

ETSI TS 143 051 V13.0.0 (2016-01)



**Digital cellular telecommunications system (Phase 2+);
Overall description;
Stage 2
(3GPP TS 43.051 version 13.0.0 Release 13)**



ReferenceRTS/TSGG-0143051vd00

Keywords

GSM

ETSI

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Contents

Intellectual Property Rights	2
Foreword.....	2
Modal verbs terminology.....	2
Foreword.....	7
1 Scope	8
2 References	8
2.1 Normative references	8
2.2 Informative references.....	9
3 Symbols and abbreviations.....	10
3.1 Symbols.....	10
3.2 Abbreviations	10
4 GERAN Architecture	11
4.1 GERAN Reference Architecture	11
4.2 UMTS Architecture applied to GERAN	12
4.3 Protocol architecture in PS domain	13
4.3.1 General.....	13
4.3.2 User plane.....	14
4.3.3 Control plane	14
4.4 Protocol architecture in CS domain.....	15
4.4.1 General.....	15
4.4.2 User plane	15
4.4.3 Control plane	15
4.5 Iur-g interface.....	16
4.5.1 General principles.....	16
4.5.2 Protocol architecture	17
4.5.3 RNSAP protocol	17
4.6 Support for MSC/SGSN in pool.....	18
4.7 CS services for GERAN Iu-mode	18
4.8 User Equipment Specific Behaviour Information (UESBI) in GERAN Iu mode	19
5 Radio Interface Protocol Architecture.....	19
5.1 Protocol Structure when connecting through Iu	19
5.2 Multiplexing Principles	21
5.2.1 Multiplexing of different types of radio access bearers for one MS	21
5.2.2 Multiplexing of user plane data from different core network interfaces.....	21
5.3 Iu vs A/Gb mode selection.....	22
5.3.1 Introduction.....	22
5.3.2 PLMN, cell and mode (re-)selection in GERAN	22
6 User and Control Plane Protocols	23
6.1 Identifiers in GERAN.....	23
6.1.1 IMSI, TMSI and P-TMSI.....	23
6.1.2 G-RNTI.....	23
6.1.3 NSAPI, RAB ID and RB ID	23
6.1.4 RB Id, RRB Id, and TFI.....	24
6.1.5 USF	24
6.1.6 SAI.....	24
6.1.7 BSC-id	24
6.1.8 LAI for 3G core network	24
6.1.9 RAI for the 3G core network	25
6.1.10 GRA Identity	25
6.1.11 GERAN internal Cell Identity	25
6.2 Relay	25

6.3	Radio Resource Control (RRC).....	25
6.3.1	RRC Functions.....	25
6.3.2	RRC Connection Levels	26
6.3.3	RRC Connection Modes	27
6.3.4	RRC Connection Mobility	27
6.3.4.1	RRC Connection mobility in RRC-Idle mode	27
6.3.4.2	RRC Connection mobility in RRC-Connected mode.....	27
6.3.5	RRC protocol and messages	28
6.3.6	Support of Radio Bearers in GERAN	28
6.4	Packet Data Convergence Protocol (PDCP).....	28
6.4.1	Services provided to upper layers	28
6.4.2	Services expected from RLC layer	29
6.4.3	PDCP Functions.....	29
6.4.3.1	Transparent Mode	29
6.4.3.2	Non-Transparent Mode	29
6.5	Radio Link Control (RLC)	30
6.5.1	Services provided to upper layer.....	30
6.5.2	RLC Functions.....	30
6.5.2.1	Transparent Mode	30
6.5.2.2	Non-Transparent Mode	30
6.5.2.2.1	Acknowledged Mode.....	30
6.5.2.2.2	Unacknowledged Mode.....	31
6.6	Medium Access Control (MAC)	31
6.6.1	Services provided to upper layers	31
6.6.2	MAC Functions	31
6.6.2.1	Additional functions for RLC transparent mode.....	32
6.6.2.2	Additional functions for RLC non-transparent mode.....	32
6.6.3	Model of MAC	32
6.6.4	MAC operation	33
6.6.4.1	General	33
6.6.4.2	TBF establishment	34
6.6.4.2.0	General	34
6.6.4.2.1	Uplink resource request from MAC-Idle state	35
6.6.4.2.1.1	Mobile Originated Transmission	35
6.6.4.2.1.2	Mobile Terminated Transmission	35
6.6.4.3	TBF multiplexing and scheduling	36
6.6.4.3.1	Multiplexing of RLC instances on TBFs.....	36
6.6.4.3.2	Scheduling of TBFs on physical-layer resources	36
6.6.4.4	TBF release	36
6.6.4.5	TBF reallocation	37
6.7	RLC/MAC PDU Formats for different protocol modes	37
6.7.1	Acknowledged RLC mode.....	37
6.7.2	Unacknowledged RLC mode.....	37
6.7.3	Transparent RLC mode.....	37
6.8	Physical Layer (Phy)	37
6.8.1	Definitions	37
6.8.2	Services provided to upper layer.....	38
6.8.2.1	Specific services of the physical layer in the MS	38
6.8.3	Logical Channels	38
6.8.3.1	Traffic channels.....	38
6.8.3.2	Control channels	39
6.8.3.2.1	Broadcast channels	39
6.8.3.2.2	Common control type channels	39
6.8.3.2.3	Dedicated control channels.....	39
6.8.3.2.4	Cell Broadcast Channel (CBCH).....	39
6.8.4	Basic Physical Subchannels	39
6.8.4.1	DBPSCH - Dedicated Basic Physical SubCHannel	40
6.8.4.2	SBPSCH - Shared Basic Physical SubCHannel	40
6.8.5	Mapping of logical channels onto basic physical subchannels	40
6.8.5.1	DBPSCH full rate.....	40
6.8.5.2	DBPSCH half rate	40
6.8.5.3	SBPSCH full rate	41

