Source: Nokia

Radio bearer control procedures

1   Introduction

The goal of this document is to define radio bearer control procedures for GERAN. This document is based on message and IE descriptions from 25.331. All information elements that are clearly inapplicable for GERAN have been removed. Most of the information elements that are included in this document are subject to further evaluation.

2   Radio bearer control procedures

The radio bearer control procedures which are defined in the present document are: Radio bearer setup, Radio bearer setup complete, Radio bearer setup failure, Radio bearer reconfiguration, Radio bearer reconfiguration complete, Radio bearer reconfiguration failure, Radio bearer release, Radio bearer release complete and Radio bearer release failure.

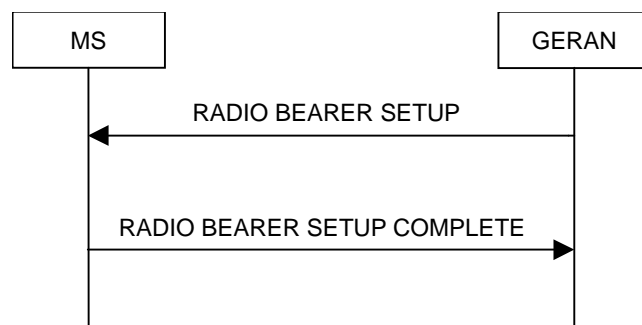## 2.1   Radio bearer establishment

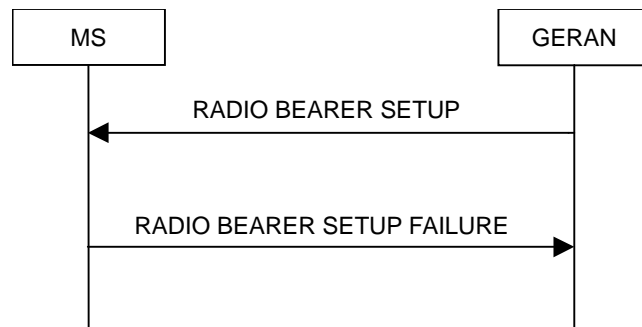**Figure 1: Radio Bearer Establishment, normal case**

Figure 2: Radio Bearer Establishment, MS reverts to old configuration

2.1.1 General

The purpose of this procedure is to establish new radio bearer(s) or re-configure previously established radio bearers. Each radio bearer established by the procedure belongs to one of the following categories:
  - a signalling radio bearer, i.e. used for control plane signalling;

  - a radio bearer that implements a radio access bearer (RAB) .

2.1.2 Initiation

The upper layer in the network may request an establishment of radio bearer(s).
To initiate the procedure, GERAN should:
  - configure new radio links in any new physical channel configuration and start transmission and reception on the new radio links;

  - transmit a RADIO BEARER SETUP message on the downlink-.

GERAN should take the MS capabilities into account when setting the new configuration.

2.1.3 Reception of a RADIO BEARER SETUP message by the MS

Upon reception of a RADIO BEARER SETUP message the MS shall set the variables for ciphering in IE "Radio bearer uplink ciphering activation time info".

The MS shall store the received MS Information Elements, RB Information Elements and the MS shall transmit a RADIO BEARER SETUP COMPLETE message on the uplink when the new configuration is in place. In particular the MS shall:
  - transmit the RADIO BEARER SETUP COMPLETE message using the new configuration;

When the transmission of the RADIO BEARER SETUP COMPLETE message has been confirmed the MS shall clear the old stored data.
The procedure ends.

If the RADIO BEARER SETUP doesn't succeed then RADIO BEARER SETUP FAILURE is sent from the MS to GERAN. When the successful delivery of the RADIO BEARER SETUP FAILURE message has been confirmed, the MS shall clear the variable and the procedure ends.

2.1.4 Reception of the RADIO BEARER SETUP COMPLETE message by the GERAN

When GERAN has received the RADIO BEARER SETUP COMPLETE message, GERAN may delete any old configuration.
The procedure ends on the GERAN side.

2.1.5 Reception of RADIO BEARER SETUP FAILURE by the GERAN

When GERAN has received the RADIO BEARER SETUP FAILURE message, GERAN may restore the old and delete the new configuration. Upper layers should be notified of the failure.
The procedure ends on the GERAN side.
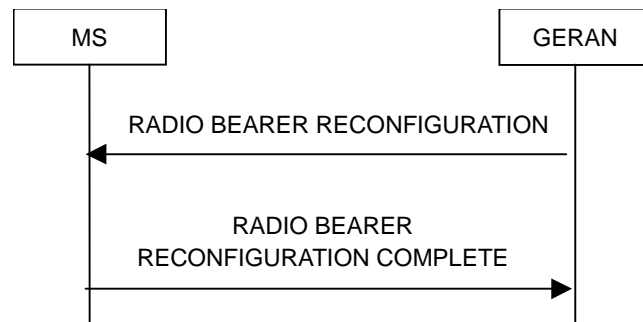
2.2   Reconfiguration procedures

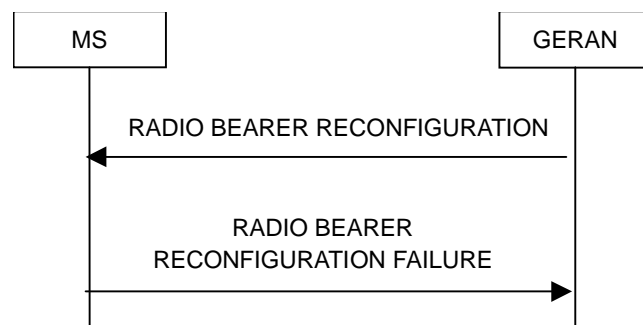**Figure 3: Radio bearer reconfiguration, normal flow**

Figure 4: Radio bearer reconfiguration, failure case

2.2.1 General

The radio bearer reconfiguration procedure is used to reconfigure parameters for a radio bearer or the signaling link to reflect a change in QoS.

