2e00-068	Statistical Multiplexing for Mobile Stations with Half Duplex Constraints	Lucent	6.3.1
2e00-069	CR 04.18 - Addition of CSCH description	Motorola	6.1.2
2e00-070	05.05 BTS requirements for GSM 850	Nokia	6.1.1
2e00-071	EDGE/GERAN status	Rappoteur	5
2e00-072	Requirements and agreements for the GERAN to CN packet switched domain interface	SMG2/SMG12/S2 adhoc on GERAN	4
2e00-073	Measurements results for EDGE repeaters	Micom	6.1.1
2e00-074	MS NER performance for 8PSK	Nokia	6.1.1
2e00-075	GERAN radio interface	Nortel	6.2.1
2e00-076	Joined CR 05.05: NER, RecPerf, Corrections	L1 drafting group	7.2
2e00-077	Revised version 027	EDGE WS #13	7.2
2e00-078	Revised version 028	EDGE WS #13	7.2
2e00-079	Revised	EDGE WS #13	7.2
2e00-080	Revised	EDGE WS #13	7.2
2e00-081	Revised 25	EDGE WS #13	7.2
2e00-082	Revised	EDGE WS #13	7.2
2e00-083	Revised from 2e00-041	SMG2EDGE	
2e00-084	Revised from 2e00-044	SMG2EDGE	

2e00-085	LS from SMG7EDGE: 7e00-043	SMG7EDGE	
2e00-086	Revised from 2e00-046	SMG2EDGE	
2e00-087	Revised from 2e00-048	SMG2EDGE	
2e00-088	Answer to LS from SMG7EDGE	SMG2EDGE	
2e00-089	GERAN reference architecture	AT&T	
2e00-090	GERAN concept document	AT&T	
2e00-091	Completion of 05.05 for EDGE	L1 subgroup	
2e00-092	GERAN Simulation Parameters	Sim subgroup	
2e00-093	GERAN Concept Document	Subgroup	
2e00-094	EDGE/GERAN Status	Rapporteur	
2e00-095	Revised from 2e00-076	L1 subgroup	
2e00-096	Revised from 2e00-091	SMG2EDGE	
2e00-097	Answer to LS from SMG7EDGE on PC	SMG2EDGE	
2e00-098	Revised from 2e00-093	SMG2EDGE	
2e00-099	Revised from 2e00-043	SMG2EDGE	

* SMG2 #35, 3-7 April 2000, Chicago

Filename	Title	Source	Agenda
2-00-544	Flexible Throughput / Delay Performance Trade-Off in GERAN R'00	Orange PCS Ltd	7.2.6.6
2-00-546	GSM/EDGE Radio Access Network (GERAN) Real-Time Fast Associated Control Channel (RTFACCH): Conversational Traffic Class	Nortel Networks	7.2.6.6
2-00-547	RTP Encoding For GSM AMR Codec To Be Used In Conjunction With GSM/EDGE Radio Access Network (GERAN) Real-Time Fast Associated Control Channel (RTFACCH)	Nortel Networks	7.2.6.6
2-00-548	GSM/EDGE Radio Access Networks (GERAN) Real-Time Fast Associated Control Channel (RTFACCH): Streaming Traffic Class	Nortel Networks	7.2.6.6
2-00-569	PROPOSED WORK ITEM, Gb -IP	Ericsson	7.1.5.11
2-00-570	Gb over IP; Concept Document	Ericsson	7.1.5.11
2-00-574	EDGE Radio Related Performance Enhancing Technologies	Lucent Technologies	7.2.6.6
2-00-575	Physical layer design studies for speech in RT-EGPRS	Lucent Technologies	7.2.6.6
2-00-576	FACCH design for Half Rate channels in RT-EGPRS	Lucent Technologies	7.2.6.6
2-00-577	BFACCH Design for Burst Based Messaging	Lucent Technologies	7.2.6.6
2-00-578	Repeated MCS9 Scheme for Streaming and Conversational Bearers in GERAN (Withdrawn)	Lucent Technologies	7.2.6.6
2-00-579	Fixed Allocation vs. Dynamic Allocation for Non-Real Time Data Services in EGPRS Phase II: Performance Study	Lucent Technologies	7.2.6.6
2-00-580	Excess Speech Delay Analysis for R2000 and R2001	Lucent Technologies	7.2.6.6
2-00-581	Statistical Multiplexing for Mobile Stations with Half Duplex Constraints	Lucent Technologies	7.2.6.6
2-00-582	Unidirectional Half-Rate Channels for Multi-slot Allocation	Lucent Technologies	7.2.6.6
2-00-583	Stealing Bit Design for Scenario 2 Multiplexing	Lucent Technologies	7.2.6.6
2-00-584	GERAN R2000 Proposal to Support PS Domain Services	Lucent Technologies	7.2.6.6
2-00-585	GERAN R2001 Proposal to Support PS Domain Services	Lucent Technologies	7.2.6.6
2-00-586	IP/UDP/RTP Header Stripping for Optimized Speech Radio Bearer	Lucent Technologies	7.2.6.6
2-00-587	GERAN Radio Access Bearers and Protocol Modes for R2000	Lucent Technologies	7.2.6.6
2-00-588	Speech Activity for AMR	Lucent Technologies	7.2.6.6
2-00-622	10.xx V0.0.2: GERAN project plan	Rapporteur	6.3
2-00-623	GERAN status OH	Rapporteur	6.3
2-00-624	User Plane Protocols	Ericsson	6.3
2-00-625	Realisation of Radio Access Bearers	Ericsson	7.2.6.6
2-00-626	GERAN traffic and control channels	Ericsson	7.2.6.6
2-00-627	Handover in GERAN	Ericsson	6.3
2-00-628	Uplink state flags for GERAN release 2000	Ericsson	7.2.6.6
2-00-629	Time slot segregation release 1999/2000/2001	Ericsson	6.4
2-00-630	Half-rate multiframe mapping	Ericsson	7.2.6.6
2-00-721	User Plane Protocols for the GERAN Radio Interface	Ericsson	6.3
2-00-722	Burst based control channels in GERAN	Ericsson	7.2.6.6
2-00-728	GSM/EDGE Radio Access Network (GERAN) Real-Time Fast Associated Control Channel (RTFACCH): Conversational Traffic Class - Half Rate	Nortel Networks	7.2.6.6
2-00-745	8PSK HR Voice Bearer	Nokia	7.2.6.6
2-00-746	GERAN Radio Access Bearers	Nokia	7.2.6.6
2-00-747	ACCH for GERAN Radio Access Bearers	Nokia	7.2.6.6
2-00-748	MACH	Nokia	7.2.6.6
2-00-749	Variable Length Interleaving	Nokia	7.2.6.6
2-00-750	Split of RLC and MAC in GERAN	Nokia	7.1.5.11
2-00-751	GERAN Simulation Parameters	SMG2 EDGE WS #13	7.2.6.6

