

3GPP TSG RAN Meeting #28
Quebec, Canada, 1 - 3 June 2005

RP-050207

Title CRs (Rel-6) to 25.101 & 25.133 for the WI "FDD Enhanced Uplink, RF"
Source 3GPP TSG RAN WG4 (Radio)
Agenda Item 8.6.1

WG Tdoc	Spec	CR	R	Cat	Rel	Curr Ver	Title	Work Item
R4-050603	25.101	408	2	F	Rel-6	6.7.0	UE maximum output power with HS-DPCCH & EDCH	EDCH-RF
R4-050544	25.133	736	1	F	Rel-6	6.9.0	E-TFC selection in the UE	EDCH-RF

Athens, Greece 9 - 13 May 2005

CR-Form-v7

CHANGE REQUEST

⌘ **25.101 CR 408** ⌘ rev **2** ⌘ Current version: **6.7.0** ⌘

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Proposed change affects: UICC apps ME Radio Access Network Core Network

Title:	⌘ UE maximum output power with HS-DPCCH and E-DCH		
Source:	⌘ 3GPP TSG RAN WG4 (Radio)		
Work item code:	⌘ EDCH-RF	Date:	⌘ 16/05/2005
Category:	⌘ F	Release:	⌘ Rel-6
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	F (correction)	2 (GSM Phase 2)	
	A (corresponds to a correction in an earlier release)	R96 (Release 1996)	
	B (addition of feature),	R97 (Release 1997)	
	C (functional modification of feature)	R98 (Release 1998)	
	D (editorial modification)	R99 (Release 1999)	
	Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		Rel-4 (Release 4)
			Rel-5 (Release 5)
			Rel-6 (Release 6)

Reason for change:	⌘ The UE maximum output power with E-DCH is not specified		
Summary of change:	⌘ This defines the allowed MPR reduction based on the Cubic Metric for the specific combination for the specific values of β_c , β_d , β_{hs} , β . This change is also introduced for HS-DPCCH to specific when applicable a lower MPR than REL5		
Consequences if not approved:	⌘ Resulting in increased ACLR and spectrum mask leakage if MPR headroom is in-correctly set for specific values of β_c , β_d , β_{hs} , β_{ec} and β_{ed} used in the estimated E-TFC and TFC selection		

Clauses affected:	⌘ 6.2.2										
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 20px;">Y</td> <td style="width: 20px;">N</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td>X</td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table>	Y	N			X				Other core specifications	⌘ TS34.121
Y	N										
X											
		Test specifications									
		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.

6.2 Transmit power

6.2.1 UE maximum output power

The following Power Classes define the nominal maximum output power. The nominal power defined is the broadband transmit power of the UE, i.e. the power in a bandwidth of at least $(1+\alpha)$ times the chip rate of the radio access mode. The period of measurement shall be at least one timeslot.

Table 6.1: UE Power Classes

Operating Band	Power Class 1		Power Class 2		Power Class 3		Power Class 4	
	Power (dBm)	Tol (dB)	Power (dBm)	Tol (dB)	Power (dBm)	Tol (dB)	Power (dBm)	Tol (dB)
Band I	+33	+1/-3	+27	+1/-3	+24	+1/-3	+21	+2/-2
Band II	-	-	-	-	+24	+1/-3	+21	+2/-2
Band III	-	-	-	-	+24	+1/-3	+21	+2/-2
Band IV	-	-	-	-	+24	+1/-3	+21	+2/-2
Band V	-	-	-	-	+24	+1/-3	+21	+2/-2
Band VI	-	-	-	-	+24	+1/-3	+21	+2/-2

NOTE: The tolerance allowed for the nominal maximum output power applies even for the multi-code DPDCH transmission mode.

