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Technical Report

3rd Generation Partnership Project;
Technical Specification Group Radio Access Network;
Terminal Power Saving Features
(Iur/Iub aspects)
(Release 4)

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Contents

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Foreword

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1   presented to TSG for information;

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y   the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z   the third digit is incremented when editorial only changes have been incorporated in the document.

1   Scope

The pupose of the present document is to help the TSG RAN WG3 group to specify the changes to existing specifications, needed for the introduction of the "Terminal Power Saving Features" option for Release 2000.

WG1 is the leading working group of this Work Item (WI) and has its own TR. The purpose of this TR is not to replace the TR or any decisions made in the leading WG. Rather, it is intended to gather all the information in order to trace the history and the status of the Work Task in other RAN WGs, and discuss issues that WG3 has impact on.

It is not intended to replace contributions and Change Requests, but only to list conclusions and make references to agreed contributions and CRs. When solutions are sufficiently stable, the CRs can be issued.

It describes agreed requirements related to the Work Task.

It identifies the affected specifications with related Change Requests.

It also describes the schedule of the Work Task.

This document is a 'living' document, i.e. it is permanently updated and presented to all TSG-RAN meetings

2   References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.
References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.

For a specific reference, subsequent revisions do not apply.

For a non-specific reference, the latest version applies.

[1]   3G TR 25.840   "Terminal Power Saving Features"

[2]   3G TS 25.423, "UTRAN Iur interface RNSAP signalling"

[3]   3G TS 25.433, "UTRAN Iub interface NBAP signalling"

3   Definitions, symbols and abbreviations

3.1   Definitions

For the purposes of the present document, the following terms and definitions apply.

3.2 Symbols

3.3 Abbreviations

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

CFN Connection Frame Number

DPCCH Dedicated Physical Control Channel

DSCH Downlink Shared Channel

4 Introduction

4.1 Background

Terminal power saving feature is one of the work items for the WCDMA Release 2000. In this technical report , the requirements and detail solutions are described

5 Requirements

This section describes the requirements to the solutions of terminal power saving feature.

5.1 General requirements

- The solution should be described in the TR 25.840 [1] and provided by Leading WG

5.2 Requirements in case of Gated DPCCH Transmission Scheme with DSCH in FDD

Required changes in Node B and UE are given in [1]. For support of gated DPCCH Transmission, the following functionality's should be provided.

- Setting Gated DPCCH Transmission scheme in a cell
- Initiation and termination of Gated DPCCH Transmission scheme
- Soft handover during gating

6   Study Areas

6.1   Gated DPCCH Transmission

6.1.1   General

Gated DPCCH transmission scheme (hereafter, "gating" or "gating mode" are used interchangeably.) is basically reduced power control rate operation to get power saving and interference reduction by turning off transmission intermittently. Gating can be applied when UTRAN and UE support gating, DSCH and associated DPCH in downlink and DPCH in uplink are set-up between UTRAN and UE, but there is no data to transmit on both uplink and downlink for a while. UTRAN can initiate the gating by higher layer signaling. UTRAN can terminate the gating by higher layer signaling. Once gating is initiated data with restricted TFS can be transmitted on downlink DPDCH that is associated with DSCH as well as uplink DPDCH, without terminating gating.

There are two kinds of period in gated DPCCH transmission depending on the transmission of data on DPDCH during gating. In Normal Gating Period, DPDCH is not transmitted However, even during gating mode, DPDCH can be transmitted without terminating the gating exceptionally for the data with restricted TFS.

In addition to this, the network signals to the UE the 'RX gating DRX cycle', which defines in which frames the data transmission can start again in downlink during gating .

6.1.2   Discussions in Leading Group

Detail description of gated DPCCH transmission can be found in TR 25.840[1].

6.1.2.1 Gating Parameters

When the call is setup, UTRAN and UE negotiate the gating capability and parameters. The parameters controlling the gating operation are:

Table 1. Gating Parameters

Gating Rate	1	1/3	1/5

Gating Mode	Downlink Only		Uplink and Downlink

TFS restrictions in downlink	tbd		

TFS restrictions in uplink	tbd		

RX gating DRX cycle	1	2	4

6.1.2.2   Initiation and Termination Indication of Gated DPCCH Transmission

The gated DPCCH transmission can be initiated by the UTRAN's command to UE. Gated DPCCH transmission can be terminated by UE's request followed by UTRAN's permission or by UTRAN's notice to UE. That is, UTRAN determines whether gated DPCCH transmission is initiated or terminated. Gating is initiated and terminated by higher layer signaling.

6.1.2.3 RX gating concept

During gating , it is possible for the network to allow battery savings for the UE also from the UE rx side. This is achieved so that network will signal 'RX gating DRX cycle' to the UE with the other gating parameters. If 'RX gating DRX cycle' >1 then it is possible for the UE to turn off the receiver during certain slots in the frames where it is known beforehand that UTRAN is not transmitting neither DPDCH or DPCCH for the UE.

Thus the 'RX gating DRX cycle' defines the cycle, in which frames the transmission of non-zero length transport block can start again during gating.

The definition is that transmission of non-zero length transport block can start again in radio frame CFN, which fulfils both of the two following relations:

a)   CFN mod (RX gating DRX cycle) = 0.

b)   CFN mod Fi = 0, where Fi is the number of radio frames in one TTI of the TrCHi carrying a non-zero length transport block [TS25.212].

