3GPP TSG RAN Meeting #19 **RP-030134**
Birmingham, United Kingdom, 11 - 14 March 2003

Title: **CRs (Rel-5) to TS 25.212**

Source: **TSG-RAN WG1**

Agenda item: **8.1.5**

TS 25.212 **(RP-030134)**

Doc-1st-	Doc-2nd-	Spec	CR	Rev	Subject	Phase	Ca	Versio	Versio	Workitem
RP-030134	R1-030294	25.212	165	1	Correction of CQI index to bit mapping	Rel-5	F	5.3.0	5.4.0	HSDPA-Phys
RP-030134	R1-030340	25.212	166	3	Correction of bit scrambling of HS-DSCH	Rel-5	F	5.3.0	5.4.0	HSDPA-Phys
RP-030134	R1-030240	25.212	168	-	Correction of subscript for modulation scheme	Rel-5	F	5.3.0	5.4.0	HSDPA-Phys

3GPP TSG-RAN-1 Meeting #31
Tokyo, Japan, February 18-21, 2003

R1-030294

CR-Form-v7

CHANGE REQUEST

⌘ **25.212** **CR** **165** ⌘ **rev** **1** ⌘ Current version: **5.3.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ [ ] ME [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	Correction of CQI index to bit mapping
Source:	⌘	TSG RAN WG1
Work item code:	⌘	HSDPA-Phys
Date:	⌘	18 Feb, 2003
Category:	⌘	**F**
Release:	⌘	Rel-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
Rel-4 *(Release 4)*
Rel-5 *(Release 5)*
Rel-6 *(Release 6)*

Reason for change: ⌘ The mapping between the 31 decimal CQI values and the 32 binary CQI codewords is modified according to RAN2 LS to enable flow control efficiently in future release(R1-030029).

Summary of change: ⌘

Previous version of the spec is following

Binary CQI code word (a_0 , a_1 , a_2 , a_3 , a_4)	CQI value	Explanation
(0 0 0 0 0)	0	Out of range
(1 0 0 0 0)	1	Transport Block Size=137
~	~	~
(0 1 1 1 1)	30	Transport Block Size=25558 in category10
(1 1 1 1 1)	Undefined	Not used

This CR proposes following modification

Binary CQI code word (a_0 , a_1 , a_2 , a_3 , a_4)	CQI value	Explanation
(0 0 0 0 0)	Undefined	Not used in release 5. This patten is used for flow control in future release.
(1 0 0 0 0)	0	Out of range
(0 1 0 0 0)	1	Transport Block Size=137
~	~	~
(1 1 1 1 1)	30	Transport Block Size=25558 in category10

		The difference from Rev 0 is "Information bits pattern" is updated to "information bit pattern".
Consequences if not approved:	⌘	The error behaviour when flow control is introduced in future release is not so good if CQI bit mapping is common between release 5 and release 6.

Clauses affected:	⌘	4.7.1.2			
Other specs affected:	⌘	**Y** / **N**			
			X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

4.7.1.2 Channel coding for HS-DPCCH channel quality information

The channel quality information is coded using a (20,5) code. The code words of the (20,5) code are a linear combination of the 5 basis sequences denoted $M_{i,n}$ defined in the table below.

Table 14: Basis sequences for (20,5) code

i	$M_{i,0}$	$M_{i,1}$	$M_{i,2}$	$M_{i,3}$	$M_{i,4}$
0	1	0	0	0	1
1	0	1	0	0	1
2	1	1	0	0	1
3	0	0	1	0	1
4	1	0	1	0	1
5	0	1	1	0	1
6	1	1	1	0	1
7	0	0	0	1	1
8	1	0	0	1	1
9	0	1	0	1	1
10	1	1	0	1	1
11	0	0	1	1	1
12	1	0	1	1	1
13	0	1	1	1	1
14	1	1	1	1	1
15	0	0	0	0	1
16	0	0	0	0	1
17	0	0	0	0	1
18	0	0	0	0	1
19	0	0	0	0	1

The CQI values 0 .. 30 as defined in [4] are converted from decimal to binary to map them to the channel quality information bits (1~~0~~ 0 0 0 0) to (1~~0~~ 1 1 1 1) respectively. The information bit pattern (0 0 0 0 0) shall not be used in this release. The channel quality information bits are a_0, a_1, a_2, a_3, a_4 (where a_0 is LSB and a_4 is MSB). The output code word bits b_i are given by:

$$b_i = \sum_{n=0}^{4} (a_n \times M_{i,n}) \bmod 2$$

where i = 0, …, 19.