2-00-771	RTP/UDP/IP Header Stripping for optimized speech service in GERAN	Nokia	7.2.6.6
2-00-772	IP TRANSPORT OPTION FOR GB INTERFACE	Nokia	7.1.5.11
2-00-795	Voice over EGPRS Performance under different operational scenarios	Nokia	7.2.6.6
2-00-796	R00 System Concept Document, v0.2	AT&T	6.3
2-00-797	Structural Changes to the System Concept Document (Withdrawn)	AT&T	6.3
2-00-798	Modification of Chapter 3 (service aspects) of GERAN System Concept Document, v0.2	AT&T	6.3
2-00-799	Inter RNC interface requirements	AT&T	6.3
2-00-800	Updated handover performance requirements	AT&T	6.3
2-00-801	Discussion paper on Streaming Radio Access Bearer	AT&T	7.2.6.6
2-00-803	Handover performance requirement (Updated) (Withdrawn)	AT&T	6.3
2-00-804	GERAN inter RNC signalling interface requirement (Withdrawn)	AT&T	6.3
2-00-807	Modification of Chapter 3 (service aspects) of GERAN System Concept Document, v0.2, revised	AT&T	6.3
2-00-843	Gb-IP Work Item definition	Ericsson	7.1.5.11
2-00-862	SACCH for Quarter Rate Channel	Nokia	7.2.6.6
2-00-912	GERAN RTFACCH presentation	Nortel Networks	7.2.6.6

* SMG2 GERAN WS #2, 8-12 May 2000, Seattle

Filename	Title	Source	Agenda
2e00-100	Minutes of meeting from the GERAN/EDGE workshop in Seattle	Secretary	2
2e00-101	Minutes of meeting from the EDGE workshop in Uppsala, Sweden	Secretary	3
2e00-102	GERAN project plan, 10.xx, V0.0.3	Rapporteur	5
2e00-103	GERAN Release 2000: GSM AMR Codec and VoIPoEGPRS Issues	Nortel	6.1.1
2e00-104	GERAN Release 2000: GSM AMR Codec and VoIPoEGPRS Issues – Presentation	Nortel	6.1.1
2e00-105	GSM/EDGE Radio Access Network (GERAN) Real-Time Fast Associated Control Channel (RTFACCH): Streaming Traffic Class, Rev. 0.1	Nortel	6.1.4
2e00-106	GSM/EDGE Radio Access Network (GERAN) Real-Time Fast Associated Control Channel (RTFACCH): Streaming Traffic Class, Rev. 0.1 – Presentation	Nortel	6.1.4
2e00-107	GSM/EDGE Radio Access Network (GERAN) Real-Time Fast Associated Control Channel (RTFACCH): Conversational Traffic Class - Full-Rate, Rev. 0.2	Nortel	6.2.1
2e00-108	GSM/EDGE Radio Access Network (GERAN) Real-Time Fast Associated Control Channel (RTFACCH): Conversational Traffic Class - Half-Rate, Rev. 0.1	Nortel	6.2.1
2e00-109	GSM/EDGE Radio Access Networks (GERAN) Real-Time Fast Associated Control Channel (RTFACCH): Conversational Traffic Class – Presentation	Nortel	6.2.1
2e00-110	Gb over IP Concept Document	Ericsson, Lucent, Nokia, Nortel Networks	6.1.2.1
2e00-111	Withdrawn	AT&T	-
2e00-112	System Concept Document	AT&T	6.1.1
2e00-113	8 PSK HR Voice Bearer Design	AT&T	6.1.4
2e00-114	Withdrawn	AT&T	6.1.2
2e00-115	GERAN – Adressing conflicts when supporting both the Gb and Iu ps interface towards SGSN	Ericsson	6.1.3
2e00-116	Withdrawn	Ericsson	6.1.3
2e00-117	USF and Adaptive antennas for GERAN	Ericsson	6.1.1
2e00-118	Protocol mode combination impacts on channel coding	Ericsson	6.1.4
2e00-119	Radio access bearers and prioritization	Ericsson	6.1.1
2e00-120	On statistical multiplexing	Ericsson	6.1.1, 6.2.1
2e00-121	Handover in GERAN	Ericsson	6.1.2
2e00-122	Ciphering issues for GSM/EDGE RAN	Ericsson	6.1.3
2e00-123	Withdrawn	Ericsson	6.1.2
2e00-124	GERAN/EDGE Status slides	Rapporteur	5.2
2e00-125	Protocol Issues for GERAN Release 2000	Lucent	6.1.3
2e00-126	GERAN Physical Sub-channels	Lucent	6.1.3
2e00-127	Repeated MCS9 for Streaming and Conversational Bearers	Lucent	6.1.4
2e00-128	Space-Time Coding for EGPRS Data	Lucent	6.2.1
2e00-129	Potential Capacity Benefit of Independent Uplink and Downlink Channel Assignment	Lucent	6.1.4
2e00-130	Transmit diversity for GERAN	Ericsson	6.2.1
2e00-131	Performance enhancing techniques for GERAN R01	Ericsson	6.2.1

