TSG RAN Meeting #17 **RP-020484**
Biarritz, France, 3 - 6 September, 2002

Title **CRs (Rel-5) to TS 25.101**
Source **TSG RAN WG4**
Agenda Item **7.4.5**

RAN4 Tdoc	Spec	CR	R	Cat	Rel	Curr Ver	Title	Work Item
R4-021384	25.101	184	2	F	Rel-5	5.3.0	Requirements in case of dedicated pilot	RANimp-BFR-UE
R4-021318	25.101	189	1	F	Rel-5	5.3.0	Corrections to Spectrum Emission Mask	TEI5
R4-021305	25.101	191		F	Rel-5	5.3.0	PRACH modulation quality	TEI5

3GPP TSR RAN WG4 Meeting #24 **R4-021384**

Helsinki, Finland 12 - 16 August 2002

CR-Form-v7

CHANGE REQUEST

⌘ **25.101** **CR** **184** ⌘ **rev** **2** ⌘ 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:	⌘	Requirements in case of dedicated pilot
Source:	⌘	RAN WG4
Work item code:	⌘	RANimp-BFR-UE
Date:	⌘	21/08/2002
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:	⌘	There are currently no performance requirements in case the phase reference is the dedicated pilot and the dedicated pilots consist of 4 pilot bits per slot
Summary of change:	⌘	Added a new requirement in section 8.3.1 with a new test #25. This test is based on a new downlink reference channel with slot format #9, having only 4 pilot bits. The new reference channel is added in appendix A.4X
Consequences if not approved:	⌘	There are no performance requirements for the case of using the dedicated pilots as phase reference and only 4 pilot bits per slot are available. Thereby the performance for this case is not known.

Clauses affected:	⌘	8.3.1 and A.4

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.

8.3 Demodulation of DCH in multi-path fading propagation conditions

8.3.1 Single Link Performance

The receive characteristics of the Dedicated Channel (DCH) in different multi-path fading environments are determined by the Block Error Ratio (BLER) values. BLER is measured for the each of the individual data rate specified for the DPCH. DCH is mapped into in Dedicated Physical Channel (DPCH).

8.3.1.1 Minimum requirement

For the parameters specified in Table 8.7, 8.9 , 8.11, 8.13 and 8.14A the average downlink $\frac{DPCH\_E_c}{I_{or}}$ power ratio shall be below the specified value for the BLER shown in Table 8.8, 8.10, 8.12, 8.14 and 8.14B. For the parameters specified in Table 8.14C and 8.14 E the downlink $\frac{DPCH\_E_c}{I_{or}}$ power ratio measured values, which are averaged over one slot, shall be below the specified value in Table 8.14D and 8.14F more than 90% of the time. These requirements are applicable for TFCS size 16.

Table 8.7: Test Parameters for DCH in multi-path fading propagation conditions (Case 1)

Parameter	Unit	Test 1	Test 2	Test 3	Test 4
Phase reference		P-CPICH			
$\hat{I}_{or}/I_{oc}$	dB	9			
I_{oc}	dBm/3.84 MHz	-60			
Information Data Rate	kbps	12.2	64	144	384

Table 8.8: Test requirements for DCH in multi-path fading propagation conditions (Case 1)

Test Number	$\frac{DPCH\_E_c}{I_{or}}$	BLER
1	-15.0 dB	10^{-2}
2	-13.9 dB	10^{-1}
	-10.0 dB	10^{-2}
3	-10.6 dB	10^{-1}
	-6.8 dB	10^{-2}
4	-6.3 dB	10^{-1}
	-2.2 dB	10^{-2}

Table 8.9: DCH parameters in multi-path fading propagation conditions (Case 2)

Parameter	Unit	Test 5	Test 6	Test 7	Test 8
Phase reference		P-CPICH			
$\hat{I}_{or}/I_{oc}$	dB	-3	-3	3	6
I_{oc}	dBm/3.84 MHz	-60			
Information Data Rate	kbps	12.2	64	144	384

Table 8.10: DCH requirements in multi-path fading propagation (Case 2)

Test Number	$\frac{DPCH\_E_c}{I_{or}}$	BLER
5	-7.7 dB	10^{-2}
6	-6.4 dB	10^{-1}
	-2.7 dB	10^{-2}
7	-8.1 dB	10^{-1}
	-5.1 dB	10^{-2}
8	-5.5 dB	10^{-1}
	-3.2 dB	10^{-2}

Table 8.11: DCH parameters in multi-path fading propagation conditions (Case 3)

Parameter	Unit	Test 9	Test 10	Test 11	Test 12
Phase reference		P-CPICH			
$\hat{I}_{or}/I_{oc}$	dB	-3	-3	3	6
I_{oc}	dBm/3.84 MHz	-60			
Information Data Rate	kbps	12.2	64	144	384

Table 8.12: DCH requirements in multi-path fading propagation conditions (Case 3)

Test Number	$\frac{DPCH\_E_c}{I_{or}}$	BLER
9	-11.8 dB	10^{-2}
10	-8.1 dB	10^{-1}
	-7.4 dB	10^{-2}
	-6.8 dB	10^{-3}
11	-9.0 dB	10^{-1}
	-8.5 dB	10^{-2}
	-8.0 dB	10^{-3}
12	-5.9 dB	10^{-1}
	-5.1 dB	10^{-2}
	-4.4 dB	10^{-3}

Table 8.13: DCH parameters in multi-path fading propagation conditions (Case 1) with S-CPICH

Parameter	Unit	Test 13	Test 14	Test 15	Test 16
Phase reference		S-CPICH			
$\hat{I}_{or}/I_{oc}$	dB	9			
I_{oc}	dBm/3.84 MHz	-60			
Information Data Rate	kbps	12.2	64	144	384

Table 8.14: DCH requirements in multi-path fading propagation conditions (Case 1) with S-CPICH

Test Number	$\frac{DPCH\_E_c}{I_{or}}$	BLER
13	-15.0 dB	10^{-2}
14	-13.9 dB	10^{-1}
	-10.0 dB	10^{-2}
15	-10.6 dB	10^{-1}
	-6.8 dB	10^{-2}
16	-6.3 dB	10^{-1}
	-2.2 dB	10^{-2}

Table 8.14A: DCH parameters in multi-path fading propagation conditions (Case 6)

Parameter	Unit	Test 17	Test 18	Test 19	Test 20
Phase reference		P-CPICH			
$\hat{I}_{or}/I_{oc}$	dB	-3	-3	3	6
I_{oc}	dBm/3.84 MHz	-60			
Information Data Rate	kbps	12.2	64	144	384

