IEEE P802.11
Wireless LANs

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| Work Plan 2: Other Open Issus Proposal |
| Date: 2015-01-15 |
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Abstract

This document provides text in support of the addition of the SYNRA control field, for types 0, 1, and 2, as discussed and requested in the January TGak F2F meeting.

The following base text is from Draft P802.11ak\_D0.06. The additions are shown Microsoft Review Tracking turned on. (red line)

1.

##### General

The format of a Data frame is defined in Figure 8-52 (Data frame). The Frame Control, Duration/ID, Address 1, Address 2, Address 3, and Sequence Control fields are present in all data frame subtypes. The presence of the Address 4 field is determined by the setting of the To DS and From DS subfields of the Frame Control field (see below). The QoS Control field is present when the QoS subfield of the Subtype field is set to 1.

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**Figure 8-52 – Data frame**

NOTE ~~1~~—The maximum frame body size shown in Figure 8-52 (Data frame) is for GCMP encryption of a maximum-size A-MSDU (note that TKIP encryption is not allowed in this case and any Mesh Control fields are part of the AMSDU subframes). The corresponding maximum for CCMP encryption is 7951 octets. The maximum frame body size if A-MSDUs are not used is 2346 octets for GCMP encryption of a maximum-size MSDU, 2338 octets for CCMP encryption of a maximum-size MSDU and 2342 octets for TKIP encryption of a maximum-size MSDU, including in both cases an 18-octet Mesh Control field. The frame body size might in all cases be greater if a vendor-specific cipher suite is used.

Data frames with a value of 1 in the QoS subfield of the Subtype field are collectively referred to as QoS Data frames. Each of these data subtypes contains QoS in their names, and this frame format is distinguished by the presence of a QoS Control field in the MAC header.

A QoS STA always uses QoS Data frames for data transmissions to other QoS STAs. A QoS STA uses frames with the QoS subfield of the Subtype field set to 0 for data transmissions to non-QoS STAs. A non-QoS STA always uses frames with the QoS subfield of the Subtype field set to 0 for data transmissions to other STAs. All STAs use frames with the QoS subfield of the Subtype field set to 0 for nonconcealed GCR broadcast Data frames unless a transmitting STA knows that all STAs in a BSS have QoS capability, in which case the transmitting STAs use QoS Data frames. All STAs use frames with the QoS subfield of the Subtype field set to 0 for nonconcealed GCR group addressed Data frames unless it is known to the transmitter that all STAs in the BSS that are members of the multicast group have QoS capability, in which case STAs use QoS Data frames. APs where dot11RobustAVStreamingImplemented is true or mesh STAs where dot11MeshGCRImplemented is true use frames with the QoS subfield of the Subtype field set to 1 for concealed GCR frames, as described in 10.24.16.3.5 (Concealment of GCR transmissions).

##### Address and BSSID fields

The content of the address fields of Data frames are dependent upon the values of the To DS and From DS fields in the Frame Control field and whether the Frame Body field contains either an MSDU (or fragment thereof) or an entire A-MSDU, as determined by the A-MSDU Present subfield of the QoS Control field (see 8.2.4.5.9 (A-MSDU Present subfield)). The content of the address fields is defined in Table 8-34 (Address field contents). Where the content of a field is shown as not applicable (N/A), the field is omitted. Note that Address 1 always holds the receiver address of the intended receiver (or, in the case of group addressed frames, receivers), and that Address 2 always holds the address of the STA that is transmitting the frame.

**Table 8-34 – Address field contents**

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A STA uses the contents of the Address 2 field to direct the acknowledgment if an acknowledgment is necessary.

The DA field contains the destination of the MSDU (or fragment thereof) or A-MSDU in the Frame Body field.

NOTE—Because a SYNRA is not a valid DA, the use of the SYNRA as an RA is not ambiguious.

The SA field contains the address of the MAC entity that initiated the MSDU (or fragment thereof) or A-MSDU in the Frame Body field.

