IEEE P802.11  
Wireless LANs

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| CFO Reporting Accuracy Requirements | | | | |
| Date: 2019-01-15 | | | | |
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**Abstract**

This submission proposes corrections to the IEEE 802.11\_D0.6 ammendment text for CFO Reporting Accuracy Requirements.

The proposed changes are relative to TGaz Draft 0.6 and TGmd Draft 2.0.

**Discussion**

Some calculations for estimation of ranging errors due to CFO error:

function max\_ranging\_error\_m = ranging\_error(cfo\_ppm\_error, N\_ista,

N\_data\_ofdm\_symbols\_in\_tf,

N\_rsta\_ant, N\_ista\_ant, N\_ltf\_rep)

N\_dl\_ndpa\_ht\_vht\_ltf\_symbols = N\_rsta\_ant \* N\_ltf\_rep; % Approximately

N\_ul\_ht\_vht\_ltf\_symbols = N\_ista\_ant \* N\_ltf\_rep; % Approximately

sifs\_max\_us = 16;

T\_legacy\_preamble\_us = 20;

T\_HT\_VHT\_preamble\_1\_stream\_us = 20;

T\_ul\_tf = T\_legacy\_preamble\_us + T\_HT\_VHT\_preamble\_1\_stream\_us + N\_data\_ofdm\_symbols\_in\_tf \* 4;

T\_dl\_ndpa = T\_legacy\_preamble\_us + T\_HT\_VHT\_preamble\_1\_stream\_us + N\_dl\_ndpa\_ht\_vht\_ltf\_symbols \* 4;

T\_ul\_ndp = T\_legacy\_preamble\_us + T\_HT\_VHT\_preamble\_1\_stream\_us + N\_ul\_ht\_vht\_ltf\_symbols \* 4;

estimated\_max\_time\_between\_measurements\_us = 2 \* sifs\_max\_us + N\_ista \* (T\_ul\_tf + T\_ul\_ndp + sifs\_max\_us) + T\_dl\_ndpa;

max\_ranging\_error\_m = (estimated\_max\_time\_between\_measurements\_us \* cfo\_ppm\_error/1e6) \* 1e-6 \* 3e8 /2;

return

**Example ranging error calcultions as a function of CFO error**

Max ranging error for the somewhat extreme case of 10 ISTAs, 10 OFDM data symbols per trigger frame, 8 RSTA antennas, 4 ISTA antennas and 8 HT/VHT-LTF repetitions:

>> [max\_ranging\_error\_m, max\_ista\_to\_rsta\_differential\_ranging\_error\_m, max\_ista\_to\_ista\_differential\_ranging\_error\_m] = ranging\_error(0.25, 10, 10, 8, 4, 8)

max\_ranging\_error\_m = 0.1113

max\_ista\_to\_rsta\_differential\_ranging\_error\_m = 0.1113

max\_ista\_to\_ista\_differential\_ranging\_error\_m = 0.2226

**Conclusion**

Seems we don’t have a very strong argument to use higher resolution than the now specified 0.5 ppm for the CFO reporting in the Passive Location Ranging, for which we need 1 byte to cover a CFO of about +-64ppm.

Proposal: Use 1 byte and a resolution of 0.5 ppm also for the TB Ranging case.

**Proposed amendment text change**

***TGaz Editor: Edit Section 9.6.7.37 (Location Measurement Report frame format) as shown below:***

**9.6.7.37 Location Measurement Report frame format**

**…**

The CFO parameter in ISTA-to-RSTA LMR indicates the clock rate difference between ISTA and RSTA. The CFO parameter is 1 octet long and it is a number in two’s complement format in units of 0.5 ppm.

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