6.1.3   Possible Gating Signalling

6.1.3.1 Radio Link Setup

- When SRNC sets up a radio link, DRNC can send gating support indicator as a part of neighboring cell information in the Radio Link Setup Response message and SRNC will save the information.
- If one of the cells that will have radio link does not support gating operation, SRNC shall terminate and not initiate gating operation.
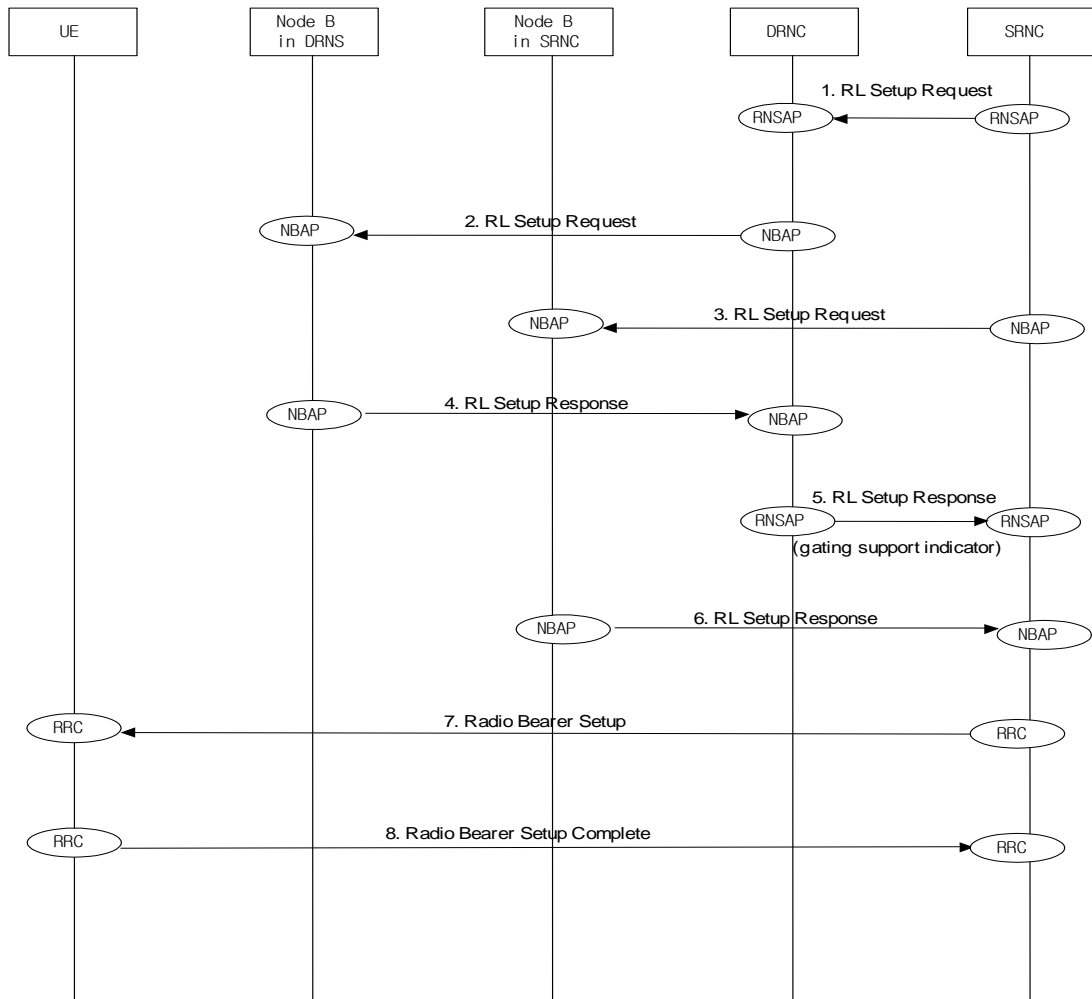
1. When SRNC sets up a Radio Link via the DRNC, SRNC sends **Radio Link Setup Request** message to DRNC
2. DRNC requests its Node B to setup a Radio Link sending **Radio Link Setup Request** message.
3. SRNC requests its Node B to setup a Radio Link sending **Radio Link Setup Request** message.
4. Node B allocates resources and notifies DRNC that the Radio Link is setup sending **Radio Link Setup Response** message.
5. DRNC notifies SRNC that the Radio Link is setup. DRNC can send the information whether neighboring cells including the active cell support gating or not using IE gating support indicator.
    Parameters: *gating support indicator*.
6. Node B allocates resources and notifies SRNC that the Radio Link is setup sending **Radio Link Setup Response** message.
7. SRNC sends UE **Radio Bearer Setup** message.
8. UE notifies SRNC that radio bearer is setup sending **Radio Bearer Setup Complete** message.

6.1.3.2 Gating Initiation and termination

- When SRNC determines gating initiation/termination, SRNC sends NBAP/RNSAP message **Radio Link Reconfiguration Prepare** the parameter, gating indicator and SRNC may include the gating

parameters (gating rate and gating direction).
- SRNC sends RRC message **Radio Bearer Reconfiguration** or **Transport Channel Reconfiguration** or **Physical Channel Reconfiguration** to initiate/terminate gating operation with the gating parameters.
- During gating operation, SRNC and UE may restrict TFCIs in order to keep lower data rate.
‒ Gating initiation and termination can be synchronized since Synchronized Radio Link Reconfiguration procedure and Radio Bearer Reconfiguration procedure have activation time which can be synchronized.
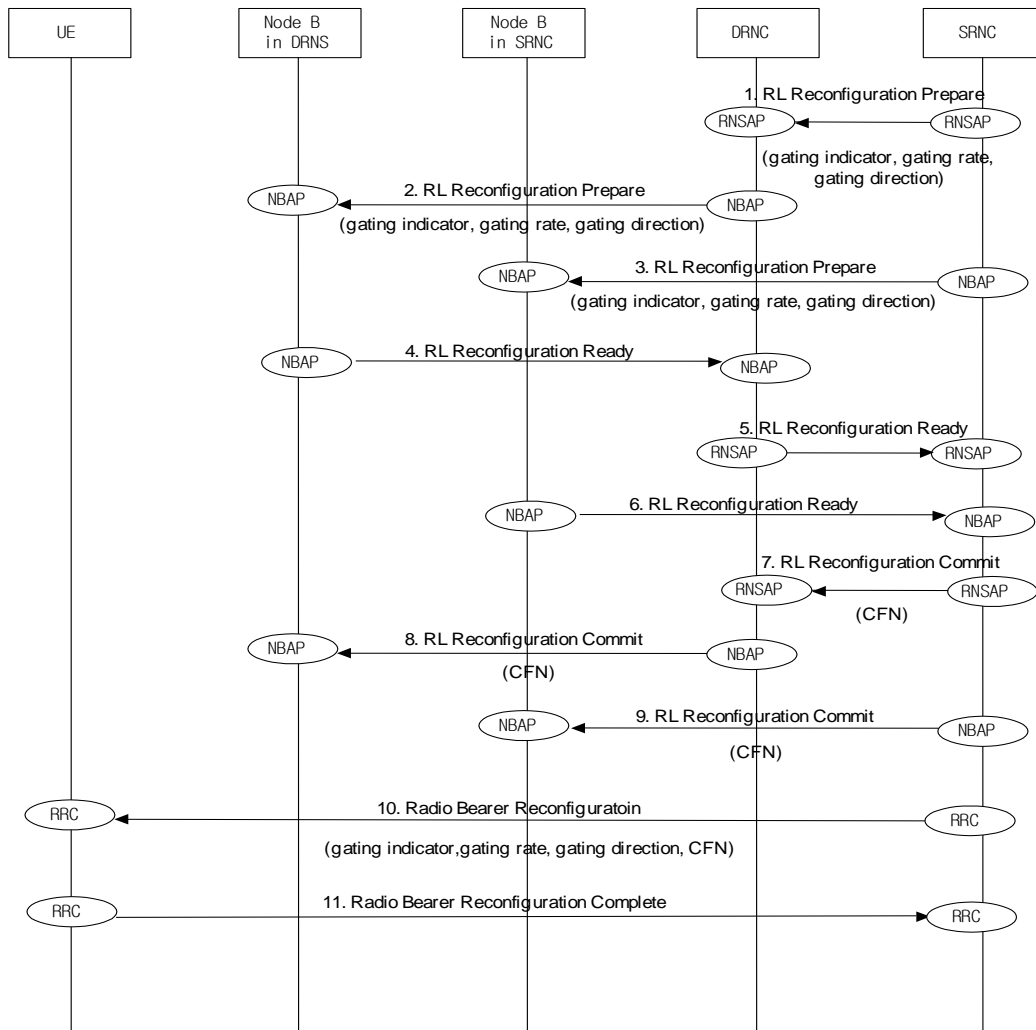
1. SRNC initiates/terminates gating operation sending **Radio Link Reconfiguration Prepare** message to DRNC with gating parameters.
   Parameters: *gating indicator, gating rate, gating direction*
2. DRNC requests its Node B to initiate/terminate gating operation sending **Radio Link Reconfiguration Prepare** message.
   Parameters: *gating indicator, gating rate, gating direction*
3. SRNC requests its Node B to initiate/terminate gating operation sending **Radio Link Reconfiguration Prepare** message.
   Parameters: *gating indicator, gating rate, gating direction*.
4. Node B prepares gating operation and notifies DRNC that the gating operation is ready sending

Radio Link Reconfiguration Ready message.