~~6.2.2 UE maximum output power with HS-DPCCH~~

~~The applicability of this clause for UEs that support E-DCH is FFS.~~

~~For all values of β_{hs} defined in [8] the UE maximum output powers as specified in Table 6.1a are applicable in the case when the HS-DPCCH is fully or partially transmitted during a DPCCH timeslot. In DPCCH time slots, where HS-DPCCH is not transmitted, the UE maximum output power shall fulfil the requirements specified in Table 6.1.~~

~~**Table 6.1a: UE maximum output powers with HS-DPCCH**~~

Ratio of β_c to β_d for all values of β_{hs}	Power Class 3		Power Class 4	
	Power (dBm)	Tol (dB)	Power (dBm)	Tol (dB)
$1/15 \leq \beta_c/\beta_d \leq 12/15$	+24	+1/-3	+21	+2/-2
$13/15 \leq \beta_c/\beta_d \leq 15/8$	+23	+2/-3	+20	+3/-2
$15/7 \leq \beta_c/\beta_d \leq 15/0$	+22	+3/-3	+19	+4/-2

6.2.2 UE maximum output power with HS-DPCCH and E-DCH

The Maximum Power Reduction (MPR) for the nominal maximum output power defined in 6.2.1 is specified in table 6.1b for the values of β_c , β_d , β_{hs} , β_{ec} and β_{ed} defined in [8] fully or partially transmitted during a DPCCH timeslot

Table 6.1a: UE maximum output power with HS-DPCCH and E-DCH

<u>UE transmit channel configuration</u>	<u>CM (dB)</u>	<u>MPR (dB)</u>
<u>For all combinations of: DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH</u>	<u>$0 \leq CM^+ \leq 3.0$</u>	<u>MAX (CM-1, 0)</u>
<u>Note 1: $CM^+ = 1$ for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$ (reference case). For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference to reference case.</u>		
<u>Note 2: The impact of 1dB power control granularity is FFS.</u>		

Where Cubic Metric (CM) is based on the UE transmit channel configuration and is given by

$$CM = [20 * \log_{10} ((v_norm)^3)_{rms} - 20 * \log_{10} ((v_norm_ref * 1.524)^3)_{rms}] / 1.85$$

Where

v_norm is the normalized voltage waveform of the input signal and 1.524 is the normalized rms voltage waveform for 12.2Kbps AMR Speech

~~v_norm_ref is the normalized voltage waveform of a reference signal (e.g. 1.524 for 12.2Kbps AMR Speech)~~

6.3 Frequency Error

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CR-Form-v7.1

CHANGE REQUEST⌘ **25.133 CR 736** ⌘ rev **1** ⌘ Current version: **6.9.0** ⌘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:	⌘ E-TFC selection in the UE		
Source:	⌘ 3GPP TSG RAN WG4 (Radio)		
Work item code:	⌘ EDCH-RF	Date:	⌘ 16/05/2005
Category:	⌘ F		Release: ⌘ Rel-6
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	F (correction)	R96 (Release 1996)	Ph2 (GSM Phase 2)
	A (corresponds to a correction in an earlier release)	R97 (Release 1997)	R98 (Release 1998)
	B (addition of feature),	R99 (Release 1999)	Rel-4 (Release 4)
	C (functional modification of feature)	Rel-5 (Release 5)	Rel-6 (Release 6)
	D (editorial modification)	Rel-7 (Release 7)	
	Detailed explanations of the above categories can be found in 3GPP TR 21.900 .		

Reason for change: ⌘ To include requirements for E-TFC for E-DCH operation**Summary of change:** Define what power allocation should be used for E-TFC.
Define supported E-TFC in terms of UE power
Note Requirements for TFC selection with HS-DPCCH are unchanged from REL5

⌘

Consequences if not approved: ⌘ No common UE behaviour for E-TFC selection**Clauses affected:** ⌘ 6.4.1, 6.4.2 and 6.5**Other specs affected:**

Y	N
X	
	X
	X

Other core specifications

⌘ 25.309, 25.302

Test specifications

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>.
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6.4 Transport format combination selection in UE

6.4.1 Introduction

When the UE estimates that a certain TFC [and E-TFC](#) would require more power than the maximum transmit power, it shall limit the usage of transport format combinations for the assigned transport format set, according to the functionality specified in section 11.4 in TS25.321. This [is](#) in order to make it possible for the network operator to maximise the coverage. Transport format combination selection is described in section 11.4 of TS 25.321.