2e00-132	Aspects of including 700 MHz frequency bands into TS 05-series	Ericsson	6.1.4
2e00-133	03.xx, Version 0.01 – GERAN Radio Interface stage 2 description	Ericsson, Nokia	6.1.1
2e00-134	GERAN radio resource management	Ericsson	6.1.3
2e00-135	Performance Analysis of QR speech channels	Nokia	6.1.4
2e00-136	FACCH for 8PSK voice bearers	Nokia	6.1.4
2e00-137	SACCH for QR Channels	Nokia	6.1.4
2e00-138	Header Stripping	Nokia	6.1.3
2e00-139	GERAN RRC principles	Nokia	6.1.3
2e00-140	Handover Concept	Nokia	6.1.3
2e00-141	Withdrawn	Nokia	6.1.3
2e00-142	MAC design for GERAN'00	Nokia	6.1.3
2e00-143	Withdrawn	Nokia	6.1.3
2e00-144	A high density Fast Uplink mechanism for Statistically multiplexed voice and data	Siemens	6.2.1
2e00-145	Link level Model of the high density Fast Uplink mechanism for Statistically multiplexed voice and data	Siemens	6.2.1
2e00-146	Performance of the high density Fast Uplink mechanism for Statistically multiplexed voice and data	Siemens	6.2.1
2e00-147	Stepwise introduction of statistical mulitplexing	Siemens	6.2
2e00-148	Ciphering in GERAN	Siemens	6.1.3
2e00-149	Idea for load sharing between 2G and 3G setups	E-Plus	6.1.2
2e00-150	Support for CS domain to UMTS CN in GERAN	SBC	6.1.2
2e00-151	Iu-CS slides	SBC	6.1.2
2e00-152	Gb/IP concept document. Revised from 110.	Gb/IP Drafting group	
2e00-153	Withdrawn	???	
2e00-154	GERAN System Concept Document	AT&T	
2e00-155	Proposed LS to SMG2 for IETF	Drafting group	
2e00-156	Proposed LS to SMG2 for SMG1	Drafting group	
2e00-157	Proposed LS to SMG2 for SMG10	Drafting group	
2e00-158	Proposed LS to SA "Support of AMR via Iu ps in GERAN"	Motorola, AT&T	
2e00-159	GERAN Stage 2 Description	Stage 2 Drafting Group	
2e00-160	Outcome of the handover requirements subgroup	Handover Subgroup	
2e00-161	Revised from 2e00-160	SMG2GERAN	
2e00-162	GERAN Radio Resource Control	Ericsson, Nokia	
2e00-163	Withdrawn		
2e00-164	Revised from 2e00-157	SMG2GERAN	
2e00-165	Revised from 2e00-158: LS WG RAN	SMG2GERAN	
2e00-166	Revised from 2e00-154. GERAN System Concept Document	Drafting Group	
2e00-167	Revised from 2e00-155: LS IETF	SMG2GERAN	
2e00-168	Revised from 2e00-159: GERAN Stage 2	SMG2GERAN	
2e00-169	Revised from 2e00-166: SCD	SMG2GERAN	
2e00-170	Requirements for header adaptation for GERAN	AT&T, SBC	

* SMG2 #36, 22-26 May 2000, Biarritz

Filename	Title	Source	Agenda
2-00-961	CR 05.02-A158 Compact frequency hopping (R99)	Nokia	7.2.6.5
2-00-962	CR 05.08-A275 Compact interference measurements (R99)	UWCC	7.2.6.5
2-00-963	CR 24.008-Axxx Compact interference measurements (R99)	UWCC	7.1.5.10
2-00-964	GSM on 700 MHz Frequency Band	Nokia	6.6
2-00-972	CR 11.21-A126 New subclause 9.4.4 signal quality EGPRS	Ericsson	7.3.6.3
2-00-981	GERAN Release 2000: GSM AMR Codec and Voice Over GERAN/UTRAN PS Domain	Nortel Networks	6.4
2-00-982	GERAN Release 2000: GSM AMR Codec and Voice Over GERAN/UTRAN PS Domain - Presentation	Nortel Networks	6.4
2-00-983	GSM/EDGE Radio Access Network (GERAN) Real-Time Fast Associated Control Channel (RTFACCH) for GERAN Release 2001: Conversational Traffic Class - Full-Rate, Rev. 0.3	Nortel Networks	7.2.6.6
2-00-984	GSM/EDGE Radio Access Network (GERAN) Real-Time Fast Associated Control Channel (RTFACCH) for GERAN Release 2001: Conversational Traffic Class - Half-Rate, Rev. 0.1	Nortel Networks	7.2.6.6
2-00-985	GSM/EDGE Radio Access Network (GERAN) Real-Time Fast Associated Control Channel (RTFACCH) for GERAN Release 2001: Conversational Traffic Class - Presentation	Nortel Networks	7.2.6.6
2-00-993	QoS Issues for GERAN Release 2000 **WITHDRAWN**	Nortel Networks	6.4, 7.2.6.6
2-00-994	Introduction to Accuracy of COMPACT Interference Measurements Change Request (CR) for GSM 05.08 Ver. 8.3.1	UWCC	7.2.6.5
2-00-995	CR 05.08-A277 COMPACT Interference Measurements Accuracy	UWCC	7.2.6.5