5. DRNC notifies SRNC that the gating operation is ready sending **Radio Link Reconfiguration Ready** message.

6. Node B prepares gating operation and notifies SRNC that the gating operation is ready sending **Radio Link Reconfiguration Ready** message.

7. RNSAP message **Radio Link Reconfiguration Commit** is sent from SRNC to DRNC for initiating/terminating gating operation at CFN.

8. NBAP message **Radio Link Reconfiguration Commit** is sent from DRNC to Node B for initiating/terminating gating operation at CFN.

9. NBAP message **Radio Link Reconfiguration Commit** is sent from SRNC to Node B for initiating/terminating gating operation at CFN.

10. SRNC sends UE **Radio Bearer Reconfiguration** message with gating parameters. Parameters: *gating indicator, gating rate, gating direction*.

11. UE notifies SRNC that gating operation is ready sending **Radio Bearer Reconfiguration Complete** message and UE initiates/terminates gating operation with gating parameters at CFN that is signaled.

6.1.3.3 Soft handover during Gating

-   When SRNC determines to setup a new Radio Link in a DRNC during gating operation, SRNC sends NBAP/RNSAP message **Radio Link Addition/Setup Request** with the parameter, gating rate, gating direction, gating indicator. Gating indicator notifies gating operation is on.

-   Node B saves the gating parameters and starts UL reception and DL transmission based on gating parameters.

-   If the Node B which will have the new Radio Link does not support the gating operation, SRNC shall send gating indicator with off to terminate gating operation.

-   SRNC sends RRC message **Active Set Update** to UE with gating indicator that will be off if gating operation should be off.

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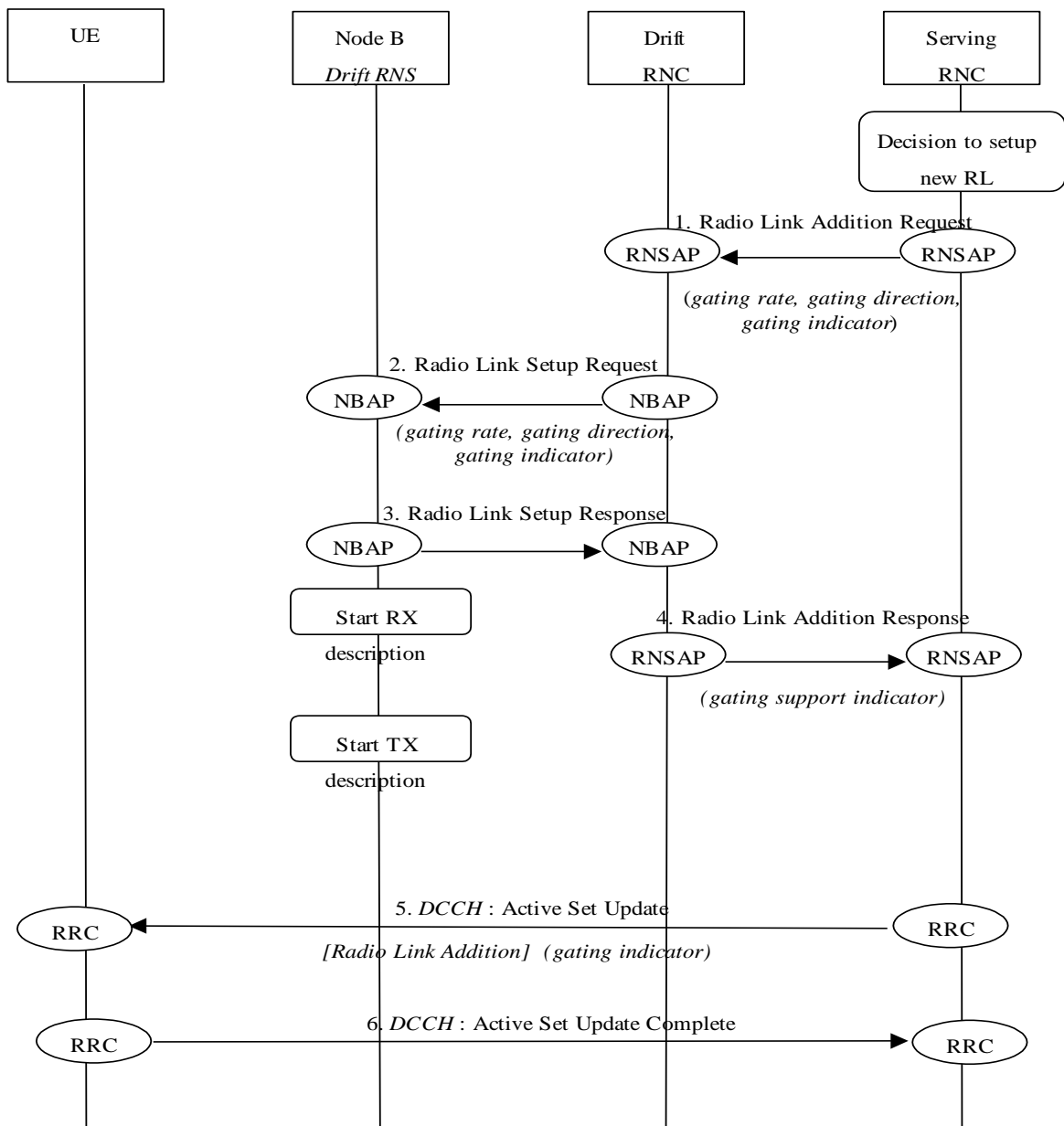
1   SRNC decides to setup a radio link via a new cell controlled by another RNC. SRNC requests DRNC
     for radio resources by sending RNSAP message **Radio Link Addition Request**. If gating operation
     is on, SRNC includes gating parameter: gating indicator with gating on.
     Parameters: *gating indicator.*

2   If requested resources are available, DRNC sends NBAP message Radio Link Setup **Request** to
     Node B. If SRNC sends gating indicator with gating on and Node B supports gating operation,
     DRNC includes gating indicator in **Radio Link Setup Request** message.
     Parameters: *gating rate, gating direction, gating indicator*

3   Node B allocates requested resources. Successful outcome is reported in NBAP message Radio
     Link Setup Response.
     Then Node B starts the UL reception and then DL transmission based on the gating parameters.