Table 8.14B: DCH requirements in multi-path fading propagation conditions (Case 6)

Test Number	$\frac{DPCH\_E_c}{I_{or}}$	BLER
17	-8.8 dB	10^{-2}
18	-5.1 dB	10^{-1}
	-4.4 dB	10^{-2}
	-3.8 dB	10^{-3}
19	-6.0 dB	10^{-1}
	-5.5 dB	10^{-2}
	-5.0 dB	10^{-3}
20	-2.9 dB	10^{-1}
	-2.1 dB	10^{-2}
	-1.4 dB	10^{-3}

Table 8.14C: DCH parameters in multi-path fading propagation conditions (Case 7)

Parameter	Unit	Test 21	Test 22	Test 23	Test 24
Phase reference		DPCCH			
$\hat{I}_{or}/I_{oc}$	dB	0	0	6	12
I_{oc}	dBm/3.84 MHz	-60			
Information Data Rate	kbps	12.2	64	144	384
Target quality value on DTCH	BLER	0.01	0.01	0.01	0.1
Maximum_DL_Power	dB	7			
Minimum_DL_Power	dB	-18			
DL Power Control step size, Δ_{TPC}	dB	1			
Limited Power Increase	-	"Not used"			

Table 8.14D: DCH requirements in multi-path fading propagation conditions (Case 7)

Test Number	$\frac{DPCH\_E_c}{I_{or}}$
21	-14.0 dB
22	-9.1 dB
23	-9.4 dB
24	-7.4 dB

Table 8.14E: DCH parameters in multi-path fading propagation conditions (Case 7)

Parameter	Unit	Test 25
Phase reference		DPCCH
$\hat{I}_{or}/I_{oc}$	dB	0
I_{oc}	dBm/3.84 MHz	-60
Information Data Rate	kbps	12.2
Target quality value on DTCH	BLER	0.01
Maximum_DL_Power	dB	7
Minimum_DL_Power	dB	-18
DL Power Control step size, Δ_{TPC}	dB	1
Limited Power Increase	-	"Not used"

Table 8.14F: DCH requirements in multi-path fading propagation conditions (Case 7)

Test Number	$\frac{DPCH\_E_c}{I_{or}}$
25	-12.5 dB

NOTE: The reference channel used for Test Number 25 is described in section A.4X

----- New Section ----

A.3 DL reference measurement channel

A.3.1 DL reference measurement channel (12.2 kbps)

The parameters for the 12.2 Kbps DL reference measurement channel are specified in Table A.11 and Table A.12. The channel coding is shown for information in figure A.5.

Table A.11: DL reference measurement channel physical parameters (12.2 kbps)

Parameter	Unit	Level
Information bit rate	kbps	12.2
DPCH	ksps	30
Slot Format #i	-	11
TFCI	-	On
Power offsets PO1, PO2 and PO3	dB	0
Puncturing	%	14.7

Table A.12: DL reference measurement channel, transport channel parameters (12.2 kbps)

Parameter	DTCH	DCCH
Transport Channel Number	1	2
Transport Block Size	244	100
Transport Block Set Size	244	100
Transmission Time Interval	20 ms	40 ms
Type of Error Protection	Convolution Coding	Convolution Coding
Coding Rate	1/3	1/3
Rate Matching attribute	256	256
Size of CRC	16	12
Position of TrCH in radio frame	fixed	fixed

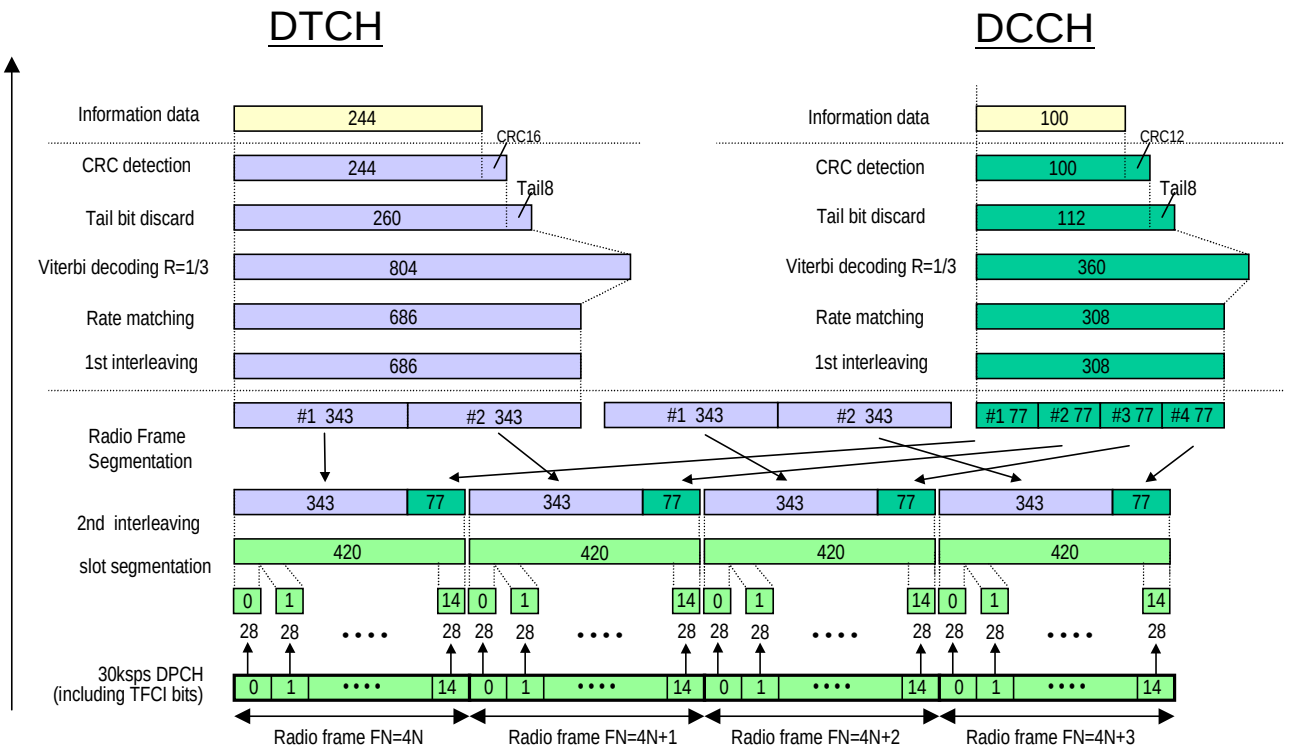

Figure A.5 (Informative): Channel coding of DL reference measurement channel (12.2 kbps)

A.3.2 DL reference measurement channel (64 kbps)

The parameters for the DL reference measurement channel for 64 kbps are specified in Table A.13 and Table A.14. The channel coding is shown for information in Figure A.6.

