

TSG RAN Meeting #19
Birmingham, United Kingdom, 11 - 14 March, 2003

RP-030038

Title CR (Rel-5) to TS 25.102
Source TSG RAN WG4
Agenda Item 8.4.5

RAN4 Tdoc	Spec	CR	R	Cat	Rel	Curr Ver	Title	Work Item
R4-020275	25.102	133	1	F	Rel-5	5.3.0	Transmit modulation quality clarification	TEI5

CHANGE REQUEST

⌘ **25.102 CR 133** ⌘ 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 Radio Access Network Core Network

Title:	⌘ Transmit modulation quality clarification		
Source:	⌘ RAN WG4		
Work item code:	⌘ TEI5	Date:	⌘ 05/03/2003
Category:	⌘ F	Release:	⌘ Rel-5
	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 R-99 specifications for transmit modulation quality do not explicitly state that the requirements of subclause 6.8 apply to all UE transmissions including access bursts (e.g. PRACH bursts). The period of measurement for EVM and PCDE measurements also required clarification. This CR is an alignment with FDD. (CR 191 to TS25.101 Rel-5, which was approved at RAN4#24)
Summary of change:	⌘ Missing Transmit modulation requirement for PRACH bursts is added. Measurement interval for EVM and PCDE measurements is clarified, it is noted that EVM measurements do include the midamble, whereas PCDE measurements do not.
Consequences if not approved:	⌘ It could be mistakenly assumed that there are no requirements for transmit modulation for access bursts such as PRACH.

Clauses affected:	⌘ 6.8						
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Y</td> <td style="padding: 2px;">N</td> </tr> <tr> <td style="padding: 2px;"><input type="checkbox"/></td> <td style="padding: 2px;"><input checked="" type="checkbox"/></td> </tr> </table>	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Other core specifications	⌘ 34.122
	Y	N					
	<input type="checkbox"/>	<input checked="" type="checkbox"/>					
	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;"><input checked="" type="checkbox"/></td> <td style="padding: 2px;"><input type="checkbox"/></td> </tr> </table>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Test specifications			
<input checked="" type="checkbox"/>	<input type="checkbox"/>						
<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px;"><input type="checkbox"/></td> <td style="padding: 2px;"><input checked="" type="checkbox"/></td> </tr> </table>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	O&M Specifications				
<input type="checkbox"/>	<input checked="" type="checkbox"/>						
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.](#)

6.8.1 Transmit pulse shape filter

The transmit pulse-shaping filter is a root-raised cosine (RRC) with roll-off $\alpha = 0.22$ 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 $\alpha = 0.22$ and T_c is the chip duration

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 corresponding to the considered chip rate and roll-off $\alpha = 0.22$. 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 period of measurement shall be one transmit timeslot excluding the guard period.](#) ~~The measurement interval is one timeslot.~~ See Annex B of TS 34.122 for further details.

6.8.2.1 Minimum Requirement

The Error Vector Magnitude shall not exceed 17.5 % for the parameters specified in Table 6.9.

Table 6.9: Test 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

This specification is applicable for multi-code transmission only.

The code domain error is computed by projecting the error vector power onto the code domain at a specific spreading factor. The error power for each code is defined as the ratio to the mean power of the reference waveform expressed in dB. ~~And t~~ [The Peak Code Domain Error is defined as the maximum value for Code Domain Error. The period of measurement shall be one transmit timeslot excluding the guard period, and the midamble.](#) ~~The measurement interval is one timeslot.~~

6.8.3.1 Minimum Requirement

The peak code domain error shall not exceed -21 dB at spreading factor 16 for the parameters specified in Table 6.9.

The requirements are defined using the UL reference measurement channel specified in subclause A.2.7.