6.8.5.4	SBPSCH half rate.....	41
6.8.6	Physical Layer Functions.....	42
6.8.7	Channel Coding	42
6.6.8	Enhanced Power control procedure	44
6.8.8.1	MS implementation.....	45
6.8.8.1.1	MS power control.....	45
6.8.8.1.2	MS link quality measurement reports.....	45
6.8.8.2	BSS implementation.....	45
6.9	Flexible Layer One (FLO).....	45
6.9.1	General.....	45
6.9.2	Definitions	45
6.9.3	Principles	45
6.9.3.1	General.....	45
6.9.3.2	Coding / multiplexing	46
7	Ciphering.....	47
7.1	Location of ciphering in the GERAN protocol architecture	47
7.2	Inputs to the ciphering algorithm	47
7.2.1	Ciphering Key.....	47
7.2.2	Bearer.....	48
7.2.3	Direction	48
7.2.4	Length.....	48
7.2.5	Parameter Settings	48
8	Integrity protection.....	49
8.1	Integrity protection on RRC messages	49
8.2	Integrity protection on RLC/MAC control messages.....	49
8.3	Calculation of message authentication code.....	49
9	Mobility Management and Session Management (MM and SM).....	49
10	Sequence Diagrams Examples for Handover.....	49
Annex A (informative): Radio Access Bearer Realization.....		50
A.1	Conversational Radio Access Bearer	50
A.2	Streaming, Interactive, Background Radio Access Bearers.....	53
A.2.1	Streaming	53
A.2.2	Interactive.....	55
A.2.3	Background	56
Annex B (informative): RLC/MAC Header format Convention		57
B.1	GPRS RLC/MAC data block header.....	57
B.1.1	Downlink RLC/MAC data block header	57
B.1.2	Uplink RLC/MAC data block header.....	57
B.2	EGPRS RLC/MAC data block header	57
B.2.1	Downlink RLC/MAC data block header	57
B.2.2	Uplink RLC/MAC data block header.....	58
B.3	ECSD RLC/MAC data block header.....	59
B.3.1	Uplink and downlink RLC/MAC data block header	59
Annex C (informative): RRC States, MAC States and RRC Connection Mobility.....		61
C.1	Void.....	61
C.2	MAC states	61
C.2.1	MAC-Dedicated state	61
C.2.1.1	Transition from MAC-Dedicated state to MAC-Idle state.....	61
C.2.1.2	Transition from MAC-Dedicated state to MAC-Shared state.....	61
C.2.1.3	Transition from MAC-Dedicated state to MAC-DTM state.....	62
C.2.2	MAC-Shared state	62
C.2.2.1	Transition from MAC-Shared state to MAC-DTM state	62

C.2.2.2	Transition from MAC-Shared state to MAC-Idle state.....	62
C.2.2.3	Transition from MAC-Shared state to MAC-Dedicated state.....	62
C.2.3	MAC-Idle state	62
C.2.3.1	Transition from MAC-Idle state to MAC-Dedicated state.....	62
C.2.3.2	Transition from MAC-IDLE state to MAC-SHARED state	62
C.2.4	MAC-DTM state	62
C.2.4.1	Transition from MAC-DTM state to MAC-Dedicated state.....	62
C.2.4.2	Transition from MAC-DTM state to MAC-Shared state	62
C.3	Mapping between RRC States and MAC States	63
Annex D (informative):	Change history	64
History		66

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1 Scope

The present document defines the stage 2 service description for a GSM/EDGE Radio Access Network (GERAN). ITU-T Recommendation I.130 describes a three-stage method for characterisation of telecommunication services, and CCITT Q.65 defines stage 2 of the method.

