Common Public Radio Interface

CPRI TWG open points response of
P802.1CM–D0.4 review

Introduction

- These are the comments/responses to the IEEE 802.1CM-D0.4 open review issues listed on slide 5 in the Editors Report.'

- Some of these comments have though already been resolved by 802.1CM so it is not exactly according to slide 5.

Mapping I/Q data into Ethernet frame #58

- The CPRI TWG does not think that IEEE 802.1CM-specification shall contain any mapping methods for user data. The purpose of 802.1CM is to specify HOW to build a bridged network that is capable of transporting fronthaul data. It is up to the "user" of such networks to specify WHAT is sent.

- CPRI industry cooperation has started the work with a new specification called eCPRI with target publish date August 2017, see Press Release here. A new functional split will be defined (within the PHY Layer).

100µs
#24

- The 100 µs is the budget given to the 802.1CM-network and is a part of the TOTAL latency budget for the complete latency between a Radio Base Station and an UE.
- CPRI TWG looks at the Fronthaul Network as a black-box, the total network latency is defined from the input to the output to/from the network. If the latency is due to distance or number of hops etc. is out of the scope for this requirement.
- If latency is >100 µs then the radio network will have a degraded performance
- The 100 µs is valid for a 4G (LTE/LTE-A) application where the HARQ-processing is performed in the “REC”.
- The value 100 µs comes from a break-down of the HARQ-processing time, i.e. baseband processing such as scheduling etc. needs to be given enough time regarding HARQ-retransmissions etc. and that leaves 100 µs left for fronthaul latency.

Latency requirement on C&M #147 & #76

- #147: After checking with the writer of the comment (David Chen, Nokia) this is a editorial issue and not an issue for CPRI TWG.

- #76: This comment is grouped with comment #68 and will be answered on the slide for that one.

FLR
#180

- The CPRI Technical Group has after simulations etc. come to the conclusion that an FLR of 10^{-7} is an “acceptable” level of lost packets. In a real network running traffic this FLR will not have an measurable effect on the radio network performance. The assumption is however that the packets are lost with a normal distribution i.e. the packets are not lost in a burst way.

- #180: Regarding radio performance FLR requirement as stated in D0.4 is acceptable but network capability will be discussed more.

FLR for Sync #53

- The CPRI Technical group does not want to add any new specific requirements regarding FLR for the PTP sync messages.
- The groups proposal is that 802.1CM should have references to the following 2 standards and sections.
  - Section 6.2.8 in ITU-T G.8275.1 “Message Rate” message rates etc. for PTP.
  - Section 9.5.9.2 in IEEE Std 1588-2008 (March 2008), requirements on message intervals are specified
  - The 802.1CM Network shall not “significantly” impact the above mentioned requirements.

Frequency accuracy #96

- Frequency accuracy is important in order to meet the 3GPP requirement of 50 ppb at the radio air interface
- It is to assumed that a network is able to deliver at least 16 ppb (on the long term) so that the end application can meet 50 ppb (adding some internal budget and budget for holdover.
- G.8261.1, as an example (network limits for frequency sync over packet) explicitly refers to 16 ppb.
- G.8271.1 does not explicitly present any frequency accuracy sync requirement as the overall specification is for time sync, and when 1 us is met in phase, 16 ppb is certainly also met on the long term in frequency.
- As a conclusion CPRI response to 802.1CM is that:
  - the end application needs to meet 50 ppb on the radio interface.
  - 16ppb as worst case at the input of the radio equipment

Time synchronization requirements #25 & #71

- The proposed action for comment #71 are ok from CPRI group.

- For comment #25 in the “Response”-part CPRI suggest to re-write text for Category C into:

  Category C
  [B16] (+/- 1.5 µs, i.e. 1.36 µs + 100ns (GM) + 40ns (internal RE time errors))

Applicability of sync requirements #47 & #97

- #47: The 3GPP timing accuracy requirements are applicable for ALL functional splits (i.e. Class 1, Class 2 ….) for LTE/LTE-A. When selecting timing Category for a specific Class you have to know which 3GPP Features will be used. So either many Classes with same functional split but different timing Categories OR few Classes but you need to specify which timing Category is needed for a specific implementation.

- #97: This comment should be handled by the 802.1CM Editor.

Ctrl_AxC and Vendor Specific Data #68 & #76

- The Ctrl_AxC and VSD is part of CPRI but will not be handled the same way when going from CPRI to an Ethernet based Fronthaul. The requirements already given to IEEE are sufficient also for these data channels. There are 4 CPRI flows Synch, C&M, User Data and Vendor Specific but 3 QoS classes are enough.

When are the Category requirements mandatory #10 & #100

- See text for comment #47. This problem could be resolved by 802.1CM Editor by stating that different timing Categories are applicable for different 3GPP features.