Agenda Item: 14.4

Source: Ericsson

Title: **Inclusion of message parameters for DRX**

Document for: Discussion and decision

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1 Introduction

This contribution proposes the message parameters needed for DRX support, to be included in TS 25.331 "RRC Protocol Specification" [1]. The proposed text uses the new enhanced RRC message and IE tabular description format.

2 DRX usage and options in UTRAN

The basic difference between DRX in Idle mode and UTRAN Connected mode is that in UTRAN Connected mode it is UTRAN instead of the CN that controls the DRX. In UTRAN connected mode DRX is typically dependent of the UE substate and the QoS for the RAB assigned. It is also assumed to be difficult to find the optimal DRX cycle length for each UE based only on the QoS of the RABs and the amount of buffering capability in UTRAN. Therefore it is assumed to be beneficial to let the UTRAN have the option to adapt and change the DRX cycle length used by a specific UE.

The transfer of DRX parameters from the different Core Networks to the UE in Idle mode is assumed to be done in the system information message.

The transfer of DRX parameters from UTRAN to the UE in UTRAN connected mode is assumed to be done in the following procedures. This will allow UTRAN to define the DRX cycle to use even if the UE is not in PCH substate at the moment. Broadcasting on BCCH of DRX parameters for UTRAN Connected mode is FFS.

Cell update

URA update

Physical Channel reconfiguration

Transport Channel Reconfiguration

RRC connection establishment

RAB establishment

RAB release

RAB and signalling link reconfiguration

3 Proposal

Update TS 25.331 [1] as follows.

10.1.1.4 CELL UPDATE CONFIRM

This message confirms the cell update procedure and can be used to reallocate new RNTI information for the UE valid in the new cell.

RLC-SAP: t.b.d.

Logical channel: t.b.d.

Direction: UTRAN→UE

Information Element	Presence	Range	IE type and reference	Semantics description
Message Type	M			
UE information elements				
S-RNTI	M			FFS whether in RRC or MAC
SRNC identity	M			PDU
S-RNTI	O			New S-RNTI
SRNC identity	O			New SRNC identity
C-RNTI	O			New C-RNTI
UTRAN DRX cycle length	O			
UTRAN mobility information elements				
URA update indicator	O			
URA identifier	O			
CN information elements				
PLMN identity	O			(Note1,2)
CN related information		0 to <MaxNoCNdomains>		CN related information to be provided for each CN domain
CN domain identity	O			(Note1,2)
NAS system info	O			(Note1,2)
Physical CH information elements				
Default DPCH Offset Value	O			FFS

10.1.1.10 URA UPDATE CONFIRM

*<Functional description of this message to be included here>*This message confirms the URA update procedure and can be used to reallocate new RNTI information for the UE valid after the URA update.

RLC-SAP: t.b.d.

Logical channel: t.b.d.

Direction: UTRAN→UE

Information Element	Presence	Range	IE type and reference	Semantics description
Message Type	M			
UE information elements				
S-RNTI	M			FFS whether in RRC or MAC PDU.
SRNC identity	M			
S-RNTI	O			New S-RNTI
SRNC identity	O			New SRNC identity
C-RNTI	O			New C-RNTI
UTRAN DRX cycle length	O			
UTRAN mobility information elements				
URA identifier	O			
CN information elements				
PLMN identity	O			(Note1,2)
CN related information		0 to <MaxNoCNdomains>		CN related information to be provided for each CN domain
CN domain identity	O			(Note1,2)
NAS system info	O			(Note1,2)

10.1.4.7 RRC CONNECTION SETUP

This message is used by the network to accept the establishment of an RRC connection for an UE, including assignment of signalling link information, transport channel information and optionally physical channel information.

RLC-SAP: t.b.d.