4.   DRNC sends RNSAP message **Radio Link Addition Response** to SRNC.

5.   SRNC sends RRC message **Active Set Update** (Radio Link Addition) to UE on DCCH. If DRNC

sends failure response with cause gating not supported, SRNC will terminate gating operation and include gating indicator with gating off in **Active Set Update**.
Parameters: *gating indicator*
6.   UE acknowledges with RRC message **Active Set Update Complete**.

7   Agreements and associated agreed contributions

7.1. Radio Link Setup/Addition procedure

-    RADIO LINK SETUP REQUEST(RNSAP/NBAP) message contains gating parameters in order to continue the gating during soft handover.
-    RADIO LINK SETUP/ADDITION RESPONSE/FAILURE(RNSAP) message contains gating support indicator as part of Neighbouring FDD Cell Information IE.
-    If SRNC request Node B to operate gating with a new RL in a cell which does not support gating, the request shall be rejected and RADIO LINK SETUP/ADDITION FAILURE(RNSAP/NBAP) message will be sent with a new cause value (e.g., gating not supported).

7.2. Synchronised Radio Link Reconfiguration Preparation procedure

-    RADIO LINK RECONFIGURATION PREPARE(RNSAP/NBAP) message contains gating indicator and gating parameters in order to initiate and terminate gating.
-    If SRNC initiate gating in a cell which does not support gating, the request shall be rejected and RADIO LINK RECONFIGURATION FAILURE(RNSAP/NBAP) message will be sent with a new cause value (e.g., gating not supported).

7.3. Uplink Signalling Transfer procedure

-    UPLINK SIGNALLING TRANSFER INDICATION(RNSAP) message contains gating support indicator in order to indicate SRNC whether gating is supported or not in the corresponding cell where the UE sent CCCH to the SRNC
.

8   Specification Impact and associated Change Requests

It is expected that this Iub/Iur protocol aspects has impacts on the following Specifications:
[2],[3].

8.1. Specification impact on 25.423

8.1.1   Impact on (9.1.3) RADIO LINK SETUP REQUEST (FDD) message

-    When SRNC determines to setup a new Radio Link in the DRNC during gating operation, SRNC

sends RNSAP messge RADIO LINK SETUP REQUEST message with the parameter, Gating Rate, Gating Direction in order to continue the gating operation with the new Radio Link.

- If SRNC request DRNC to operate gated DPCCH scheme with a new RL in a cell which does not support gating, DRNC shall reject the request and send RADIO LINK SETUP FAILURE message with a new cause value (e.g gating not supported).

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.40		YES	reject
Transaction ID	M		9.2.1.59		–	
SRNC-Id	M		RNC-Id 9.2.1.50		YES	reject
S-RNTI	M		9.2.1.53		YES	reject
D-RNTI	O		9.2.1.24		YES	reject
Allowed Queuing Time	O		9.2.1.2		YES	reject
UL DPCH Information		*1*			YES	reject
>UL Scrambling Code	M		9.2.2.53		–	
>Min UL Channelisation Code Length	M		9.2.2.25		–	
>Max Number of UL DPDCHs	C – CodeLen		9.2.2.24		–	
>Puncture Limit	M		9.2.1.46	For the UL.	–	
>TFCS	M		TFCS for the UL 9.2.1.63		–	
>UL DPCCH Slot Format	M		9.2.2.52		–	
>Uplink SIR Target	O		Uplink SIR 9.2.1.69		–	
>Diversity mode	M		9.2.2.8		–	
>SSDT Cell Identity Length	O		9.2.2.41		–	
>S Field Length	O		9.2.2.36		–	
DL DPCH Information		*1*			YES	reject
>TFCS	M		TFCS for the DL. 9.2.1.63		–	
>DL DPCH Slot Format	M		9.2.2.9		–	
>Number of DL Channelisation Codes	M		9.2.2.26A		–	
>TFCI Signalling Mode	M		9.2.2.46		–	
>TFCI Presence	C-SlotFormat		9.2.1.55		–	
>Multiplexing Position	M		9.2.2.26		–	
>Power Offset Information		*1*			–	
>>PO1	M		Power Offset 9.2.2.30	Power offset for the TFCI bits.	–	
>>PO2	M		Power Offset 9.2.2.30	Power offset for the TPC bits.	–	
>>PO3	M		Power Offset 9.2.2.30	Power offset for the pilot bits.	–	
>FDD TPC Downlink Step Size	M		9.2.2.16		–	
>Limited Power Increase	M		9.2.1.33		–	
>Inner Loop DL PC Status	M		9.2.2.21a		–	
DCH Information	M		DCH FDD Information		YES	reject

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
			9.2.2.4A			
DSCH Information	O		DSCH FDD Information 9.2.2.13A		YES	reject
RL Information		1…<maxnoofRLs>			EACH	notify
>RL ID	M		9.2.1.49		–	
>C-Id	M		9.2.1.6		–	
>First RLS Indicator	M		9.2.2.16A		-	
>Frame Offset	M		9.2.1.30		–	
>Chip Offset	M		9.2.2.1		–	
>Propagation Delay	O		9.2.2.33		–	
>Diversity Control Field	C – NotFirstRL		9.2.2.6		–	
>Initial DL TX Power	C_ifAlone		DL Power 9.2.2.10		–	
>Primary CPICH Ec/No	C_ifAlone		9.2.2.32		–	
>SSDT Cell Identity	O		9.2.2.40		–	
>Transmit Diversity Indicator	C – Diversity mode		9.2.2.50		–	
Transmission Gap Pattern Sequence Information	O		9.2.2.47A		YES	reject
Active Pattern Sequence Information	O		9.2.2.A		YES	reject
Gating Parameter	O		9.2.2.x		YES	reject

9.2.2.x   Gating Parameter

The Gating Parameter defines the parameters for the gating operation.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Gating Parameter				
>Gating rate	M		ENUMERATED (1/3, 1/5).	
>Gating direction	M		ENUMERATED(Uplink and Downlink, Downlink only)	

8.1.2   Impact on RADIO LINK SETUP RESPONSE/FAILURE message and RADIO LINK ADDITION RESPONSE/FAILURE message.

- When one or more than one Radio Links are set up or added, DRNC can send gating support indicators for each Radio Link and as part of *Neighboring FDD Cell Information* IE in RADIO LINK SETUP RESPONSE/FAILURE message or RADIO LINK ADDITION RESPONSE/FAILURE message.