Table A.13: DL reference measurement channel physical parameters (64 kbps)

Parameter	Unit	Level
Information bit rate	kbps	64
DPCH	ksps	120
Slot Format #i	-	13
TFCI	-	On
Power offsets PO1, PO2 and PO3	dB	0
Repetition	%	2.9

Table A.14: DL reference measurement channel, transport channel parameters (64 kbps)

Parameter	DTCH	DCCH
Transport Channel Number	1	2
Transport Block Size	1280	100
Transport Block Set Size	1280	100
Transmission Time Interval	20 ms	40 ms
Type of Error Protection	Turbo Coding	Convolution Coding
Coding Rate	1/3	1/3
Rate Matching attribute	256	256
Size of CRC	16	12
Position of TrCH in radio frame	fixed	fixed

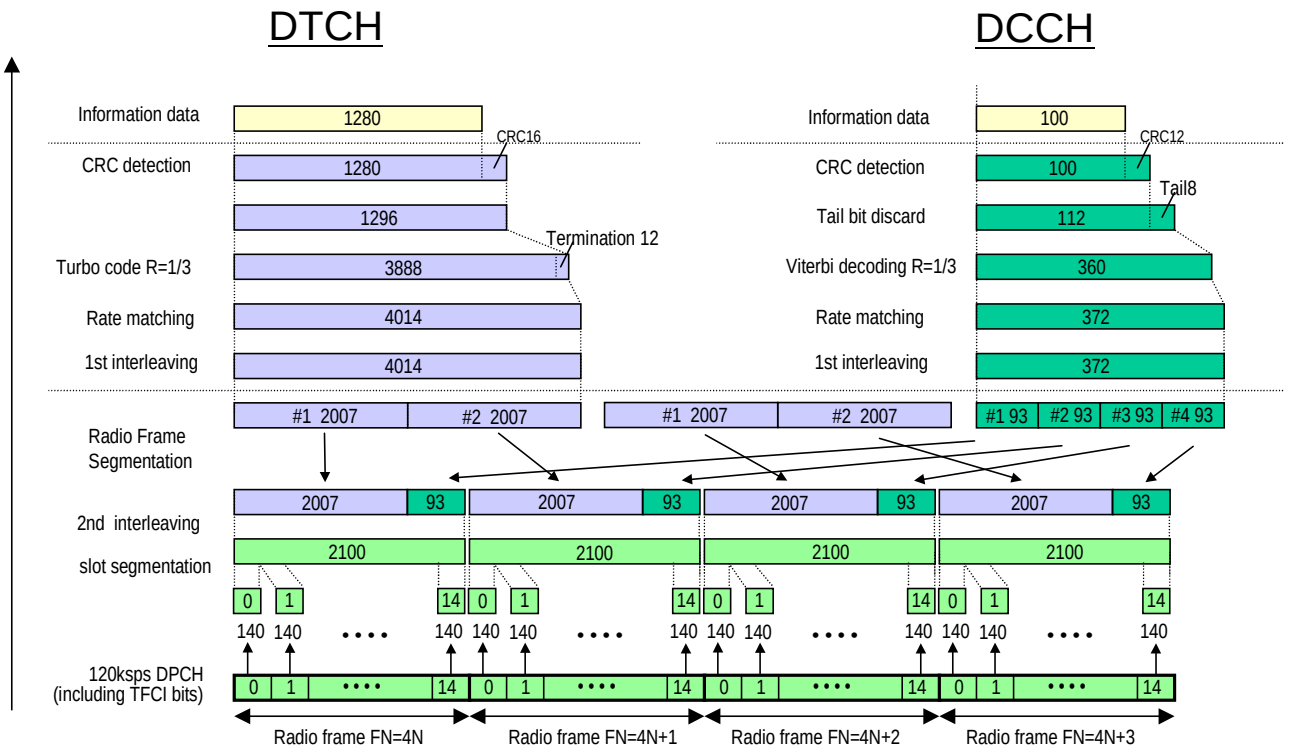

Figure A.6 (Informative): Channel coding of DL reference measurement channel (64 kbps)

A.3.3 DL reference measurement channel (144 kbps)

The parameters for the DL measurement channel for 144 kbps are specified in Table A.15 and Table A.16. The channel coding is shown for information in Figure A.7.

Table A.15: DL reference measurement channel physical parameters (144 kbps)

Parameter	Unit	Level
Information bit rate	kbps	144
DPCH	ksps	240
Slot Format #i	-	14
TFCI	-	On
Power offsets PO1, PO2 and PO3	dB	0
Puncturing	%	2.7

Table A.16: DL reference measurement channel, transport channel parameters (144 kbps)

Parameter	DTCH	DCCH
Transport Channel Number	1	2
Transport Block Size	2880	100
Transport Block Set Size	2880	100
Transmission Time Interval	20 ms	40 ms
Type of Error Protection	Turbo Coding	Convolution Coding
Coding Rate	1/3	1/3
Rate Matching attribute	256	256
Size of CRC	16	12
Position of TrCH in radio frame	fixed	fixed

