IEEE P802.11
Wireless LANs

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| Clause 5 Changes for EPD |
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Abstract

This document contains proposed changes to Clause 5, for TGak consideration

R0 – Initial discussion document.

**Discussion:**

Consider the scenario where an AP does not require EPD for all associated STAs, but does support EPD, and some non-AP STAs support EPD.

In this case, the AP will need to send data frames as EPD to those STAs that support it, and as LPD to those that do not, as well as use LPD for all RA group addressed frames.

Similarly, a non-AP STA will need to understand that a received frame might be in LPD or EPD, depending on whether the RA is a group address or not.

In the MA-UNITDATA.request, it is probably not reasonable to expect the MAC service user to know whether the AP will use a group address RA or not, before it supplies the MSDU. So, MSDUs from the MAC Service user need to indicate what format they are, and the AP needs to reformat to the other format in the case where that is what’s needed on the WM.

In the MA-UNITDATA.indication, it is probably most efficient to deliver the frame as it was received, rather than guess what format the MAC Service user wants, but then it needs to be indicated to the MAC Service user which format the MSDU is in, so it can properly parse the frame.

Thus, we need to add an EDP/LDP format indication to these two primitives.

**Proposed changes:**

***In 11ak draft, clause 5.1.4, delete this sentence from the replacement text, and delete the Editor’s Note that follows it:***

The MAC service user provides LPD or EPD formatted MSDUs as indicated by a MIB attribute.

***Change text as follows (this assumes 11-15/415r3 is already applied):***

**5.2 MAC data service specification**

**5.2.1 General**

The IEEE Std 802.11 MAC supports the following service primitives as defined in ISO/IEC 8802-2: 1998:
— MA-UNITDATA.request
— MA-UNITDATA.indication
— MA-UNITDATA-STATUS.indication

IEEE Std 802.11 places restrictions and semantics on the parameter values for these primitives, as described in 5.2.3 (MA-UNITDATA.request) to 5.2.5 (MA-UNITDATA-STATUS.indication).

**5.2.2 GLK MAC data service specification**

In a GLK STA, the MAC data plane architecture includes a MAC service with two additional parameters, a set of service\_access\_point\_identfiers, and an MSDU format indicator.

A GLK STA coordinates with the 802.1AC [Bn] IEEE 802.11 General Link convergence function to create a virtual point-to-point LAN for each GLK link to an associated or peered GLK STA. This point-to-point LAN is presented by the convergence function as a unique ISS SAP which is ultimately mapped to an 802.1Q bridge port. Each such SAP is identified by a locally unique service\_access\_point\_identifier, generated by the STA and the convergence function.

When GLK is in use, the MAC service primitives presented have an additional parameter: station vector. On an MA-UNITDATA.request, this parameter is a set of service\_access\_point\_identifiers specifying the one or more GLK links that are to be used for this request. On an MA-UNITDATA.indication, it is a vector of exactly one service\_access\_point\_identifier specifying the GLK link that carried this MSDU.

When GLK is in use, the MAC service primitives have an additional parameter: MSDU format. On an MA-UNITDATA.request, this parameter indicates whether the supplied MSDU is in EPD or LPD format. If the format is inappropriate for the transmission that carries this MSDU per 5.1.4 (MSDU format), the STA must convert the format before transmission. On an MA-UNITDATA.indication, this parameter indicates the format of the received MSDU, which is known per the format rules of 5.1.4 (MSDU format). The MAC service user must use this information to interpret the MSDU correctly.

**5.2.3 MA-UNITDATA.request**

**5.2.3.1 Function**

This primitive requests a transfer of an MSDU from a local LLC sublayer entity or bridge to a single peer LLC sublayer entity or bridge, or multiple peer LLC sublayer entities or bridges in the case of group addresses.

**5.2.3.2 Semantics of the service primitive**

The parameters of the primitive are as follows:

MA-UNITDATA.request(

source address,

destination address,

routing information,

data,

priority,

service class,

station vector,

MSDU format

)

The source address (SA) parameter specifies an individual MAC sublayer address of the sublayer entity from which the MSDU is being transferred.

The destination address (DA) parameter specifies either an individual or a group MAC sublayer entity address.

The routing information parameter specifies the route for the data transfer (a null value indicates source routing is not to be used). For IEEE Std 802.11, the routing information parameter shall be null.