The present document illustrates how the services requested by a GSM/UMTS Core Network are realized by the GERAN.

The main focus of the present document is on functionality related to the Iu interfaces. The aim of the present document is not to describe functionality related to the A and Gb interfaces in details. There is no detailed description of the interfaces towards the core network and only references are given to the appropriate specifications.

2 References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
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2.1 Normative references

- [1] 3GPP TS 25.410: "UTRAN Iu Interface: General Aspects and Principles".
- [2] 3GPP TS 25.411: "UTRAN Iu interface Layer 1".
- [3] 3GPP TS 25.412: "UTRAN Iu interface signalling transport".
- [4] 3GPP TS 25.413: "UTRAN Iu interface RANAP signalling".
- [5] 3GPP TS 25.414: "UTRAN Iu interface data transport & transport signalling".
- [6] 3GPP TS 25.415: "UTRAN Iu interface user plane protocols".
- [7] 3GPP TS 48.014: "General Packet Radio Service (GPRS); Base Station System (BSS) - Serving GPRS Support Node (SGSN) interface; Gb interface Layer 1".
- [8] 3GPP TS 48.016: "General Packet Radio Service (GPRS); Base Station System (BSS) - Serving GPRS Support Node (SGSN) interface; Network Service".
- [9] 3GPP TS 48.018: "General Packet Radio Service (GPRS); Base Station System (BSS) - Serving GPRS Support Node (SGSN); BSS GPRS Protocol (BSSGP)".
- [10] 3GPP TS 45.001: "Digital cellular telecommunications system (Phase 2+); Physical layer on the radio path; General description".
- [11] 3GPP TS 45.002: "Digital cellular telecommunications system (Phase 2+); Multiplexing and multiple access on the radio path".
- [12] 3GPP TS 43.002: "Network Architecture".
- [13] 3GPP TS 48.001: "Base Station System - Mobile Services Switching Centre (BSS-MSC) Interface General Aspects".

- [14] 3GPP TS 48.002: "Base Station System - Mobile Services Switching Centre (BSS-MSC) Interface - Interface Principles".
- [15] 3GPP TS 48.004: "Base Station System - Mobile Services Switching Centre (BSS-MSC) Interface Layer 1 Specification".
- [16] 3GPP TS 48.006: "Signalling Transport Mechanism Specification for the Base Station System - Mobile Services Switching Centre (BSS-MSC) Interface".
- [17] 3GPP TS 48.008: "Mobile Switching Centre - Base Station system (MSC-BSS) Interface Layer 3 Specification".
- [18] 3GPP TS 48.063: "Inband Tandem Free Operation (TFO) of Speech Codecs; Service Description; Stage 3".
- [19] 3GPP TS 25.420: "UTRAN Iur Interface: General Aspects and principles".
- [20] 3GPP TS 25.421: "UTRAN Iur Interface Layer 1".
- [21] 3GPP TS 25.422: "UTRAN Iur Interface signalling transport".
- [22] 3GPP TS 25.423: "UTRAN Iur Interface RNSAP signalling".
- [23] 3GPP TS 24.022: "Radio Link Protocol (RLP) for Circuit Switched Bearer and Teleservices".
- [24] 3GPP TS 44.018: "Radio Resource Control Protocol".
- [25] 3GPP TS 24.008: 'Mobile radio interface layer 3 specification; Core Network Protocols - Stage 3'.
- [26] 3GPP TS 44.060: 'Radio Link Control / Medium Access Control (RLC/MAC) protocol'.
- [27] 3GPP TS 45.008: 'Radio subsystem Link Control'.
- [28] 3GPP TS 23.003: "Numbering, Addressing and Identification".
- [29] 3GPP TS 23.221: 'Architectural requirements (Release 5)'
- [30] 3GPP TS 23.236: 'Intra Domain Connection of RAN Nodes to Multiple CN Nodes'
- [31] 3GPP TS 23.195: 'Provision of User Equipment Specific Behaviour Information (UESBI) to network entities'