2.2.2 Initiation

To initiate the procedure, GERAN should:
  - configure new radio links in any new physical channel configuration;
  - start transmission and reception on the new radio links;
  - transmit a RADIO BEARER RECONFIGURATION message on the downlink.
  - transmit new ciphering and/or integrity protection information to be used after reconfiguration.
In the Radio Bearer Reconfiguration procedure GERAN should indicate that uplink transmission shall be suspended on certain bearers. Uplink transmission on a radio bearer used by the RRC signalling should not be suspended.

2.2.3 Reception of RADIO BEARER RECONFIGURATION by the MS

Upon reception of a RADIO BEARER RECONFIGURATION message the MS shall perform actions specified below:
  - store the received MS Information Elements and RB Information Elements,

The MS shall:
- suspend or resume uplink transmission for each radio bearer, as indicated by the IE "RB suspend/resume" information element, if included;

RADIO BEARER RECONFIGURATION COMPLETE is sent to the mobile. When the successful delivery of the RADIO BEARER RECONFIGURATION COMPLETE message has been confirmed, the MS shall clear the old configuration.

2.2.4 Reception of a RADIO BEARER RECONFIGURATION COMPLETE message by the GERAN

When GERAN has received the RADIO BEARER RECONFIGURATION COMPLETE message, GERAN may delete the old configuration. The procedure ends on the GERAN side.

If the radio bearer reconfiguration procedure fails then RADIO BEARER RECONFIGURATION FAILURE is sent from the MS to GERAN.

When the successful delivery of the RADIO BEARER RECONFIGURATION FAILURE message has been confirmed, the MS shall clear the old configuration.

2.2.5 Reception of a RADIO BEARER RECONFIGURATION FAILURE message by the GERAN

When GERAN has received the RADIO BEARER RECONFIGURATION FAILURE message, GERAN may restore the old and delete the new configuration. Upper layers should be notified of the failure. The procedure ends on the GERAN side.
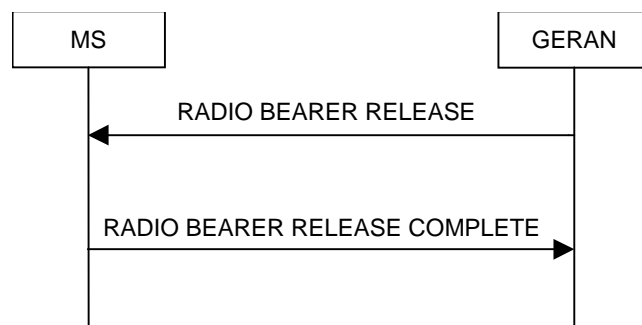
2.3   Radio bearer release
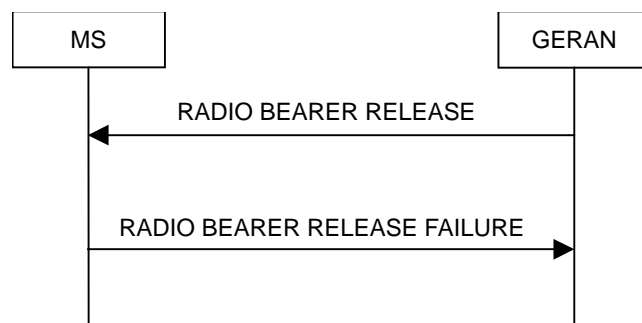

Figure 5: Radio Bearer Release, normal case

Figure 6: Radio Bearer Release, MS reverts to old configuration

2. 3.1 General

The purpose of this procedure is to release existing radio bearer(s).

2.3.2 Initiation

The upper layer in the network may request a release of radio bearer(s).

To initiate the procedure, GERAN:
- may configure new radio links in any new physical channel configuration and start transmission and reception on the new radio links;

- transmits a RADIO BEARER RELEASE message on the downlink.

GERAN should take the MS capabilities into account when setting the new configuration.

2.3.3 Reception of RADIO BEARER RELEASE by the MS

Upon reception of a RADIO BEARER RELEASE message the MS shall perform the following:
- store the received MS Information Elements, RB Information Elements, -

    - for the released radio bearer(s):

        - delete the information about the radio bearer

        - when all radio bearers belonging to the same radio access bearer have been released:

            - indicate release of the radio access bearer to the upper layer entity using the CN domain identity together with the RAB identity

            - delete all information about the radio access bearer

    - for all remaining radio bearer(s):

        - configure MAC multiplexing

The MS may first release the current physical channel configuration and shall then establish a new physical channel configuration.
The MS shall transmit a RADIO BEARER RELEASE COMPLETE message on the uplink when the new configuration is in place

When the successful delivery of the RADIO BEARER RELEASE COMPLETE message has been confirmed the MS shall clear the old configuration variables.
- If radio bearer release procedure fails then RADIO BEARER RELEASE FAILURE message is sent from MS to GERAN.

When the successful delivery of the RADIO BEARER RELEASE FAILURE message has been confirmed, the MS shall clear the old configuration data.

2.3.4 Reception of the RADIO BEARER RELEASE COMPLETE message by the GERAN

When GERAN has received the RADIO BEARER RELEASE COMPLETE message, GERAN may delete any old configuration.
The procedure ends on the GERAN side.

2.3.5 Reception of the RADIO BEARER RELEASE FAILURE message by the GERAN

When GERAN has received the RADIO BEARER RELEASE FAILURE message, GERAN may restore the old and delete the new configuration. Upper layers should be notified of the failure.
The procedure ends on the GERAN side.

3   Structure of the messages

3.1   General

RB type determines the configuration of PDCP/RLC/MAC/ PHY layers. In the table below the general description PDCP/RLC/MAC/ PHY layers in case of different type of RB is presented. Parameters will be transferred in the radio bearer control procedures based on this general configuration.