2-001003	CR 04.60-A837 rev 1 Bit order within EGPRS RLC data blocks and related editorial corrections (R99)	Ericsson	7.1.5.10
2-001012	CR 05.03-A040 Clarification of stealing bits for MCS-1 to 4 (R99)	Ericsson	7.2.6.3
2-001013	CR 05.08-A280 Clarification GPRS downlink transmission requirements (R99)	Ericsson	7.2.6.3
2-001017	CR 04.60-A850 Correction on MS Radio Access Capabilities (R99)	Motorola	7.1.5.10
2-001018	CR 04.60-A851 Corrections on USF block definition and GPRS Cell Options (R99)	Motorola	7.1.5.10
2-001019	CR 04.60-A849 Clarifications on EGPRS measurements (R99)	Motorola	7.1.5.10
2-001020	CR 05.08-A281 Correction of inconsistency in the handling of BEP_PERIOD2 (R99)	Motorola	7.2.6.3
2-001021	CR 05.08-A282 Cell_Bar_Access_2 missing in 05.08 (R99)	Motorola	7.2.6.3
2-001022	CR 05.08-A283 Clarifications on EGPRS measurements (R99)	Motorola	7.2.6.3
2-001023	CR 08.16-A021 Support for Internet Protocol (IP) as a Sub-Network Service Protocol (R99)	Nortel Networks	7.1.5.11
2-001024	CR 08.18-A103 Support for Internet Protocol (IP) as a Sub-Network Service Protocol (R99)	Nortel Networks	7.1.5.11
2-001025	CR 05.03-A041 Correction to the interleaving formula of MCS-8 case (R99)	Nortel Networks	7.2.6.3
2-001026	Protocol Issues for GERAN Release 2000	Lucent Technologies	7.2.6.6, 7.1.5.11
2-001027	Proposed Updates to GERAN Stage 2 Description	Lucent Technologies	7.2.6.6
2-001028	Repeated MCS9 for Streaming and Conversational Bearers	Lucent Technologies	7.2.6.6
2-001029	Space-Time Coding for EGPRS Data	Lucent Technologies	7.2.6.6
2-001030	Capacity Benefit of Independent Uplink and Downlink Channel Assignment	Lucent Technologies	7.2.6.6
2-001031	GERAN System Concept Document	Rapporteur (AT&T)	6.3
2-001032	Access burst for block based fast Access **WITHDRAWN**	AT&T	7.2.6.6
2-001033	Requirements for Header Adaptation for GERAN	AT&T, SBC	6.4, 7.2.6.6
2-001035	LCS GERAN stage 2 description, version 0.0.1	Nokia	6.1, 7.1.5.2, 7.2.6.9
2-001040	Operating Frequency Band as a Release Independent Feature	Nokia	6.6, 7.2.6.10
2-001042	CR 04.60-A860 Multiplexing of GPRS and EGPRS MSs (R99)	Ericsson	7.1.5.10
2-001049	A High Density Fast Uplink Mechanism for Statistically Multiplexed Voice and Data	Siemens	7.2.6.6
2-001050	Link Level Model of the High Density Fast Uplink Mechanism for Statistically Multiplexed Voice and Data	Siemens	7.2.6.6
2-001051	Performance of the High Density Fast Uplink Mechanism for Statistically Multiplexed Voice and Data	Siemens	7.2.6.6
2-001052	CR 04.60-A865 Clarification of definition of resent block bit (RSB) (R99)	Siemens	7.1.5.10
2-001076	10.59 - EDGE project schedule	Rapporteur	6.2
2-001077	10.99 – GERAN project schedule	Rapporteur	6.3
2-001078	Introduction of GERAN into GSM specifications	Rapporteur	6.3
2-001079	Status report GERAN - OH slides	Rapporteur	6.3
2-001080	Transmit diversity for GERAN	Ericsson	7.2.6.6
2-001081	Performance enhancing techniques for GERAN R01	Ericsson	7.2.6.6
2-001082	Aspects of including 700 MHz frequency bands into TS 05-series	Ericsson	6.6, 7.2.6.13
2-001083	Protocol mode combination impacts on channel coding	Ericsson	7.2.6.6
2-001084	Radio access bearers and prioritization	Ericsson	7.2.6.6
2-001085	Ciphering issues for GSM/EDGE RAN	Ericsson	6.3
2-001086	GERAN - Adressing conflicts when supporting both the Gb and Iu ps interface towards SGSN	Ericsson	6.4, 7.1.5.11
2-001087	Handover in GERAN	Ericsson	6.4
2-001090	Outcome of the Handover Requirement session	SMG2 GERAN #02	6.3
2-001091	Draft LS on Security functions in GERAN	SMG2 GERAN #02	6.3
2-001095	GERAN Overall Description - Stage 2	SMG2 GERAN #02	6.3
2-001096	GERAN Simulation Parameters	SMG2 EDGE #12	6.4
2-001097	Handover Concept for GERAN	Nokia	6.3
2-001098	Discussion paper for GERAN R00 Specifications	Nokia	6.3
2-001099	CR 04.60-A864 Neighbour cell masking	Nokia	7.2.6.5, 7.1.5.10
2-001100	CR 04.18-A122 Neighbour cell masking	Nokia	7.2.6.5, 7.1.5.10
2-001101	MAC Design for GERAN'00	Nokia	7.1.5.11
2-001102	Performance analysis of quarter rate speech channels	Nokia	7.2.6.6
2-001103	SACCH for Quarter Rate Channels	Nokia	7.2.6.6
2-001104	FACCH for 8PSK Voice Bearers	Nokia	7.2.6.6
2-001105	Fast Adaptation Mechanisms for 8PSK Voice Bearer	Nokia	7.2.6.6
2-001108	Location Services in Release 2000: specification structure, LCS System stage 2	Nokia	6.1
2-001110	Liaison statement on usage of terms GSM, UMTS and GERAN	TSG-SA WG1	4.3, 6.6
2-001115	Channel Coding for 8PSK HR Voice Bearers	Ericsson	7.2.6.6
2-001116	Streaming allocation for real-time traffic classes	Alcatel	7.2.6.6

