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Wireless LANs

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| Correction to remove behaviour from clause 9.3.1.5 |
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Abstract

During discussions in TGbi some behavioural text in the current clause 9.3.1.5 was pointed to, as it needs to be updated to allow for TGbi operations (see 11-24/1717r0 slide 10). This illustrates why 802.11 should not contain behavioural text in clause 9, as stated in the SA and 802.11 style guides. Hence this proposed correction. It is unfortunate that this correction will not be able simplify the 802.11bi draft as 802.11bi will be based on 802.11-2024 (802.11me) and proceed amendments (e.g., 802.11bh, 802.11be, …). But this is not a reason not to make the proposed change. Please note this is an example of clause 9 behavioural text that should be removed, if TGmf agrees to this proposed way forward, additional changes to remove more behavioural text will be provided.

Introduction/background:

The [802.11 specification style guide](https://mentor.ieee.org/802.11/dcn/09/11-09-1034-21-0000-802-11-editorial-style-guide.docx) states that behavioural requirements should not be contained in clause 9, clause 3.4 states:

 “Statements that describe the actions of a STA in order to determine a value for a field and any other behavioural specification should not be present in Clause 9.”

Unfortunately, many behavioural requirements exist in Clause 9. These behavioural requirements have the impact of making the specification difficult to maintain and are often redundant with requirements in the behavioural clauses. Behavioural requirements in Clause 9 should be removed from the specification, if they are redundant then no additional changes need be made, if the behavioural requirement in not elsewhere in the specification it should be moved to the appropriate location. The only purpose of clause 9 is to provide the format of fields and elements, so that other clauses that specify behaviour can use the defined formats without the need to define them in the behavioural clause. This promotes the ability to reuse fields and elements and allows for the definitions to be easily found in one location (clause 9).”

When drafting text in in TGbi the current clause 9.3.1.5 was pointed to, as needing to be updated to allow for TGbi operations (see 11-24/1717r0 slide 10). This update is necessary because clause 9.3.1.5 contains the following highlighted behavioural text:

**“9.3.1.5 PS-Poll frame format**

**9.3.1.5.1 General**

The frame format for the PS-Poll frame is defined in Figure 9-44 (PS-Poll frame format).

The BSSID (RA) field is set to the address of the STA contained in the AP. The TA field(#3522) is the address of the STA transmitting the frame or a bandwidth signaling TA. In a PS-Poll frame transmitted by a VHT STA or an HE STA(11ax) in a non-HT or non-HT duplicate format and where the scrambling sequence carries the TXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT, the TA field(#3522) is a bandwidth signaling TA.

**9.3.1.5.2 Non-BDT variant of the PS-Poll frame format**

The Duration/ID field contains the AID value assigned to the STA transmitting the frame by the AP in the (Re)Association Response frame that established that STA’s current association, with the two MSBs set to 1.

**9.3.1.5.3 BDT variant of the PS-Poll frame format**

A PS-Poll frame with the Duration/ID field that contains a duration value as described in 9.2.5 (Duration/ID field (QoS STA)) is a BDT variant of the PS-Poll frame and is referred to as PS-Poll+BDT frame.

The Poll Type field in the Frame Control field of the PS-Poll+BDT frame is set to 0.

Bit 15 of the Duration/ID field of a PS-Poll+BDT frame is set to 0.

A non-S1G STA does not transmit PS-Poll+BDT frames.” [1]

The AID value assignment and use is mentioned in many other location in the specification, but this contribution is just addressing this one case as an example of the harm such behavioral text causes when it is in clause 9:

1. Restricting the usability of the format to the case where the behavior is desired.
2. Requiring any future use of the format to correct/extend the behavior for any new or different behavior.
3. Making maintenance of the 802.11 specification much more complicated than it needs to be.

The behaviour need not be provided in Both clauses 9.3.1.5.2 and 9.3.1.5.3 are unnecessary as the specialised use of the Duration/ID field required by BDT should be described in the BDT clause and the behaviour of non-BDT could be provided by the legacy text in 802.11-2016, with an edit to allow for the duration used in 802.11ah. Therefore, it is suggested that the text of 9.3.1.5 be modified and the behaviour described in 9.3.1.5.3 be provided in clause 10.49 Bidirectional TXOP, as shown below:

**9.3.1.5 PS-Poll frame format**

The frame format for the PS-Poll frame is defined in Figure 9-44 (PS-Poll frame format).

The BSSID (RA) field is set to the address of the STA contained in the AP. The TA field(#3522) is the address of the STA transmitting the frame or a bandwidth signaling TA. In a PS-Poll frame transmitted by a VHT STA or an HE STA(11ax) in a non-HT or non-HT duplicate format and where the scrambling sequence carries the TXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT, the TA field(#3522) is a bandwidth signaling TA.

The Duration/ID field contains the AID value of the transmitting STA, with the two MSBs set to 1 when an ID is provided or a duration in a PS-Poll+BDT frame (10.49.2).

**10.49.2 Rules for BDT**

Throughout this subclause, an S1G STA signals a Response Indication of Long Response by setting the TXVECTOR parameter RESPONSE\_INDICATION to Long Response for non-NDPs and by setting the Idle Indication field to 1 and the Duration field to 0 for NDP (PS-Poll-)Ack frames. The S1G STA signals a Response Indication of No Response by setting the TXVECTOR parameter RESPONSE\_INDICATION to No Response for non-NDPs or by setting the Idle Indication field to 0 and the Duration field to 0 for NDP (PS-Poll-)Ack frames. The S1G STA signals a Response Indication of Normal Response by setting the TXVECTOR parameter RESPONSE\_INDICATION to Normal Response for non-NDPs.