Parameters transferred in RB procedures					
PDCP mode and parameters	**RLC mode and parameters**	**MAC mode and parameters**	**Physical layer parameters**		**RB type**
			Physical subchannel	**Channel**	
Non transparent *Header removal*	TRANSP	Dedicated	DPSCH/F	TCH/F	Conversational
			DPSCH/H	TCH/H	
			DPSCH/Q	TCH/Q	
Non-transparent *Header Compression or No Adaptation* Transparent	UNACK	Dedicated (TFI)	DPSCH/F	PDTCH /F	Conver-sational, streaming
				TCH/F	
			DPSCH/H	PDTCH/ H	

				TCH/H	
ACK		DPSCH/F	PDTCH/F	Streaming, Interactive, Background
		DPSCH/H	PDTCH/H	
UNACK	Shared	SPSCH	None#	Streaming
			None#	
ACK		SPSCH	None#	Interactive, Background

Note: No parameters for physical channel are transferred in RB control messages. MAC takes care of allocation SPSCH.

3.1 RADIO BEARER SETUP

This message is sent by GERAN to the MS to establish new radio bearer(s).

Logical channel: PDTCH or main DCCH

Direction: GERAN → MS

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	M		Message Type	
MS Information Elements				
Integrity check info	C		Integrity check info	IE shall be set to the used signalling radio bearer identity when the encoded RRC message is used as the MESSAGE parameter in the integrity protection algorithm
Integrity protection mode info	O		Integrity protection mode info	At least 2 spare values, Criticality: reject, are needed The IE is mandatory if the IE "Integrity protection mode command" has the value "start ", otherwise it is not needed in the message. The IE is only present if the IE "Integrity protection mode command" has the value "modify"
Ciphering mode info	O		Ciphering mode info	This information element contains the ciphering specific security mode control information. 14 spare values needed. Criticality: criticality reject is needed.
Starting time	M		44.18-10.5.2.38 Starting time procedures	[Note: replaces the Activation Time that is used in UTRAN.]
New G-RNTI	O		G-RNTI	The G-RNTI (GERAN Radio Network Temporary Identity) is allocated to an MS having a RRC connection and identifies the MS within GERAN
CN Information Elements				
CN Information info	O		CN Information info	Identifies the type of core network domain. Enumerated (CS domain, PS domain)
GERAN mobility information elements				
GRA identity			GRA identity	Gives the identity of the GERAN Registration Area
RB Information Elements				
Signalling RB information to setup list [Note: SRBs are FFS in GERAN]		1 to <maxSRBsetup>		For each signalling radio bearer established
>Signalling RB information to setup	M			
RAB information to setup list	O	1 to <maxRABsetup>		For each RAB established
>RAB information for setup	M			
RB information to be affected list	O	1 to <maxRB>		RB information affected are RB mapping info and RB identity.
>RB information to be affected	M			
Quality target parameters	FFS			[Note: QoS parameters are FFS]

Information Element/Group name	Need	Multi	Type and reference	Semantics description
PhyCH information elements				
CHOISE logical channel type				
>TCH parameters	C			
>>channel type			Channel description 10.5.2.5-44.018 [FFS	**Channel type** field is 5 bits (number of bits needed is FFS)
>>TN			Channel description 10.5.2.5-44.018 [FFS]	The **TN** field (3 bit) is the binary representation of the timeslot number as defined in GSM 05.10. Range: 0 to 7
>>TSC			Channel description 10.5.2.5-44.018 [FFS]	The **TSC** field (3 bit) is the binary representation of the training sequence code as defined in 3GPP TS 45.002
>>> ARFCN			Channel description 10.5.2.5-44.018 [FFS]	The **ARFCN** field (10 bit) is the binary representation of the absolute RF channel number, see 3GPP TS 45.005. Range: 0 to 1023.
>>Indirect encoding of hopping RF channel configuration				
>>> MAIO			Channel description 10.5.2.5-44.018 [FFS]	The **MAIO** field (6 bit) is the binary representation of the mobile allocation index offset, see 3GPP TS 45.002. Range: 0 to 63.
>>>MA_NUMBER_IND			Channel description 10.5.2.5-44.018 [FFS]	The **MA_NUMBER_IND** field (1 bit) is the binary representation of the MA_NUMBER to use as reference to a GPRS mobile allocation
>>>> CHANGE_MARK_1			Channel description 10.5.2.5-44.018 [FFS]	The CHANGE_MARK_1 field (2 bit) is the binary representation of the allowed value of the SI *change mark* associated with the GPRS mobile allocation to which the MA_NUMBER refers. Range: 0 to 3.
>>Direct encoding of hopping RF channel configuration				
>> >MAIO : bit (6) >			Channel description 10.5.2.5-44.018 [FFS]	The **MAIO** field (6 bit) is the binary representation of the mobile allocation index offset, see 3GPP TS 45.002. Range: 0 to 63.
>>> HSN			Channel description 10.5.2.5-44.018 [FFS]	The **HSN** field (6 bit) is the binary representation of the hopping sequence number, see 3GPP TS 45.002. Range: 0 to 63.
>>TCH rate			Enumerated (full, half, quater)	43.051-Annex A
>>Coding scheme			Enumerated (,)	Modulation schemes used for RB : 43.051 Annex A
>>Modulation_scheme			Enumerated (,)	Modulation schemes used for RB : GMSK or 8PSK. 43.051 Annex A