2-001118	Assignment of ARFCN for the new 700 MHz band	Siemens	6.6
2-001119	Ciphering function in GERAN	Siemens	6.3
2-001123	Support for CS Domain to UMTS CN in GERAN	SBC, Pacific Bell Wireless, BellSouth, VoiceStream, Tele Denmark, E-Plus	6.3
2-001124	Support for CS Domain to UMTS CN in GERAN (Presentation)	SBC	6.3
2-001125	CS Service Requirements for GERAN	SBC	6.3
2-001126	Guiding principles for over the air protocol design	AT&T	6.3
2-001127	Gb over Ip concept document	Ericsson, Lucent, Nortel Networks, Motorola, Nokia	6.6, 7.1.5.1
2-001130	LS on Security functions in GERAN	SMG2	6.3
2-001131	Request for feedback on TR22.976 Study on Release 2000 services and capabilities	3GPP TSG-SA WG1	6.3
2-001137	Proposed LS on RTP Encoding of GSM AMR Codec	SMG2	7.2.6.6
2-001139	CR 04.60-A868 Clarification on the use of the Resent block bit in NCS7-8-9 (R99)	Alcatel	7.1.5.10
2-001140	CR 04.60-A869 Clarification on the use of TLLI in NCS7-8-9 (R99)	Alcatel	7.1.5.10
2-001163	CR 05.05-A159 Clarification of BTS output power capability with 8-PSK	Nokia	7.2.6.5
2-001164	Draft Liaison Statement on Support of AMR via Iups in GERAN	SMG2 GERAN#02	7.2.6.6
2-001168	CR 05.08-A281 rev 1 Correction of inconsistency in the handling of BEP_PERIOD2 (R99)	Motorola	7.2.6.3
2-001169	CR 05.08-A282 rev 1 Cell_Bar_Access_2 missing in 05.08 (R99)	Motorola	7.2.6.3
2-001170	CR 05.08-A283 rev 1 Clarifications on EGPRS measurements (R99)	Motorola	7.2.6.3
2-001171	CR 05.02-A158 rev 1 Compact frequency hopping (R99)	Nokia	7.2.6.5
2-001172	CR 05.08-A275 rev 1 Compact interference measurements (R99)	SMG2-WPB	7.2.6.5
2-001173	CR 05.08-A277 rev 1 COMPACT Interference Measurements Accuracy **WITHDRAWN**	SMG2-WPB	7.2.6.5
2-001179	Draft Liaison Statement on Support of AMR via Iups in GERAN	SMG2	7.2.6.6
2-001183	CR 04.60-A837 rev 2 Bit order within EGPRS RLC data blocks and related editorial corrections (R99)	Ericsson	7.1.5.10
2-001184	CR 04.60-A851 rev 1 Corrections on USF block definition and GPRS Cell Options (R99)	Motorola	7.1.5.10
2-001185	CR 04.60-A860 rev 1 Multiplexing of GPRS and EGPRS MSs (R99)	Ericsson	7.1.5.10
2-001189	CR 04.60-A860 rev 2 Multiplexing of GPRS and EGPRS MSs (R99)	Ericsson	7.1.5.10
2-001190	CR 04.60-A837 rev 3 Bit order within EGPRS RLC data blocks and related editorial corrections (R99)	Ericsson	7.1.5.10
2-001191	CR 04.60-A870 Clarification of PI bit usage during retransmission in combined RLC/MAC data blocks	Motorola	7.1.5.10
2-001200	GSM 10.99 – GERAN project schedule	Rapporteur	7.2.6.6
2-001201	Proposed on Liaison Statement on requirements for GERAN	SMG2-WPB	7.2.6.6
2-001203	CR 05.08-A282 rev 2 Cell_Bar_Access_2 missing in 05.08 (R99)	Motorola	7.2.6.3
2-001204	CR 05.05-A159 rev 1 Clarification of BTS output power capability with 8-PSK	Nokia	7.2.6.5
2-001205	CR 11.21-A126 rev 1 New subclause 9.4.4 signal quality EGPRS	Ericsson	7.3.6.3
2-001209	CR 11.21-A126 rev 2 New subclause 9.4.4 signal quality EGPRS	Ericsson	7.3.6.3
2-001214	Proposed on Liaison Statement on requirements for GERAN	SMG2-WPB	7.2.6.6
2-001217	Proposed Work Item on Support of GERAN CS Services with GERAN Radio and UMTS CN	SBC	8.2.2
2-001221	Reply to an LS about security functions in GERAN	3GPP TSG-SA WG3	4.3
2-001222	Proposed Liaison Statement on requirements for GERAN	SMG2	8.2.2

* SMG2 GERAN telco, 27th June 2000, USA hosted

Filename	Title	Source	Agenda
2g00-022	A Comparison Between SIP and GSM 04.08 Call Setup/Release	Nortel	T2
2g00-023	Requirements on GERAN Radio Bearers for Multi-media Control Signalling	Ericsson	T2
2g00-024	Header adaptation in GERAN	Ericsson	T3
2g00-025	GERAN'00 RR Functionality	Nokia	T4
2g00-026	GERAN Support for SIP Signaling in RT Sesssion	Lucent	T2

| 2g00-027 | Handover for GERAN | Nokia | T1 |

A-2 Annex 2: GERAN radio requirements

A-2.1 Introduction

The GERAN provides a range of bearer services to mobile and stationary users in a variety of application areas and operating environments. The radio access network will be connected to the third generation core network and will as far as possible extend the services of the fixed networks to mobile users.

This document outlines the overall requirements for GERAN release 2000, which includes all GSM/EDGE work items of release 2000. More specific radio requirements, such as radio requirements for the AMR wide band speech codec, are included as references, if available, and are not discussed in this document. The requirements should be used as guidelines for the design of the radio access network.The requirements should be aligned with the requirements on UTRAN.

