IEEE P802.11  
Wireless LANs

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| Some Proposed Changes to 11ak D0.01 (CC17) | | | | |
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Abstract

This document provides proposed changes to the IEEE P802.11ak D0.01 for following comments of CC17.

* CID 49, 62, 68, 69, and 80
* CID 52, 53, and 26
* CID 60

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| 49 | 7 | 4.3.21.3 | Since only a group addressed MPDU transmitted by a GLK AP requires Control Block, using CBA-MSDU format every time causes unnecessary overhead. A GLK STA shall be able to use the normal A-MSDU for throughput improvement.  To distinguish a frame that contains Control Block from other frame, it shall be defined as a new Extension frame 'CB QoS Data'. | 1) Replace 4.3.21.3 by follows;  ---  A GLK AP may use the Control Block (CB) QoS Data frame to specify which members of the group addressed non-AP STAs by the CB QoS Data frame will process MSDU(s).  Support of the CB QoS Data frame is optional. When the GLK AP does not use the CB QoS Data frame, the GLK AP converts a group addressed MPDU to multiple individually addressed MPDUs.  2) Define a new Extension frame type CB QoS Data in 8.2.4.1.3 by modifying the Table 8-1 as follows;  ----  11 Extension <ANA> CB QoS Data  11 Extension <ANA+1>-1111 Reserved  3) Specify a CB QoS Data frame in 8.3.4 and remove 8.3.2.3.  4) Replace "CBA-MSDU" by "CB QoS Data" throughout the draft  A submission 11-14/0539 will provide proposed texts. |
| 69 | 1 |  | [for David Kloper] Concerns: Aggregation is critical to 11n/11ac/11ad performance, and subversion of A-MSDU can severely impact that. I think Egress processing would be an issue, as marking is by aggregate vs MSDU, and frames are entering the bridge function interleaved between interfaces/flows and so can be expected to have different sets of destination peers. Ingress processing can be expensive with a complicated format more applicable to Mgmt traffic, requiring linear walking a variable sized, unordered list. As the packet rates go up, this will be a serious concern. Again, these format changes might break any HW acceleration in chipsets. | Recommendations if keeping CBA-MSDU: 1) Support is optional, and only used for Mcast RA, as adding no value for Ucast RA; 2) Replace complicated Mgmt frame like format with a fixed sized bitmap; 3) Rather than use AID that only exists in 1 direction, and thus arbitrarily limiting its usage, use the proposed GLK IE to inform each peer which bit is assigned for them in each direction; 4) Strongly prefer bitmap in 24 LSb of RA; |
| 62 |  | 10.24.16 | A wireless link is less reliable than a wired link, and there is no MAC-level recovery on group addressed transmission except DMS and GCR (as described in the paragraph of IEEE P802.11mc D2.7 subclause 9.3.6). A GLK STA should support DMS and optionally support GCR for enhanced reliability.  Since current DMS/GCR mechanism does not support selective reception of a group addressed MPDU, it is necessary to specify the DMS/GCR procedure for a GLK STA. | Modify the GCR related description in 9 and 10.24.16 to support a MPDU with Control Block.  A submission 11-14/0539 will provide proposed texts. |
| 68 | 1 |  | [for David Kloper] I think the use of Mcast (RA not DA), and the complexity you have added w/ CBA-MSDU is not worthwhile. With 10% PER + collisions + selection of lower data rates for Mcast, this may be unavoidable on the last hop to Clients, but on intermediate GLK links it will quickly add up over multiple hops, and make the network unusable. Better to layer Bridging on a reliable / low PER link, after unicast MAC layer retries. | Recommend that: 1) Replication as unicast 4 Addr frames to the desired set of Peers is called out as mandatory; 2) If keeping support for Mcast RA, it is negotiated (support being optional), and only used to the set of supporting peers; 3) Simplification of CBA-MSDU format, which is only used for Mcast RA; |
| 80 | 7 | 4.3.21.4 | Without the CBA-MSDU, we don't need a "GLK BSS". The current SS types will suffice. | Eliminate the GLK BSS. Allow non-GLK and GLK STAs to be in the same BSS. A GLK non-AP STA (if operating in GLK mode, of course) ignores 3-address frames with multicast or broadcast Receiver addresses. The AP (and Bridge) should have no problem keeping things straight -- the non-GLK STAs connect through the existing DS, typically all to a single port in the bridge, and the GLK STAs connect through the new 11ak interface directly to the bridge. Whether point-to-point links between GLK non-AP STAs and non-GLK non-AP STAs are possible needs to be thought about. |

