TSG-RAN Working Group 4 (Radio) meeting #8
Sophia Antipolis, France 26-29 October 1999

TSG R4#8 (99)705

Agenda Item: 8.4 & 8.7

Source: Ericsson

Title: Peak code domain error

Document for: Discussion and Approval

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1. Introduction

In the TSG RAN WG4 #3 meeting in Tokyo the concept of Peak Code Domain Error was introduced in Tdoc R4-99107 by Hewlett Packard. The aim of this requirement is to ensure that modulation errors are evenly spread in the code domain. The proposal was accepted and included in the requirement specifications. However, no requirement or test case has been defined. This Tdoc aims at furthering the discussion and proposes requirements and a test case.

2. Discussion

The purpose of the peak code domain error requirement is to ensure that the modulation errors are evenly spread over the codes, and not only over a few codes for which performance would be degraded. This phenomenon can not be detected in the Error Vector Magnitude test, which is measured before despreading.
The peak code domain error test shall be performed with the BS operating under conditions that are close to normal. I.e. with many codes transmitted at the same time. We propose to use 50 codes with equal power. Testing at these conditions will ensure that the effects of non-linearites in the BS do not degrade the system capacity.
In [1] the theoretical background is explained in detail. If the error is evenly distributed between the codes, the PCDE becomes:

$PCDE = 10 \cdot \log_{10}(\frac{EVM^2}{SF})$, Where EVM is the Error Vector magnitude and SF is the spreading factor.

EVM is in 25.104 section 6.8.2.1 required to be <12.5%, with a SF of 256 this gives an Peak code domain error of –42 dB.

3. Text proposal for 25.104

6.8.3.1 Minimum requirement

The peak code domain error shall not exceed [-42] dB for a spreading factor of 256.

4. Text proposal for 25.141

7.4.1 Test conditions and measurement method

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1. Connect the base station RF output port to the code domain analyser.
2. Set the base station to transmit a signal modulated in accordance to table XXX. [50 codes with equal power and spreading factor of 256]. Total power at the RF output port shall be the nominal power as specified by the manufacturer.
3. Measure the peak code domain error

7.4.2 Minimum requirement

The peak code domain error shall not exceed [-42] dB.

5. References

[1] Uplink and Downlink Modulation Accuracy, Tdoc TSG R4-99107, Hewlett Packard.