IEEE P802.11
Wireless LANs

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| LB 203 Comment Resolution for Timing Measurement related fixes to Clause 24 PHY |
| Date: 2014-08-25 |
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Abstract

This submission proposes resolutions for comments in Clause 24 PHY of TGah Draft 2.0 in order to be usable in the Timing Measurement Protocol (10.24.5) with the following CIDs:

* 3534, 3535

Revisions:

* Rev 0: Initial version of the document.

Note: During the review of this submission it was discovered that Cl. 7.3.5.6.3 which describes the PHY-TXSTART.confirm primitive specifies the conditions when a PHY-TXSTART.confirm is generated and indicated to the MAC. A few errors were identified in the set of conditions specificed in Cl. 7.3.5.6.3 of REVmc Draft3.0. In addition, it was observed that content of the TXSTATUS vector included in the PHY-TXSTART.confirm is best described in Cl. 7.3.5.6.3 instead of repeating it in the description of the PHY Transmit Procedure for each 802.11 PHY.

As a result, Cl. 7.3.5.6.3 will be amended as follows:

This primitive is issued by the PHY to the MAC entity once all of the following conditions are met:

— The PHY has received a PHY-TXSTART.request primitive from the MAC entity.

— ~~If dot11TODImplemented and dot11TODActivated are true or if dot11TimingMsmtActivated is true.~~

~~— If the TXVECTOR parameter TIME\_OF\_DEPARTURE\_REQUESTED in the PHYTXSTART.request(TXVECTOR) primitive is true.~~

— The PHY is ready to begin accepting outgoing data octets from the MAC.

If dot11TODImplemented and dot11TODActivated are both true or dot11TimingMsmtActivated is true; and the parameter TIME\_OF\_DEPARTURE\_REQUESTED in the TXVECTOR specified in the PHY-TXSTART.request is true, then the PHY shall include the TIME\_OF\_DEPARTURE and TIME\_OF\_DEPARTURE\_ClockRate parameters in the TXSTATUS vector (See Table 21-2).

If dot11TimingMsmtActivated is true, then the PHY shall include TX\_START\_OF\_FRAME\_OFFSET in the TXSTATUS vector (See Table 21-2).

This change will be proposed to REVmc.

Interpretation of a Motion to Adopt

A motion to approve this submission means that the editing instructions and any changed or added material are actioned in the TGah Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGah Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGah Editor: Editing instructions preceded by “TGah Editor” are instructions to the TGah editor to modify existing material in the TGah draft. As a result of adopting the changes, the TGah editor will execute the instructions rather than copy them to the TGah Draft.***

**Discussion: Background of Timing measurement protocol**

When Timing Measurement action frame and the corresponding ACK are transmitted/received, timestamps t1, t2, t3 and t4 corresponding to the time of departure of the Timing Measurement action frame at the transmitter (t1), the time of arrival of the Timing Measurement action frame at the receiver (t2), the time of departure of the ACK to the Timing Measurement action frame at the receiver (t3) and the time of arrival of the ACK to the Timing Measurement action frame at the transmitter (t4) are captured by the corresponding PHY.

Clause 7.3.4.2 describes the PHY-SAP that the PHY exposes to the MAC – specifically, PHY-TXSTART.request (TXVECTOR), PHY-TXSTART.confirm (TXSTATUS) and PHY-RXSTART.indication (RXVECTOR) are of interest to the Timing Measurement protocol.