Information Element/Group name	Need	Multi	Type and reference	Semantics description
>>Interl. scheme			Enumerated (,)	Indication of interlv. Scheme.-43.051-Annex A
>PDTCH parameters	C			
>>P0, BTS_PWR_CTRL_MODE and PR_MODE fields	O			These fields are optional downlink power control parameters and are encoded as in the PACKET UPLINK ASSIGNMENT message in GSM 04.60.
>>Power Control Parameters IE	O			This field is encoded as the Power Control Parameters IE in the PACKET DOWNLINK ASSIGNMENT message in GSM 04.60. The power control parameters information element contains parameters the mobile station shall use to determine its TX values.
>>>>Timeslot –allocation	O			This information field indicates the timeslots carrying a PCCCH–. It is 8 bit field. The bit 8 indicates the timeslot status. If the field is not present——, the timeslot allocation is indicated by the Power Control Parameters IE.
>>MEASUREMENT_INTER-VAL (5 bit field)	O			If present, this field is encoded as the MEASUREMENT_INTERVAL field in the PACKET DOWNLINK ASSIGNMENT message in GSM 04.60. This information field indicates the number of block periods from start of the one assigned measurement period to the beginning of the next measurement period.
>>LINK_QUALITY_MEASURE-MENT_MODE (2 bit field)	O			This field is encoded as the LINK_QUALITY_MEASUREMENT_MODE in the PACKET DOWNLINNK ASSIGNMENT message in GSM 04.60. This field determines the measurements to be included within the EGPRS Timeslot Link Quality Measurements IE
>>PDTCH rate	C		Enumerated (full,half)	43.051-Annex. A
>>Coding scheme	C		Enumerated (..)	43.051-Annex. A
>>Modulation	C		Enumerated (,)	Modulation schemes used for RB : GMSK or 8PSK. 43.051 Annex A
>>Interl. scheme	C		Enumerated (,)	Indication of interlv. Scheme.-43.051-Annex A

C

3.2 RADIO BEARER SETUP COMPLETE

This message is sent by MS to confirm the establishment of the radio bearer.

Logical channel: PDTCH or main DCCH

Direction: MS → GERAN

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	M		Message Type	
MS information elements				
Integrity check info	C		Integrity check info	IE shall be set to the used signalling radio bearer identity when the encoded RRC message is used as the MESSAGE parameter in the integrity protection algorithm
Uplink integrity protection activation info	O		Integrity protection activation info	This IE contains the time, in terms of RRC sequence numbers, when a new integrity protection configuration shall be activated for the signalling radio bearers
RB Information elements				
Radio bearer uplink ciphering activation time info			RB activation time info	This IE contains the time, in terms of RLC sequence numbers, when a certain configuration shall be activated, for a number of radio bearers

3.3 RADIO BEARER SETUP FAILURE

This message is sent by MS, if it does not support the configuration given by GERAN.

Logical channel PDTCH or main DCCH

Direction: MS→GERAN

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	M		Message Type	
MS information elements				
Integrity check info	C		Integrity check info	IE shall be set to the used signalling radio bearer identity when the encoded RRC message is used as the MESSAGE parameter in the integrity protection algorithm
Failure cause	M		Failure cause and error information	Cause for failure to perform the requested procedure
RB information elements				
Radio bearers for which reconfiguration would have succeeded	O	1.to.<max RB>	RB identity,	

3.4 RADIO BEARER RECONFIGURATION

This message is sent from GERAN to reconfigure parameters related to a change of QoS. This procedure can also change the multiplexing of MAC, and physical channels.

Logical channel: PDTCH or main DCCH

Direction: GERAN → MS

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	M		Message Type	
MS information elements				
Integrity check info	C		Integrity check info	IE shall be set to the used signalling radio bearer identity when the encoded RRC message is used as the MESSAGE parameter in the integrity protection algorithm
Integrity protection mode info	O		Integrity protection mode info	
Ciphering mode info	O		Ciphering mode info	This information element contains the ciphering specific security mode control information. 14 spare values needed. Criticality: criticality reject is needed
Starting time	M		44.18-10.5.2.38 Starting time procedures	[Note: replaces the Activation Time that is used in UTRAN.]
New G-RNTI	O		G-RNTI	The G-RNTI (GERAN Radio Network Temporary Identity) is allocated to an MS having a RRC connection and identifies the MS within GERAN
CN information elements				
CN Information info	O		CN Information info	Identifies the type of core network domain. Enumerated (CS domain, PS domain)
GERAN mobility information elements				
GRA identity	O		GRA identity	Gives the identity of the

Information Element/Group name	Need	Multi	Type and reference	Semantics description
				GERAN Registration Area
RB information elements				
RAB information to reconfigure list	O	1 to < maxRABsetup >		
>RAB information to reconfigure	M		RAB information to reconfigure	
RB information to reconfigure list	O	1to <maxRB>		
>RB information to reconfigure	M		RB information to reconfigure	
RB information to be affected list	O	1 to <maxRB>		
>RB information to be affected	M		RB information to be affected	
Quality target parameters	FFS			[Note: QoS parameters are FFS]
PhyCH information elements				
CHOISE logical channel type				
>TCH parameters	C			
>>channel type			Channel description 10.5.2.5-44.018 [FFS	**Channel type** field is 5 bit (number of bits needed is for FFS)
>>TN			Channel description 10.5.2.5-44.018 [FFS]	The **TN** field (3 bit) is the binary representation of the timeslot number as defined in GSM 05.10. Range: 0 to 7
>>TSC			Channel description 10.5.2.5-44.018 [FFS]	The **TSC** field (3 bit) is the binary representation of the training sequence code as defined in 3GPP TS 45.002
>>> ARFCN			Channel description 10.5.2.5-44.018 [FFS]	The **ARFCN** field (10 bit) is the binary representation of the absolute RF channel number, see 3GPP TS 45.005. Range: 0 to 1023.
>>Indirect encoding of hopping RF channel configuration				
>>> MAIO			Channel description 10.5.2.5-44.018 [FFS]	The **MAIO** field (6 bit) is the binary representation of the mobile allocation index offset, see 3GPP TS 45.002. Range: 0 to 63.
>>>MA_NUMBER_IND			Channel description 10.5.2.5-44.018 [FFS]	The **MA_NUMBER_IND** field (1 bit) is the binary representation of the MA_NUMBER to use as reference to a GPRS mobile allocation
>>>> CHANGE_MARK_1			Channel description 10.5.2.5-44.018 [FFS]	The **CHANGE_MARK_1** field (2 bit) is the binary representation of the allowed value of the SI *change mark* associated with the GPRS mobile allocation to which the MA_NUMBER refers. Range: 0 to 3.
>>Direct encoding of hopping				