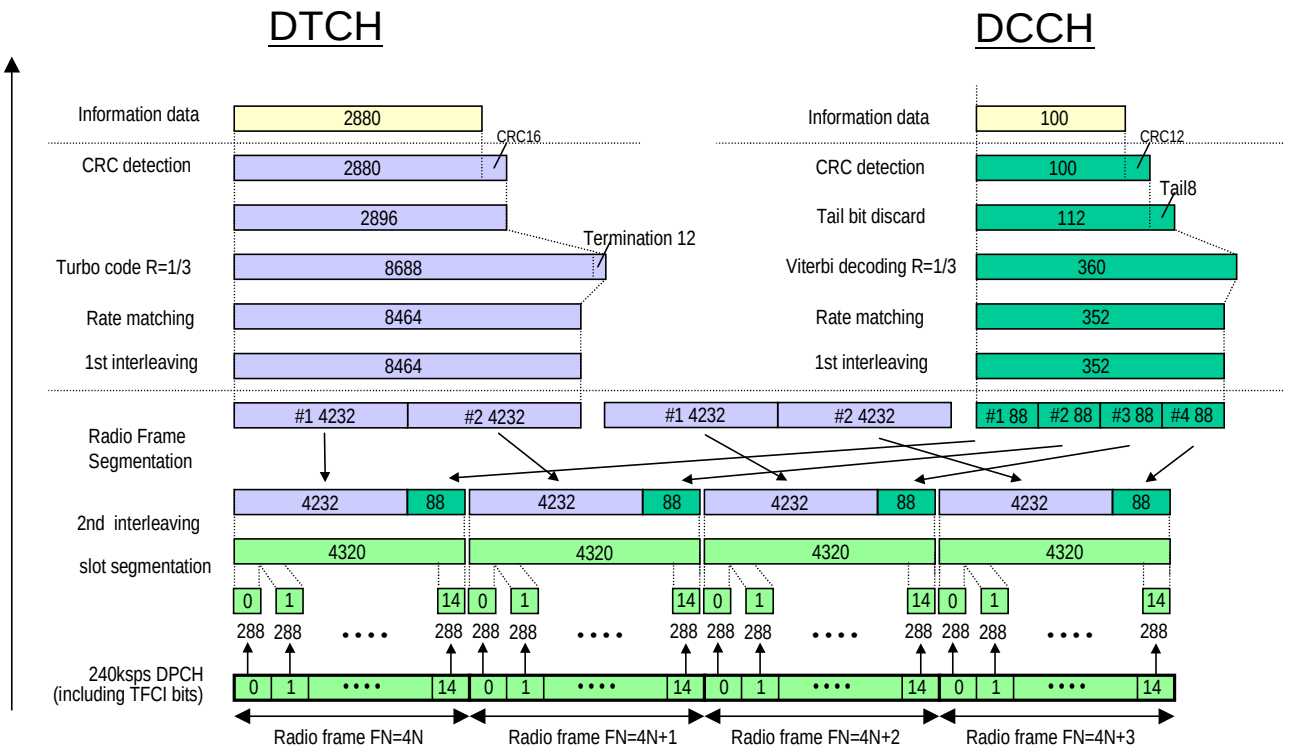

Figure A.7 (Informative): Channel coding of DL reference measurement channel (144 kbps)

A.3.4 DL reference measurement channel (384 kbps)

The parameters for the DL measurement channel for 384 kbps are specified in Table A.17 and Table A.18. The channel coding is shown for information in Figure A.8

Table A.17: DL reference measurement channel, physical parameters (384 kbps)

Parameter	Unit	Level
Information bit rate	kbps	384
DPCH	ksps	480
Slot Format # i	-	15
TFCI		On
Power offsets PO1, PO2 and PO3	dB	0
Puncturing	%	22

Table A.18: DL reference measurement channel, transport channel parameters (384 kbps)

Parameter	DTCH	DCCH
Transport Channel Number	1	2
Transport Block Size	3840	100
Transport Block Set Size	3840	100
Transmission Time Interval	10 ms	40 ms
Type of Error Protection	Turbo Coding	Convolution Coding
Coding Rate	1/3	1/3
Rate Matching attribute	256	256
Size of CRC	16	12
Position of TrCH in radio frame	fixed	Fixed

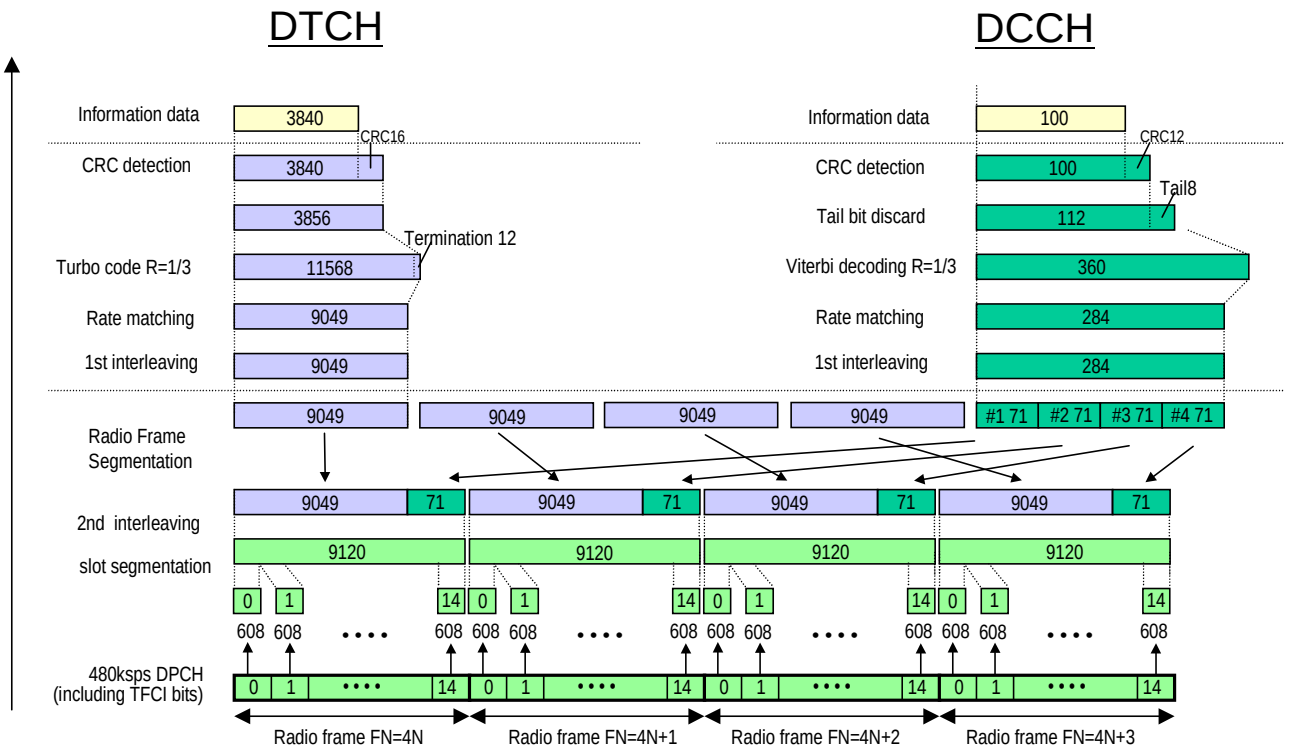

Figure A.8 (Informative): Channel coding of DL reference measurement channel (384 kbps)

A.4 DL reference measurement channel for BTFD performance requirements

The parameters for DL reference measurement channel for BTFD are specified in Table A.19 and Table A.20. The channel coding for information is shown in figures A.9, A.10, and A11.