6.4.2 Requirements

The UE shall continuously evaluate based on the *Elimination*, *Recovery* and *Blocking* criteria defined below, how TFCs on an uplink DPDCH can be used for the purpose of TFC selection. The evaluation shall be performed for every TFC in the TFCS using the estimated UE transmit power.

The UE transmit power estimation for a given TFC, when HS-DPCCH is not transmitted during the measurement period, shall be calculated using the DPDCH and DPCCH gain factors of the corresponding TFC and reference transmit power. The reference transmit power is the transmit power of DPCCH and DPDCH of a given TFC during the measurement period for which UE transmit power estimation is made. If HS-DPCCH is transmitted either partially or totally within the given measurement period the UE transmit power estimation for a given TFC shall be calculated using DPDCH and DPCCH gain factors, the maximum value of the HS-DPCCH gain factor that is used during the measurement period, and the reference transmit power. The timing of the measurement period, which is defined in 9.1.6.1 as one slot, is the same as the timing of the DPCH slot.

[E-TFC selection is allowed only in the CELL_DCH state. E-TFC selection is based on the estimated power leftover from TFC selection if the DPDCH is present and from the HS-DPCCH](#)

The UE shall consider the *Elimination* criterion for a given TFC to be detected if the estimated UE transmit power needed for this TFC is greater than the Maximum UE transmitter power for at least X out of the last Y successive measurement periods immediately preceding evaluation. The MAC in the UE shall consider that the TFC is in Excess-Power state for the purpose of TFC selection.

MAC in the UE shall indicate the available bitrate for each logical channel to upper layers within T_{notify} from the moment the *Elimination* criterion was detected.

The UE shall consider the *Recovery* criterion for a given TFC to be detected if the estimated UE transmit power needed for this TFC has not been greater than the Maximum UE transmitter power for the last Z successive measurement periods immediately preceding evaluation. The MAC in the UE shall consider that the TFC is in Supported state for the purpose of TFC selection.

MAC in the UE shall indicate the available bitrate for each logical channel to upper layers within T_{notify} from the moment the *Recovery* criterion was detected.

The evaluation of the *Elimination* criterion and the *Recovery* criterion shall be performed at least once per radio frame.

The definitions of the parameters X, Y and Z which shall be used when evaluating the *Elimination* and the *Recovery* criteria when no compressed mode patterns are activated are given in Table 6.0.

Table 6.0: X, Y, Z parameters for TFC selection

X	Y	Z
15	30	30

The UE shall consider the *Blocking* criterion for a given TFC to be fulfilled at the latest at the start of the longest uplink TTI after the moment at which the TFC will have been in Excess-Power state for a duration of:

$$(T_{\text{notify}} + T_{\text{modify}} + T_{\text{LI_proc}})$$

where:

T_{notify} equals 15 ms, and

T_{modify} equals $\text{MAX}(T_{\text{adapt_max}}, T_{\text{TTI}})$, and

$T_{\text{L1 proc}}$ equals 15 ms, and

$T_{\text{adapt_max}}$ equals $\text{MAX}(T_{\text{adapt_1}}, T_{\text{adapt_2}}, \dots, T_{\text{adapt_N}})$, and

N equals the number of logical channels that need to change rate, and

$T_{\text{adapt_n}}$ equals the time it takes for higher layers to provide data to MAC in a new supported bitrate, for logical channel n . For services where no codec is used T_{adapt} shall be considered to be equal to 0 ms. For services where either UMTS_AMR2 or UMTS_AMR_WB is used, T_{adapt} shall be considered to be equal to the time required to switch from the current codec mode to a new supported codec mode. In that case T_{adapt} equals 20 ms + 40 ms per codec mode switch. E.g. T_{adapt} equals 60ms if one codec mode switch is necessary and T_{adapt} equals 140ms if 3 codec mode switches are necessary.

T_{TTI} equals the longest uplink TTI of the selected TFC (ms).