A-2.2 Definitions and Abbreviations

A-2.2.1 Definitions
GSM/EDGE RAN GERAN is a term used to describe a GSM and EDGE based 200 kHz radio access network. The GERAN is based on GSM/EDGE release 99, and covers all new features for GSM Release 2000 and subsequent releases, with full backward compatibility to previous releases.

A-2.2.2 Abbreviations
3G	Third Generation
BER	Bit Error Rate
CN	Core network
CS	Circuit Switched
GERAN	GSM/EDGE Radio Access Network
RAN	Radio Access Network
RAB	Radio Access Bearer
RB	Radio Bearer
QoS	Quality of Service
PS	Packet Switched
UMTS	Universal Mobile Telecommunications System
UTRAN	UMTS Terrestrial Radio Access Network

A-2.3 High Level Requirements

The following high level requirements have been initially identified for the GERAN in responsibility of SMG2:

- All bearer classes (conversational, streaming, interactive and background) as defined for UTRAN shall be provided

- The same quality of service handling and radio access bearer service attributes shall be supported as required for UTRAN (as described in TS 23.107). Whether the same range of values of the service attributes as supported by UTRAN shall be supported by GERAN in Release 2000 is for further study

- Support for multiple QoS profiles in parallel shall be provided in the GERAN.

A-2.4 Bearer Definition

A-2.4.1 Radio Access Bearers
GERAN shall provide the same radio access bearers as UTRAN. However, voice is foreseen to be important future service and therefor it seen as important to optimize the conversational radio access bearer class for IP voice services.

It is required to have the GERAN support Adaptive Multi-Rate (AMR) CODEC speech and to be consistent with S2 requirements. Further, it is desired to have the GERAN support Tandem Free Operation (TFO) services. Further, voice radio access bearers should be provided with quality and delay comparable to current digital cellular systems.

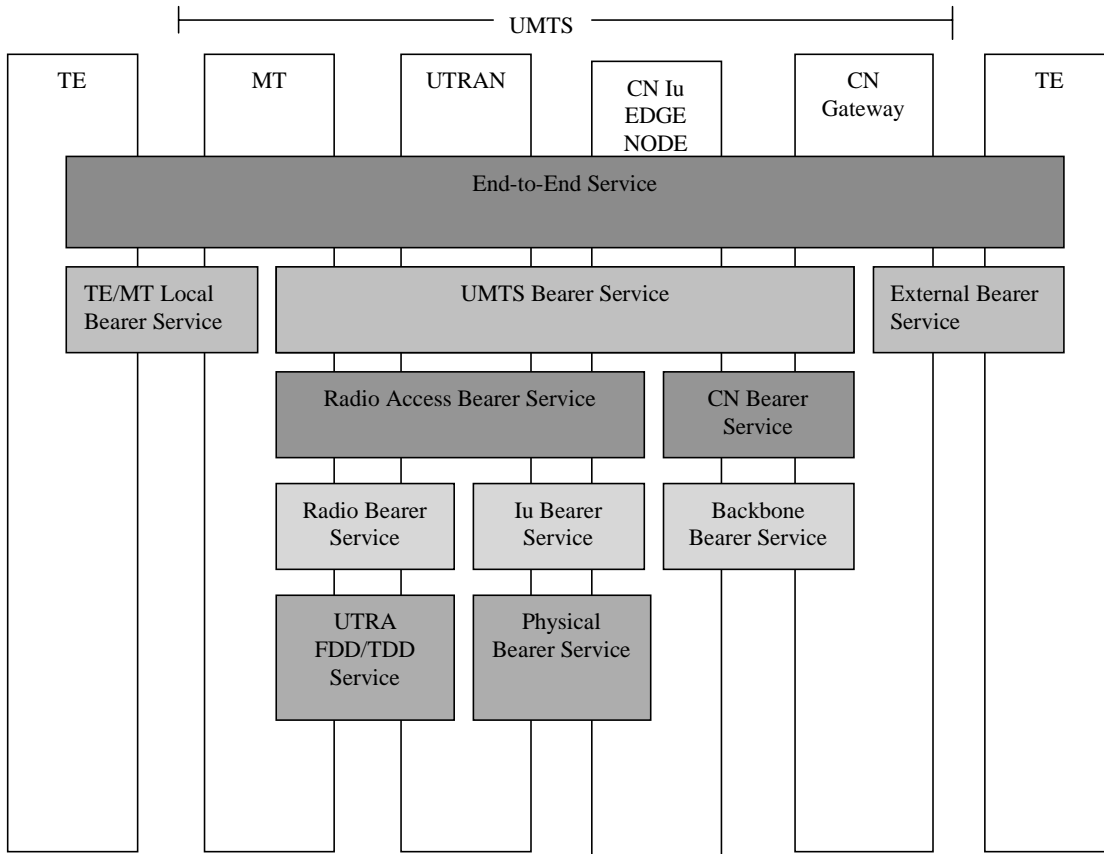Figure 1 shows the UMTS QoS architecture. As illustrated in the figure the Radio Access Bearer Service is realized by a Radio Bearer Service and an Iu-Bearer Service.

Figure 1. UMTS QoS architecture.

A-2.4.1.1   **Radio Access Bearer Attributes**

A set of attributes and their possible values are used to describe a radio access bearer capability. This set has been chosen so that a radio access bearer capability can be entirely defined by giving a value to each attribute of the set. In particular, the set and the associated allowed values enable characterization of future (not yet used or foreseen) transfer needs. For the GERAN the same set of attributes are chosen as for the UTRAN, which are defined in 23.107 [1]. The support of the different values may vary from the radio environment the user is in (indoor, urban, rural and etc.), see section A-2.4.2.1.

The values used by the 3G CN are as follows:

Table 1. Value ranges of the radio access bearer service attributes in UMTS.

