IEEE P802.11
Wireless LANs

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| Comment resolutions for remaining CIDs in RDP Control |
| Date: 2017-05-01 |
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Abstract

This submission proposes resolutions for multiple comments related to TGax D1.0 with the following CIDs (4 CIDs):

* 3156, 3160, 9812, 8246

Revisions:

* Rev 0: Initial version of the document.

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 TGax Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 3156 | Ahmadreza Hedayat | 28.58 | Why there is a 6-bit rsereved subfield in RDP? If it is for the purpose of byte-alignment, then need to consider that there is a Control ID of 4 bits for RDP, leading to total of 10 bits. | Either remove the reserved bits, or update the reserved subfield for what it was intended for. | Revised –This control field was generalized by the concepts introduced in motioned document 11-17-1476r21. As such there may be other added functionalities, in this or future amendments that can make use of those fields. In addition, since the field is now generalized then we do need to add back the RDG/More PPDU field that was removed as resolution to 9811 which was motioned prior to document 1476r21. The field is going to maintain its previous functionality. In addition, we propose to fix some inconsistencies introduced by document 11-17-1476r21 and other minor issues identified in this subclause. TGax editor to make the changes shown in 11-17/0604r0 under all headings that include CID 3156. |
| 3160 | Ahmadreza Hedayat | 28.58 | In HE, a STA may grant a RD to its AP and the AP may use it to schedule UL MU transmission, which may include the STA or not. So there should be additional indications where a STA can indicate whether RD grant shall not be used for UL MU transmission, and if so whether the UL MU transmissions shall include the STA (i.e. the AP shall serve the STA during UL MU). | As in the comment | Revised –Agree in principle with the comment. Proposed resolution is to clarify that the same behavior as in 11ac is possible (i.e., DL MU MIMO) since other sequences add complexity and burden the STA (power consumption, wake time).TGax editor to make the changes shown in 11-17/0604r0 under all headings that include CID 3160. |
| 9812 | Young Hoon Kwon | 29.08 | It is not clear why this field needs 6 reserved bits. This field only has 2 meaningful bits. And having 6 bits of reserved bits is somewhat overkill. Also, as is shown in other variant A-Control field, byte-matching is not needed. | Per comment. | Revised –This control field was generalized by the concepts introduced in motioned document 11-17-1476r21. As such there may be other added functionalities, in this or future amendments that can make use of those fields. In addition, since the field is now generalized then we do need to add back the RDG/More PPDU field that was removed as resolution to 9811 which was motioned prior to document 1476r21. The field is going to maintain its previous functionality. In addition, we propose to fix some inconsistencies introduced by document 11-17-1476r21 and other minor issues identified in this subclause. TGax editor to make the changes shown in 11-17/0604r0 under all headings that include CID 9812. |
| 8246 | Pascal VIGER | 21.25 | 9.2.4.5.7 TXOP Duration Requested subfieldThe "TXOP Duration Requested" is used by a STA to indicate its need for its next EDCA TXOP. Such duration information is not relevant for UL MU operation (meaningless). An HE STA shall not use "TXOP Duration" format but only using the "queue size" format. | Add following sentence at the end of chapter 9.2.4.5.7: "An HE STA does not use the "TXOP Duration Requested" subfield format. For HE buffer status feedback operation for UL MU, it should either or both use the "queue size" format in QoS Control field (see 9.2.4.5.6) or the BSR format in A-Control subfield of the HE variant HT Control field (see 9.2.4.6.4.5). " | Accepted |

## Discussion: *Due to the new editorial style guide all the changes for HE RDP may need to be moved to an independent subclause in clause 27 (HE MAC).*