Information Element/Group name	Need	Multi	Type and reference	Semantics description
RF channel configuration				
>>> MAIO : bit (6) >			Channel description 10.5.2.5-44.018 [FFS]	The **MAIO** field (6 bit) is the binary representation of the mobile allocation index offset, see 3GPP TS 45.002. Range: 0 to 63.
>>> HSN			Channel description 10.5.2.5-44.018 [FFS]	The **HSN** field (6 bit) is the binary representation of the hopping sequence number, see 3GPP TS 45.002. Range: 0 to 63.
>>TCH rate	C		Enumerated (full,half, quater)	43.051-Annex A
>>Coding scheme	C		Enumerated (..)	43.051-Annex A
>>Modulation scheme	C		Enumerated (.)	Modulation schemes used for RB : GMSK or 8PSK. 43.051 Annex A
>>Interl. scheme	C		Enumerated (.)	Indication of interlv. Scheme.-43.051-Annex A
>PDTCH parameters	C			
>>P0, BTS_PWR_CTRL_MODE and PR_MODE fields >				These fields are optional downlink power control parameters and are encoded as in the PACKET UPLINK ASSIGNMENT message in GSM 04.60.
>>Power Control Parameters IE				This field is encoded as the Power Control Parameters IE in the PACKET DOWNLINK ASSIGNMENT message in GSM 04.60. The power control parameters information element contains parameters the mobile station shall use to determine its TX values.
>>Timeslot –allocation				This information field indicates the timeslots carrying a PCCCH-. It is 8 bit field. The bit 8 indicates the timeslot status. If the field is not present-, the timeslot allocation is indicated by the Power Control Parameters IE.
>>MEASUREMENT_INTER-VAL (5 bit field)				If present, this field is encoded as the MEASUREMENT_INTERVAL field in the PACKET DOWNLINK ASSIGNMENT message in GSM 04.60. This information field indicates the number of block periods from start of the one assigned measurement period to the beginning of the next measurement period.
>>LINK_QUALITY_MEASURE-MENT_MODE (2 bit field)				This field is encoded as the LINK_QUALITY_MEASUREMENT_MODE in the PACKET DOWNLINNK ASSIGNMENT message in GSM 04.60. This field determines the measurements to be included within the EGPRS Timeslot Link Quality Measurements IE

Information Element/Group name	Need	Multi	Type and reference	Semantics description
>>PDTCH rate	C		Enumerated (full,half)	43.051-Annex. A
>>Modulation scheme	C		Enumerated (,)	Modulation schemes used for RB : GMSK or 8PSK. 43.051 Annex A
>>Interl. scheme	C		Enumerated (,)	Indication of interlv. Scheme.-43.051-Annex A
>>Coding scheme	C		Enumerated (,)	Coding scheme used for RB. 43.051-Annex A

3.5 RADIO BEARER RECONFIGURATION COMPLETE

This message is sent from the MS when a RB and signalling link reconfiguration has been done.

Logical channel: PDTCH or main DCCH

Direction: MS→ GERAN

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	M		Message Type	
MS information elements				
Integrity check info	C		Integrity check info	IE shall be set to the used signalling radio bearer identity when the encoded RRC message is used as the MESSAGE parameter in the integrity protection algorithm
Uplink integrity protection activation info	O		Integrity protection activation info	This IE contains the time, in terms of RRC sequence numbers, when a new integrity protection configuration shall be activated for the signalling radio bearers
RB Information elements				
Radio bearer uplink ciphering activation time info	O		RB activation time info	This IE contains the time, in terms of RLC sequence numbers, when a certain configuration shall be activated, for a number of radio bearers
RB with PDCP information list	O	1 to <maxRBallRABs>		This IE is needed for each RB having PDCP in the case of lossless serving BSC relocation
>RB with PDCP information	M		RB with PDCP	

3.6   RADIO BEARER RECONFIGURATION FAILURE

This message is sent by MS if the configuration given by GERAN is unacceptable or if the MS failed to establish the physical channel(s).

Logical channel: PDTCH or main DCCH

Direction: MS→GERAN

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	M		Message Type	
MS information elements				
Integrity check info	C		Integrity check info	<u>IE shall be set to the used signalling radio bearer identity when the encoded RRC message is used as the MESSAGE parameter in the integrity protection algorithm</u>
Failure cause	M		Failure cause and error information	
RB information elements				
Radio bearers for which reconfiguration would have succeeded	O	1.to.<max RB>	RB identity,	

3.7   RADIO BEARER RELEASE

This message is used by GERAN to release a radio bearer. It can also include modifications to the configurations of physical channels.

Logical channel: PDTCH or main DCCH

Direction: GERAN → MS

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	M		Message Type	
MS Information Elements				
Integrity check info	C		Integrity check info	IE shall be set to the used signalling radio bearer identity when the encoded RRC message is used as the MESSAGE parameter in the integrity protection algorithm
Integrity protection mode info	O		Integrity protection mode info	
Ciphering mode info	O		Ciphering mode info	This information element contains the ciphering specific security mode control information. 14 spare values needed. Criticality: criticality reject is needed
Starting time	M		44.18-10.5.2.38 Starting time procedures	[Note: replaces the Activation Time that is used in UTRAN.]
New G-RNTI	O		G-RNTI	
CN Information Elements				
CN Information info	O		CN Information info	
GERAN mobility information elements				
GRA identity	O		GRA identity	
RB Information Elements				
RAB information to reconfigure list	O	1 to < maxRABsetup >		
>RAB information to reconfigure	M		RAB information to reconfigure	
RB information to release list	M	1 to <maxRB>		
>RB information to release	M		RB information to release	
RB information to be affected list	O	1 to <maxRB>		
>RB information to be affected	M		RB information to be affected	
Quality target parameters	FFS			[Note: QoS parameters are FFS]
PhyCH information elements				
CHOISE logical channel type				
>TCH parameters	C			

