Source: **T1**

Title: **CR's to TS 34.122 v3.0.0 for approval**

Agenda item: **6.1**

Document for: **Approval**

This document contains 1 CRs to TS 34.122 v3.0.0. These CRs have been agreed by T1 and are put forward to TSG T for approval.

CRs due to adding/updating/correction of tests:

T1 Doc	Spec	CR	Rev	Phase	Subject	Cat	Version Current	Version -New
T1-000150	34.122	001		R99	Corrections to EVM and PCDE formulae (B.2.7.1, B2.7.2)	F	3.0.0	3.1.0

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

34.122 CR **001**   Current Version: 3.0.0

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

For submission to:	T1#8		for approval	X		strategic		(for SMG
list expected approval meeting # here ↑			for information			non-strategic		use only)

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: (U)SIM ☐   ME **X**   UTRAN / Radio ☐   Core Network ☐
(at least one should be marked with an X)

Source:	T1/RF	**Date:**	2000-08-31

Subject: Corrections to EVM and PCDE formulae

Work item:

Category:	F	Correction		X	**Release:**	Phase 2	
	A	Corresponds to a correction in an earlier release				Release 96	
(only one category	B	Addition of feature				Release 97	
shall be marked	C	Functional modification of feature				Release 98	
with an X)	D	Editorial modification				Release 99	X
						Release 00	

Reason for change:	The EVM and PCDE calculations are relative to R' not R, and should therefore be normalised relative to R' not R.

Clauses affected: B.2.7.1, B.2.7.2

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.

B.2.7.1 Error Vector Magnitude (EVM)

The Error Vector Magnitude EVM is calculated according to the following steps:

1) Take the error vector **E** defined in subclause B.2.7 (Form EVM) and calculate the RMS value of **E**; the result will be called RMS(**E**).

2) Take the varied reference vector **R'** defined in subclause B.2.~~3~~6 and calculate the RMS value of **R'**; the result will be called RMS(**R'**).

3) Calculate EVM according to:

$$\cancel{EVM = \frac{RMS(\mathbf{E})}{RMS(\mathbf{R})} \times 100\%} \quad EVM = \frac{RMS(E)}{RMS(R')} \times 100\%$$

(here, EVM is relative and expressed in %)

(see note TDD)

B.2.7.2 Peak Code Domain Error (PCDE)

The Peak Code Domain Error is calculated according to the following steps:

1) Take the error vectors **e** defined in subclause B.2.7 (Form PCDE)

2) Take the orthogonal vectors of the channelisation - code set **C** (all codes belonging to one spreading factor) as defined in TS 25.213 and TS 25.223 (range +1, -1). (see Note: Symbol length)

3) To achieve meaningful results it is necessary to descramble **e,** leading to **e'** (see Note1: Scrambling code)

4) Calculate the inner product of **e'** with **C**. Do this for all symbols of the measurement interval and for all codes in the code space.
   This gives an array of format k x ns, each value representing an error-vector representing a specific symbol and a specific code, which can be exploited in a variety of ways.

   k: number of codes

   ns: number of symbols in the measurement interval

5) Calculate k RMS values, each RMS value unifying ns symbols within one code.
   (These values can be called "*Absolute CodeEVMs*" [Volt].)

6) Find the peak value among the k "*Absolute CodeEVMs*".
   (This value can be called "*Absolute PeakCodeEVM*" [Volt].)

7) Calculate PCDE according to:

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$$10*lg \; \frac{(\text{``}\textit{Absolute PeakCodeEVM}\text{''})^2}{(RMS(\mathbf{R'}))^2} \; dB$$ (a relative value in dB).

(see Note: Denominator)

(see Note2: Scrambling code)

(see Note IQ)

(see Note TDD)

(see Note Synch channel)