### Discussion:

The comments CID 49, CID 68, and CID 69 propose to make a CBA-MSDU as optional and to allow use of current A-MSDU. I agree with commenters that a GLK STA shall support the current A-MSDU format to improve throughtput.

There are two possible solutons as follows;

1. As proposed in CID 49, specify a new frame format as an Extension frame.
2. As proposed in CID 69, use a groupcast address as RA to specify the recipient by a bitmap contained in least significant bits.

If the groupcast RA is used for subsetting, a GLK STA can use unmodified Group Addressed Transmission Service (DMS and GCR, see CID 62), thus a “GLK BSS” becomes unnecessary as commented in CID 80.

Use of the groupcast RA with bitmap was proposed in very early stage of TGak with submissions 11-12/1441r1 and 11-13/0141r1. These submissions say that the number of non-AP GLK STAs associated to the AP is limited to at most 24. However, the groupcast RA can be a local address (i.e. it shall be unique only in a BSS) and the GLK AP can assign multiple local groupcast addresses for subsetting. If there are more than 24 non-AP GLK STAs associated with the GLK AP, the GLK AP may send the multiple group addressed frames each for subgroup of STA as shown in Figure 1.

So, I propose to use the multiple local multicast addresses with bitmap for subsetting, and to remove the CBA-MSDU format. If the improved reliability is required, the GLK STA should setup Group Addressed Transmission Service (DMS or GCR) for subsetting groucast RAs.

Figure Subsetting with groupcast RA

GLK AP / Bridge

S

S

S

S

S

S

S

S

Bridge

X

Blocked Port

groupcast #1

groupcast #2

Broadcast frame

groupcast RA#1

Subsetting RA Specifier #1

1 1 1 1 0 0 0.. 0

Bitmap (16 or 24bits)

groupcast RA#2

Subsetting RA Specifier #2

1 1 0 1 0 0 0.. 0

Blocked port

### Proposed Changes for CID 49, 62, 68, 69, and 80

I will provide draft texts if TGak agrees to use groupcast RA with bimap for subsetting.

| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** |
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| 52 | 7 | 4.3.21.4.2 | If a GLK IBSS (PBSS) involves more than 2 STAs, each STA shall provide one or more MSAPs corresponding to the other STAs. It is better to update Figure 4-12a as involving three STAs.  (NOTE) P802.1AC D0.2 does not allow IBSS/PBSS as GLK BSS. It may be necessary to revise P802.1AC D0.2. | Change the 4.3.21.4.2 as follows;  ---  Figure 4-12a shows a GLK IBSS/PBSS involving three GLK STAs. Each participating STA provides the MAC service via MSAPs. A difference from non-GLK 802.11 is that either or both of the MSAPs are connected to an 802.1Q bridge or network providing 802.1Q conformant service that, in turn are connected to one or more end stations. The MSAPs provided by different STAs are safely connected to the same 802.1Q conformant network since one service provided by such a network is protection from loops.  (A submission 11-14/0539 will provide proposed texts and figures.)  Figure 4-12a -- GLK IBSS/PBSS |
| 26 | 8 | 4.3.21.4.3 | Figure 4-12b, and the language here, are inaccurate. A GLK AP only offers a single MSAP, but that MSAP Service does include the vector of destinations parameter as mentioned here. The logical entities represented by this vector could be discussed, but they are not MSAPs. Current thinking is actually leaning toward having that discussion in 802.1AC in the convergence function, instead of in 11ak, though. | Reword the text here, and redraw Figure 4-12b to show only one MSAP. Optionally (depending on the 802.1AC discusion outcome) this text could discuss (and the figure could show) moltiple logical entities of some other type (ISS SAPs?). Language in 4.5.3 needs to use alternate language (or this alternate logical entity concept), too. |
| 53 | 8 | 4.3.21.4.3 | If two non-AP STAs setup DLS (TDLS) link between them, these non-AP STAs have multiple MSAPs as shown in the Figure 4-12b of a submission 11-14/0539.  (NOTE} P802.11AC D0.2 allows non-AP STAs to use DLS / TDLS as transit link in 802.1Q Bridged network. | Replace "GLK AP MSAPs" in the first paragraph of 4.3.21.4.3 by "GLK STA MSAPs" and replace the Figure 4-12b by the revised figure in the submission 11-14/0539. |