Table A.19: DL reference measurement channel physical parameters for BTFD

Parameter	Unit	Rate 1	Rate 2	Rate 3
Information bit rate	kbps	12.2	7.95	1.95
DPCH	ksps	30		
Slot Format # i	-	8		
TFCI	-	Off		
Power offsets PO1, PO2 and PO3	dB	0		
Repetition	%	5		

Table A.20: DL reference measurement channel, transport channel parameters for BTFD

Parameter	DTCH			DCCH
	Rate 1	Rate 2	Rate 3	
Transport Channel Number	1			2
Transport Block Size	244	159	39	100
Transport Block Set Size	244	159	39	100
Transmission Time Interval	20 ms			40 ms
Type of Error Protection	Convolution Coding			Convolution Coding
Coding Rate	1/3			1/3
Rate Matching attribute	256			256
Size of CRC	12			12
Position of TrCH in radio frame	fixed			fixed

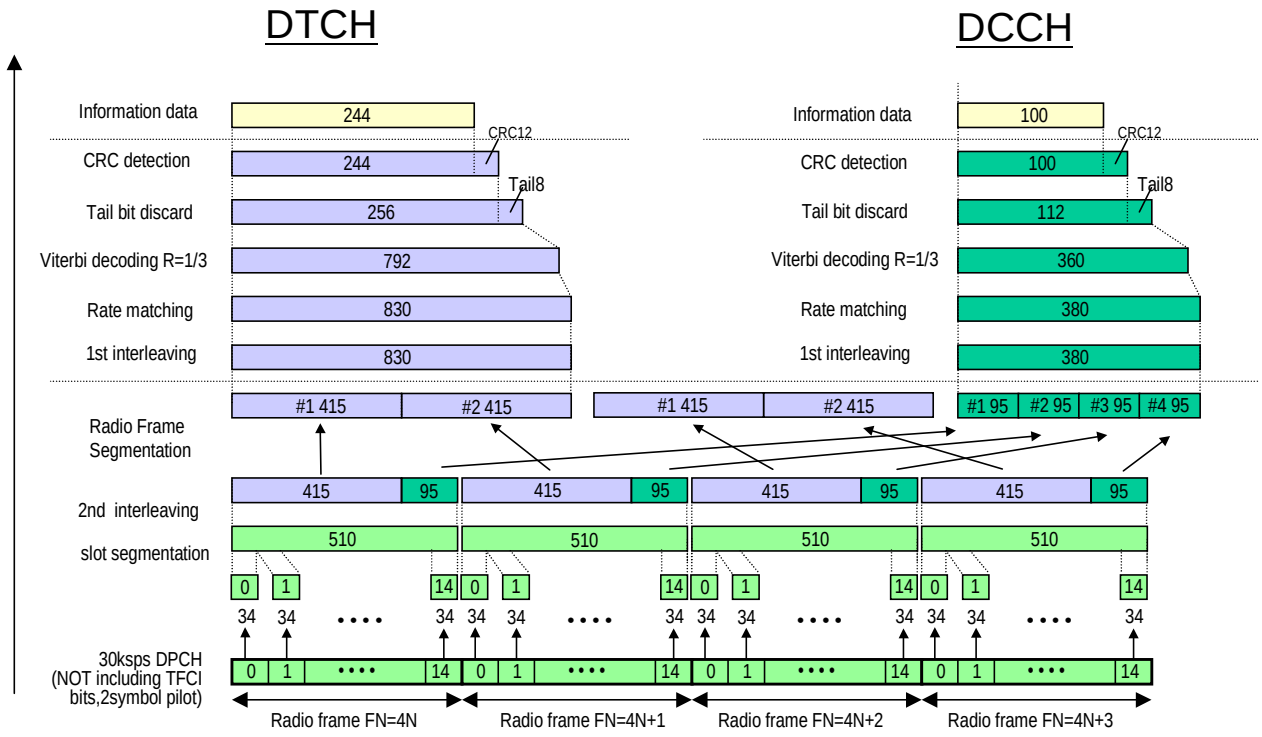

Figure A.9 (Informative): Channel coding of DL reference measurement channel for BTFD (Rate 1)

