TSG-RAN Working Group 1 meeting #11

San Diego, USA

February 29 – March 3, 2000

TSGR1#11(00)0242

Agenda item:

Source: Ericsson

Title: CR 25.212-041r2: Correction of UL compressed mode by higher layer scheduling

Document for: Decision

The number of bits in a radio frame in normal mode is denoted by $N_{data,j}$ and the number of bits located in the transmission gap N_{TGL}. In compressed mode by higher layer scheduling, the number of bits in a radio frame is calculated as $N_{data,j}^{cm} = N_{data,j} - N_{TGL}$ (1).

In uplink, the spreading factor (SF) and therefore $N_{data,j}$ is changed on radio frame basis. The idea with compressed mode by higher layer scheduling is that higher layers will only allow TFCs with low bitrate in compressed frames. If all TFCs use the same SF, $N_{data,j}$ is constant and the relation (1) is correct.

If there for example are two TFCs that use different SFs then the lower SF may be needed in compressed mode by higher layer scheduling. That is, only allowing the TFC with lower bitrate but using the SF of the TFC with higher bitrate creates the transmission gap. However, in the relation (1) $N_{data,j}$ denotes the number of bits for current TFC, i.e. in compressed mode this would always correspond to the number of bits for the TFC with lower bitrate. This is of course not what is wanted and it is therefore proposed that 25.212 is changed as shown in the attached CR.

In 25.211, N_{data} is defined as the number of bits in a slot, while N_{data} in section 4.2.7.1.1 means the number of bits in a frame. The attached CR therefore also proposes that the notation in section 4.2.7.1.1 is changed.

Revision history

r1 (TSGR1#10(00)0171): Definition of N_{tr} added.

r2: Old definition of N_{data} kept. There still is an inconsistency between 25.212 and 25.211 in the definition of N_{data}. Considering that there are draft CRs available from other companies that use the old N_{data} notation, it is outside the scope of this CR to remove the inconsistency. Preferable, the inconsistency should be corrected when 25.212 is stable.

3GPP TSG RAN WG1 Meeting #10
Beijing, China, January 18 – 21, 2000

Document ???99???
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

25.212	**CR**	**041r2**	Current Version:	3.1.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑　　*↑ CR number as allocated by MCC support team*

For submission to:	TSG-RAN #7	for approval	X	strategic		*(for SMG use only)*
list expected approval meeting # here ↑		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG　The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

Proposed change affects: *(at least one should be marked with an X)*	(U)SIM		ME	X	UTRAN / Radio	X	Core Network	

Source:	Ericsson	**Date:**	2000-02-29
Subject:	Correction of UL compressed mode by higher layer scheduling		
Work item:			

Category:	F	Correction	X	**Release:**	Phase 2	
	A	Corresponds to a correction in an earlier release			Release 96	
(only one category	B	Addition of feature			Release 97	
shall be marked	C	Functional modification of feature			Release 98	
with an X)	D	Editorial modification			Release 99	X
					Release 00	

Reason for change:	Current expression for the number of bits in a radio frame in compressed mode by higher layer scheduling only holds when all TFCs use the same SF.
Clauses affected:	3.2, 4.2.7.1.1 and 4.2.7.1.2

Other specs affected:	Other 3G core specifications		→ List of CRs:	
	Other GSM core specifications		→ List of CRs:	
	MS test specifications		→ List of CRs:	
	BSS test specifications		→ List of CRs:	
	O&M specifications		→ List of CRs:	

Other comments:	

help.doc

<--------- double-click here for help and instructions on how to create a CR.

3.2 Symbols

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

éxù	round towards ¥, i.e. integer such that *x* £ *éxù* < *x*+1
ëxû	round towards -¥, i.e. integer such that *x*-1 < *ëxû* £ *x*
çxç	absolute value of *x*
N_{first}	The first slot in the *TG*.
N_{last}	The last slot in the *TG*. N_{last} is either a slot in the same radio frame as N_{first} or a slot in the radio frame immediately following the slot that contains N_{first}.
N_{tr}	Number of transmitted slots in a radio frame.

Unless otherwise is explicitly stated when the symbol is used, the meaning of the following symbols is:

i	TrCH number
j	TFC number
k	Bit number
l	TF number
m	Transport block number
n_i	Radio frame number of TrCH *i*.
p	PhCH number
r	Code block number
I	Number of TrCHs in a CCTrCH.
C_i	Number of code blocks in one TTI of TrCH *i*.
F_i	Number of radio frames in one TTI of TrCH *i*.
M_i	Number of transport blocks in one TTI of TrCH *i*.
P	Number of PhCHs used for one CCTrCH.
PL	Puncturing Limit for the uplink. Signalled from higher layers
RM_i	Rate Matching attribute for TrCH *i*. Signalled from higher layers.