**3.4 Abbreviations and acronyms**

**TGax Editor: *Insert the following acronyms as follows (#Ed):***

CAS Command and status*(#Ed)*

**TGax Editor: *Change the heading and the paragraphs below as follows (#CID 3156, 9812, Ed):***

* Command and status (CAS) Control

The Control Information subfield, when the Control ID subfield is 6, contains the Command And Status (CAS) Indication (CAS)*(#Ed)*. The format of the subfield frame is shown in Figure 9-15i (Control Information subfield format when the Control ID subfield is 6).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | B0 |  B1 |  B2 | B3B7 |
|  | AC Constraint | RDG/More PPDU | SR PPDU Indication | Reserved |
| Bits: | 1 | 1 | 1 | 4 |
| * Control Information subfield format when the Control ID subfield is 6*(#3156, 9812, Ed)*
 |

The AC Constraint subfield is defined in Table 9-10 (AC Constraint subfield values), except that a value of 1 indicates to an HE STA that the response can contain RD Data frames from the same AC or higher ACs as defined in 10.28.4 (Rules for RD responder).

The RDG/More PPDU subfield is defined in Table 9-11 (RDG/More PPDU subfield values).*(#3156, 9812, Ed)*The SR PPDU Indication subfield indicates whether the PPDU carrying the MPDU carrying the CAS Control subfield is an SR PPDU. The SR PPDU Indication is set to 1 when the PPDU is an SR PPDU; otherwise it is set to 0. *(#3156, 9812, Ed)*

* Reverse direction protocol

10.28.1 General

The RD protocol may be supported by an HT STA and by a DMG STA. A STA receiving an RDG is never required to use the grant. The RD protocol defined in this subclause applies to both types of STAs.

**TGax Editor: *Change the paragraph below as follows (#CID 3156, 9812, Ed):***

An HT STA indicates support of the RD feature as an RD responder using the RD Responder subfield of the HT Extended Capabilities field of the HT Capabilities element. A STA shall set the RD Responder subfield to 1 in frames that it transmits containing the HT Capabilities element if dot11RDResponderOptionImplemented is true. Otherwise, the STA shall set the RD Responder subfield to 0. In an non-HE HT STA the RDG/More PPDU subfield and the AC Constraint subfield are present in the HTC field. In an HE STA the RDG/More PPDU subfield and the AC Constraint subfield are present in the CAS Control field. *(#3156, 9812, Ed)*

A DMG STA indicates support of the RD feature using the Reverse Direction subfield of the DMG STA Capability Information field of the DMG Capabilities element. A STA shall set the Reverse Direction subfield to 1 in frames that it transmits containing the DMG Capabilities element if dot11RDResponderOptionImplemented is true. Otherwise, the STA shall set the Reverse Direction subfield to 0. In a DMG STA the RDG/More PPDU subfield and the AC Constraint subfield are present in the QoS Control field.

* + 1. Reverse direction (RD) exchange sequence

An RD exchange sequence comprises the following:

* The transmission of a PPDU by a TXOP holder or SP source(11ad) containing an RD grant (the *RDG PPDU*), which is indicated by the PPDU containing one or more +HTC or(#2145) DMG(11ad) MPDUs in which the RDG/More PPDU subfield is equal to 1. The STA that transmits this PPDU is known as the *RD initiator*. The rules for an RD initiator apply only during a single RD exchange sequence, i.e., after the transmission of an RDG PPDU and up to the end of the last PPDU in the RD exchange sequence.
* The transmission of one or more PPDUs (the *RD response burst*) by the STA addressed in the MPDUs of the RDG PPDU. The first (or only) PPDU of the RD response burst contains at most one immediate BlockAck or (#1198)Ack (#190)frame. The last (or only) PPDU of the RD response burst contains any MPDUs requiring a (#190)response that is an immediate BlockAck or (#1198)Ack frame. The STA that transmits the RD response burst is known as the *RD responder*. The rules for an RD responder apply only during a single RD exchange sequence, i.e., following the reception of an RDG PPDU and up to the transmission of a PPDU by the RD responder in which the RDG/More PPDU subfield is equal to 0.
* The transmission of a PPDU by the RD initiator containing an immediate (#192)BlockAck frame or (#190)(#1198)Ack frame (the *RD initiator final PPDU*), if so required by the last PPDU of the RD response burst.