8.1.2.1 (9.1.4) RADIO LINK SETUP RESPONSE (FDD) message

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.40		YES	reject
Transaction ID	M		9.2.1.59		–	
D-RNTI	O		9.2.1.24		YES	ignore
CN PS Domain Identifier	O		9.2.1.12		YES	ignore
CN CS Domain Identifier	O		9.2.1.11		YES	ignore
RL Information Response		1..<maxnoofRLs>			EACH	ignore
>RL ID	M		9.2.1.49		–	
>RL Set ID	M		9.2.2.35		–	
>URA Information	M		9.2.1.70B		–	
>SAI	M		9.2.1.52		–	
>Cell GAI	O		9.2.1.5A		–	
>UTRAN Access Point Position	O		9.2.1.70A		–	
>Received total wide band power	M		9.2.2.35A		–	
>Secondary CCPCH Info	O		9.2.2.37B		–	
>DL Code Information	M		FDD DL Code Information 9.2.2.14A		–	
>Diversity Indication	C-NotFirstRL		9.2.2.7		–	
>CHOICE *Diversity Indication*	M				–	
>>*Combining*					–	
>>>RL ID	M		9.2.1.49	Reference RL ID for the combining	–	
>>*Non Combining or First RL*					–	
>>>DCH Information Response	M		9.2.1.16A		–	
>SSDT Support Indicator	M		9.2.2.43		–	
>Maximum Uplink SIR	M		Uplink SIR 9.2.1.69		–	
>Minimum Uplink SIR	M		Uplink SIR 9.2.1.69		–	
>Closed Loop Timing Adjustment Mode	O		9.2.2.3A		–	
>Maximum Allowed UL Tx Power	M		9.2.1.35		–	
>Maximum DL TX Power	M		DL Power 9.2.2.10		–	
>Minimum DL TX Power	M		DL Power 9.2.2.10		–	
>Primary Scrambling Code	O		9.2.1.45		–	
>UL UARFCN	O		UARFCN 9.2.1.66	Corresponds to Nu in ref. [6]	–	

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
>DL UARFCN	O		UARFCN 9.2.1.66	Corresponds to Nd in ref. [6]	–	
>Primary CPICH Power	O		9.2.1.44		–	
>DSCH Information Response	O		DSCH FDD Information Response 9.2.2.13B		YES	ignore
>Neighbouring UMTS Cell Information	O		9.2.1.41A		–	
>Neighbouring GSM Cell Information	O		9.2.1.41C		YES	ignore
>Gating Support Indicator	M		9.2.2.x		YES	ignore
Uplink SIR Target	O		Uplink SIR 9.2.1.69		YES	ignore
Criticality Diagnostics	O		9.2.1.13		YES	ignore

8.1.2.2 (9.1.5) RADIO LINK SETUP FAILURE (FDD) message

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.40		YES	reject
Transaction ID	M		9.2.1.59		–	
D-RNTI	O		9.2.1.24		YES	ignore
CN PS Domain Identifier	O		9.2.1.12		YES	ignore
CN CS Domain Identifier	O		9.2.1.11		YES	ignore
CHOICE *Cause Level*	M				YES	ignore
>*General*					–	
>>Cause	M		9.2.1.5		–	
>*RL Specific*					–	
>>Unsuccessful RL Information Response		*1...<maxnoofRLs>*			EACH	Ignore
>>>RL ID	M		9.2.1.49		–	
>>>Cause	M		9.2.1.5		–	
>>Successful RL Information Response		*0..<maxnoofRLs-1>*			EACH	ignore
>>>RL ID	M		9.2.1.49		–	
>>>RL Set ID	M		9.2.2.35		–	
>>>URA Information	M		9.2.1.70B		–	
>>>SAI	M		9.2.1.52		–	
>>>Cell GAI	O		9.2.1.5A		–	
>>>UTRAN Access Point Position	O		9.2.1.70A		–	
>>>Received total wide band power	M		9.2.2.35A		–	
>>>Secondary CCPCH Info	O		9.2.2.37B		–	
>>>DL Code Information	M		FDD DL Code Information 9.2.2.14A		YES	ignore
>>>Diversity Indication	M		9.2.2.7		–	
>>>CHOICE *Diversity Indication*	M				–	
>>>>*Combining*					–	
>>>>>RL ID	M		9.2.1.49	Reference RL ID for the combining	–	
>>>>*Non Combining or First RL*					–	
>>>>>DCH Information Response	M		9.2.1.16A		–	
>>>SSDT Support Indicator	M		9.2.2.43		–	
>>>Maximum Uplink SIR	M		Uplink SIR 9.2.1.69		–	
>>>Minimum Uplink SIR	M		Uplink SIR 9.2.1.69		–	
>>>Closed Loop Timing Adjustment Mode	O		9.2.2.3A		–	

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
>>>Maximum Allowed UL Tx Power	M		9.2.1.35		–	
>>>Maximum DL TX Power	M		DL Power 9.2.2.10		–	
>>>Minimum DL TX Power	M		DL Power 9.2.2.10		–	
>>>DSCH Information Response	O		DSCH FDD Information Response 9.2.2.13B		YES	ignore
>>>Neighbouring UMTS Cell Information	O		9.2.1.41A		–	
>>>Gating Support Indicator	M		9.2.2.x		YES	ignore
>>>Neighbouring GSM Cell Information	O		9.2.1.41C		YES	ignore
Uplink SIR Target	O		Uplink SIR 9.2.1.69		YES	ignore
Criticality Diagnostics	O		9.2.1.13		YES	ignore

9.2.1.5   Cause

IE/Group Name	Presence	Range	IE type and reference	Semantics description
CHOICE *Cause Group*				
>*Radio Network Layer*				
>>Radio Network Layer Cause	M		ENUMERATED (Unknown C-ID, Cell not Available, Power Level not Supported, UL Scrambling Code Already in Use, DL Radio Resources not Available, UL Radio Resources not Available, Measurement not Supported For The Object, Combining Resources Not Available, Combining not Supported, Reconfiguration not Allowed, Requested Configuration not Supported, Synchronisation Failure, Requested Tx Diversity Mode not Supported, Measurement Temporarily not Available, Unspecified, Invalid CM Settings, Reconfiguration CFN not Elapsed, Number of DL Codes Not Supported, Dedicated Transport Channel Type not Supported, DL Shared Channel Type not Supported, UL Shared Channel Type not Supported, Common Transport Channel Type not Supported, UL Spreading Factor not Supported, DL Spreading Factor not Supported, CM not Supported, Transaction not Supported by Destination Node B, RL Already Activated/Allocated, ..., Gating not Supported)	

Radio Network Layer cause	Meaning
…	
Gating not Supported	The concerning cell(s) do not support gating