2.2 Informative references

- [32] 3GPP TS 23.060: "General Packet Radio Service (GPRS); Service Description; Stage 2".
- [33] 3GPP TS 43.64: "General Packet Radio Service (GPRS); Overall description of the GPRS radio interface; Stage 2".
- [34] 3GPP TS 23.034: "High Speed Circuit Switched Data (HSCSD); Stage 2".
- [35] 3GPP TS 41.004: "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".
- [36] ITU-T Recommendation I.130: "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".
- [37] ITU-T Recommendation Q.65: "The unified functional methodology for the characterization of services and network capabilities including alternative object-oriented techniques".
- [38] 3GPP TS 23.153: 'Out of Band Transcoder Control'
- [39] 3GPP TR 45.902: 'Flexible Layer One'

3 Symbols and abbreviations

3.1 Symbols

For the purposes of the present document, the following symbols apply:

A	Interface between a BSS and a 2G MSC
Gb	Interface between a BSS and a 2G SGSN
Iu-cs	Interface between a BSS and a 3G MSC
Iu-ps	Interface between a BSS and a 3G SGSN
Iur-g	Interface between two BSSs

NOTE: whether the Iur-g interface is also used between a BSS and an RNC is FFS.

Um	Interface between MS and BSS
----	------------------------------

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply. Additional applicable abbreviations can be found in 3GPP TS 41.004 [27] and 3GPP TS 43.064 [25].

ADCH	Associated Dedicated CHannel
ARQ	Automatic Repeat reQuest
AS	Access Stratum
BCCH	Broadcast Control CHannel
BSS	Base Station Subsystem
CBCH	Cell Broadcast CHannel
CC	Call Control
CDCH	Control-plane DCH
CN	Core Network
CPBCH	COMPACT PBCCH
CS-i	GPRS Coding Scheme i
DC	Dedicated Control
DCH	Dedicated CHannel
DLC	Data Link Control
DBPSCH	Dedicated Basic Physical Sub CHannel
ECSD	Enhanced Circuit Switched Data
EDGE	Enhanced Data rates for Global Evolution
E-FACCH	Enhanced FACCH
E-IACCH	Enhanced Inband Associated Control CHannel
EGPRS	Enhanced GPRS
EPC	Enhanced Power Control
EPCCH	Enhanced Power Control CHannel
E-TCH	Enhanced TCH
FACCH	Fast Associated Control CHannel
FLO	Flexible Layer One
FPC	Fast Power Control
GC	General Control
GERAN	GSM/EDGE Radio Access Network
GPRS	General Packet Radio Service
GRA	GERAN Registration Area
G-RNTI	GERAN Radio Network Temporary Identity
GSM	Global System for Mobile Communications
IETF	Internet Engineering Task Force
IMSI	International Mobile Subscriber Identity
IP	Internet Protocol
LCS	LoCation Services
MAC	Medium Access Control
MCS-i	EGPRS Modulation and Coding Scheme i

MM	Mobility Management
MS	Mobile Station
NAS	Non Access Stratum
NSAPI	Network layer SAPI
Nt	Notification
O-FACCH	Octal FACCH
O-TCH	Octal TCH
PBCCH	Packet BCCH
PDCH	Packet Data Channel
PDCP	Packet Data Convergence Protocol
PDP	Packet Data Protocol
PDTCH	Packet Data TCH
PDU	Packet Data Unit
PLMN	Public Land Mobile Network
PTCCH	Packet Timing advance Control Channel
P-TMSI	Packet TMSI
PUESBINE	Provision of UE Specific Behaviour Information to Network Entities
QoS	Quality of Service
RAB	Radio Access Bearer
RANAP	Radio Access Network Application Part
RB	Radio Bearer
RLC	Radio Link Control
RNSAP	Radio Network Subsystem Application Part
ROHC	Robust Header Compression
RRC	Radio Resource Control
RTP	Real Time Protocol
SACCH	Slow Associated Control Channel
SACCH/TP	SACCH for enhanced power control
SAP	Service Access Point
SAPI	Service Access Point Identifier
SDCCH	Stand-alone Dedicated Control Channel
SDU	Service Data Unit
SBPSCH	Shared Basic Physical Sub Channel
TB	Transport Block
TBF	Temporary Block Flow
TCH	Traffic Channel
TCP	Transmission Control Protocol
TFC	Transport Format Combination
TFCI	Transport Format Combination Indicator
TFCS	Transport Format Combination Set
TLLI	Temporary Logical Link Identifier
TMSI	Temporary Mobile Subscriber Identity
TrCH	Transport Channel
TTI	Transmission Time Interval
UDCH	User-plane DCH
UDP	User Datagram Protocol
UESBI	UE Specific Behaviour Information
UMTS	Universal Mobile Telecommunication System
USF	Uplink State Flag
UTRAN	UMTS Terrestrial Radio Access Network

