IEEE P802.11
Wireless LANs

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| TB NDP Ranging Synchronization  |
| Date: 2019-03-10 |
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Abstract

This submission proposes the text for TB NDP ranging synchronization.

Revisions:

* R0:

Initial text of TSF synchronization in TB NDP.

* R1:

Partial TSF time in Ranging NDP Announcement is changed to 16 bits TSF[21:6]

The adjustment of TSF[63:22] of ISTA is added

Clarify that the TSF[21:6] in Partial TSF is the start time when RSTA transmits PSDU with Trigger Poll.

* R2:

Change the adjustment of TSF[63:22] to a note.

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 TGax Draft. This introduction is not part of the adopted material.

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

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

**The text preceded by “Discussion” is not part of the adopted changes.**

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| **CID** | **Section** | **Page** | **Line** | **Comment** | **Proposed Change** | **Resolution** |
| 1888 | 11.22.6.4.3 | 93 | 14 | The method to synchronize STA(ISTA) with AP(RSTA) for TN NDP ranging should be defined | As in comment | RevisedDiscussion: agree with the comment. ISTA needs to synchronize its TSF time with RSTA. Otherwise ISTA may miss the negotiated TB NDP ranging service period. The synchronization method through Beacon/Probe Response may not be suitable for ISTAs working in off channel. One possible method is that the RSTA announces its partial TSF time e.g. TSF LSB[21:6] of its trigger polling transmission. When partial TSF time is used for TSF synchronization, the nontransmitted part of TSF, e.g. TSF[63:22] between ISTA and RSTA may be different. One example is following: Before ISTA’s TSF setting per the partial TSF[21:6], AP’s TSF[63:22] is Y, TSF[21:6] is 0xFFF8. STA’s TSF[63:22] is Y+1, TSF[21:6] is 0x0009. This issue is also fixed. TGaz editor, please make changes as showing in 11-19/0470r2 with the tag CID 1888 |

**9.3.1.19 VHT/HE/Ranging NDP Announcement frame format**

***TGaz editor: add the following text at the end of subclause 9.3.1.19:***

(#1888)When AID11/RID11 has value 2044, the STA Info field is defined as follows:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | B0 B10 | B11 B26 | B27 | B28 | B29 B31 |
|  | AID11/RID11 | Partial TSF | Disambiguation | Reserved | Token |
| Bits: |  11 | 16 | 1 | 1 | 3 |

(#1888) One STA Info field with AID11/RID11 field equal to 2044 is present in a Ranging NDP Announcement frame when Ranging NAP Announcement is for TB NDP ranging. The STA Info field with AID11/RID11 field equal to 2044 is the first STA Info field within Ranging NDP Announcement frame. The STA Info field with AID11/RID11 field equal to 2044 carries TSF[21:6] when the RSTA transmits Trigger Poll frame that procedes the Ranging NDP Anouncement frame.

(#1888) The Token field is set to the value of Token field of the Trigger Poll frame whose prartial transmission TSF time is carried.

**9.3.1.23.9 Ranging Trigger variant**

***TGaz editor: change figure Figure 9-61d*** *Trigger Dependent Common Info subfield for the Ranging Trigger variant**as follows:*

|  |  |  |  |
| --- | --- | --- | --- |
|  | B0 B3 | B4 | B5 B7 |
|  | Ranging Trigger Subtype | Reserved | Token |
| Bits: |  4 | 1 | 3 |

***TGaz editor: add the following paragraph at the end of 9.3.1.23.9:***

(#1888) The Token field is reserved in Ranging Trigger other than Trigger Poll frame. In a Trigger Poll frame, the Token field is used to match the Trigger Poll frame with the partial TSF time in Ranging NDP Announcement frame.

**11.22.6.4.3 Measurement Exchange in TB Mode**

**11.22.6.4.3.3 TB Ranging Measurement Sounding Part**

***TGaz editor: add the following paragraph in 11.22.6.4.3.3:***

(#1888) A RSTA maintains a trigger poll counter. Before transmitting a Trigger poll frame, the RSTA shall increase trigger poll counter by one (modulo 16) and set the Token field of the Trigger Poll per the value in trigger poll counter.

(#1888) When transmitting a Ranging NDP Announcement frame, a RSTA shall include a value in Partial TSF field that equals to RSTA’s TSF[21:6] at the time that the first data symbol of the PSDU is transmitted to the PHY plus the RSTA’s delays through its local PHY from the MAC-PHY interface to its interface with the WM. Additionally, the RSTA shall set the Token subfield in the STA Info field with AID11/RID11 subfield equal to 2044 to the value of the Token subfield in the Trigger Poll frame whose partial TSF time is carried in the Ranging NDP Annoucnement frame.

(#1888) NOTE----An ISTA needs to adjust its TSF time to make sure the TSF[63:22] is same as RSTA’s TSF[63:22] when adjusting TSF[21:6]. When receiving a Ranging NDP Announcement frame from a RSTA for TB ranging, an ISTA could use the partial TSF value in the received Ranging NDP Announcementr frame to synchronize its TSF with the RSTA’s TSF in order to determine the start of subsequent TB based measurement service period:

* If ISTA’s TSF[21:6] at the reception of Trigger Poll is larger than the received Partial TSF and TSF [21:6] – Partial TSF is more than 216-1, ISTA’s TSF [63:22] is increased by 1. If ISTA’s TSF [21:6] at the reception of Trigger Poll is less than Partial TSF and Partial TSF –TSF [21:6] is more than 216-1, ISTA’s TSF [63:22] is decreased by 1.

ISTA’s TSF[21:6] is set to the sum of the value of Partial TSF and the time between the reception of Trigger Poll and the reception of Ranging NDP Announcement in the same TB NDP ranging sequence. If the sum of the value of Partial TSF and the time between the reception of Trigger Poll and the reception of Ranging NDP Announcement in the same TB NDP ranging sequence is more than 222, ISTA’s TSF [63:22] is increased by 1.