Traffic class	Conversational class	Streaming class	Interactive class	Background class
Maximum bitrate [kbps]	<2000 (1) (2)	<2000 (1) (2)	< 2000 – overhead (2) (3)	<2000 - overhead (2) (3)

Delivery order	Yes/No	Yes/No	Yes/No	Yes/No
Maximum SDU size [octets]	<1500 (4)	<1500 (4)	<1500 (4)	<1500 (4)
SDU format information	(5)	(5)		
Delivery of erroneous SDUs	Yes/No/-	Yes/No/-	Yes/No/-	Yes/No/-
Residual BER	$5*10^{-2}$, 10^{-2}, 10^{-3}, 10^{-4} (6)	$5*10^{-2}$, 10^{-2}, 10^{-3}, 10^{-4}, 10^{-5}, 10^{-6} (6)	$4*10^{-3}$, 10^{-5}, $6*10^{-8}$ (6) (7)	$4*10^{-3}$, 10^{-5}, $6*10^{-8}$ (6) (7)
SDU error ratio	10^{-2}, 10^{-3}, 10^{-4}, 10^{-5} (6)	10^{-2}, 10^{-3}, 10^{-4}, 10^{-5} (6)	10^{-3}, 10^{-4}, 10^{-6} (6)	10^{-3}, 10^{-4}, 10^{-6} (6)
Transfer delay [ms]	80 – maximum value(6)	500 – maximum value (6)		
Guaranteed bit rate [kbps]	<2000 (1) (2)	<2000 (1) (2)		
Traffic handling priority			1,2,3 (8)	
Allocation/Retention priority	1,2,3 (8)	1,2,3 (8)	1,2,3 (8)	1,2,3 (8)
Source statistic descriptor	Speech/unknown	Speech/unknown	Speech/unknown	Speech/unknown

1) Bitrate of 2000 kbps requires that UTRAN operates in transparent RLC protocol mode, in this case the overhead from layer 2 protocols is negligible.

2) The granularity of the bit rate parameters must be studied. Although the UMTS network has capability to support a large number of different bitrate values, the number of possible values must be limited not to unnecessarily increase the complexity of for example terminals, charging and interworking functions. Exact list of supported values shall be defined together with S1, N1, N3 and R2.

3) Impact from layer 2 protocols on maximum bitrate in non-transparent RLC protocol mode shall be estimated.

4) Maximum SDU size shall at least allow UMTS network to support external PDUs having as high MTU as Internet/Ethernet (1500 octets). The need for higher values must be investigated by N1, N3, S1, R2, R3.

5) Definition of possible values of exact SDU sizes for which UTRAN can support transparent RLC protocol mode, is the task of RAN WG3.

6) Values are indicative. Exact values on Residual BER, SDU error ratio and transfer delay shall defined together with S1, N1, N3 and R2.

7) Values are derived from CRC lengths of 8, 16 and 24 bits on layer 1.

8) Number of priority levels shall be further analysed by S1, N1 and N3.

A-2.4.2 Radio Bearers

Mapping of radio access bearers onto radio bearers is up to the RAN as long as the requested QoS is achieved.

Each radio bearer will be mapped to one or more radio interface logical channels for the purposes of transmission over the GERAN. Suggested properties of the GERAN:

- The design of GERAN should allow for several radio bearers to be used simultaneously with single user equipment. This could be used for instance to provide support for multiple QoS profiles in parallel
- The design of GERAN should allow for optimised voice radio bearers in both the PS and the CS domain. The handling of TFO is for further study.

The design of GERAN should allow efficient support of the wide variety of services, including future services, which have yet to be defined.

A-2.4.2.1 Minimum radio bearer capabilities

Giving one of the possible values to each RAB service attribute defines a possible radio access bearer service. However, not all combinations are necessarily supported by the GERAN system. The following table shows potential combinations for the attributes that are expected to change dependent on the radio environment. The values given under the different QoS classes are Maximum bitrate/BER/Max Transfer Delay [1].

Table 2. Minimum radio bearer capabilities.

Operating environment	Propagation conditions	Conversational	Streaming	Background	Interactive
Rural outdoor (Terminal relative speed to ground up to 250 km/h)	HT100 850/900 Mhz: RA250 1800/1900 Mhz: RA130	T.B.D.	T.B.D.	T.B.D.	T.B.D.
Urban/ Suburban outdoor (Terminal relative speed to ground up to 120 km/h)	HT100 TU50	T.B.D.	T.B.D.	T.B.D.	T.B.D.
Indoor/ Low range outdoor (Terminal relative speed to ground up to 10 km/h)	Indoor TU3	T.B.D.	T.B.D.	T.B.D.	T.B.D.

A-2.4.2.2 RTP/UDP/IP Header adaptation

GERAN shall support header adaptation in order to provide an increase in spectral efficiency. In particular the header adaptation mechanism should not degrade the hand over performance and user perceived quality (e.g. header adaptation mechanism should not degrade the speech quality). Error propagation due to header adaptation should be kept to a minimum or avoided, if at all possible. In addition the header adaptation mechanism should operate under all expected BER and delay conditions.

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[1] To complete the requirements the percentile for the values given in the table should be defined.

A-2.5 Handover requirements

This section deals with both intra and inter GERAN handover and cell re-selection requirements. Cell re-selection refers to cell change when in idle mode or ready state, whereas handover refers to change of physical channel (in the same or possibly in a new cell) when in non-idle state.

The overall requirements on GERAN handover and cell re-selection are:

- For support of pre release 2000 terminals the GERAN should provide cell re-selection in the same way as (E)GPRS;
- For support of pre release 2000 terminals the GERAN should provide handover in the same way as GSM;
- Cell re-selection and handover should be in the responsibility of the radio access network[2];
- GERAN should support intra- (within a cell) and inter- (between cells) cell handovers;
- For the GERAN release 2000, handover performance should be no worse than for GSM circuit switched services. In particular, the transmission gap should be no more than 150 ms;

- In GERAN release 2000, other requirements related to the HO function shall be of same quality as in GSM release 99 (e.g. neighbourcell measurement rate).