Logical channel: CCCH

Direction: UTRAN → UE

Information Element	Presence	Range	IE type and reference	Semantics description
Message Type	M			
UE information elements				
Initial UE identity	M			FFS whether conveyed on RRC or MAC.
S-RNTI	M			
SRNC identity	M			
C-RNTI	O			Only if assigned to a common transport channel
Activation time	O			
UTRAN DRX cycle length	O			
RAB information elements				
RAB identity	M			Indicates the signalling link
Signalling link type	M			
RAB multiplexing info	M			For the signalling link
TrCH information elements				
TFCS	O			Uplink TFCS
TFCS	O			Downlink TFCS
TFC subset	O			
Uplink transport channel information		0 to \<MaxULTrCHCount\>		Send transport channel information for each new Uplink transport channel
Transport channel identity	M			
TFS	M			
Downlink transport channel information		0 to \<MaxDLTrCHCount\>		Send transport channel information for each new downlink transport channel
Transport channel identity	M			
TFS	M			
PhyCH information elements				
Frequency info	O			
Uplink DPCH power control info	O			
Uplink radio resource information				
Uplink timeslot info	O			
CHOICE channel requirement	O			
Uplink DPCH info				
PRACH info				
Downlink radio resource information				
Downlink information		0 to \<Max RLcount\>		Send downlink information for each radio link to be set-up
Primary CCPCH info				
Downlink DPCH info				
Secondary CCPCH info				
Downlink timeslot info	O			Note 1
SSDT indicator	O			FFS
SSDT Cell ID	C ifSSDT			FFS
Gated Transmission Control info	O			FFS
Default DPCH Offset Value	O			

10.1.5.1 PHYSICAL CHANNEL RECONFIGURATION

This message is used by UTRAN to assign, replace or release a set of physical channels used by a UE.

RLC-SAP: t.b.d.

Logical channel: DCCH

Direction: UTRAN → UE

Information Element	Presence	Range	IE type and reference	Semantics description
Message Type	M			
UE Information elements				
Activation time	O			
C-RNTI	C - RACH/FACH			
UTRAN DRX cycle length	O			
UTRAN mobility Information elements				
URA update indicator	C - PCH and optional			
Physical Channel information elements				
Frequency info	O			
Uplink DPCH power control info	O			
Uplink radio resource information				
CHOICE channel requirement	O			
Uplink DPCH info				
PRACH info				
Uplink timeslot info	O			
Downlink radio resource information				
Downlink information		0 to <Max RLcount>		Send downlink information for each radio link
Primary CCPCH info				
Downlink DPCH info				
Secondary CCPCH info				For FACH
Secondary CCPCH info				For PCH
Downlink timeslot info	O			Note 1
SSDT indicator	O			FFS
SSDT Cell ID	C ifSSDT			FFS
Gated Transmission Control info	O			FFS
Default DPCH Offset Value	O			

10.1.5.3 RADIO ACCESS BEARER RECONFIGURATION

This message is sent from UTRAN to reconfigure parameters related to a change of QoS. This procedure can also change the multiplexing of MAC, reconfigure transport channels and physical channels.
RLC-SAP: t.b.d.
Logical channel: DCCH
Direction: UTRAN → UE

Information Element	Presence	Range	IE type and reference	Semantics description
Message Type	M			
UE Information elements				
Activation time	O			
C-RNTI	C - RACH/FACH			
UTRAN DRX cycle length	O			
RAB information elements				
RAB information		0 to <MaxRABcount>		RAB information is sent for each RAB affected by this message
RAB identity	M			
RLC info	O			FFS
RAB multiplexing info	M			
Transport Channel Information Elements				
TFCS	O			for uplink DCHs
TFCS	O			for downlink DCHs
TFC subset	O			for DCHs in uplink
Uplink transport channels				
Transport channel identity		0 to <MaxDelTrCH>		
Reconfigured TrCH information		0 to <MaxReconAddTrCH>		
Transport channel identity	M			
TFS	M			
DRAC information	C DRAC	1 to <MaxReconAddTrCH>		
Dynamic Control				
Transmission time validity				
Time duration before retry				
Silent period duration before release				
Downlink transport channels				
Transport channel identity		0 to <MaxDelTrCH>		
Reconfigured TrCH information		0 to <MaxReconAddTrCH>		
Transport channel identity	M			
TFS	M			
Physical Channel information elements				
Frequency info	O			
Uplink DPCH power control info	O			
Uplink radio resource information	O			
CHOICE channel requirement	O			
Uplink DPCH info				
PRACH info				
Uplink timeslot info	O			
Downlink radio resource information				
Downlink information		0 to <Max RLcount>		Send downlink information for each radio link

Primary CCPCH info				
Downlink DPCH info				
Secondary CCPCH info				
Downlink timeslot info	O			Note 1
SSDT indicator	O			FFS
Gated Transmission Control info	O			FFS
Default DPCH Offset Value	O			