8.1.2.3 (9.1.7) RADIO LINK ADDITION RESPONSE (FDD) message

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.40		YES	reject
Transaction ID	M		9.2.1.59		–	
RL Information Response		1..<maxnoof RLs-1>			EACH	ignore
>RL ID	M		9.2.1.49		–	
>RL Set ID	M		9.2.2.35		–	
>URA Information	M		9.2.1.70B		–	
>SAI	M		9.2.1.52		–	
>Cell GAI	O		9.2.1.5A		–	
>UTRAN Access Point Position	O		9.2.1.70A		–	
>Received total wide band power	M		9.2.2.35A		–	
>Secondary CCPCH Info	O		9.2.2.37B		–	
>DL Code Information	M		FDD DL Code Information 9.2.2.14A		YES	ignore
>Diversity Indication	M		9.2.2.7		–	
>CHOICE *Diversity Indication*	M				–	
>>*Combining*					–	
>>>RL ID	M		9.2.1.49	Reference RL ID	–	
>>*Non Combining*					–	
>>>DCH Information Response	M		9.2.1.16A		–	
>SSDT Support Indicator	M		9.2.2.43		–	
>Minimum Uplink SIR	M		Uplink SIR 9.2.1.69		–	
>Maximum Uplink SIR	M		Uplink SIR 9.2.1.69		–	
>Closed Loop Timing Adjustment Mode	O		9.2.2.3A		–	
>Maximum Allowed UL Tx Power	M		9.2.1.35		–	
>Maximum DL TX Power	M		DL Power 9.2.2.10		–	
>Minimum DL TX Power	M		DL Power 9.2.2.10		–	
>Neighbouring UMTS Cell Information	O		9.2.1.41A		–	
>Neighbouring GSM Cell Information	O		9.2.1.41C		YES	ignore
>Gating Support Indicator	M		9.2.2.x		YES	ignore
Criticality Diagnostics	O		9.2.1.13		YES	Ignore

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8.1.2.4 (9.1.8) RADIO LINK ADDITION FAILURE (FDD) message

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Type	M		9.2.1.40		YES	Reject
Transaction ID	M		9.2.1.59		–	
CHOICE *Cause Level*	M				YES	Ignore
>*General*					–	
>>Cause	M		9.2.1.5		–	
>*RL Specific*					–	
>>Unsuccessful RL Information Response		1..<*maxnoof RLs-1*>			EACH	Ignore
>>>RL ID	M		9.2.1.49		–	
>>>Cause	M		9.2.1.5		–	
>>Successful RL Information Response		0..<*maxnoof RLs-2*>			EACH	Ignore
>>>RL ID	M		9.2.1.49		–	
>>>RL Set ID	M		9.2.2.35		–	
>>>URA Information	M		9.2.1.70B		–	
>>>SAI	M		9.2.1.52		–	
>>>Cell GAI	O		9.2.1.5A		–	
>>>UTRAN Access Point Position	O		9.2.1.70A		–	
>>>Received total wide band power	M		9.2.2.35A		–	
>>>Secondary CCPCH Info	O		9.2.2.37B		–	
>>>DL Code Information	M		FDD DL Code Information 9.2.2.14A		YES	Ignore
>>>Diversity Indication	M		9.2.2.7		–	
>>>CHOICE *Diversity Indication*	M				–	
>>>>*Combining*					–	
>>>>>RL ID	M		9.2.1.49	Reference RL ID	–	
>>>>*Non Combining*					–	
>>>>>DCH Information Response	M		9.2.1.16A		–	
>>>SSDT Support Indicator	M		9.2.2.43		–	
>>>Minimum Uplink SIR	M		Uplink SIR 9.2.1.69		–	
>>>Maximum Uplink SIR	M		Uplink SIR 9.2.1.69		–	
>>>Closed Loop Timing Adjustment Mode	O		9.2.2.3A		–	
>>>Maximum Allowed UL Tx Power	M		9.2.1.35		–	
>>>Maximum DL TX Power	M		DL Power 9.2.2.10		–	
>>>Minimum DL TX	M		DL Power		–	

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Power			9.2.2.10			
>>>Neighbouring UMTS Cell Information	O		9.2.1.41A		–	
>>>Neighbouring GSM Cell Information	O		9.2.1.41C		YES	Ignore
>>>Gating Support Indicator	M		9.2.2.x		YES	Ignore
Criticality Diagnostics	O		9.2.1.13		YES	Ignore

- If DRNC has any information on the neighbouring cell support for gating, the support indicator shall be indicated.

9.2.1.41B   Neighbouring FDD Cell Information

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Neighbouring FDD Cell Information		1..<max noofFDD neighbours>			–	
>C-Id	M		9.2.1.6		–	
>UL UARFCN	M		UARFCN 9.2.1.66	Corresponds to Nu in ref. [6]	–	
>DL UARFCN	M		UARFCN 9.2.1.66	Corresponds to Nd in ref. [6]	–	
>Frame Offset	O		9.2.1.30		–	
>Primary Scrambling Code	M		9.2.1.45		–	
>Primary CPICH Power	O		9.2.1.44		–	
>Cell Individual Offset	O		9.2.1.7		–	
>Tx Diversity Indicator	M		9.2.2.50			
>STTD Support Indicator	O		9.2.2.45		–	
>Closed Loop Mode1 Support Indicator	O		9.2.2.2		–	
>Closed Loop Mode2 Support Indicator	O		9.2.2.3		–	
>Gating Support Indicator	O		9.2.2.x		YES	ignore

9.2.2.x   Gating Support Indicator
The Gating Support Indicator indicates whether gating operation is supported or not in the cell.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Gating Support Indicator			ENUMERATED (Gating Supported, Gating not Supported).	

8.1.3 Impact on 9.1.11 RADIO LINK RECONFIGURATION PREPARE (FDD) message

- When gating is initiated, SRNC sends RNSAP message RADIO LINK RECONFIGURATION PREPARE message with *Gating Indicator* IE set "ON" and the gating parameters (gating rate and gating direction). When gating is terminated, SRNC sends RNSAP message RADIO LINK RECONFIGURATION PREPARE message with *Gating Indicator* IE set "OFF".

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
Message Type	M		9.2.1.40		YES	reject
Transaction ID	M		9.2.1.59		–	
Allowed Queuing Time	O		9.2.1.2		YES	reject
UL DPCH Information		*0..1*			YES	reject
>UL Scrambling Code	O		9.2..2.53		–	
>UL SIR Target	O		Uplink SIR 9.2.1.69		–	
>Min UL Channelisation Code Length	O		9.2.2.25		–	
>Max Number of UL DPDCHs	C – CodeLen		9.2.2.24		–	
>Puncture Limit	O		9.2.1.46	For the UL.	–	
>TFCS	O		9.2.1.63	TFCS for the UL.	–	
>UL DPCCH Slot Format	O		9.2.2.52		–	
>Diversity mode	O		9.2.2.8		–	
>SSDT Cell Identity Length	O		9.2.2.41		–	
>S-Field Length	O		9.2.2.36		–	
DL DPCH Information		*0..1*			YES	reject
>TFCS	O		9.2.1.63	TFCS for the DL.	–	
>DL DPCH Slot Format	O		9.2.2.9		–	
>Number of DL Channelisation Codes	O		9.2.2.26A		–	
>TFCI Signalling Mode	O		9.2.2.46		–	
>TFCI Presence	C-SlotFormat		9.2.1.55		–	
>Multiplexing Position	O		9.2.2.26		–	
>Limited Power Increase	O		9.2.1.33		–	
DCHs to Modify	O		FDD DCHs to Modify 9.2.2.14C		YES	reject
DCHs to Add	O		DCH FDD Information 9.2.2.4A		YES	reject
DCHs to Delete		*0..<maxnoof DCHs>*			GLOBAL	reject
>DCH ID	M		9.2.1.16		–	
DSCHs to Modify		0..1			YES	reject
>DSCH Info		0..<maxnoof DSCHs>			–	
>>DSCH ID	M		9.2.1.26A		–	
>>TrCh Source Statistics Descriptor	O		9.2.1.65		–	
>>Transport Format Set	O		9.2.1.64	For DSCH	–	