When a Data frame carries an MSDU (or fragment thereof), the DA and SA values related to that MSDU are carried in the Address 1, Address 2, Address 3, and Address 4 fields (according to the setting of the To DS and From DS fields) as defined in Table 8-34 (Address field contents).

When a Data frame carries an A-MSDU, the DA and SA values related to each MSDU carried by the A-MSDU are carried within the A-MSDU. One or both of these fields may also be present in the Address 1 and Address 2 fields as indicated in Table 8-34 (Address field contents).

NOTE ~~2~~—If a DA or SA value also appears in any of these address fields in a Data frame sent by a non-GLK STA, the value is necessarily the same for all MSDUs within the A-MSDU because this is guaranteed by the To DS and From DS field settings.

The RA field is the individual address of the STA that is the immediate intended receiver of the frame or the group address of the STAs that are the immediate intended receivers of the frame.

When a GLK data MPDU transmission is sent to a group destination address or an individual destination address that is not known by the corresponding 802.1Q Bridge, the RA is a SYNRA as described in 9.43 (Addressing of GLK data MPDU transmission).

The TA field is the address of the STA that is transmitting the frame.

The BSSID of the Data frame is determined as follows:

 a) If the STA is contained within an AP or is associated with an AP, the BSSID is the address currently in use by the STA contained in the AP.

 b) If the STA is a member of an IBSS, the BSSID is the BSSID of the IBSS.

 c) If the STA is transmitting a Data frame when dot11OCBActivated is true, the BSSID is the wildcard BSSID.

 d) If the STA is a member of an MBSS, the BSSID is the address of the transmitter and is equal to the Data frame’s TA.

 e) If the STA participates in a PBSS, the BSSID is the address of the STA contained in the PCP of the PBSS.

##### Other MAC Header fields

The Sequence Control field is defined in 8.2.4.4 (Sequence Control field).

The QoS Control field is defined in 8.2.4.5 (QoS Control field).

The HT Control field is defined in 8.2.4.6 (HT Control field). The presence of the HT Control field is determined by the Order subfield of the Frame Control field, as specified in 8.2.4.1.10 (Order field).

NOTE ~~4~~—The HT Control field is not present in frames transmitted by a DMG STA.

##### The frame body

The frame body consists of either:

— The MSDU (or a fragment thereof), the Mesh Control field (present if the frame is transmitted by a mesh STA and the Mesh Control Present subfield of the QoS Control field is 1, otherwise absent), and a security header and trailer (present if the Protected Frame subfield in the Frame Control field is 1, otherwise absent)

— The A-MSDU and a security header and trailer (present if the Protected Frame subfield in the Frame Control field is 1, otherwise absent)

The presence of an A-MSDU in the frame body is indicated by setting the A-MSDU Present subfield of the QoS Control field to 1, as shown in Table 8-6 (QoS Control field).

For Data frames of subtype Null (no data), CF-Ack (no data), CF-Poll (no data), and CF-Ack+CF-Poll (no data) and for the corresponding QoS data frame subtypes, the Frame Body field is null (i.e., has a length of 0 octets); these subtypes are used for MAC control purposes. For Data frames of subtypes Data, Data+CF-Ack, Data+CF-Poll, and Data+CF-Ack+CF-Poll, the Frame Body field contains all of, or a fragment of, an MSDU after any encapsulation for security. For Data frames of subtypes QoS Data, QoS Data+CF-Ack, QoS Data+CF-Poll, and QoS Data+CF-Ack+CF-Poll, the Frame Body field contains an MSDU (or fragment thereof) or A-MSDU after any encapsulation for security. For Data frames of subtype QoS Data that are transmitted by a mesh STA, the Frame Body field also contains a Mesh Control field, as described in 8.2.4.7.3 (Mesh Control field).