The data parameter specifies the MSDU to be transmitted by the MAC sublayer entity. The length of the MSDU shall be less than or equal to the value shown in Table 8-19 (Maximum data unit sizes (in octets) and durations (in microseconds)).

The priority parameter specifies the requested priority of the data unit transfer. The allowed values of priority are described in 5.1.1.4 (Interpretation of priority parameter in MAC service primitives).

The service class parameter specifies the requested service class of the data unit transfer. The allowed values of service class are described in 5.1.1.5 (Interpretation of service class parameter in MAC service primitives in a STA) and 5.1.3 (MSDU ordering).

The station vector parameter is present if GLK is in use, and provides a set of service\_access\_point\_identifiers (as defined in 802.1Q) indicating the set of virtual point-to-point LANs for this data transfer, and thus the set of GLK links over which the MSDU is transferred.

The MSDU format parameter indicates if the supplied MSDU is in EDP or LDP format.

**5.2.3.3 When generated**

This primitive is generated by the LLC sublayer entity or bridge when an MSDU is to be transferred to a peer LLC sublayer entity or entities, or bridge or bridges.

**5.2.3.4 Effect of receipt**

On receipt of this primitive, the MAC sublayer entity determines whether it is able to fulfill the request according to the requested parameters. A request that cannot be fulfilled according to the requested parameters is discarded, and this action is indicated to the LLC sublayer entity using an MA-UNITDATASTATUS.indication primitive that describes why the MAC was unable to fulfill the request. If the request can be fulfilled according to the requested parameters, the MAC sublayer entity properly formats a frame and passes it to the lower layers for transfer to a peer MAC sublayer entity or entities (see 5.1.4 (MSDU format)), and indicates this action to the LLC sublayer entity or bridge using an MA-UNITDATASTATUS.indication primitive with transmission status set to Successful.

At an AP for which dot11SSPNInterfaceActivated is true, upon receipt of an MA-UNITDATA.request primitive having an individually addressed destination address and a priority of Contention or ContentionFree, the AP’s MAC sublayer shall perform rate limiting to enforce the resource utilization limit in dot11NonAPStationMaxAuthBestEffortRate in the dot11InterworkingEntry identified by the destination MAC address of the frame to be transmitted. The specific mechanism to perform rate limiting is outside the scope of this standard.

— If the rate limiting mechanism does not discard the frame, then dot11NonAPStationBestEffort- MSDUCount shall be incremented by 1 and dot11NonAPStationBestEffortOctetCount shall be incremented by the number of octets in the MSDU.

— If the rate limiting mechanism discards the frame, then dot11NonAPStationDroppedBestEffort- MSDUCount shall be incremented by 1 and dot11NonAPStationDroppedBestEffortOctetCount shall be incremented by the number of octets in the MSDU.

At an AP for which dot11SSPNInterfaceActivated is true, upon receipt of an MA-UNITDATA.request primitive having an individually addressed destination address for which the priority is an integer in the range of 0 to 7, inclusive, then the AP’s MAC sublayer shall derive the access category from the priority using the mapping in Table 9-1 (UP-to-AC mappings). The AP’s MAC sublayer shall retrieve the MIB variables listed below from the dot11InterworkingEntry identified by the destination MAC address of the frame to be transmitted and perform the following operations:

— If the access category is AC\_VO, then the AP’s MAC sublayer shall perform rate limiting to enforce the resource utilization limit in dot11NonAPStationMaxAuthVoiceRate; the specific mechanism to perform rate limiting is outside the scope of this standard. If the rate limiting mechanism does not discard the frame, then dot11NonAPStationVoiceMSDUCount shall be incremented by 1 and dot11NonAPStationVoiceOctetCount shall be incremented by the number of octets in the MSDU. If the rate limiting mechanism discards the frame, then dot11NonAPStationDroppedVoiceMSDUCount shall be incremented by 1 and dot11NonAPStationDroppedVoiceOctetCount shall be incremented by the number of octets in the MSDU.