NOTE 1—An RD initiator might include multiple RD exchange sequences within a single TXOP or SP(11ad). Each RD exchange sequence within a single TXOP or SP(11ad) might be addressed to a different recipient, and any single recipient might be given more than one RDG within a single TXOP or SP(11ad).

**TGax Editor: *Change the note below and add a new paragraph as follows (#CID 3160):***

NOTE 2—If the RD responder is a VHT AP, the RD response burst can contain VHT MU PPDUs that might have TXVECTOR parameter NUM\_USERS > 1. If the RD responder is an HE AP, the RD response burst can contain HE MU MIMO PPDUs that might have TXVECTOR parameter NUM\_USERS > 1.*(#3160)* (11ac)

An example of an RD exchange sequence is given in O.3 (Example of an RD exchange sequence).

* Rules for RD initiator

An RDG shall not be present unless the MPDU carrying the grant, or every MPDU carrying the grant in an A‑MPDU, matches one of the following conditions:

* A QoS (#100)Data (Ed)frame with the Ack Policy field equal to any value except PSMP Ack (i.e., including Implicit Block Ack Request), or
* A (#193)BlockAckReq frame related to an HT-immediate (#2353)block ack agreement, or
* An MPDU not needing an immediate response (e.g., block ack(#2069)(Ed) under an HT-immediate (#2353)block ack agreement, or Action No Ack).

An RDG shall not be present within a PSMP sequence.

NOTE 1—These rules together with the rules in 9.7.3 (A-MPDU contents) cause an RDG to be delivered in a PPDU that either requires no immediate response or requires an immediate (Ed)response that is a BlockAck or (#1198)Ack frame.

NOTE 2—An RD initiator is not required to examine the RD Responder field of a potential responder before deciding whether to send a PPDU to that STA in which the RDG/More PPDU subfield is set to 1.

NOTE 3—An RD initiator is required according to 10.9 (HT Control field operation) to examine the +HTC-HT(#5125) Support field of a potential responder before deciding whether to send a PPDU to that STA in which the RDG/More PPDU subfield is set to 1.

**TGax Editor: *Change the paragraphs below as follows (#CID 3156, 9812, Ed):***

***NOTE to TGax Editor: The baseline text higlighed in green is the most recent baseline text (REVmc D8.0. Please update the baseline text to this most recent content.***

Transmission of a +HTC or DMG frame by an RD initiator with the RDG/More PPDU subfield equal to 1 (either transmitted as a non-A-MPDU frame, as an S-MPDU(11ah), or within an A-MPDU) indicates that the duration indicated by the Duration/ID field is available for the RD response burst and RD initiator final PPDU (if present). Transmission of an MPDU by an HE RD initiator that contains a CAS Control field with the RDG/More PPDU subfield equal to 1*(#3156, 9812, Ed)* indicates that the duration indicated by the Duration/ID field is available for the RD resposnse burst and RD initiator final PPDU (if present).

An RD initiator that sets the RDG/More PPDU field to 1 in a +HTC or(#2145) DMG(11ad) frame shall set the AC Constraint subfield to 1 in that frame if the allocation is a TXOP and the TXOP(11ad) was gained through the EDCA channel access mechanism and shall otherwise set it to 0. An HE STA RD initiator that sets the RDG/More PPDU field to 1 in aa CAS Control field in a frame transmitted during a TXOP may set the AC Constraint subfield of the CAS Control field to 1*(#3156, 9812, Ed)*.