IE/Group Name	Presence	Range	IE Type and Reference	Semantics Description	Criticality	Assigned Criticality
>>Allocation/ Retention Priority	O		9.2.1.1		–	
>>Scheduling Priority Indicator	O		9.2.1.51A		–	
>>BLER	O		9.2.1.4		–	
>>Transport Bearer Request Indicator	M		9.2.1.61		–	
>PDSCH RL ID	O		RL ID 9.2.1.49		–	
>TFCS	O		9.2.1.63	For DSCH	–	
DSCHs to Add	O		DSCH FDD Information 9.2.2.13A		YES	reject
DSCHs to Delete		0..1			YES	reject
>DSCH Info		1..<maxnoof DSCHs>			–	
>>DSCH ID	M		9.2.1.26A		–	
RL Information		*0..<maxnoof RLs>*			EACH	reject
>RL ID	M		9.2.1.49		–	
>SSDT Indication	O		9.2.2.41		–	
>SSDT Cell Identity	C - SSDTIndON		9.2.2.40		–	
>Transmit Diversity Indicator	C – Diversity mode		9.2.2.50		–	
Transmission Gap Pattern Sequence Information	O		9.2.2.47A		YES	reject
Gating Indicator	O		9.2.2.x		YES	reject
Gating Parameter	C-GatingON		9.2.2.x		YES	reject

Condition	Explanation
SSDTIndON	The IE may be present if the *SSDT Indication* IE is set to 'SSDT Active in the UE'.
CodeLen	This IE is present only if the *Min UL Channelisation Code length* IE equals to 4.
SlotFormat	This IE is only present if the *DL DPCH Slot Format* IE is equal to any of the values 12 to 16.
Diversity mode	This IE is present if *Diversity Mode* IE is present in the *UL DPCH Information* IE and is not equal to "none".
GatingON	The IE is present only if the *Gating Indicator* IE is set to "ON".

9.2.2.x   Gating Indicator

The Gating Indicator indicates whether gating operation is active or not:

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Gating Indicator			ENUMERAT ED (ON, OFF).	

8.2. Specification impact on 25.433

8.2.1   Impact on (9.1.36) RADIO LINK SETUP REQUEST (FDD) message

- When one or more than one Radio Links in the Node B are setup during gating operation, NBAP messge RADIO LINK SETUP REQUEST message will be sent with the parameter, Gating Rate, Gating Direction
- If CRNC request Node B to operate gated DPCCH scheme with a new RL in a cell which does not support gating, Node B shall reject the request and send RADIO LINK SETUP FAILURE message with a new cause value (e.g gating not supported).

IE/Group Name	Presence	Range	IE type and reference	Semantics description	Criticality	Assigned Criticality
Message Discriminator	M		9.2.1.45		–	
Message Type	M		9.2.1.46		YES	reject
CRNC Communication Context ID	M		9.2.1.18	The reserved value "All CRNCC C" shall not be used.	YES	reject
Transaction ID	M		9.2.1.62		–	
UL DPCH Information		1			YES	reject
>UL Scrambling Code	M		9.2.2.59		–	
>Min UL Channelisation Code length	M		9.2.2.22		–	
>Max Number of UL DPDCHs	C – CodeLen		9.2.2.21		–	
>puncture Limit	M		9.2.1.50	For UL	–	
>TFCS	M		9.2.1.58	for UL	–	
>UL DPCCH Slot Format	M		9.2.2.57		–	
> UL SIR Target	M		UL SIR 9.2.2.58		–	
>Diversity mode	M		9.2.2.9		–	
>SSDT cell ID Length	O		9.2.2.45		–	
>S Field Length	C-FBI		9.2.2.40		–	
DL DPCH Information		1			YES	reject
>TFCS	M		9.2.1.58	For DL	–	
>DL DPCH Slot Format	M		9.2.2.10		–	
>TFCI signalling mode	M		9.2.2.50		–	
>TFCI presence	C-SlotFormat		9.2.1.57		–	
>Multiplexing Position	M		9.2.2.23		–	
>PDSCH RL ID	C-DSCH		RL ID 9.2.1.53		–	
>PDSCH code mapping	C-DSCH		9.2.2.25		–	
>Power Offset Information		1			–	
>>PO1	M		Power Offset 9.2.2.29	Power offset for the TFCI bits	–	
>>PO2	M		Power Offset 9.2.2.29	Power offset for the TPC bits	–	
>>PO3	M		Power Offset 9.2.2.29	Power offset for the pilot bits	–	
>FDD TPC DL Step Size	M		9.2.2.16		–	
>Limited Power Increase	M		9.2.2.18A		–	
>Inner Loop DL PC Status	M		9.2.2.18B		–	
DCH Information	M		DCH FDD Information 9.2.2.4D		YES	reject
DSCH Information	O		DSCH FDD Information 9.2.2.13B		YES	reject

TFCI2 bearer information		0..1			-	
>ToAWS	M		9.2.1.61		-	
>ToAWE	M		9.2.1.60		-	
RL Information		1 to \<maxnoof RLs\>			EACH	notify
>RL ID	M		9.2.1.53		–	
>C-ID	M		9.2.1.9		–	
>First RLS Indicator	M		9.2.2.16A		–	
>Frame Offset	M		9.2.1.31		–	
>Chip Offset	M		9.2.2.2		–	
>Propagation Delay	O		9.2.2.35		–	
>Diversity Control Field	C – NotFirstRL		9.2.1.25		–	
>DL Code Information	M		FDD DL Code Information 9.2.2.14A		–	
>Initial DL transmission Power	M		DL Power 9.2.1.21		–	
>Maximum DL power	M		DL Power 9.2.1.21		–	
>Minimum DL power	M		DL Power 9.2.1.21		–	
>SSDT Cell Identity	O		9.2.2.44		–	
>Transmit Diversity Indicator	C – Diversity mode		9.2.2.53		–	
Transmission Gap Pattern Sequence Information	O		9.2.2.53A		YES	reject
Active Pattern Sequence Information	O		9.2.2.A		YES	reject
Gating Parameter	O		9.2.2.x		YES	reject

9.2.2.x   Gating Parameter

The Gating Parameter defines the parameters for the gating operation.