10.1.5.5 RADIO ACCESS BEARER RELEASE

<Functional description of this message to be included here>
RLC-SAP: t.b.d.
Logical channel: DCCH
Direction: UTRAN → UE

Information Element	Presence	Range	IE type and reference	Semantics description
Message Type	M			
UE Information elements				
Activation time	O			
C-RNTI	C - RACH/FACH			
UTRAN DRX cycle length	O			
RAB information elements				
RAB identity		1 to <MaxRelRABcount>		
RAB identity		0 to <MaxOtherRABcount>		
RAB multiplexing info	O			
Transport Channel Information Elements				
TFCS	O			for uplink DCHs
TFCS	O			for downlink DCHs
TFC subset	O			for DCHs in uplink
Uplink transport channels				
Transport channel identity		0 to <MaxDelTrCH>		
Reconfigured TrCH information		0 to <MaxReconAddFFSTrCH>		
Transport channel identity	M			
TFS	M			
DRAC information	C DRAC	1 to <MaxReconAddFFSTrCH>		
Dynamic Control				
Transmission time validity				
Time duration before retry				
Silent period duration before release				
Downlink transport channels				
Transport channel identity		0 to <MaxDelTrCH>		
Reconfigured TrCH information		0 to <MaxReconAddTrCH>		Editor : this limit should probably also be MaxReconAddFFSTrCH
Transport channel identity	M			
TFS	M			
Physical Channel information elements				
Frequency info	O			
Uplink DPCH power control info	O			
Uplink radio resource information	O			
CHOICE channel requirement	O			
Uplink DPCH info				
PRACH info				
Uplink timeslot info	O			
Downlink radio resource information				
Downlink information		0 to <Max		Send downlink information for

		RLcount>		each radio link to be set-up
Primary CCPCH info				
Downlink DPCH info				
Secondary CCPCH info				
Downlink timeslot info	O			Note 1

10.1.5.7 RADIO ACCESS BEARER SETUP

<Functional description of this message to be included here>
RLC-SAP: t.b.d.
Logical channel: DCCH
Direction: UTRAN → UE

Information Element	Presence	Range	IE type and reference	Semantics description
Message Type	M			
CN information elements				
NAS binding info	M			
CN domain identity				
UE Information elements				
Activation time	O			
C-RNTI	C - RACH/FACH			
UTRAN DRX cycle length	O			
RAB information elements				
RAB identity	M			For the new RAB
RLC info	M			
RAB multiplexing info	M			
Information for other RAB's affected by this message		0 to <MaxOtherRABcount>		
RAB identity	M			
RAB multiplexing info	M			
Transport Channel Information Elements				
TFCS	O			for uplink DCHs
TFCS	O			for downlink DCHs
TFC subset	O			for DCHs in uplink
Uplink transport channels				
Transport channel identity		0 to <MaxDelTrCH>		editor should this be FFS also?
Reconfigured TrCH information		0 to <MaxReconAddTrCH>		
Transport channel identity	M			
TFS	M			
DRAC information	C DRAC	1 to <MaxReconAddTrCH>		
Dynamic Control				
Transmission time validity				
Time duration before retry				
Silent period duration before release				
Downlink transport channels				
Transport channel identity		0 to <MaxDelTrCH>		FFS
Reconfigured TrCH information		0 to <MaxReconAddTrCH>		
Transport channel identity	M			
TFS	M			
Physical Channel information elements				
Frequency info	O			
Uplink DPCH power control info	O			
Uplink radio resource information	O			
CHOICE channel requirement	O			
Uplink DPCH info				
PRACH info				

Uplink timeslot info	O			
Downlink radio resource information				
Downlink information		0 to <Max RLcount>		Send downlink information for each radio link
Primary CCPCH info				
Downlink DPCH info				
Secondary CCPCH info				
Downlink timeslot info	O			Note 1
SSDT indicator	O			FFS
SSDT Cell ID	C ifSSDT			FFS
Gated Transmission Control info	O			FFS
Default DPCH Offset Value	O			

10.1.5.9 TRANSPORT CHANNEL RECONFIGURATION

This message is used by UTRAN to configure the transport channel of a UE. This also includes a possible reconfiguration of physical channels. The message can also be used to assign a TFC subset and reconfigure physical channel.
RLC-SAP: t.b.d.
Logical channel: DCCH
Direction: UTRAN → UE

