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Title: Liaison Statement to RAN WG1 on chip timing alignment

From: RAN WG4

To: RAN WG1

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RAN WG4 would like to ask the advice of Ran WG1 regarding the requirement for alignment of code channels at the chip level. It has been noticed (see figure below) that the EVM of a received code is very sensitive to small variations in chip timing with respect to the reference code. With significant misalignment, demodulation performance could be affected. The IS-97 specification (extract appended) shows a requirement that codes be aligned within one sixteenth of a chip (± 50 ns at 1.2288 Mcps).

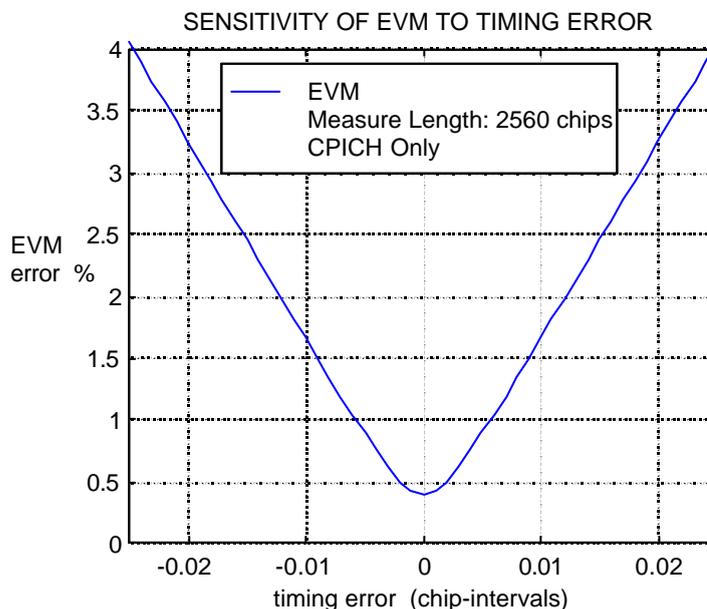
Potential sources for misalignment could be quite varied, e.g. sample misalignment at digital baseband, analogue baseband or IF summing, analogue summing at RF e.g. for soft handover or PA load sharing.

Questions:

1. Is there a requirement for the alignment of code channels at the chip level beyond what is stated in 25.211 subclause 7.1:

“The P-CCPCH, on which the cell SFN is transmitted, is used as timing reference for all the physical channels, directly for downlink and indirectly for uplink.”

2. In the event that a misalignment occurs would it be expected that the UE could handle this up to a certain level e.g. by using the embedded pilot rather than the CPICH? The answer to this may have an impact on the most favourable way to measure modulation quality.



Extract from IS-97 (Recommended Minimum Performance Standards for cdma2000 Spread Spectrum Base Stations)

4.2.1.2 Pilot Channel to Code Channel Time Tolerance

4.2.1.2.1 Definition

Pilot channel to code channel time tolerance is the permissible error in timing between the radiated pilot channel and the other code channels transmitted out of the RF output port containing the same pilot channel within one Forward CDMA Channel.

4.2.1.2.2 Method of Measurement

1. Configure the base station according to the test model described in 6.5.2. Connect the RF output port containing the Forward Pilot Channel as shown in Figure 6.5.1-6.
2. For each band class that the base station supports, configure the base station to operate in that band class and perform steps 3 and 4.
3. Monitor the transmitter output with the code domain power test equipment as described in 6.4.2.2 and measure the relative timing of the active channels.
4. If the base station supports transmit diversity, configure the base station according to the test model described in 6.5.2. Connect the RF output ports as shown in Figure 6.5.1-7.

4.2.1.2.3 Minimum Standard

For code channels on the same Forward CDMA Channel, the time error between the Forward Pilot Channel and all code channels transmitted out of the RF output port containing the Forward Pilot Channel shall be less than ± 50 ns.