Information Element/Group name	Need	Multi	Type and reference	Semantics description
>>>>channel type			Channel description 10.5.2.5-44.018 [FFS]S	The **Channel type** field is 5 bit (number of bits needed is for FFS)
>>TN	C		Channel description 10.5.2.5-44.018 [FFS]	The **TN** field (3 bit) is the binary representation of the timeslot number as defined in GSM 05.10. Range: 0 to 7
>>TSC			Channel description 10.5.2.5-44.018 [FFS]	The **TSC** field (3 bit) is the binary representation of the training sequence code as defined in 3GPP TS 45.002
>>->ARFCN			Channel description 10.5.2.5-44.018 [FFS]	The **ARFCN** field (10 bit) is the binary representation of the absolute RF channel number, see 3GPP TS 45.005. Range: 0 to 1023.
>>Indirect encoding of hopping RF channel configuration				
>>> MAIO			Channel description 10.5.2.5-44.018 [FFS]	The **MAIO** field (6 bit) is the binary representation of the mobile allocation index offset, see 3GPP TS 45.002. Range: 0 to 63.
>>>MA_NUMBER_IND			Channel description 10.5.2.5-44.018 [FFS]	The **MA NUMBER IND** field (1 bit) is the binary representation of the MA NUMBER to use as reference to a GPRS mobile allocation
>>>> CHANGE_MARK_1			Channel description 10.5.2.5-44.018 [FFS]	The **CHANGE MARK 1** field (2 bit) is the binary representation of the allowed value of the SI *change mark* associated with the GPRS mobile allocation to which the MA_NUMBER refers. Range: 0 to 3.
>>Direct encoding of hopping RF channel configuration				
>> >MAIO : bit (6) >			Channel description 10.5.2.5-44.018 [FFS]	The **MAIO** field (6 bit) is the binary representation of the mobile allocation index offset, see 3GPP TS 45.002. Range: 0 to 63.
>>> HSN			Channel description 10.5.2.5-44.018 [FFS]	The **HSN** field (6 bit) is the binary representation of the hopping sequence number, see 3GPP TS 45.002. Range: 0 to 63.
>>TCH rate	C		Enumerated (full,half, quater)	43.051-Annex A
>>Coding scheme	C		Enumerated (…)	43.051-Annex A
>>Modulation scheme	C		Enumerated (.)	Modulation schemes used for RB : GMSK or 8PSK. 43.051 Annex A
>>Interl. scheme	C		Enumerated (.)	Indication of interlv. Scheme.-43.051-Annex A
>PDTCH parameters	C			

Information Element/Group name	Need	Multi	Type and reference	Semantics description
>>P0, BTS_PWR_CTRL_MODE and PR_MODE fields				These fields are optional downlink power control parameters and are encoded as in the PACKET UPLINK ASSIGNMENT message in GSM 04.60.
>>Power Control Parameters IE>				This field is encoded as the Power Control Parameters IE in the PACKET DOWNLINK ASSIGNMENT message in GSM 04.60. The power control parameters information element contains parameters the mobile station shall use to determine its TX values.
>>Timeslot allocation				This information field indicates the timeslots carrying a PCCCH. It is 8 bit field. The bit 8 indicates the timeslot status. If the field is not present, the timeslot allocation is indicated by the Power Control Parameters IE.
>>MEASUREMENT_INTER-VAL (5 bit field)				If present, this field is encoded as the MEASUREMENT_INTERVAL field in the PACKET DOWNLINK ASSIGNMENT message in GSM 04.60. This information field indicates the number of block periods from start of the one assigned measurement period to the beginning of the next measurement period.
>>LINK_QUALITY_MEASURE-MENT_MODE (2 bit field)				This field is encoded as the LINK_QUALITY_MEASUREMENT_MODE in the PACKET DOWNLINNK ASSIGNMENT message in GSM 04.60. This field determines the measurements to be included within the EGPRS Timeslot Link Quality Measurements IE
>>PDTCH rate	C		Enumerated (full,half)	43.051-Annex. A
>>Modulation scheme	C		Enumerated (,)	Modulation schemes used for RB : GMSK or 8PSK. 43.051 Annex A
>>Interl. scheme	C		Enumerated (,)	Indication of interlv. Scheme.-43.051-Annex A
>>Coding scheme	C		Enumerated (,)	coding scheme used for RB. 43.051-Annex A

3.8 RADIO BEARER RELEASE COMPLETE

This message is sent from the MS when radio bearer release has been completed.

Logical channel: PDTCH or main DCCH

Direction: MS → GERAN

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	M		Message Type	
MS information elements				
Integrity check info	C		Integrity check info	IE shall be set to the used signalling radio bearer identity when the encoded RRC message is used as the MESSAGE parameter in the integrity protection algorithm
Uplink integrity protection activation info	O		Integrity protection activation info	This IE contains the time, in terms of RRC sequence numbers, when a new integrity protection configuration shall be activated for the signalling radio bearers
RB Information elements				
Radio bearer uplink ciphering activation time info	O		RB activation time info	This IE contains the time, in terms of RLC sequence numbers, when a certain configuration shall be activated, for a number of radio bearers

3.4 3.9 RADIO BEARER RELEASE FAILURE

This message is sent by MS if the configuration given by GERAN is unacceptable or if radio bearer can not be released.

Logical channel: PDTCH or main DCCH

Direction: MS→GERAN

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message Type	M		Message Type	
MS information elements				
Integrity check info	C		Integrity check info	IE shall be set to the used signalling radio bearer identity when the encoded RRC message is used as the MESSAGE parameter in the integrity protection algorithm
Failure cause	M		Failure cause and error information	Cause for failure to perform the requested procedure
RB information elements				
Radio bearers for which reconfiguration would have succeeded	O	1.to.<max RB>	RB identity,	

3.5 3.10 MESSAGE PARAMETERS

3.10.1 MS Information elements

3.10.1.1. Starting time

The *Starting Time* information element is coded as shown in figure 10.5.2.38/3GPP TS 44.018.