The maximum length of the Frame Body field can be determined from the maximum MSDU length, plus the length of the Mesh Control field (if present), plus the length of the SYNRA Extended AID bit array or Extended AID list (if present), plus any overhead from encapsulation for encryption (i.e., it is always possible to send a maximum length MSDU, with any encapsulations provided by the MAC layer within a single Data frame). When the frame body carries an A-MSDU, the size of the frame body field is limited by:

— The PHY's maximum PHY service data unit (PSDU) length

— If A-MPDU aggregation is used, a maximum MPDU length of 4095 octets (see 8.7 (Aggregate MPDU (A-MPDU)))

Within all Data frames sent by STAs during the CFP under PCF, the Duration/ID field is set to 32 768. Within all Data frames sent by the QoS STA, the Duration/ID field contains a duration value as defined in 8.2.5 (Duration/ID field (QoS STA)). Within all Data frames sent during the CP by non-QoS STAs, the Duration/ID field is set according to the following rules:

 — If the Address 1 field contains a group address, the duration value is set to 0.

 — If the More Fragments bit is 0 in the Frame Control field of a frame and the Address 1 field contains an individual address, the duration value is set to the time, in microseconds, required to transmit one Ack frame, plus one SIFS.

 — If the More Fragments bit is 1 in the Frame Control field of a frame and the Address 1 field contains an individual address, the duration value is set to the time, in microseconds, required to transmit the next fragment of this Data frame, plus two Ack frames, plus three SIFSs.

The duration value calculation for the Data frame is based on the rules in 9.7 (Multirate support) that determine the data rate at which the Control frames in the frame exchange sequence are transmitted. If the calculated duration includes a fractional microsecond, that value is rounded up to the next higher integer. All STAs process Duration/ID field values less than or equal to 32 767 from valid Data frames (without regard for the RA, DA, and/or BSSID address values that might be present in these frames) to update their NAV settings as appropriate under the coordination function rules.

NOTE ~~3~~—The QoS Data and QoS Null subtypes are the only Data subtypes transmitted by a DMG STA.

1.

## SYNRA address filtering operation *(note for some Word reason I could not set this paragraph number to the correct value of 9.42 )*

***Note to the Editor: Please move the frame format figures and descriptive text to section 8.3.2.1.4***

A GLK STA receiving an MPDU with a SYNRA performs the address filtering described in this clause. If the ToDS bit is zero, the MPDU is discarded. The structure of a SYNRA is shown in Figure 9-90-SYNRA structure.



Non-AP GLK STAs shall support the receipt of SYNRAs but are not required to generate SYNRAs (since MPDUs to multiple receivers can always be sent with serial unicast)

Values of the 2-bit SYNRA Type field are listed below.

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| --- | --- |
| SYNRA Type | Description |
| 0 | AID bit array |
| 1 | Extended AID bit array |
| 2 | Extended AID list |
| 3 | Reserved |

If the SYNRA type is zero, the SYNRA control field consists of an E/I subfield, an AID offset subfield and an AID bitmap subfield.

The E/I subfield is a single bit indicating if the STAs having AIDs not specifically indicated in the AID bit map shall discard or pass the MPDU. If the bit in the E/I subfield is 0, the STAs not in the AID range covered by the AID bitmap shall discard the MPDU. If the bit in the E/I subfield is 1, the STAs not in the AID range covered by the AID bitmap shall pass the MPDU through the address 1 filter.

The AID offset subfield is a value corresponding to the value of the AID that will be included or excluded by the value of the first bit (B40) of the AID bitmap subfield.

The AID bitmap subfield is a bit array indicating which receivers in the bitmap are to accept or exclude the MPDU. B40 corresponds to AID equal to the AID offset, the next bit B41 will correspond to the AID offset plus 1, and the remaining bits will correspond to the sequential AIDs, with B47 corresponds to AID offset plus 7.. The structure of a SYNRA type 0 control subfield is shown in Figure 9-xx.



If the SYNRA is type 3, the receiver discards the MPDU.

If the SYNRA type is 1 or 2, the SYNRA is called an extended SYNRA and the Control Field is considered to be composed of an 8-bit unsigned Extended SYNRA Size subfield and an Extended SYNRA Second subfield as shown in Figure 9-91 Extended SYNRA control subfields. For extended SYNRA types, there is an Extended SYNRA Information field as described below.