~~The Maximum UE transmitter power is defined as follows~~

~~———— Maximum UE transmitter power = $\text{MIN}(\text{Maximum allowed UL TX Power}, \text{UE maximum transmit power})$~~

~~where~~

~~———— Maximum allowed UL TX Power is set by UTRAN and defined in [16], and~~

~~—— UE maximum transmit power is defined by the UE power class, and specified in [3]. The UE is allowed to reduce its maximum transmit power for certain gain factors when HS-DPCCH is transmitted as defined in [3].~~

If the UE is allowed to reduce its maximum transmit power for certain TFCs, [and E-TFCs](#) the UE shall use the reduced maximum transmit power in the evaluation of the TFC [and E-TFC](#) selection criteria for those TFCs.

6.5 Maximum allowed UL TX Power

The Maximum UE transmitter power is defined as follows

$$\text{Maximum UE transmitter power} = \text{MIN} \{ \text{Maximum allowed UL TX Power, } P_{\text{MAX}} \}$$

Where

- Maximum allowed UL TX Power is set by UTRAN and defined in [16], and

- P_{MAX} is the UE nominal maximum transmit power is defined by the UE power class, and specified in table 6.1 of [3]

For TFC selection the UE is allowed to reduce P_{MAX} when HS-DPCCH is transmitted by the TFC-MPR values specified in table [x]

Table [x] : TFC-MPR used for TFC selection

<u>Inputs for TFC selection</u>		<u>TFC-MPR</u>
<u>Case</u>	<u>Ratio of β_c to β_d for all values of β_{hs}</u>	<u>(dB)</u>
1	$1/15 \leq \beta_c/\beta_d \leq 12/15$	0
2	$13/15 \leq \beta_c/\beta_d \leq 15/8$	1
3	$15/7 \leq \beta_c/\beta_d \leq 15/0$	2

For E-TFC selection the UE is allowed to reduce P_{MAX} by the E-TFC MPR values specified in Table [y]

Table [y] : E-TFC-MPR used for E-TFC selection

<u>Inputs for selection E-TFC</u>							<u>E-TFC-MPR</u>	
<u>Case</u>	β_c	β_{hs}	β_d	β_{ec}	β_{ed}	<u>E-DPDCH</u>		<u>(dB)</u>
						SFmin	Ncodes	
1	≥ 0	≥ 0	0	0	0	NA	0	[1.00]
2	≥ 0	0	0	≥ 0	≥ 0	≥ 4	1	[0.25]
3	≥ 0	≥ 0	0	≥ 0	≥ 0	4	1	[0.00]
4	≥ 0	≥ 0	0	≥ 0	≥ 0	4	2	[0.10]
5	≥ 0	≥ 0	0	≥ 0	≥ 0	2	2	[0.00]
6	≥ 0	≥ 0	0	≥ 0	≥ 0	2	4	[0.50]
7	≥ 0	0	≥ 0	≥ 0	≥ 0	≥ 4	1	[0.75]
8	≥ 0	≥ 0	≥ 0	≥ 0	≥ 0	≥ 4	1	[1.40]
9	≥ 0	≥ 0	≥ 0	≥ 0	≥ 0	4	2	[0.70]
10	≥ 0	0	≥ 0	≥ 0	≥ 0	2	2	[0.50]
11	≥ 0	≥ 0	≥ 0	≥ 0	≥ 0	2	2	[0.50]

~~UTRAN may limit the power the UE is using on the uplink by setting the maximum allowed UL TX power IE defined in TS25.331.~~

For each measurement period, the UE shall with the use of the UE transmitted power measurement, estimate if it has reached the Maximum allowed UL TX Power or not. With tolerances as defined for the UE transmitted power measurement accuracy (section 9.1.6.1), the UE output power shall not exceed the Maximum allowed UL TX Power, as set by the UTRAN.

For UE output powers that are outside the range covered by the UE transmitted power measurement the UE output power shall not exceed the Maximum allowed UL TX Power with more than the tolerances specified for the Open loop power control in TS 25.101 section 6.4.1.