### Discussion

As commented in CID 26, a GLK STA provides only a single MAC\_SAP and 802.1AC convergence function maps multiple MSAPs for 802.1Q Bridge. I propose to add 802.1AC convergence layer between GLK STA and 802.1Q Bridge.

### Proposed Changes for CID 52, 36, and 53:



Figure 4-12a – GLK IBSS / PBSS



Figure 4-12b GLK infrastructure BSS

| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** |
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| 60 |  | 9.2.8 | It is necessary to specify addressing rules for GLK STA to support following cases required by a GLK STA.  - A GLK AP transmits an individually addressed MSDU as a group addressed MPDU when a final destination is not learned by associated 802.1Q bridge.  - A GLK STA transmits a group addressed MSDU as an individually addressed MPDU when CB QoS Data frame is not used. | 1) Insert the following text after the fifth paragraph of 9.2.8 (P1241L23 of 802.11mc D2.7).  ----  A GLK STA also uses the address matching rules described in 9.42.1 (Addressing of individually addressed data frames for GLK STA), when it receives an individually addressed frame. A GLK STA also uses the address matching rules described in  9.42.2 (Addressing of group addressed data frames for GLK STA).  2) Insert new subclauses 9.42.1 (Addressing of individually addressed data frames for GLK STA) and 9.42.2 (Addressing of group addressed data frames for GLK STA), and specify the addressing rule of a MPDU for a GLK STA. A submission 11-14/0539 will provide proposed texts. |

### Discussion:

The subclause 9.3.6 (Group addressed MPDU transfer procedure) of P802.11mc D2.5 specifies forwarding rules for group addressed messages. These rules are not applicable to a GLK AP. It is necessary to specify addressing and forwarding rules for the GLK STA.

### Proposed Changes:

*Insert the following text after the fifth paragraph of 9.2.8*

### 9.2.8 MAC data service

A GLK STA also uses the addressing rules described in 9.42 (Addressing of data frames for GLK STA).

*Insert the following new subclause*

### 9.42 Addressing of data frames for GLK STA

A GLK STA shall transmit individually addressed MSDUs (as a consequence of an MA-UNITDATA.request with an individual destination address) destined to an address that is different from the STA within the same BSS using either a 4-address frame format or an A-MSDU format.

The GLK STA shall transmit group addressed MSDUs (as a consequence of an MA-UNITDATA.request with a group destination address) to other GLK STAs using either a 4-address frame format or an A-MSDU format.

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

* Address 1 is the MAC address of the immediate destination STA(s) (the receiver(s) of the MPDU)
* Address 2 is the MAC address of 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(s) (the receiver(s) of the MPDU)
* Address 2 is either the MAC address of 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)

If multiple immediate destination STAs are specified by a corresponding IEEE 802.1Q Bridge, the GLK STA shall transmit the MSDU by one of the following methods:

* Transmit multiple individually addressed MPDUs to each immediate destination
* Transmit group addressed MPDU(s) with recepiant subsetting.
  + The GLK STA should use DMS or GCR to enhance the reliability.

The GLK STA may transmit individually addressed MSDUs (as a consequence of an MA-UNITDATA.request with an individual destination address) destined to the STA within the same BSS using a 3-address frame format.

**References:**

[1] 11-12/1441r1 “Problem list for P802.1Qbz / P802.11ak point-to-point model”

[2] 11-13/0141r1 “802.1Qbz–802.11ak Solutions: Station Subsetting Issue”