Information Element	Presence	Range	IE type and reference	Semantics description
Message Type	M			
UE Information elements				
Activation time	O			
C-RNTI	C - RACH/FACH			
Control only state timer	O			FFS
UTRAN DRX cycle length	O			
Transport Channel Information Elements				
TFCS	O			for uplink DCHs
TFCS	O			for downlink DCHs
TFC subset	O			for DCHs in uplink
Uplink transport channels				
Reconfigured TrCH information		0 to <MaxReconTrCH>		
Transport channel identity				
TFS				
DRAC information	C DRAC	1 to <MaxReconTrCHDRAC>		
Dynamic Control				
Transmission time validity				
Time duration before retry				
Silent period duration before release				
Downlink transport channels				
Reconfigured TrCH information		0 to <MaxReconTrCH>		
Transport channel identity				
TFS				
Physical Channel information elements				
Frequency info	O			
Uplink DPCH power control info	O			
Uplink radio resource information				
CHOICE channel requirement	O			
Uplink DPCH info				
PRACH info				
Uplink timeslot info	O			
Downlink radio resource information				
Downlink information		0 to <Max RLcount>		Send downlink information for each radio link
Primary CCPCH info				
Downlink DPCH info				
Secondary CCPCH info				
Downlink timeslot info	O			Note 1
SSDT indicator	O			FFS
SSDT Cell ID	C ifSSDT			FFS
Gated Transmission Control info	O			FFS
Default DPCH Offset Value	O			

10.1.6.1 SYSTEM INFORMATION

<Functional description of this message to be included here>
RLC-SAP: t.b.d.
Logical channel: BCCH or DCCH or CCCH
Direction: UTRAN → UE

NOTE: The division of the system information into messages is FFS.

Information Element	Presence	Range	IE type and reference	Semantics description
Message Type	M			
CN information elements				
PLMN Identity	M			
CN information		1 to <maxCNdomains>		Send CN information for each CN domain. Information must be included for at least one core network domain type.
CN domain identity	M			
NAS system information	M			
CN DRX cycle length	M			
UTRAN mobility information elements				
URA identity		1 to <maxURAcount>		
Information for periodic cell and URA update	M			
Cell identity	M			The necessity and usage of cell identity is FFS.
Cell selection and re-selection info	M			
UE information				
Uplink access control info	M			
DRAC information		0 to <maxDRACclasses>		DRAC information is sent for each class of terminal
Transmission probability				
Maximum bit rate				
PhyCH information elements				
PRACH power control info	M			
RACH information		1 to <maxRACHcount>		
Frequency info	O			
PRACH info	M			
FACH information		1 to <maxFACHcount>		
Frequency info	O			
Secondary CCPCH info	M			
PCH information		1 to <maxPCHcount>		
Frequency info	O			
Secondary CCPCH info	M			
Measurement information elements				
Intra-frequency measurement information		0 to <maxIntrafreqcount>		
Measurement Identity Number	M			Note 1
Intra-frequency cell info		1 to <maxMeasObjCount>		
Intra-frequency measurement quantity	M			
Intra-frequency measurement reporting criteria	M			
Intra-frequency reporting quantity for RACH reporting	C - RACHrep			
Inter-frequency measurement information		0 to <maxInterfr		

				eqcount>
Measurement Identity Number	M			Note 1
Inter-frequency cell info		1 to <max MeasObjC ount>		
Inter-frequency measurement quantity	M			
Inter-frequency measurement reporting criteria	M			
Inter-system measurement information		0 to <maxInter Syscount>		
Measurement Identity Number	M			Note 1
Inter-system cell info		1 to <max MeasObjC ount>		
Inter-system measurement quantity	M			
Inter-system measurement reporting criteria	M			

Add the following Information Element functional descriptions.

10.2.3 UE Information elements

10.2.3.28 UTRAN DRX cycle length

Indicates the time interval between paging occasions to be used by the UE in UTRAN Connected mode.

10.2.1 CN Information elements

10.2.1.6 CN DRX cycle length

Indicates the time interval between paging occasions to be used by the UE when attached to a specific Core Network domain.

4 References

[1] TSGR2#6(99)714, TS 25.331 V1.2.0, RRC Protocol Specification, Source: Rapporteur