An S1G-STA sending a PS-Poll+BDT frame shall set the duration value as described in 9.2.5, the Poll Type field in the Frame Control field to 0, and bit 15 of the Duration/ID field to 0. A non-SIG STA does not transmit PS-Poll+BDT frames.

History of Clause 9.3.1.5.2:

In [1] IEEE P802.11-ReVme/D7.0, August 2024 as show above and as in [2].

In [2] IEEE Std 802.11-2020 as shown above.

In [3] IEEE Std 802.11-2016 Sub-Clauses 9.3.1.5.1, 9.3.1.5.2, and 9.3.1.5.2 did not exist, but some of their content was provided in Clause 9.3.1.5 PS-Poll frame format, shown below.

**9.3.1.5 PS-Poll frame format**

The frame format for the PS-Poll frame is as defined in Figure 9-23.

The BSSID is the address of the STA contained in the AP. The TA field value is the address of the STA transmitting the frame or a bandwidth signaling TA. In a PS-Poll frame transmitted by a VHT STA in a non-HT or non-HT duplicate format and where the scrambling sequence carries the TXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT, the TA field value is a bandwidth signaling TA. The ID field contains the AID value assigned to the STA transmitting the frame by the AP in the (Re)Association Response frame that established that STA’s current association, with the two MSBs set to 1.

The first changes were introduced in [4] 802.11ah-2016 when BDT – bidirectional TXOP added. The changes made to Clause 9.3.1.5 in [4] add the subclauses: 9.3.1.5.1 (an edited version of 9.3.1.5) and 9.2.1.5.2. As shown below:

***Insert the following subclause title after the subclause title for 9.3.1.5:***

**9.3.1.5.1 General**

***Change 9.3.1.5.1 as follows:***

The frame format for the PS-Poll frame is as defined in Figure 9-23.

The BSSID (RA) field is set to the address of the STA contained in the AP. The TA field is the address of the STA transmitting the frame or a bandwidth signaling TA. In a PS-Poll frame transmitted by a VHT STA in a non-HT or non-HT duplicate format and where the scrambling sequence carries the TXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT, the TA field value is a bandwidth signaling TA.

The Duration/ID field contains the AID value assigned to the STA transmitting the frame by the AP in the (Re)Association Response frame that established that STA’s current association, with the two MSBs set to 1.

***Insert the following subclause (9.3.1.5.2) after 9.3.1.5.1:***

**9.3.1.5.2 BDT variant of the PS-Poll frame format**

A PS-Poll frame with the Duration/ID field that contains a duration value as described in 9.2.5 is a BDT variant of the PS-Poll frame and is referred to as PS-Poll+BDT frame.

The Poll Type field in the Frame Control field of the PS-Poll+BDT frame is set to 0.

Bit 15 of the Duration/ID field of a PS-Poll+BDT frame is set to 0.

A non-S1G STA does not transmit PS-Poll+BDT frames.

The 802.11bh edits were added to draft 802.11REVmd-D1.0.

No changes were made in D2.0.

Edits were made in D3.0 in response to comment 2558, adding 9.3.1.5.2 and moving the old 9.3.1.5.2 to be 9.3.1.5.3, as shown below (note additional editorial changes were made in REVme):

**9.3.1.5 PS-Poll frame format**

**9.3.1.5.1 General(11ah)**

The frame format for the PS-Poll frame is as defined in Figure 9-33 (PS-Poll frame format(#2607)(11ah)).

The BSSID (RA) field is set to(11ah) (#2555)the address of the STA contained in the AP. The TA field value is the address of the STA transmitting the frame or a bandwidth signaling TA. In a PS-Poll frame transmitted by a VHT STA in a non-HT or non-HT duplicate format and where the scrambling sequence carries the TXVECTOR parameter CH\_BANDWIDTH\_IN\_NON\_HT, the TA field value is a bandwidth signaling TA.

**9.3.1.5.2 Non-BDT variant of the PS-Poll frame format(#2558)**

The (11ah)Duration/ID field contains the AID value assigned to the STA transmitting the frame by the AP in the (Re)Association Response frame that established that STA’s current association, with the two MSBs set to 1.

**9.3.1.5.3 BDT variant of the PS-Poll frame format(11ah)**

A PS-Poll frame with the Duration/ID field that contains a duration value as described in 9.2.5 (Duration/ID field (QoS STA)) is a BDT variant of the PS-Poll frame and is referred to as PS-Poll+BDT frame.

The Poll Type field in the Frame Control field of the PS-Poll+BDT frame is set to 0.

Bit 15 of the Duration/ID field of a PS-Poll+BDT frame is set to 0.

A non-S1G STA does not transmit PS-Poll+BDT frames.

As noted above additional edits were made in REVme to remove “value” in the two locations highlighted above in response to CID #3522) and “or an HE STA” was added following “VHT STA” and before “in a non-HT or …” in 9.3.1.5.1.

**References:**

[1] IEEE P802.11-ReVme/D7.0, August 2024.

[2] IEEE Std 802.11-2020

[3] IEEE Std 802.11-2016

[4] 802.11ah-2016