An RD initiator shall not transmit a +HTC or DMG frame with the RDG/More PPDU subfield set to 1 that requires a response MPDU that is not one of the following frames:

* Ack
* Compressed BlockAck
* Multi-STA BlockAck

Subject to TXOP or SP(11ad) constraints, after transmitting an RDG PPDU, an RD initiator may transmit its next PPDU as follows:

* *Normal continuation:*The RD initiator may transmit its next PPDU a minimum of a SIFS after receiving a response PPDU that meets one of the following conditions:
* Contains one or more (#152)received +HTC or(#2145) DMG(11ad) frames with the RDG/More PPDU subfield equal to 0(Ed)
* In(#5450) an HT STA,(11ad) contains one or more (#152)received frames that are capable of carrying the HT Control field but did not contain an HT Control field(Ed)
* Contains a (#152)received frame that requires an immediate response(Ed)
* In(#5450) a DMG STA, none of the correctly received frames in the PPDU carry the QoS Control field(11ad)(Ed)
* *Error recovery:*The RD initiator may transmit its next PPDU when the CS mechanism (see 10.3.2.1 (CS mechanism)) indicates that the medium is idle at the TxPIFS slot boundary (#7608)(see Figure 10-26 (EDCA mechanism timing relationships)) (this transmission is a continuation of the current TXOP or SP(11ad)).

NOTE 4(#1101)—Error recovery of the RDG mechanism is the responsibility of the RD initiator.

NOTE 5(#1101)—After transmitting a PPDU containing an RDG, if the response is corrupted so that the state of the RDG/More PPDU subfield is unknown, the RD initiator of the RD exchange is not allowed to transmit after a (#156)SIFS. Transmission can occur a PIFS(#156) after deassertion of CS.

NOTE 6 – Control response frames generated by HE STAs are assumed to not be capable of carrying the HT Control field.

(#5156)A STA that transmits a QoS +CF-Ack(#369) (#100)Data frame according to the rules in 10.22.3.5 (HCCA transfer rules) may also include an RDG in that frame provided that

* It is a non-A‑MPDU frame or VHT single MPDU,(11ac) and
* The target of the +CF-Ack(#369) is equal to the Address 1 field of the frame.

NOTE 6(#5156)(#1101)—In a non-DMG BSS(#2054) the(11ad) RD initiator can transmit a CF-End frame according to the rules for TXOP truncation in 10.22.2.9 (Truncation of TXOP) following an(#1294) RD transmit sequence. An RD responder never transmits a CF-End.

NOTE 7(#5156)(#1101)—In a DMG network, the RD initiator can transmit a CF-End frame according to the rules for TXOP truncation in 10.22.2.9 (Truncation of TXOP) or SP truncation in 10.36.8 (Dynamic truncation of service period), as appropriate, following an(#1294) RD transmit sequence. An RD responder never transmits a CF-End.(11ad)

* Rules for RD responder

An RD responder shall transmit the initial PPDU of the RD response burst a SIFS after the reception of the RDG PPDU. PPDUs in a response burst are separated by SIFS or RIFS. The RIFS rules in the RD are the same as in the forward direction; the use of RIFS is constrained as defined in 10.3.2.3.2 (RIFS) and 10.26.3.3 (RIFS protection).

NOTE 1(#1101)—The transmission of a response by the RD responder does not constitute a new channel access but a continuation of the RD initiator’s TXOP or SP(11ad). An RD responder ignores the NAV when responding to an RDG.

**TGax Editor: *Change the 2nd paragraph as follows (#CID 3156, 9812, Ed):***

The recipient of an RDG may decline the RDG by

* Not transmitting any frames following the RDG PPDU when no response is otherwise required, or
* Transmitting a control response frame with the RDG/More PPDU subfield set to 0, or
* Transmitting a control response frame that contains no HT Control field
* Transmitting a control response frame aggregated with other MPDUs with the RDG/More PPDU subfield set to 0*(#3156, 9812, Ed)*

An RD responder that is a non-DMG STA(11ad) may transmit a +CF-Ack(#369) non-A‑MPDU frame or +CF-Ack(#3027) VHT single MPDU in response to a(11ac) QoS Data +HTC non-A-MPDU frame or VHT single(11ac) MPDU that has the Ack Policy field equal to Normal Ack and the RDG/More PPDU subfield equal to 1.

The RD responder shall ensure(11ad) that its PPDU transmission(s) and any expected responses fit entirely within the remaining TXOP or SP(11ad) duration, as indicated in the Duration/ID field of MPDUs within the RDG PPDU.