If the SYNRA type is 1, the SYNRA control field consists of an E/I subfield, an AID offset subfield and an AID vector length subfield.

The E/I subfield is a single bit indicating if the STAs having AIDs not specifically indicated in the AID vector shall discard or pass the MPDU. If the bit in the E/I subfield is 0, the STAs not in the AID range covered by the AID Vector shall discard the MPDU. If the bit in the E/I subfield is 1, the STAs not in the AID range covered by the AID Vector shall pass the MPDU through the address 1 filter.

The AID Offset subfield is a value corresponding to the value of the AID that will be included or excluded by the value of the first bit in the AID Vector.

The AID Vector Length subfield is value indicating the number of octets that are contained in the AID vector, a value between 0 and 255.

The AID Vector is located in the first AID Vector Length octets of the Frame Body field. The first bit in the AID vector corresponds to the AID value of the AID offset subfield, the next bit corresponds to the AID value of the AID offset plus 1, the AID value is incremented for each bit until the last bit in the AID Vector is reached. If the bit in the AID vector is 0, the STA having that AID shall discard the MPDU. If the bit is a 1, the MPDU passes the address 1 filter.

The structure of a SYNRA type 1 control subfield is shown in Figure 9-xx.



If the SYNRA type is 2, the SYNRA control field consists of an E/I subfield, a reserved subfield and a Number of Extended SYNRA AIDs subfield.

The E/I subfield is a single bit indicating if the STAs having AIDs that are indicated in the Extended SYNRA list shall be discard or pass the MPDU. If the bit in the E/I subfield is 0, the STAs indicated shall discard the MPDU. If the bit in the E/I subfield is 1, the STAs indicated shall pass the MPDU through the address 1 filter.

The reserved subfield is reserved bits.

The Number of Extended SYNRA AIDs subfield is a value indicating the number of AIDs that are contained in Extended SYNRA AID list, a value between 0 and 255.

The Extended SYNRA AID list is located in the first (Number of Extended SYNRA AIDs × 2) octets of the Frame Body. Each pair of octets contains one AID.

The structure of a SYNRA type 2 control subfield is shown in Figure 9-xx.



***Insert a second new subclause under clause 9 as follows:***

## Addressing of GLK data MPDU transmission

GLK transmissions of MSDUs that are sent as a consequence of an MA-UNITDATA.request with an individual destination address that is not in the same BSS shall use either a 4-address frame format or an A-MSDU format.

GLK transmissions of MSDUs that are sent as a consequence of an MA-UNITDATA.request with an individual destination address that is in the same BSS use any of a 3-address frame format, a 4-address frame format or an A-MSDU format.

GLK transmissions of MSDUs that are sent as a consequence of an MA-UNITDATA.request with a group destination address shall use either a 4-address frame format or an A-MSDU format.

If a corresponding IEEE 802.1Q Bridge specifies multiple immediate STA destinations, GLK transmission of a MSDU shall use one of the following methods:

* Transmit multiple individually addressed MPDUs to each immediate destination.
* Transmit group addressed MPDU(s) using a SYNRA as specified in 9.42 (SYNRA address filtering operation).

The addressing of the 4-address frame shall be as follows:

* Address 1 is the MAC address of the immediate destination STA (the receiver of the MPDU) or a SYNRA
* Address 2 is the MAC address of the transmitter STA (the transmitter of the MPDU)
* Address 3 is the DA of the MSDU (the destination address of the MSDU).
* Address 4 is the SA of the MSDU (the source address of the MSDU)

The addressing of the frame containing an A-MSDU shall be as follows:

* Address 1 is the MAC address of the immediate destination STA (the receiver of the MPDU) or a SYNRA
* Address 2 is the MAC address of the transmitter STA (the transmitter of the MPDU)
* Address 3 is the BSSID
* DA in A-MSDU subframe header is the DA of the MSDU (the destination address of the MSDU)
* SA in A-MSDU subframe header is the SA of the MSDU (the source address of the MSDU)

 **References:**