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CHANGE REQUEST

⌘ **25.212** **CR** **166** ⌘ **rev** **3** ⌘ Current version: **5.3.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐ ME ☒ Radio Access Network ☒ Core Network ☐

Title:	⌘	Correction of bit scrambling of HS-DSCH
Source:	⌘	TSG RAN WG1
Work item code:	⌘	HSDPA-Phys
Date:	⌘	20 Jan, 2003
Category:	⌘	**F**
Release:	⌘	Rel-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change:	⌘	- The variable y'_m of bit scrambling for HS-DSCH is not defined at $m = B$ although m takes value B. <Addition at Rev 1> - The subindex 'm' for variable in section 4.5.1a should be avoided because of subindex 'm' is used for transport block number in whole TS25.212. - In section 4.5.1, although transport block subindex is shown as 'm' in TS25.212, there is misleading description that 'i' looks transport block subindex. - It was clarified that i=1 and m=1 in HS-DSCH section. <Addition at Rev 2> - Bit order of vector g was clarified. <Addition at Rev 3> - Temporal variable 'i' was substituated to 'x' because 'i' isused for TrCH number. 'x' is temporary variable in TS25.212.
Summary of change:	⌘	The range of the difinition of y'_m is extended from $m < B$ to $m \leq B$. - The subindex 'm' for variable is substituted to ' γ '. ' γ ' was chosen as the character which is not yet used in TS25.212. - Misleading description is removed in section 4.5.1 - It was clarified that i=1 and m=1 in HS-DSCH section.
Consequences if not approved:	⌘	The variable y'_m of bit scrambling for HS-DSCH remains undefined at $m = B$. Some index related text may bring confusion.

Clauses affected:	⌘	4.5, 4.5.1, 4.5.1a			
Other specs affected:	⌘	**Y**	**N**		⌘
			X	Other core specifications	
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

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3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

4.5 Coding for HS-DSCH

Data arrives to the coding unit in form of a maximum of one transport block once every transmission time interval. The transmission time interval is 2 ms which is mapped to a radio sub-frame of 3 slots.

The following coding steps can be identified:

- add CRC to each transport block (see subclause 4.5.1);
- bit scrambling (see subclause 4.5.1a);
- code block segmentation (see subclause 4.5.2);
- channel coding (see subclause 4.5.3);
- hybrid ARQ (see subclause 4.5.4);
- physical channel segmentation (see subclause 4.5.5);
- interleaving for HS-DSCH (see subclause 4.5.6);
- constellation re-arrangement for 16 QAM (see subclause 4.5.7);
- mapping to physical channels (see subclause 4.5.8).

The coding steps for HS-DSCH are shown in the figure below.

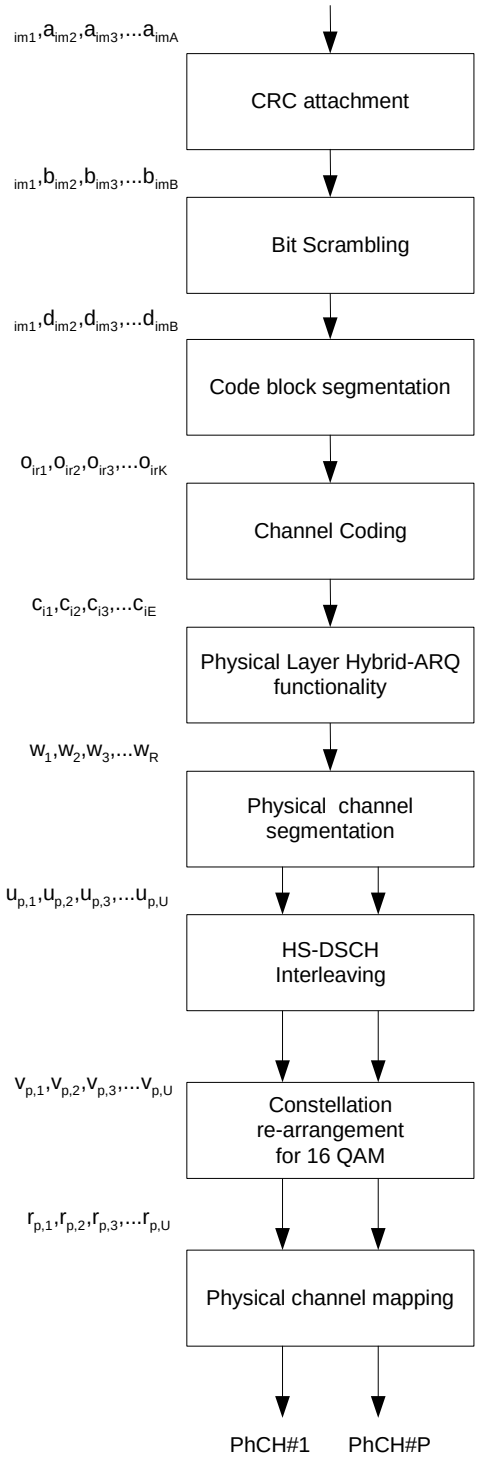

Figure 16: Coding chain for HS-DSCH

In the following the number of transport blocks and the number of transport channels is always one i.e. m=1, i=1. When referencing non HS-DSCH formulae which are used in correspondence with HS-DSCH formulae the convention is used that transport block subscripts may be omitted (e.g. X_1 may be written X).