**TGax Editor: *Change the 5th paragraph as follows (#CID 3156, 9812, Ed):***

An RD responder shall not transmit an MPDU (either individually or aggregated within an A-MPDU) that is not one of the following frames:

* Ack
* Compressed BlockAck
* Compressed BlockAckReq
* Extended Compressed BlockAck
* Extended Compressed BlockAckReq
* Multi-STA BlockAck
* QoS Data
* QoS Null *(#3156, 9812, Ed)*
* Management

Change the 6th paragraph as follows (breaking it into two paragraphs):

~~If the AC Constraint subfield is equal to 1, the RD responder shall transmit Data frames of only the same AC as the last frame received from the RD initiator.~~ If the AC Constraint subfield is equal to 1 in last frame received from an RD initiator:

* A non-HE RD responder shall transmit Data frames of only the same AC as the last frame received from the RD initiator
* An HE RD responder may transmit A-MPDU with or multi-TID A-MPDU with MPDUs from one or more ACs that have a priority that is equal to or higher than the lowest priority AC of the MPDU(s) carried in the last PPDU received from the RD initiator (see 10.13 (A-MPDU operation) and when the RD initiator is an HE STA subject to the additional rules defined in 27.10.4(A-MPDU with multiple TID).

For a BlockAckReq or BlockAck frame, the AC is determined by examining the TID field. For a Management frame, the AC is AC\_VO. The RD initiator shall not transmit a +HTC or DMG MPDU with the RDG/More PPDU subfield set to 1 from which the AC cannot be determined. If the AC Constraint subfield is equal to 0, the RD responder may transmit Data frames of any TID.

**TGax Editor: *Change the 7th paragraph as follows (#CID 3160, Ed):***

During an RD response burst(#2072)(#1302) any PPDU transmitted by an RD responder shall contain at least one MPDU with an Address 1 field that matches the MAC address of the RD initiator, and the inclusion of traffic to STAs other than the RD initiator in a VHT MU PPDU, or HE MU MIMO PPDU shall not increase the duration of the PPDU beyond that required to transport the traffic to the RD initiator.*(#3160)* (11ac) The RD responder shall not transmit any frame(Ed) causing a response after SIFS(11ac) with an Address 1 field that does not match the MAC address of the RD initiator. The RD responder shall not transmit any PPDUs with a CH\_BANDWIDTH that is wider than the CH\_BANDWIDTH of the PPDU containing the frame(s) that delivered the RD grant. (11ac)

If an RDG PPDU also requires an immediate block ack(#2069)(Ed) response, the BlockAck (Ed)frame shall be included in the first PPDU of the response.

When a PPDU is not the final PPDU of a response burst, an HT Control field carrying the RDG/More PPDU subfield set to 1 shall be present in every MPDU within the PPDU capable of carrying the HT Control field, or if the PPDU is transmitted in a DMG BSS, the RDG/More PPDU subfield within the QoS Control field shall be set to 1 in every MPDU within the PPDU(11ad). The last PPDU of a response burst shall have the RDG/More PPDU subfield set to 0 in all +HTC or(#2145) DMG(11ad) MPDUs contained in that PPDU.

The RD responder shall not set the RDG/More PPDU subfield to 1 in any MPDU in a PPDU that contains an MPDU that requires an immediate response.

NOTE 2(#1101)— If the RD responder transmits a PPDU that expects a transmission by the RD initiator after SIFS and no such transmission is detected, the RD responder has to wait for either another RDG or its own TXOP or SP(11ad) before it can retry the exchange.

After transmitting a PPDU containing one or more +HTC or(#2145) DMG(11ad) MPDUs in which the RDG/More PPDU subfield is equal to 0, the RD responder shall not transmit any more PPDUs within the current response burst.

NOTE 3(#1101)— If an RD-capable STA that is not the TXOP holder or SP source(11ad) receives a PPDU that does not indicate an RDG, there is no difference in its response compared to a STA that is not RD-capable.