IEEE P802.11
Wireless LANs

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| Proposed Resolution of TGme CIDs 6116, 6117, and 6123 |
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Abstract

Proposed resolution for the comments to the first WG LB of 802.11REVme D4.0 to CIDs 6116, 6117, and 6123 are provided.

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| **CID** | **TEG** | **Clause** | **P** | **L** | **Comment** | **Resolution** | **Proposed**  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 6116 | T | 15.2.3 | 3124 | 61 | The definition of RX\_START\_OF\_Frame\_OFFSET seems to only be located in the RXVECTOR parameter tables and the definition itself does not make sense. All timing parameters for measurements are provided by the PHY, the MAC only uses the PHY supplied values. Hence, "an estimate of the offset from the point in time at which the start of the preamble off the PPDU arrived at the received antenna connector to the point in time at which this primitive is issued to the MAC" does not make sense. In clause 8.3.5.6.3 there is a note stating that a more precise name for RX\_START\_OF\_FRAME\_OFFSET would be RX\_START\_OF\_PPDU\_TO\_PHY\_RXSTART\_PRIMITIVE\_OFFSET. In clause 15.2.3 RXVECTOR parameters all of the parameters are defined in subclauses except the RX\_START\_OF\_FRAME\_OFFSET parameter. However in clause 6.3.55.1 an offset is mention in Note 2 that describes an offset that can be used to correct the timestamp generated by the PHY by subtracting the delay between actual start of frame arrival at the antenna to when the timestamp is generated (this is an implementation specific value). I believe that this offset is the RX\_START\_OF\_FRAME\_OFFSET. Also note that previous versions of 802.11 (e.g. 2012) had two times shown Figure 6-16 t2 and t3, where t3 corresponded to the time stamp and t2 the time of arrival, which was "t3"-"the offset". | Replace: "An estimate of the offset (in 10 ns units) from the point in time at which the start of the preamble of the PPDU arrived at the receive antenna connector to the point in time at which this primitive is issued to the MAC." With: "An estimate of the offset (in 10 ns units) from the point in time at which the start of the preamble of the PPDU arrived at the receive antenna to the point in time that the time stamp is generated." Note this definition should also be corrected at the following additional locations: 3457.12, 3523.6, 3541.42, 3698.27, 3828.10, 3881.20, and 4540.36 (8 locations in all). Also note that in the final location the units are 0.1 ns not 10 ns as elsewhere. |  |
| 6117 | T | 15.3.7 | 3132 | 37 | The note states that the RX\_START\_OF\_FRAME\_OFFSET value is used to estimate the start of the preamble, but this is not correct. It is used as an offset to correct the estimated start of the preamble, not to estimate it. The note should be corrected. | Replace the NOTE with the following: "NOTE—The RX\_START\_OF\_FRAME\_OFFSET value is the offset used to compensate for the delay in generating the timestamp as described in 6.3.55 (Timing measurement). The estimated arrival time of the start of the preamble for the incoming PPDU is the value of the timestamp minus the value of RX\_START\_OF\_FRAME\_OFFSET." Note this note should also be corrected at the following additional locations: 3157.55, 3218.19, 3327.56, 3385.58, 3501.30, 3825.45. (7 locations in all). |  |
| 6123 | T | 16.2.6 | 3157 | 56 | The phrase "... was detected on the medium at the receive antenna connector." does not make sense, was it detected on the medium or at the receiver antenna connector? It can't be both. 802.11 generally references all measurement to the receiver antenna connector. But for this case it is not clear where the time reference should be taken from. Is it when the PPDU preamble arrives at the antenna medium interface? Or, is it the antenna connector (which is a virtual or physical location in the STA). Given that location accuracy, may depend on where the measurement is taken and referenced to, this should be clear. Depending on antenna implementation, the time it takes for the PPDU to go from the antenna medium interface to the antenna connector may be a significant duration and may impact the STAs ability to perform high accuracy location. | Replace: "... was detected on the medium at the receive antenna connector." With: ".... was detected at the receive antenna connector." There are other location where this change should be made 3327.56, 3385.58, 3501.31, 3704.17, and 3825.46. Note: this choice may require a new offset value be provided for the delay between the time the PPDU is detected at the antenna medium interface and the time it is detected at the antenna connector, or it might change the definition of the RX\_START\_OF\_FRAME\_OFFSET. |  |