Table on Intra GERAN handover and cell reselection

	GERAN R00 PS	GERAN R99 PS	GERAN R00 CS	GERAN R99 CS
GERAN R00 PS	HO CRS	CRS	No	No
GERAN R99 PS	CRS	CRS	No	No
GERAN R00 CS	No	No	HO	HO
GERAN R99 CS	No	No	HO	HO

HO   is for RT services
CRS is for NRT services
„No" means neither HO or CRS is supported

A-2.5.1 Interworking with other systems

Specific requirements are expected from SA2. The following table should be seen as the working assumption on required handover scenarios between different systems while waiting input from SA2.

Table on Inter GERAN handover and cell reselection

	ANSI 136	UTRAN R99 PS	UTRAN R99 CS	UTRAN R00 PS	UTRAN R00 CS
GERAN R00 PS	No	CRS	No	HO CRS	No
GERAN R00 CS	FFS	No	HO	No	HO

HO   is for RT services
CRS is for NRT services
„No" means neither HO or CRS is supported

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[2] Network controlled cell re-selection refers to cell re-selection as in GSM, where the cell selection procedure is controlled by broadcasted parameters.

A-2.6 Security issues

Specific requirements are expected from SMG10.

A-2.7 Operational requirements

A-2.7.1 Architecture requirements

Specific requirements are expected from SA2.

A-2.7.2 Radio operation environments

GERAN should support all Radio Access Bearers in the radio environments specified in current GSM 05.05.

A-2.7.3 Radio access network planning

For a comparable services, GERAN should provide cell range at least as good as GSM Release 99. GERAN systems should not affect the performance of existing EGPRS/GSM systems.

GERAN should support frequency planning similar to GSM Release 99.

Note: Coverage for RT services of GERAN needs to be defined.

A-2.7.4 Interference Management

GERAN should support interference management at least similar to GSM Release 99. The GERAN solution should not preclude the use of smart antennas.

A-2.7.5 Frequency bands and licensing

GERAN systems should be deployable in at least those frequency bands defined in GSM 05.05 release 99.

A-2.8 Efficient spectrum usage

A-2.8.1 Spectral efficiency

For comparable services, GERAN systems should have significantly higher spectral efficiency as compared to Release 99. It is understood that implementation of increased spectral efficiency may be restricted by the requirement of creating a Release 2000 Standard.

A-2.8.2 Spectrum utilization

For initial deployment GERAN shall support all services in at least 2.4 MHz of spectrum. GERAN shall support all packet domain services (real and non real time) in COMPACT mode deployment. It is recognized that spectrum efficiency may be greater with larger spectrum deployments.

A-2.9 Deployment requirements

A-2.9.1 Deployment

GERAN should be flexible to support a variety of initial deployments.

It should be possible to deploy GERAN with a minimum of upgrades to GSM Release 99 radio equipment. GSM/EDGE RAN may be deployed as a contiguous coverage, Island coverage, or Spot coverage system. It is anticipated that GERAN will also be deployed on a city-by-city basis.

A-2.9.2   Backward compatibility

It should be possible to deploy GERAN in spectrum shared with GSM Release 99, as well as other GSM systems. GERAN should be deployable in carriers and time slots adjacent to those supporting GSM Release 99, at least with fixed division of time slots between GERAN and the other systems.

It is recognized that there may be advantages to dedicating radio resources system-wide to some types of GERAN operation.

A-2.9.3   Complexity / cost

It should be possible to provide a variety of MS as well as Base Station types of varying complexity, cost and capabilities in order to satisfy the needs of different types of operator and user scenarios. The Release 2000 is expected to imply the same RF properties as a Release 1999.

A-2.9.4   Terminal

GERAN systems should support a variety of terminal types, including advanced feature phones, PDA's, PCMCIA cards, and other terminal types. Hand portables and PCMCIA card sized GERAN terminals should be optimized in terms of size, weight, operating time, range, and the effective radiated power and cost/performance ratio.

A-2.9.5   Network

For further study

A-2.10 Requirements from bodies outside SMG

A-2.10.1   Electromagnetic compatibility

GERAN systems should cause no more interference to other equipment than current GSM-based systems.

A-2.10.2   RF radiation

GERAN systems should operate at RF emission power levels consistent with applicable recommendations and specifications for electromagnetic radiation.

A-2.10.3   Security

For further study

A-2.11 Evolution of GERAN

Release 2000 of GERAN should include efficient support of RT services in the PS domain and it should be aligned with UMTS. The GERAN shall be defined so that it can be implemented in phases with increasing functionality (for example making use of new technology), while allowing the maximum possible backwards compatibility. The introduction of new functions should be done in a manner that maximizes forward compatibility with enhancements expected in subsequent releases. The definition of GERAN should allow evolution to higher bit rates.

A-2.12 Open Issues

This section summerizes the open issues that have been identified in this document.

1. Is there support for multiple QoS profiles in parallel in R99

2. A discussion on the relation of TFO to the Transcoder (TRAU) position in the architecture highlighted the issue of how UTRAN deals with TFO. The following questions arose:
    1. Clarification on how TFO is handled in UMTS   (This is a question for 3GPP TSG S4))
    2. What voice requirements will come from S2

3. Input from SA2 is expected on the RAB attribute value ranges.

4. The T.B.D. in table 2 need to be resolved. Another open issue in the table is whether other propagation models should be included, e.g. BUx.

5. Verify that the speech gap during handover should be no more than 150 ms is a GSM requirement.

6. The delay and data loss requirements on different handovers and cell re-selection shall be specified further. The requirements depend on the service and that should be reflected as well.

A-2.13   References

[1]   TSG SA2, 23.107, "QoS Concept and Architecture".

History

Document history	
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