3.10.1.2 Ciphering Algorithm

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Ciphering algorithm	M			

3.10.1.3 Ciphering mode info

This information element contains the ciphering specific security mode control information.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Ciphering mode command	M		Enumerated (start/restart, stop)	
Ciphering algorithm			Ciphering algorithm	
Radio bearer downlink ciphering activation time info	O		RB activation time info,	

3.10.1.4 Initial MS identity

This information element identifies the MS at a request of an RRC connection.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CHOICE MS id type	M			At least 8 spare choices, Criticality: reject, is needed
>IMSI (GSM-MAP)			IMSI (GSM-MAP)	
>TMSI and LAI (GSM-MAP)				
>>TMSI (GSM-MAP)	M		TMSI (GSM-MAP)	
>>LAI (GSM-MAP)	M		Location Area Identification	
>P-TMSI and RAI (GSM-MAP)				
>>P-TMSI (GSM-MAP)	M		P-TMSI (GSM-MAP)	
>>RAI (GSM-MAP)	M		Routing Area Identification	
>IMEI			IMEI 10.3.1.5	
>ESN (DS-41)			TIA/EIA/IS-2000-4	
>IMSI (DS-41)			TIA/EIA/IS-2000-4	
>IMSI and ESN (DS-41)			TIA/EIA/IS-2000-4	
>TMSI (DS-41)			TIA/EIA/IS-2000-4	

3.10.1.5 Integrity check info

The Integrity check info contains the RRC message sequence number needed in integrity protection [FFS].

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Message authentication code	M			
RRC Message sequence number	M			

3.10.1.6   Integrity protection activation info

This IE contains the time, in terms of RRC sequence numbers, when a new integrity protection configuration shall be activated for the signalling radio bearers.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
RRC message sequence number list	M			
>RRC message sequence number	M			

3.10.1.7   Integrity protection Algorithm

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Integrity protection algorithm	M			

3.10.1.8   Integrity protection mode info

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Integrity protection mode command	M			
Downlink integrity protection activation info				
Integrity protection algorithm	O			
Integrity protection initialization number				

3.10.1.9   PDCP capability

Indicates which algorithms and which value range of their parameters are supported by the MS.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Support for lossless Serving BSC relocation	M		Boolean	TRUE means supported
Support for RFC2507	M		Boolean	TRUE means supported
Max HC context space	C-*hc_sup*		Integer(512, 1024, 2048, 4096, 8192)	Maximum header compression context space in bytes supported by the MS At least 3 spare values needed, criticality: reject

Condition	Explanation
hc_sup	Presence is mandatory if IE Support for RFC 2507 = TRUE. Otherwise this field is not needed in the message

3.10.10   G-RNTI

The G-RNTI (GERAN Radio Network Temporary Identity) is allocated to an MS having a RRC connection and identifies the MS within GERAN.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Serving BSC identity	M		bit string(12)	
-RNTI	M		bit string(20)	

3.10.2 CN Information elements

3.10.2.1 CN domain identity

Identifies the type of core network domain.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
CN domain identity	M		Enumerated (CS domain, PS domain, Don't care	Identifies the core network identity. At least one spare value needed.

3.10.3 GERAN mobility Information elements

3.10.3.1 GRA identity

Gives the identity of the GERAN Registration Area. It can be used to indicate to the MS which GRA it shall use in case of overlapping GRAs.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
GRA identity	M		bit string(16)	GERAN Registration Area

3.10.4 Radio Bearer Information elements

3.10.4.1 PDCP info

The purpose of the PDCP info IE is to indicate which algorithms shall be established and to configure the parameters of each of the algorithms.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
PDCP mode			Enumerated (transparent, non-transparent)	Transparent or Non-transparent. Only Non-transparent mode is used in case of Conversational RB
Support for lossless Serving BSC relocation	C-*LosslessCriteria*		Boolean	TRUE means support
Max PDCP SN	C*Lossless*		Integer (255, 65535)	Maximum PDCP sequence number. Default value is 65535.
PDCP PDU header	M		Enumerated (present, absent)	Whether a PDCP PDU header is existent or not. Default value is "present"
Header compression information	O	1 to <maxPDCPAlgoType>		
>CHOICE *algorithm type*	M			7 spare values needed, criticality: reject. Note: new algorithm for Header Removal is needed.
>>RFC2507				Header compression according to IETF standard RFC2507
>>>F_MAX_PERIOD	MM		Integer (1..65535)	Largest number of compressed non-TCP headers that may be sent without sending a full header. Default value is 256.
>>>F_MAX_TIME	M		Integer (1..255)	Compressed headers may not be sent more than F_MAX_TIME seconds after sending last full header. Default value is 5.
>>>MAX_HEADER	MM		Integer (60..65535)	The largest header size in octets that may be compressed. Default value is 168.
>>>TCP_SPACE	MM		Integer (3..255)	Maximum CID value for TCP connections. Default value is 15.
>>>NON_TCP_SPACE	MM		Integer (3..65535)	Maximum CID value for non-TCP connections. Default value is 15.
>>>EXPECT_REORDERING	MM		Enumerated (reordering not expected, reordering expected)	Whether the algorithm shall reorder PDCP SDUs or not. Default value is "reordering not expected".

Condition	Explanation
LosslessCriteria	This IE is present only if the IE "RLC mode" is "Acknowledged" and the IE "In-sequence delivery " is "True".
Lossless	This IE shall be present if the IE "Support for lossless Serving BSC relocation" Is TRUE, otherwise it shall be absent.

3.10.4.2 PDCP SN info

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Receive PDCP sequence number	M		Integer(0..65 535)	The PDCP sequence number which the sender of the message is expecting next to be received.

3.10.4.34 Predefined configuration identity

This information element identifies a pre- defined radio parameter configuration.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Predefined radio configuration identity	M		Integer (0..15)	

3.10.4.45 Predefined configuration value tag

This information element is used to identify different versions of a radio bearer configuration as may be used within one PLMN e.g. to support different GERAN implementations.