**Background (key statements in the specification 802.11me D3.0):**

These comments address the Receive PHY (15.3.7, 16.2.6, 17.2.12, ) requirements for timing information when dot11TemingMsmtActiveated is true. When true, the for a successful reception of a PPDU will cause the PHY to forward a PHY-RXSTART.indication(RXVECTOR) primitive and the RX\_START\_OF\_FRAME\_OFFSET parameter within the RXVelctor to the MAC. The PHY-RXSTART.indication(RXVECTOR) primitive is generated when the PHY header has been received (the end of the CRC, see figures 15-8 (3125.1), 16-6 (3150.1), 17-19 (3210.1), 19-26 (3318.1), 21-36 (3491.1), 23-50 (3693.23-51 (3694.1) 23-52 (3694.36), 25-38 (3817.1) . The requirement provides a note to describe the RX\_START\_OF\_Frame\_OFFSET and its reference point: “NOTE—The RX\_START\_OF\_FRAME\_OFFSET value is used (#3049)to estimate when the start of the preamble for the incoming (#14)PPDU was detected on the medium at the receive antenna connector.” (3125.37, 3150.55, 3211.18, 3320.56, 3378.58, 3493.30, 3696.16, 3817.45 ) – Also see Tables 16-5 (3156.12), 18-3 (3221.6), 19-1 (3239.42), 21-1 (3396.39), 22-1 (3527.1), 23-1 (3582.1), 27-1 (4008.39), 28-1 (4246.52)

Also referenced at 4244.23.

In 8.3.5.6.3 (557.41) the RX\_START\_OF\_FRAME\_OFFSET value is described in a note as: “(#14)NOTE—A more precise name for TX\_START\_OF\_FRAME\_OFFSET would be TX\_START\_OF\_PPDU\_TO\_PHY\_TXSTART\_PRIMITIVE\_OFFSET. Similarly, a more precise name for RX\_START\_OF\_FRAME\_OFFSET would be RX\_START\_OF\_PPDU\_TO\_PHY\_RXSTART\_PRIMITIVE\_OFFSET.”

3125.40: The RXVECTOR associated with this primitive includes the SIGNAL field, the SERVICE field, the

(#14)PSDU length in octets (calculated from the LENGTH field in microseconds), the antenna used for

receive (RX\_ANTENNA), RSSI, and SQ.

1581.62: The TOD field contains a timestamp that represents the time, with respect to a time base, at which the start

of the preamble of the last transmitted Fine Timing Measurement frame appeared at the transmit antenna

connector.

1582.1: The TOA field contains a timestamp that represents the time, with respect to a time base, at which the start

of the preamble of the Ack frame to the last transmitted Fine Timing Measurement frame arrived at the

receive antenna connector.

3118.37: (#1373)(#1370)TX\_START\_OF\_FRAME\_OFFSET is an estimate of the offset (in 10 ns units) from the

point in time at which the start of the preamble (#14)of the PPDU was transmitted at the transmit antenna

connector to the point in time at which this primitive is issued to the MAC.

**Discussion:**

For the RX START OF FRAME OFFSET to be meaningful, it must provide an offset that allows for the TOA to be “corrected” so that the measured arrival time of the start of the PPDU preamble at the antenna connector (the TOA) can be “offset” to estimate the time that the start of the PPDU preamble arrives at the media/antenna interface. As the time of arrival at the media/antenna interface is the time that is used to calculate the “time of flight” of the PPDU. The “time of flight” is the time difference between the departure of the start of the PPDU preamble from the antenna/media interface of the transmitter to the time the start of the PPDU preamble arrives at the media/antenna interface of the receiver.

The statement in the specification that: “NOTE—The RX\_START\_OF\_FRAME\_OFFSET value is used (#3049)to estimate when the start of the preamble for the incoming (#14)PPDU was detected on the medium at the receive antenna connector.” Does not make any sense because “detected on the medium” and “at the receiver antenna connector” are not the same location, and there is no need to know an offset in time to the antenna connector because the TOA is already defined to be referenced to the antenna connector.

Therefore, the revised resolutions are:

For CID 6116

Replace:

"An estimate of the offset (in 10 ns units) from the point in time at which the start of the preamble of the PPDU arrived at the receive antenna connector to the point in time at which this primitive is issued to the MAC."

With: "An estimate of the offset (in 10 ns units) from the point in time at which the start of the preamble of the PPDU arrived at the receive antenna media/antenna to the point in time that start of the PPDU arrives at the antenna connector."

For CIDs 6117 and 6123:

Replace:

"NOTE—The RX\_START\_OF\_FRAME\_OFFSET value is used (#3049)to estimate when the start of the preamble for the incoming (#14)PPDU was detected on the medium at the receive antenna connector.

With:

NOTE—The RX\_START\_OF\_FRAME\_OFFSET value is used to estimate when the start of the preamble for the incoming PPDU arrived at the medium/antenna interface of the receiving STA. The estimated arrival time of the start of the preamble for the incoming PPDU at the medium/antenna interface is the value of the TOA minus the value of RX\_START\_OF\_FRAME\_OFFSET."

At the locations provided.**References:**