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| **CID** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 3534 | 253 | 24.2.2 | TxVector and RxVextor definitions need to be updated to include support for 802.11v Timing Measurement feature | The commenter will bring a submission to resolve this issue. | Rejected- To use timing measurement protocol, in each of the PHY clauses, TXVECTOR needs to be extended to include a TIME\_OF\_DEPARTURE\_REQUESTED to indicate that in the corresponding PHY-TXSTART.confirm we expect TIME of Departure values to be returned in TXSTATUS. Further, RXVECTOR needs to be extended to include a RX\_START\_OF\_FRAME\_OFFSET. Indeed, in Table 24-1 Page 369 Line 32-50, TIME\_OF\_DEPARTURE\_REQUESTED and RX\_START\_OF\_FRAME\_OFFSET are already included in theTXVECTOR and RXVECTOR.Hence, no revisioins are required for TXVECTOR and RXVECTOR. . |
| 3535 |  | 24.3.18 and 24.3.19 | PHY Transmit and Receive procedures need to be updated with details related to 802.11v Timing Measurement. | The commenter will bring a submission to resolve this issue. | Revised–Agree with the commenter.The PHY transmit procedure (24.3.18) corresponding to Clause 24 (802.11ah) needs to be updated related to 802.11v Timing Measurement.The PHY receive procedure (24.3.19) corresponding to Clause 24 (802.11ah) needs to describe conditions under which the RXVECTOR would include Time of Arrival parameters (RX\_START\_OF\_FRAME\_OFFSET).TGah editor to make the changes shown in 14/xxxxr0 under all headings that contain CID 3535. |

**Propose:**

* Revised for CID 3535, per discussion and editing instructions in 11-14/xxxxr0.

***TGah Editor: Insert the following between paragraphs 5 and 6 in Clause 24.3.18 PHY transmit procedure as follows:*** *(CID3535)*

The PHY indicates the state of the primary channel and other channels (if any) via the PHY-CCA.indication primitive (see 24.3.17.5 (CCA sensitivity)) and 7.3.5.11 (PHY-CCA.indication)). Note that under some circumstances, the MAC uses the value of the PHY-CCA.indication primitive before (and if) issuing the PHY-TXSTART.request primitive. Transmission of the PPDU shall be initiated by the PHY after receiving the PHY-TXSTART.request(TXVECTOR) primitive. The TXVECTOR elements for the PHYTXSTART.request primitive are specified in Table 24-1 (TXVECTOR and RXVECTOR parameters).

Transmission of the PHY preamble shall start immediately, using the parameters passed in the PHY-TXSTART.request primitive and the PHY shall issue a PHY-TXSTART.confirm (TXSTATUS) primitive to the MAC.

After the PHY preamble transmission isstarted, the PHY entity immediately initiates data scrambling and data encoding. The encoding method for the Data field is based on the FEC\_CODING, CH\_BANDWIDTH, NUM\_STS, STBC, MCS, and NUM\_USERS parameter of the TXVECTOR, as described in 24.3.2 (S1G PPDU format).

***TGah Editor: Change the fifth paragraph in Clause 24.3.19 PHY receive procedure as follows:*** *(CID 3535)*

After the PHY-CCA.indication(BUSY) is issued, the PHY entity shall search for the CE field and begin receiving the CE field. The PHY demodulates the header according to the PHY typedetermined the reception of the CE field. If the CE field indicated a SC PHY, the receiver is capable of receiving low-power SC PHY, and dot11LowPowerSCPHYActivated is true, then the PHY shall attempt to demodulate both a SC header and an SC low-power header. The PHY shall decode the header and determine the MCS, length and other parameters needed for the demodulation of the packet.

Subsequently, if dot11TimingMsmtActivated is true, a PHY-RXSTART.indication (RXVECTOR) shall be issued and RX\_START\_OF\_FRAME\_OFFSET parameter within the RXVECTOR shall be forwarded (see 24.2.2 (TXVECTOR and RXVECTOR parameters)).

NOTE—The RX\_START\_OF\_FRAME\_OFFSET value is used as described in 6.3.57 (Timing measurement) in order to estimate when the start of the preamble for the incoming frame was detected on the medium at the receive antenna connector.

At the end of the data portion of the packet, the PHY shall indicate a PHY-RXEND.indication(No\_Error) primitive to the MAC. If the header indicated the presence of training field, the PHY shall continue to receive these training fields after the data portion of the packet and measure the channel. After the end of the training fields, the PHY shall generate a PHY-CCA.indication(IDLE) primitive.