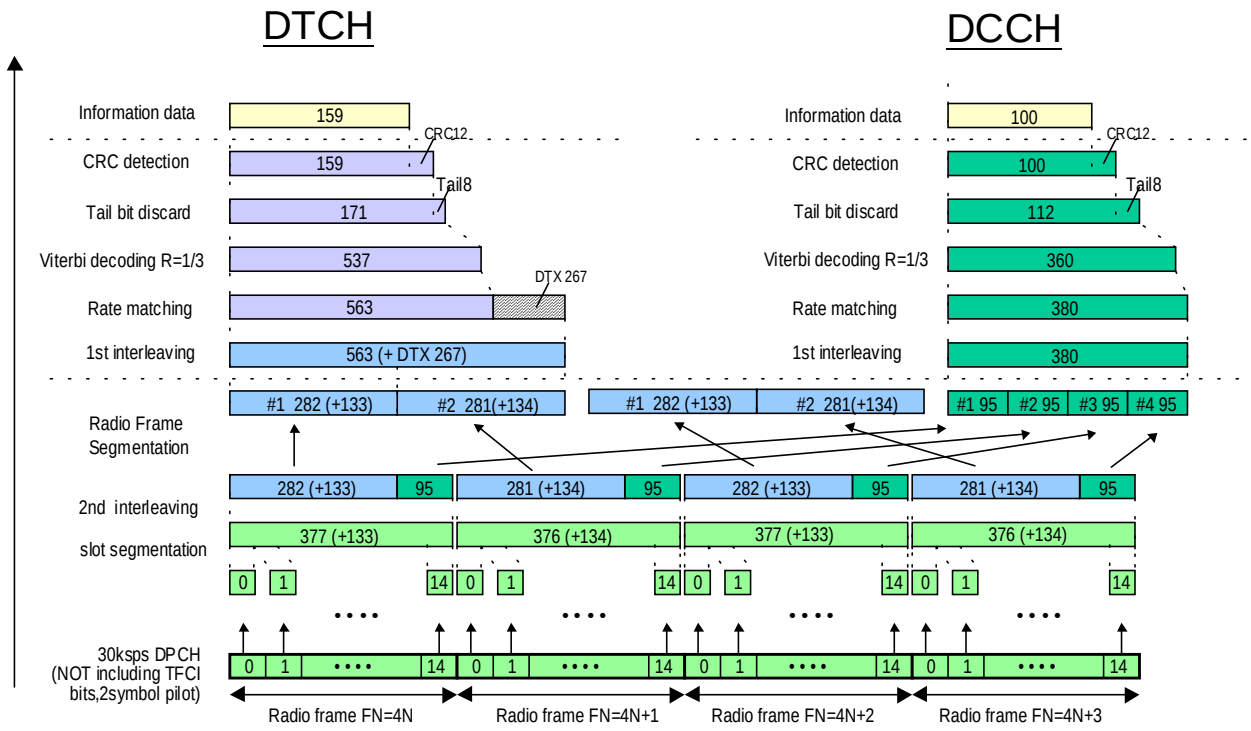

Figure A.10 (Informative): Channel coding of DL reference measurement channel for BTFD (Rate 2)

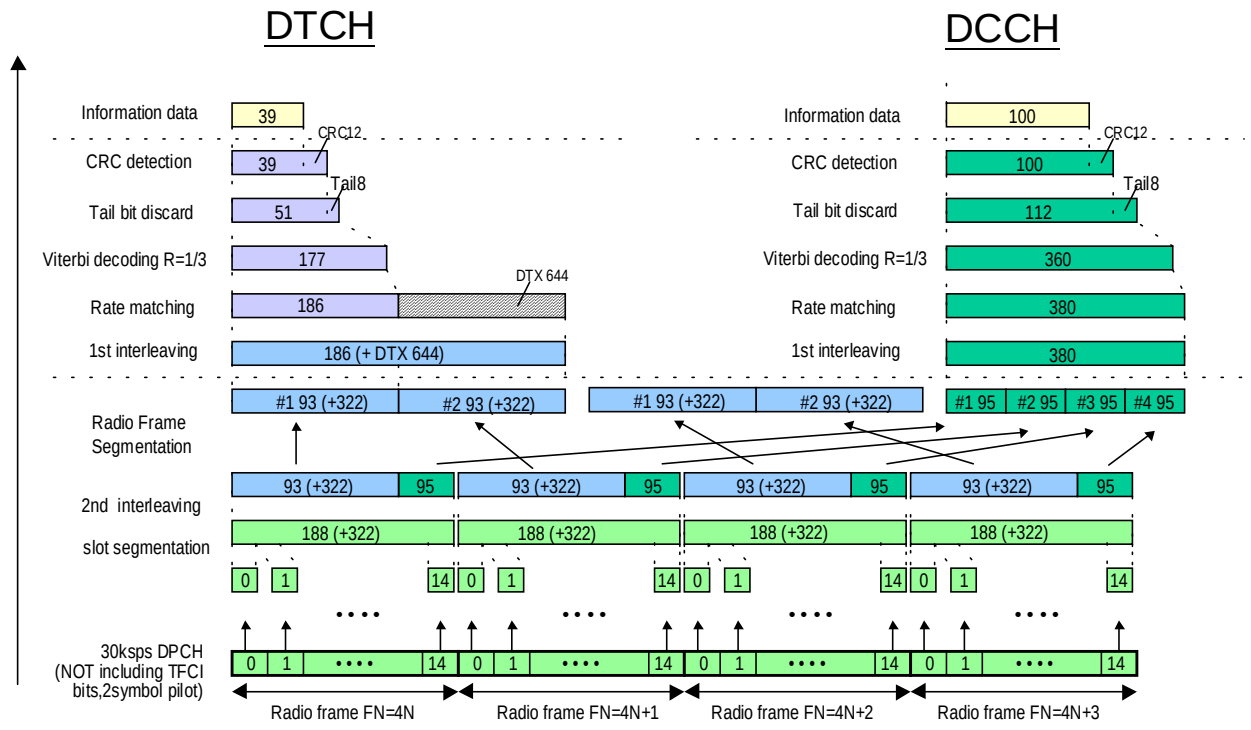

Figure A.11 (Informative): Channel coding of DL reference measurement channel for BTFD (Rate 3)

A.4X DL reference measurement channel for requirements using DPCCH with 4 pilot bits as phase reference

A.4X.1 DL reference measurement channel (12.2 kbps)

The parameters for the 12.2 Kbps DL reference measurement channel are specified in Table A.20X and Table A.20Y. The channel coding is shown for information in figure A.12.

Table A.20X: DL reference measurement channel physical parameters for DPCCH used as phase reference

Parameter	Unit	Level
Information bit rate	kbps	12.2
DPCH	ksps	30
Slot Format #i	-	9
TFCI	-	On
Power offsets PO1, PO2 and PO3	dB	0
Puncturing	%	2.5

Table A.20Y: DL reference measurement channel, transport channel parameters for DPCCH used as phase reference

Parameter	DTCH	DCCH
Transport Channel Number	1	2
Transport Block Size	244	100
Transport Block Set Size	244	100
Transmission Time Interval	20 ms	40 ms
Type of Error Protection	Convolution Coding	Convolution Coding
Coding Rate	1/3	1/3
Rate Matching attribute	256	256
Size of CR C	16	12
Position of TrCH in radio frame	fixed	fixed