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Predefined configuration value tag	M		Integer(0..15)	

3.10.4.56 Predefined RB configuration-FFS

This information element concerns a pre- defined configuration of radio bearer parameters

Information Element/Group name	Need	Multi	Type and Reference	Semantics description
Signalling radio bearer information [FFS]				
Signalling RB information to setup List	O			For each signalling radio bearer
>Signalling RB information to setup	O			
RB information				
RB information to setup list	M			
>RB information to setup	M			

3.10.4.67 RAB info

This IE contains information used to uniquely identify a radio access bearer.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
RAB identity	M		RAB identity	
CN domain identity	M		CN domain identity	
RAB NAS Synchronization Indicator	O		RAB NAS Synchronizat ion info	
Re-establishment timer	M		Re-establishme nt timer	

3.10.4.78 RAB info short

This IE contains information used to uniquely identify a radio access bearer.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
RAB identity	M		RAB identity	
CN domain identity	M		CN domain identity	

3.10.4.89 RAB information for setup

Information Element/Group name	Need	Multi	Type and reference	Semantics description
RAB info	M		RAB info	
RB information to setup list	M	1 to <maxRBperRAB>		
>RB information to setup	M		RB information to setup	

3.10.4.910 RAB information to reconfigure

Information Element/Group name	Need	Multi	Type and reference	Semantics description
RAB identity	M		RAB Identity	
RAB NAS synchronization indicator	M		RAB NAS Synchronization info	

3.10.4.1011 RAB NAS Synchronization info

This IE contains information used to uniquely identify a radio access bearer.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
NAS Synchronization info	M		Bitstring(4)	

3.10.4.112 RB activation time info

This IE contains the time, in terms of RLC sequence numbers, when a certain configuration shall be activated, for a number of radio bearers.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Radio bearer activation time	O	1 to <maxRB>		
>RB identity	M		RB identity	
>RLC sequence number	M		Integer (0.. 4095)	RLC SN [TS 25.322]

3.10.4.123 RB identity

An identification number for the radio bearer affected by a certain message.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
RB identity	M		Integer(0..31)	Values 0-4 shall only be used for signalling radio bearers

3.10.4.13~~4~~   RB information to be affected

Information Element/Group name	Need	Multi	Type and reference	Semantics description
RB identity	M		RB identity	
RB mapping info	M		RB mapping info	

3.10.4.14~~5~~   RB information to reconfigure

Information Element/Group name	Need	Multi	Type and reference	Semantics description
RB identity	M		RB identity	
PDCP info	O		PDCP info	
PDCP SN info	C PDCP		PDCP SN info	PDCP sequence number info from the network. Present only in case of lossless Serving BSC relocation.
CHOICE *RLC info type*	O			
>RLC info			RLC info	
RB mapping info	O		RB mapping info	
RB suspend/resume	O		Enumerated(suspend, resume)	

Condition	Explanation
PDCP	This IE is optional only if "PDCP info" is present. Otherwise it is absent.

3.10.4.15~~6~~   RB information to release

Information Element/Group name	Need	Multi	Type and reference	Semantics description
RB identity	M		RB identity	

3.10.4.16~~7~~   RB information to setup

Information Element/Group name	Need	Multi	Type and reference	Semantics description
RB identity	M		RB identity	
PDCP info	O		PDCP info	
RLC info	M		RLC info	
RB mapping info	M		RB mapping info	

Multi Bound	Explanation
MaxSetupRBcount	The maximum number of RBs to setup.

3.10.4.17~~8~~   RB mapping info

A multiplexing option for each possible transport channel this RB can be multiplexed on.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
Information for each multiplexing option	M			
>Number of uplink RLC logical channels	C-*UL-RLC info*			
>>Logical channel identity	O			
>>MAC logical channel priority	M			
>>Logical channel max loss	M			
>Number of downlink RLC logical channels	C-*DL-RLC info*			
>>Logical channel identity	O			

Condition	Explanation
UL-RLC info	If "CHOICE Uplink RLC mode" in IE "RLC info" is present this IE is M. Otherwise the IE is not needed.
DL-RLC info	If "CHOICE Downlink RLC mode" in IE "RLC info" is present this IE is M. Otherwise the IE is not needed.

3.10.4.18~~9~~   RB with PDCP information

Information Element/Group name	Need	Multi	Type and reference	Semantics description
RB identity	M		RB identity	
PDCP SN info	M		PDCP SN info	PDCP sequence number info from the sender of the message for lossless Serving BSC -relocation.

3.10.4.19~~20~~   RLC info

The content of RLC info .

Information Element/Group name	Need	Multi	Type and reference	Semantics description
>CHOISE RLC mode-	M			Indicates if Acknowledged, Unacknowledged or Transparent mode RLC shall be used. One spare value needed, criticality: reject.
>>AM RLC	C			Both MAC Dedicated and MAC Shared
>>>resegment IE	C			This information element defines whether retransmitted uplink RLC data blocks shall be resegmented or not **RESEGMENT IE** 0 Retransmitted RLC data blocks shall not be resegmented 1 Retransmitted RLC data blocks shall be resegmented according to commanded MCS
>>>in-sequency delivery	C		Boolean	TRUE indicates that RLC shall preserve the order of higher layer PDUs when these are delivered. FALSE indicates that receiving RLC entity could allow SDUs to be delivered to the higher layer in different order than submitted to RLC sublayer at the transmitting side.
>>>EGPRS window	C			This field is encoded as the

size				EGPRS window size IE in the PACKET UPLINK ASSIGNMENT message in GSM 04.60
>>UM RLC	C			Both MAC Dedicated and MAC Shared.
>>>EGPRS window size	C			This field is encoded as the EGPRS window size IE in the PACKET UPLINK ASSIGNMENT message in GSM 04.60
>>TM RLC	C			Only in case that MAC mode is Dedicated.

NOTE   This information element is included within IE "Predefined RB configuration"

3.10.4.20~~1~~   Signalling RB information to setup

Signaling RBs and thus these IE are FFS.

Information Element/Group name	Need	Multi	Type and reference	Semantics description
RB identity	M			
CHOICE *RLC info type*	MP			
>RLC info				
RB mapping info	MP			

NOTE   This information element is included within IE "Predefined RB configuration"