4 GERAN Architecture

4.1 GERAN Reference Architecture

The reference architecture of GERAN is illustrated in Figure 1.

GERAN connects with 3 interfaces A, Gb and Iu interfaces to the core network. Any combination comprising one, two or three of these 3 interfaces is possible. Two Base Station Subsystems (BSS) may be connected to each other with an Iur-g interface. A BSS and an RNC may also be connected via an Iur-g interface.

The mobile station shall operate using **only the following modes**:

- A/Gb mode**, e.g. for pre-Release 5 terminals, for Release 5 terminals when connected to a GERAN with no I_u interface towards the Core Network;
- Iu mode** (i.e. I_{u-CS} and I_{u-PS}), e.g. for Release 5 terminals when connected to a GERAN with I_u interfaces towards the Core Network.

Both modes must be supported by the standard and no other modes (e.g. A / I_{u-PS} or I_{u-CS} / G_b) shall be allowed.

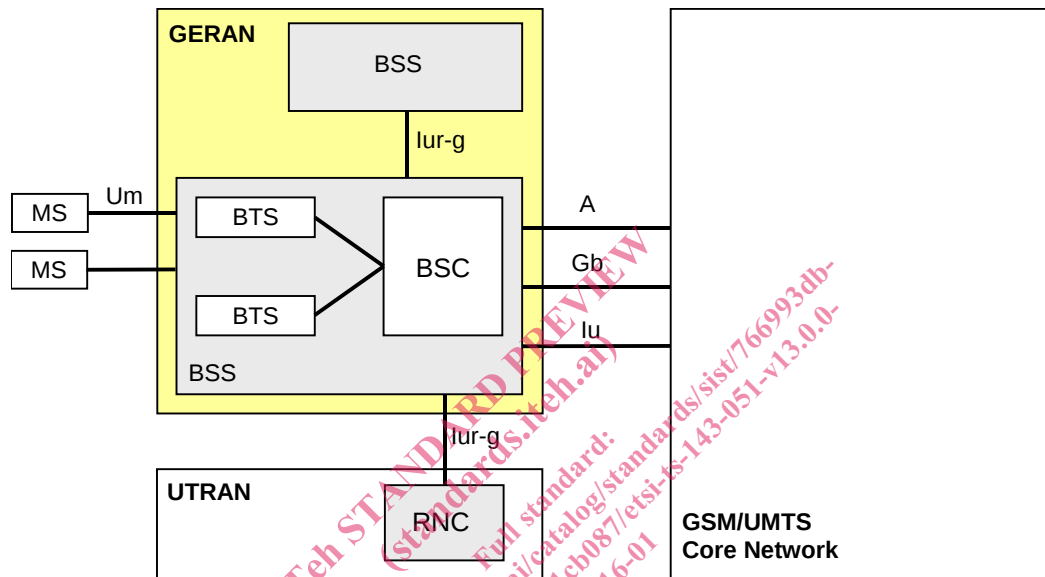


Figure 1: GERAN reference architecture

The functional split within a BSS is implementation-dependent.

4.2 UMTS Architecture applied to GERAN

This clause describes the GERAN architecture when it connects to the core network through an Iu interface. Figure 2 shows the assumed UMTS architecture as outlined in 3GPP TS 23.110. GERAN is shown instead of UTRAN. The figure below shows the UMTS architecture in terms of its entities Mobile Station, GERAN and Core Network. The respective reference points Um (Radio Interface) and Iu (CN-RAN reference) are shown. The figure illustrates furthermore the high-level functional grouping into the Access Stratum and the Non-Access Stratum.

The Access Stratum offers services through the following Service Access Points (SAP) to the Non-Access Stratum:

- General Control (GC) SAPs;
- Notification (Nt) SAPs; and
- Dedicated Control (DC) SAPs.

The SAPs are marked with circles in Figure 2.