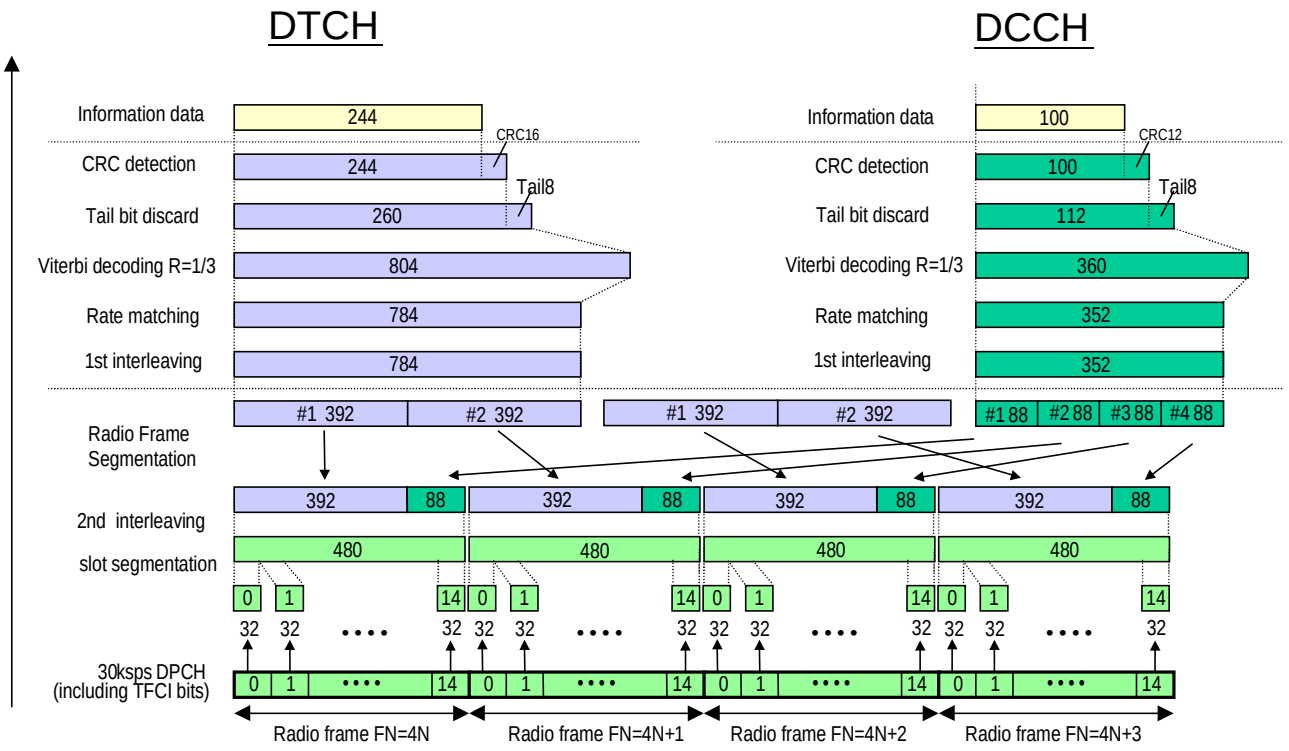

Figure A.12 (Informative): Channel coding of DL reference measurement channel for requirements using DPCCH with 4 channel bits (12.2 kbps)

---- New Section ----

C.3.5 Connection with tests having DPCCH as a phase reference

Table C.6 is applicable for measurements for tests 21, 22, 23 ~~and~~ 24 and 25 in subclause 8.3.1.

Table C.6: Downlink Physical Channels transmitted during a connection

Physical Channel	Antenna (gain)	Power	NOTE
P-CPICH	Sector (0 dB)	P-CPICH_Ec/Ior = -10 dB	UE is informed by higher layer signalling that P-CPICH shall not be used as a phase reference
P-CCPCH		P-CCPCH_Ec/Ior = -12 dB	
SCH		SCH_Ec/Ior = -12 dB	This power shall be divided equally between Primary and Secondary Synchronous channels
PICH		PICH_Ec/Ior = -15 dB	
DPCH	Beam (6.0dB)	Test dependent power	DPCH phase shall be uncorrelated with the phase of P-CPICH (different propagation in sector and beam)
OCNS		Necessary power so that Beam total transmit power is 20 % of Node B total transmit power	1) OCNS interference consists of 16 dedicated data channels as specified in Table C.6. 2) 60% of the power from Node B (Ior) is not involved in the tests, but is still counted as a part of the transmitted power.

3GPP TSR RAN WG4 Meeting #24 **R4-021318**

Helsinki, Finland 12 - 16 August 2002

CR-Form-v7

CHANGE REQUEST

⌘ **25.101** **CR** **189** ⌘ **rev** **1** ⌘ Current version: **5.3.0** ⌘

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

Title:	⌘	Corrections to Spectrum Emission Mask
Source:	⌘	RAN WG4
Work item code:	⌘	TEI5
Date:	⌘	21/08/2002
Category:	⌘	**F**
Release:	⌘	Rel-5

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R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change:	⌘	The interpretation of the lower limit is unclear as it is specified in a different bandwidth to the measurement bandwidth. The interpretation of the lower limit to apply for band II is also unclear, particularly since the band II limit is sometimes less stringent that the normal limit.
Summary of change:	⌘	The –50 dBm/3.84 MHz lower limit is specified in terms of 30 kHz and 1 MHz bandwidths. The definition of the minimum requirement for band II is made explicit. The original Note *** is split into notes 5 and 6 since the use of integration and the specification of the noise bandwidth apply also to the 30 kHz bandwidth measurements. Various layout and editorial changes made to Table 6.10 to reduce the possibility of incorrect interpretation.
Consequences if not approved:	⌘	An incorrect interpretation of the minimum requirement could result in incorrect implementation of the tests and an incorrect pass/fail result. Isolated Impact Analysis: A UE that conformed to the correct interpretation of the current specification will be unaffected by this change.

Clauses affected:	⌘	6.6.2.1			
Other specs affected:	⌘	**Y** / **N**	Other core specifications	⌘	
		☐ / ☒			
		☒ / ☐	Test specifications		34.121
		☐ / ☒	O&M Specifications		
Other comments:	⌘				

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6.6 Output RF spectrum emissions

6.6.1 Occupied bandwidth

Occupied bandwidth is a measure of the bandwidth containing 99 % of the total integrated power of the transmitted spectrum, centered on the assigned channel frequency. The occupied channel bandwidth shall be less than 5 MHz based on a chip rate of 3.84 Mcps.

6.6.2 Out of band emission

Out of band emissions are unwanted emissions immediately outside the nominal channel resulting from the modulation process and non-linearity in the transmitter but excluding spurious emissions. This out of band emission limit is specified in terms of a spectrum emission mask and Adjacent Channel Leakage power Ratio.

6.6.2.1 Spectrum emission mask

The spectrum emission mask of the UE applies to frequencies, which are between 2.5 MHz and 12.5 MHz away from the UE centre carrier frequency. The out of channel emission is specified relative to the RRC filtered mean power of the UE carrier.

6.6.2.1.1 Minimum requirement

The power of any UE emission shall not exceed the levels specified in Table 6.10. The absolute requirement is based on a –50 dBm/3.84 MHz minimum power threshold for the UE. This limit is expressed for the narrower measurement bandwidths as –55.8 dBm/1 MHz and –71.1 dBm/30 kHz.