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Gating Parameter				
>Gating rate	M		ENUMERATED (1/3, 1/5).	
>Gating direction	M		ENUMERATED(Uplink and Downlink, Downlink only)	

8.2.2   Impact on 9.1.42 RADIO LINK RECONFIGURATION PREPARE (FDD) message

-    When gating is initiated, NBAP message RADIO LINK RECONFIGURATION PREPARE message will be sent with *Gating Indicator* IE set "ON" and the gating parameters (gating rate and gating direction). When gating is terminated, NBAP message RADIO LINK RECONFIGURATION PREPARE message will be sent with *Gating Indicator* IE set "OFF".

IE/Group Name	Presence	Range	IE Type and Reference	Semantic Description	Criticality	Assigned Criticality
Message Discriminator	M		9.2.1.45		–	
Message Type	M		9.2.1.46		YES	reject
Node B Communication Context ID	M		9.2.1.48	The reserved value "All NBCC" shall not be used.	YES	reject
Transaction ID	M		9.2.1.62		–	
UL DPCH Information		*0..1*			YES	reject
>UL Scrambling code	O		9.2.2.59		–	
>UL SIR Target	O		UL SIR 9.2.2.58		–	
>Min UL Channelistion Code Length	O		9.2.2.22		–	
>Max Number of UL DPDCHs	C – CodeLen		9.2.2.20		–	
>Puncture Limit	O		9.2.1.50	For UL	–	
>TFCS	O		9.2.1.58		–	
>UL DPCCH Slot Format	O		9.2.2.57		–	
>Diversity mode	O		9.2.2.9		–	
>SSDT Cell Identity Length	O		9.2.2.45		–	
>S-Field Length	O		9.2.2.40		–	
DL DPCH Information		*0..1*			YES	reject
>TFCS	O		9.2.1.58		–	
>DL DPCH Slot Format	O		9.2.2.10		–	
>TFCI Signalling Mode	O		9.2.2.50		–	
>TFCI presence	C-Slot Format		9.2.1.57		–	
>Multiplexing Position	O		9.2.2.23		–	
>PDSCH code mapping	O		9.2.2.25		–	
>PDSCH RL ID	O		RL ID 9.2.1.53		–	
>Limited Power Increase	O		9.2.2.18A		–	
DCHs to Modify	O		DCHs FDD to Modify 9.2.2.4E		YES	reject
DCHs to Add	O		DCH FDD Information 9.2.2.4D		YES	reject
DCHs to Delete		*0..<max noofDCHs>*			GLOBAL	reject
>DCH ID	M		9.2.1.20		–	
DSCH to modify		*0..<max noofDSCHs>*			YES	reject
>DSCH ID	M		9.2.1.27		–	
>Transport Format Set	O		9.2.1.59	For the DL.	–	
>Allocation/Retention Priority	O		9.2.1.1A		–	
>Frame Handling Priority	O		9.2.1.30		–	
>ToAWS	O		9.2.1.61		–	
>ToAWE	O		9.2.1.60		–	

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>Transport Bearer Request Indicator	M		9.2.1.62A		–	
DSCH to add	O		DSCH FDD Information 9.2.2.13B		YES	reject
DSCH to Delete		0..<max noofDSCHs>			YES	reject
>DSCH ID	M		9.2.1.27		–	
TFCI2 bearer specific information		0..1			YES	reject
>CHOICE *TFCI2 bearer action*	M				–	
>>*Add or modify*					–	
>>>ToAWS	M		9.2.1.61		–	
>>>ToAWE	M		9.2.1.60		–	
>>*Delete*			NULL		–	
RL Information		0..<max noofRLs>			EACH	reject
>RL ID	M		9.2.1.53		–	
>DL Code Information	O		FDD DL Code Information 9.2.2.14A		–	
>Maximum DL Power	O		DL Power 9.2.1.21		–	
>Minimum DL Power	O		DL Power 9.2.1.21		–	
>SSDT Indication	O		9.2.2.47		–	
>SSDT Cell Identity	C–SSDTIndON		9.2.2.44		–	
>Transmit Diversity Indicator	C – Diversity mode		9.2.2.53		–	
Transmission Gap Pattern Sequence Information	O		9.2.2.53A		YES	reject
Gating Indicator	O		9.2.2.x		YES	reject
Gating Parameter	C-GatingON		9.2.2.x		YES	reject

Condition	Explanation
SSDTIndON	The IE may be present if the SSDT Indication is set to 'SSDT Active in the UE'.
CodeLen	This IE is present only if "Min UL Channelisation Code length" equals to 4.
SlotFormat	This IE is only present if the DL DPCH slot format is equal to any of the value 12 to 16.
SF/2	This IE is present only if the *Transmission Gap Pattern Sequence Information* IE is included and the indicated Downlink Compressed Mode method for at least one of the included Transmission Gap Pattern Sequence is set to "SF/2'".
Diversity mode	This IE is present unless *Diversity Mode* IE in *UL DPCH Information* group, unless it is equal to "none"
GatingON	The IE is present only if *Gating Indicator* IE is equal to "ON"

9.2.2.x   Gating Indicator

The Gating Indicator indicates whether gating operation is active or not:

IE/Group Name	Presence	Range	IE type and reference	Semantics description
Gating Indicator			ENUMERATED (ON, OFF).	

8.3. List of CR's

The CR's related to Terminal Power saving Features are listed in table 1.

Table 1: List of Change request for gating operation.

3G TS/TR	Title	CR number	Clause/Subclause	Remarks
3G TS 25.433	The impacts on TS25.433 for supporting gating operation	375	8.2.17, 8.3.2, 9.1.36, 9.1.42, 9.2.1, 9.2.2, 9.3	
3G TS 25.423	The impacts on TS25.423 for supporting gating operation	324	8.3.1, 8.3.2, 8.3.4, 9.1.3, 9.1.11, 9.2.1, 9.2.2	

9   Backward Compatibility

A UE based on Release 99 can be used in Release 4 UTRAN with gated DPCCH transmission capability without any impact because the gating capability is negotiated during call-setup. Similarly,

a UE based on Release 4 with gated DPCCH transmission capability can be used in Release 99 UTRAN without any impact by the same reason. Consequently, the backward compatibility is guaranteed with gated DPCCH transmission in Release 4.

10 Project Plan

10.1 Schedule

Date	Meeting	Scope	[expected] Input	[expected]Output

10.2 Work Task Status

	Planned Date	Milestone	Status

11 History

Document history		
V0.0.1	2000-08	First proposal
V0.1.0	2000-08	Version agreed at RAN3#15
V0.1.1	2000-11	Rapporteurs proposal for inclusion of contributions/comments received during RAN3#17
V0.1.2	2001-01	Editorial changes added
V0.2.0	2001-01	Version agreed at RAN3#18
V0.2.1	2001-02	Text proposal in chap 6 is added. Text proposal in chap 8 is added.
V0.3.0	2001-02	Version agreed at RAN3#19
V0.3.1	2001-02	Sections 6.1.3.1 and 6.1.4 are removed. Text is added in chap 7, section 8.3 and chap 9.
Rapporteur for 3GPP RAN TR 25.938 is:		
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