TSG-RAN Working Group 1(Radio) meeting #9 ***TSGR1#9(99) j12***

30 November – 3 December 1999, Dresden, Germany

Source : LGIC

Title : Revised CR to 25.222 for initial offset value change for convolutional code rate matching

Document for : Approval

1 Introduction

In WG1 #8 in New York, the proposal of changing the current initial offset value of rate matching algorithm for convolutional code[Tdoc R1-99g86] was approved in the plenary. But it was pointed out that the format of CR was wrong and was requested to be revised according to the CR rule with CR number.

The purpose of this document is to provide the revised CR of original Tdoc R1-99g86.

2 Text Proposal

3GPP TSG RAN WG1 Meeting #9
Dresden, Germany, Nov 30 – Dec 3, 1999

Document ????9???
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.

25.222	CR	003	Current Version:	

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

For submission to: TSG-RAN #6	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: LGIC **Date:** 1999-11-22

Subject: Changing the initial offset value for convolutional code rate matching

Work item:

Category: *(only one category shall be marked with an X)*

F	Correction	
A	Corresponds to a correction in an earlier release	
B	Addition of feature	
C	Functional modification of feature	X
D	Editorial modification	

Release:

Phase 2	
Release 96	
Release 97	
Release 98	
Release 99	X
Release 00	

Reason for change: Current initial offset value for convolutional code rate matching provides a poor performance.

Clauses affected: 4.2.7.1 Determination of rate matching parameters

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.

4.2.7.1 Determination of rate matching parameters

The following relations are used when calculating the rate matching pattern:

$$Z_{0,j} = 0$$

$$Z_{ij} = \left\lfloor \frac{\sum_{m=1}^{i} RM_m \cdot N_{mj}}{\sum_{m=1}^{I} RM_m \cdot N_{mj}} \cdot N_{data,j} \right\rfloor \quad \text{for all i = 1 .. I}$$

$$\Delta N_{ij} = Z_{ij} - Z_{i-1,j} - N_{ij} \quad \text{for all i = 1 .. I}$$

Puncturing can be used to minimise the required transmission capacity. The maximum amount of puncturing that can be applied is signalled from higher layers and denoted by PL. The possible values for N_{data} in depend on the number of dedicated physical channels and on their characteristics (spreading factor, length of midamble and TFCI, usage of TPC and multiframe structure), respectively. The supported set of N_{data} , denoted SET0, depends on the UE capabilities.

$N_{data,\,j}$ for the transport format combination j is determined by executing the following algorithm:

SET1 = { 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 }

$N_{data,\,j}$ = min SET1

The number of bits to be repeated or punctured, ΔN_{ij}, within one radio frame for each TrCH i is calculated with the relations given at the beginning of this section for all possible transport format combinations j and selected every radio frame.

If $\Delta N_{ij} = 0$ then the output data of the rate matching is the same as the input data and the rate matching algorithm of section 4.2.7.3 does not need to be executed.

Otherwise, the rate matching pattern is calculated with the algorithm described in section 4.2.7.3. For this algorithm the parameters e_{ini}, e_{plus}, e_{minus}, and N are needed, which are calculated according to the following equations:

For convolutional codes,

a = 2

$\Delta N = \Delta N_{i,j}$

$N = N_{i,j}$

$q = \lfloor N / (|\Delta N|) \rfloor$

If q is even

then q' = q – gcd(q, F_i)/F_i -- where gcd (q, F_i) means greatest common divisor of q and F_i

-- note that q' is not an integer, but a multiple of 1/8

else

q' = q

endif

for x = 0 to F_i-1

$S(I_F(\lceil x*q' \rceil \bmod F_i)) = (\lceil x*q' \rceil \operatorname{div} F_i)$–

End for

$e_{ini} = (a \cdot S(n_i) \cdot |\Delta N| + 1) \bmod a \cdot N$.

$e_{plus} = a \cdot N$

$e_{minus} = a^{x}|DN|$

puncturing for $DN<0$, repeating otherwise.

For turbo codes, if repetition is to be performed, such as $DN_{i,j} >0$, parameters for turbo codes are the same as parameter for convolutional codes. If puncturing is to be performed, parameters are as follows.

a = 2 for Y sequence, and

a = 1 for Y' sequence.

$$\Delta N = \begin{cases} \lfloor DN_{i,j} / 2 \rfloor & \text{for Y sequence} \\ \lceil DN_{i,j} / 2 \rceil & \text{for Y' sequence} \end{cases}$$

$N = \lfloor N_{i,j} / 3 \rfloor$,

$q = \lfloor N / |\Delta N| \rfloor$

if($q \leq 2$)

for x=0 to F_i-1

if(Y sequence)

$S[I_F[(3x+1) \bmod F_i]] = x \bmod 2$;

if(Y' sequence)

$S[I_F[(3x+2) \bmod F_i]] = x \bmod 2$;

end for

else

if q is even

then $q' = q - gcd(q, F_i)/ F_i$ -- where $gcd(q, F_i)$ means greatest common divisor of q and F_i

-- note that q' is not an integer, but a multiple of 1/8

else $q' = q$

endif

for x=0 to F_i –1

$r = \lceil x*q' \rceil \bmod F_i$;

if(Y sequence)

$S[I_F[(3r+1) \bmod F_i]] = \lceil x*q' \rceil \operatorname{div} F_i$;

if(Y' sequence)

$S[I_F[(3r+2) \bmod F_i]] = \lceil x*q' \rceil \operatorname{div} F_i$;

endfor

endif

For each radio frame, the rate-matching pattern is calculated with the algorithm in section 4.2.7.3, where:

N is as above,

$e_{ini} = (a \cdot S(n_i) \cdot |\Delta N| + N) \bmod a \cdot N$, if $e_{ini} = 0$ then $e_{ini} = a \cdot N$.

$e_{plus} = a \cdot N$

$e_{minus} = a \cdot |\Delta N|$

puncturing for $DN<0$, repeating otherwise.