4.5.1 CRC attachment for HS-DSCH

CRC attachment for the HS-DSCH transport channel shall be done using the general method described in 4.2.1 above with the following specific parameters.

~~There will be a maximum of one transport block, i=1.~~ The CRC length shall always be L_1 = 24 bits.

4.5.1a Bit scrambling for HS-DSCH

The bits output from the HS-DSCH CRC attachment are scrambled in the bit scrambler. The bits input to the bit scrambler are denoted by $b_{im,1}, b_{im,2}, b_{im,3}, ..., b_{im,B}$, where B is the number of bits input to the HS-DSCH bit scrambler The bits after bit scrambling are denoted $d_{im,1}, d_{im,2}, d_{im,3}, ..., d_{im,B}$.

Bit scrambling is defined by the following relation:

$$d_{im,k} = (b_{im,k} + y_k) \bmod 2 \qquad k = 1,2,\ldots,B$$

and y_k results from the following operation:

~~$y'_m = 0$~~ $y'_\gamma = 0$ -15 < ~~m~~ γ -< 1

~~$y'_m = 1$~~ $y'_\gamma = 1$ ~~m~~ γ = 1

~~$y'_m = \left(\sum_{i=1}^{16} g_i \cdot y'_{m-i}\right) \bmod 2$~~ $y'_\gamma = \left(\sum_{x=1}^{16} g_x \cdot y'_{\gamma-x}\right) \bmod 2$ ~~$1 < m < B$~~ $1 < \gamma \le B$,

where ~~$g = \{0,0,0,0,0,0,0,0,0,0,1,0,1,1,0,1\}$~~ $g = \{g_1, g_2, \ldots, g_{16}\} = \{0,0,0,0,0,0,0,0,0,0,1,0,1,1,0,1\}$,

$y_k = y'_k \qquad k = 1,2,\ldots,B.$

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CHANGE REQUEST

⌘ **25.212** **CR** **168** ⌘ **rev** **-** ⌘ Current version: **5.3.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ [ ] ME [X] Radio Access Network [X] Core Network [ ]

Title:	⌘	Correction of subscript for modulation scheme information
Source:	⌘	TSG RAN WG1
Work item code:	⌘	HSDPA-Phys
Date:	⌘	06/02/2003
Category:	⌘	**F**
Release:	⌘	Rel-5

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R98 (Release 1998)
R99 (Release 1999)
Rel-4 (Release 4)
Rel-5 (Release 5)
Rel-6 (Release 6)

Reason for change:	⌘	The subscript for the modulation scheme information is incorrect.
Summary of change:	⌘	The subscript is corrected.
Consequences if not approved:	⌘	A non-existent term is used in the specification.

Clauses affected:	⌘	4.6.3			
Other specs affected:	⌘	**Y**	**N**		
			X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

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4.6.3 Multiplexing of HS-SCCH information

The channelization-code-set information $x_{ccs,1}$, $x_{ccs,2}$, …, $x_{ccs,7}$ and modulation-scheme information $x_{ms,1}$ are multiplexed together. This gives a sequence of bits $x_{1,1}$, $x_{1,2}$, …, $x_{1,8}$ where

$x_{1,i} = x_{ccs,i}$ $i=1,2,\ldots,7$

$x_{1,i} = x_{ms,i-7}$ $i=8$

The transport-block-size information $x_{tbs,1}$, $x_{tbs,2}$, …, $x_{tbs,6}$, Hybrid-ARQ-process information $x_{hap,1}$,$x_{hap,2}$, $x_{hap,3}$, redundancy-version information $x_{rv,1}$, $x_{rv,2}$, $x_{rv,3}$ and new-data indicator $x_{nd,1}$ are multiplexed together. This gives a sequence of bits $x_{2,1}$, $x_{2,2}$, …, $x_{2,13}$ where

$x_{2,i} = x_{tbs,i}$ $i=1,2,\ldots,6$

$x_{2,i} = x_{hap,i-6}$ $i=7,8,9$

$x_{2,i} = x_{rv,i-9}$ $i=10,11,12$

$x_{2,i} = x_{nd,i-12}$ $i=13$