Table 6.10: Spectrum Emission Mask Requirement

Δf*[1] in MHz	Minimum requirement[2] Band I, II, III		Additional requirements Band II[3]	Measurement bandwidth[6]
	Relative requirement	Absolute requirement		
2.5 - 3.5	$\left\{-35-15\cdot\left(\frac{\Delta f}{MHz}-2.5\right)\right\}dBc$	-71.1 dBm	-15 dBm	30 kHz **[4]
3.5 - 7.5	$\left\{-35-1\cdot\left(\frac{\Delta f}{MHz}-3.5\right)\right\}dBc$	-55.8 dBm	-13 dBm	1 MHz ***[5]
7.5 - 8.5	$\left\{-39-10\cdot\left(\frac{\Delta f}{MHz}-7.5\right)\right\}dBc$	-55.8 dBm	-13 dBm	1 MHz ***[5]
8.5 - 12.5 MHz	-49 dBc	-55.8 dBm	-13 dBm	1 MHz ***[5]

*Note 1 Δf is the separation between the carrier frequency and the centre of the measurement bandwidthing filter.

Note 2 The minimum requirement for bands I, II & III is calculated from the relative requirement or the absolute requirement, whichever is the higher power.

Note 3 For operation in Band II only, the minimum requirement is calculated from the minimum requirement calculated in Note 2 or the additional requirement for band II, whichever is the lower power.

**Note 4 The first and last measurement position with a 30 kHz filter is at Δf equals to 2.515 MHz and 3.485 MHz.

***Note 5 The first and last measurement position with a 1 MHz filter is at Δf equals to 4 MHz and 12 MHz. As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. To improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth can be different from the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

Note 6 As a general rule, the resolution bandwidth of the measuring equipment should be equal to the measurement bandwidth. However, to improve measurement accuracy, sensitivity and efficiency, the resolution bandwidth may be smaller than the measurement bandwidth. When the resolution bandwidth is smaller than the measurement bandwidth, the result should be integrated over the measurement bandwidth in order to obtain the equivalent noise bandwidth of the measurement bandwidth.

The lower limit shall be –50 dBm/3.84 MHz or which ever is higher.

3GPP TSR RAN WG4 Meeting #24 **R4-021305**

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CR-Form-v7

CHANGE REQUEST

⌘ **25.101** **CR** **191** ⌘ **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 ☒ Radio Access Network ☐ Core Network ☐

Title:	⌘	PRACH modulation quality
Source:	⌘	RAN WG4
Work item code:	⌘	TEI5
Date:	⌘	21/08/2002
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 R99 specifications for transmit modulation quality do not explicitly state that the requirements of subclause 6.8 apply to all UE transmissions including PRACH and PCPCH bursts. Also, it is noted that for 25 us either side of expected transients at slot and PRACH/PCPCH boundaries, the transmit modulation requirements do not apply.
Summary of change:	⌘	The PRACH and PCPCH are called out explicitly in subclause 6.8. A relaxation of 25 us either side of the slot or RACH boundary is introduced. The period of measurement for EVM and PCDE is updated to allow for the PRACH/PCPCH preambles which is 4096 chips – 50 us (192) chips = 3904 chips.
Consequences if not approved:	⌘	It could be mistakenly assumed that there are no requirements for transmit modulation for PRACH and PCPCH. Modulation quality measurements made in the presence of expected transients could erroneously fail the tests. Isolated Impact Analysis: A UE that conformed to the correct interpretation of the current specification will be unaffected by this change.

Clauses affected:	⌘	6.8			
Other specs affected:	⌘	Y / N	Other core specifications	⌘	
		N: X			
		Y: X	Test specifications		34.121
		N: 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.

6.8 Transmit modulation

Transmit modulation defines the modulation quality for expected in-channel RF transmissions from the UE. The requirements apply to all transmissions including the PRACH/PCPCH pre-amble and message parts and all other expected transmissions. In cases where the mean power of the RF signal is allowed to change versus time e.g. PRACH, DPCH in compressed mode, change of TFC and inner loop power control, the EVM and Peak Code Domain Error requirements do not apply during the 25 us period before and after the nominal time when the power is expected to change.

6.8.1 Transmit pulse shape filter

The transmit pulse shaping filter is a root-raised cosine (RRC) with roll-off α =0.22 in the frequency domain. The impulse response of the chip impulse filter $RC_0(t)$ is:

$$RC_0(t) = \frac{\sin\left(\pi \frac{t}{T_C}(1-\alpha)\right) + 4\alpha \frac{t}{T_C}\cos\left(\pi \frac{t}{T_C}(1+\alpha)\right)}{\pi \frac{t}{T_C}\left(1-\left(4\alpha \frac{t}{T_C}\right)^2\right)}$$

Where the roll-off factor α =0.22 and the chip duration is

$$T = \frac{1}{chiprate} \approx 0.26042 \ \mu s$$

6.8.2 Error Vector Magnitude

The Error Vector Magnitude is a measure of the difference between the reference waveform and the measured waveform. This difference is called the error vector. Both waveforms pass through a matched Root Raised Cosine filter with bandwidth 3,84 MHz and roll-off α=0,22. Both waveforms are then further modified by selecting the frequency, absolute phase, absolute amplitude and chip clock timing so as to minimise the error vector. The EVM result is defined as the square root of the ratio of the mean error vector power to the mean reference power expressed as a %. The measurement interval is one timeslot except for the PRACH/PCPCH preambles where it is 3904 chips.

6.8.2.1 Minimum requirement

The Error Vector Magnitude shall not exceed 17.5 % for the parameters specified in Table 6.15.

Table 6.15: Parameters for Error Vector Magnitude/Peak Code Domain Error

Parameter	Unit	Level
UE Output Power	dBm	≥ –20
Operating conditions		Normal conditions
Power control step size	dB	1

6.8.3 Peak code domain error

The Peak Code Domain Error is computed by projecting power of the error vector (as defined in 6.8.2) onto the code domain at a specific spreading factor. The Code Domain Error for every code in the domain is defined as the ratio of the mean power of the projection onto that code, to the mean power of the composite reference waveform. This ratio is expressed in dB. The Peak Code Domain Error is defined as the maximum value for the Code Domain Error for all codes. The measurement interval is one timeslot except for the PRACH/PCPCH preambles where it is 3904 chips.

The requirement for peak code domain error is only applicable for multi-code transmission.

6.8.3.1 Minimum requirement

The peak code domain error shall not exceed -15 dB at spreading factor 4 for the parameters specified in Table 6.15 . The requirements are defined using the UL reference measurement channel specified in subclause A.2.5.