Temporary variables, i.e. variables used in several (sub)sections with different meaning.

x, X
y, Y
z, Z

4.2.7.1.1 Determination of SF and number of PhCHs needed

In uplink, puncturing can be applied to match the CCTrCH bit rate to the PhCH bit rate. The bit rate of the PhCH(s) is limited by the UE capability and restrictions imposed by UTRAN, through limitations on the PhCH spreading factor. The maximum amount of puncturing that can be applied is signalled from higher layers and denoted by PL. The number of available bits in the radio frames of one PhCH for all possible spreading factors is given in [2]. Denote these values by N_{256}, N_{128}, N_{64}, N_{32}, N_{16}, N_{8}, and N_{4}, where the index refers to the spreading factor. The possible number of bits available to the CCTrCH on all PhCHs,~~values of~~ N_{data}, then are $\{ N_{256}, N_{128}, N_{64}, N_{32}, N_{16}, N_{8}, N_{4}, 2N_{4}, 3N_{4}, 4N_{4}, 5N_{4}, 6N_{4}\}$. Depending on the UE capability and the restrictions from UTRAN, the allowed set of N_{data} , denoted SET0, can be a subset of $\{ N_{256}, N_{128}, N_{64}, N_{32}, N_{16}, N_{8}, N_{4}, 2N_{4}, 3N_{4}, 4N_{4}, 5N_{4}, 6N_{4}\}$. $N_{data,\,j}$ for the transport format combination j is determined by executing the following algorithm:

SET1 = { N_{data} in SET0 such that is non negative }

If SET1 is not empty and the smallest element of SET1 requires just one PhCH then

$N_{data,j}$ = min SET1

else

SET2 = { N_{data} in SET0 such that $N_{data} - PL \cdot \sum_{x=1}^{I} \frac{RM_x}{\min_{1 \le y \le I}\{RM_y\}} \cdot N_{x,j}$ is non negative }

Sort SET2 in ascending order

N_{data} = min SET2

While N_{data} is not the max of SET2 and the follower of N_{data} requires no additional PhCH do

N_{data} = follower of N_{data} in SET2

End while

$N_{data,j} = N_{data}$

End if

4.2.7.1.2 Determination of parameters needed for calculating the rate matching pattern

The number of bits to be repeated or punctured, DN_{ij}, within one radio frame for each TrCH i is calculated with equation 1 for all possible transport format combinations j and selected every radio frame. $N_{data,j}$ is given from section 4.2.7.1.1. In compressed mode $N_{data,j}$ is replaced by $N^{cm}_{data,j}$ in Equation 1. $N^{cm}_{data,j}$ is given as follows:~~from the following relation:~~

In compressed mode by higher layer scheduling, $N^{cm}_{data,j}$ is obtained by executing the algorithm in section 4.2.7.1.1 but with the number of bits in one radio frame of one PhCH reduced to $\frac{N_{tr}}{15}$ of the value in normal mode.

N_{tr} is the number of transmitted slots in a compressed radio frame and is defined by the following relation:

$$N_{tr} = \begin{cases} 15 - TGL, & \text{if } N_{first} + TGL \le 15 \\ N_{first}, & \text{in first frame if } N_{first} + TGL > 15 \\ 30 - TGL - N_{first}, & \text{in second frame if } N_{first} + TGL > 15 \end{cases}$$

N_{first} and TGL are defined in section 4.4.

In compressed mode by spreading factor reduction, $N_{data,j}^{cm} = 2N_{data,j} - 2N_{TGL}$, where ~~for compressed mode by spreading factor reduction~~ $N_{TGL} = \frac{15 - N_{tr}}{15} N_{data,j}$

~~$N_{data,j}^{cm} = N_{data,j} - N_{TGL}$, for compressed mode by higher layer scheduling~~

$$\cancel{N_{TGL} =} \begin{cases} \frac{TGL}{15} N_{data,j}, \text{ if } N_{first} + TGL \le 15 \\ \frac{15 - N_{first}}{15} N_{data,j}, \text{ in first frame if } N_{first} + TGL > 15 \\ \frac{TGL - (15 - N_{first})}{15} N_{data,j} \text{ in second frame if } N_{first} + TGL > 15 \end{cases}$$

~~N_{first} and TGL are defined in section 4.4.~~

If $DN_{ij} = 0$ then the output data of the rate matching is the same as the input data and the rate matching algorithm of section 4.2.7.5 does not need to be executed.

If $DN_{ij} \neq 0$ the parameters listed in sections 4.2.7.1.2.1 and 4.2.7.1.2.2 shall be used for determining e_{ini}, e_{plus}, and e_{minus} (regardless if the radio frame is compressed or not).