TAE Requirements

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IEEE 1914.1 TF

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Next Generation Fronthaul Interface
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TAE Requirements			
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Outline

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- How Can We Get the Values?

- Motions

Liaison from P1914 to ITU-T SG15/Q13

- Next Q13 meeting is in October. Our request to see C-259 will be dealt with at that meeting.

- SG15 member and new P1914 member, Tim Frost (Calnex), indicated that more statistically-significant analyses is to be done for the C-259 scenarios

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Liaison Response from 3GPP to ITU

- Sept 2017 liaison response from 3GPP to ITU-T SG15 stated that $\pm 1.5\mu s$ is still the common TAE requirement for 5G radios. This value is the same as for 4G radios.

- The TAE requirements for Carrier Aggregation and CoMP (and other enhanced communication methods) are still being studied.

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Suggested Network TAE Targets

Given:

- the lack of new progress in 3GPP
- that all current views for 5G TAE are the same as those for 4G (CPRI, 802.1CM, discussions in ITU)
- that location services have the most stringent requirements we have yet seen

we should work with the following TAE requirements (values given are for the radio):

- ±10ns from closest common BC, for location
- ±32.5ns from closest common BC, for MIMO and Tx diversity
- ±65ns from closest common BC, for intra-band contiguous carrier aggregation
- ±130ns from closest common BC[1], for intra-band non-contiguous and inter-band carrier aggregation
- ±1500ns from any PRTC or ePRTC, for generic services

  1 As specified by CPRI org. However, some standard bodies indicate that this TAE is relative to a common PRTC/ePRTC.

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Problems Defining TAE Requirements

- Many factors affect system performance:
  - ePRTC vs PRTC
  - Number of hops
  - Fiber asymmetry (unidir vs bidir, wavelengths) and compensation
  - Availability of SyncE or eSyncE
  - Full or partial network support for PTP
  - Static and dynamic timestamping errors
- Carriers build their networks differently
- Specifying nodal/device performance requirements may be incompatible to or overly stringent for each network implementation

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How Can We Define Nodal Requirements?

- Not too difficult for single-hop scenarios:
  - Fiber asymmetry (unidir vs bidir, wavelengths) and compensation
  - Model single-hop SyncE or eSyncE wander
  - Static and dynamic timestamping errors

- Need to limit options for multi-hop scenarios:
  - 10 hops and 20 hops?
  - All have eSyncE?
  - Full network support for PTP? Definitely
  - Partial network support for PTP (i.e. GNSS)? Probably

How Can We Get the Values?

- Wait for ITU-T's continuation of C-259 simulations

- Request ITU-T's continuation of C-259 simulations to be run with our selected scenarios

- Run our own simulations or thought-experiments
  - Accurately modeling the behaviour of SyncE/eSyncE wander through many hops may be the most difficult aspect. This is something the ITU-T has in their portfolio.
  - Model without SyncE/eSyncE and assume there is full network support for PTP

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Motion # _____

- Limit multi-hop scenarios to the following:
  - 10 hops and 20 hops
  - All have eSyncE
  - Full network support for PTP
  - Partial network support for PTP (i.e. use GNSS)

- Mover: Richard Tse

- Seconder:

- Yes:__ No:__ Abstain:__

Motion # _____

- Request ITU-T to run statistically significant simulations (as per C-259) for our selected multi-hop scenarios.

- Mover: Richard Tse

- Seconder:

- Yes:__ No:__ Abstain:__

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Motion # _____

- Perform our own modeling, assuming there is full network support for PTP and no SyncE/eSyncE

- Mover: Richard Tse

- Seconder:

- Yes:__   No:__   Abstain:__