— If the access category is AC\_VI, then the AP’s MAC sublayer shall perform rate limiting to enforce the resource utilization limit in dot11NonAPStationMaxAuthVideoRate; the specific mechanism to perform rate limiting is outside the scope of this standard. If the rate-limiting mechanism does not discard the frame, then dot11NonAPStationVideoMSDUCount shall be incremented by 1 and dot11NonAPStationVideoOctetCount shall be incremented by the number of octets in the MSDU. If the rate limiting mechanism discards the frame, then dot11NonAPStationDroppedVideoMSDUCount shall be incremented by 1 and dot11NonAPStationDroppedVideoOctetCount shall be incremented by the number of octets in the MSDU.

— If the access category is AC\_BE, then the AP’s MAC sublayer shall perform rate limiting to enforce the resource utilization limit in dot11NonAPStationMaxAuthBestEffortRate; the specific mechanism to perform rate limiting is outside the scope of this standard. If the rate-limiting mechanism does not discard the frame, then dot11NonAPStationBestEffortMSDUCount shall be incremented by 1 and dot11NonAPStationBestEffortOctetCount shall be incremented by the number of octets in the MSDU. If the rate limiting mechanism discards the frame, then dot11NonAPStationDroppedBestEffortMSDUCount shall be incremented by 1 and dot11NonAPStationDroppedBestEffortOctetCount shall be incremented by the number of octets in the MSDU.

— If the access category is AC\_BK, then the AP’s MAC sublayer shall perform rate limiting to enforce the resource utilization limit in dot11NonAPStationMaxAuthBackgroundRate; the specific mechanism to perform rate limiting is outside the scope of this standard. If the rate-limiting mechanism does not discard the frame, then dot11NonAPStationBackgroundMSDUCount shall be incremented by 1 and dot11NonAPStationBackgroundOctetCount shall be incremented by the number of octets in the MSDU. If the rate limiting mechanism discards the frame, then dot11NonAPStationDroppedBackgroundMSDUCount shall be incremented by 1 and dot11NonAPStationDroppedBackgroundOctetCount shall be incremented by the number of octets in the MSDU.

At an AP for which dot11SSPNInterfaceActivated is true, upon receipt of an MA-UNITDATA.request primitive having an individually addressed destination address whose priority is an integer in the range of 8 to 15, inclusive, then the AP’s MAC sublayer shall perform rate limiting to enforce the resource utilization limit in dot11NonAPStationAuthMaxHCCAHEMMRate; the specific mechanism to perform rate limiting is outside the scope of this standard.

— If the rate-limiting mechanism does not discard the frame, then dot11NonAPStationHCCAHEMMMSDUCount shall be incremented by 1, and dot11NonAPStationHCCAHEMMOctetCount shall be incremented by the number of octets in the MSDU.

— If the rate limiting mechanism discards the frame, then dot11NonAPStationDroppedHCCAHEMMMSDUCount shall be incremented by 1 and dot11NonAPStationDroppedHCCAHEMMOctetCount shall be incremented by the number of octets in the MSDU.

**5.2.4 MA-UNITDATA.indication**

**5.2.4.1 Function**

This primitive defines the transfer of an MSDU from the MAC sublayer entity to the LLC sublayer entity or bridge, or entities or bridges in the case of group addresses. In the absence of error, the contents of the data parameter are logically complete and unchanged relative to the data parameter in the associated MA-UNITDATA.request primitive.

**5.2.4.2 Semantics of the service primitive**

The parameters of the primitive are as follows:

MA-UNITDATA.indication(

source address,

destination address,

routing information,

data,

reception status,

priority,

service class,

station vector,

MSDU format

)

The SA parameter is an individual address as specified by the SA field of the incoming frame.

The DA parameter is either an individual or a group address as specified by the DA field of the incoming frame.

The routing information parameter specifies the route that was used for the data transfer. The MAC sublayer entity shall set this field to null.

The data parameter specifies the MSDU as received by the local MAC entity.

The reception status parameter indicates the success or failure of the received frame. The MAC always reports “success” because all failures of reception are discarded without generating MAUNITDATA.indication primitive.

The priority parameter specifies the receive processing priority that was used for the data unit transfer. The allowed values of priority are described in 5.1.1.4 (Interpretation of priority parameter in MAC service primitives).

The service class parameter specifies the receive service class that was used for the data unit transfer. The allowed values of service class are described in 5.1.1.5 (Interpretation of service class parameter in MAC service primitives in a STA) and 5.1.3 (MSDU ordering).

The station vector parameter is present if GLK is in use, and comprises a set of service\_access\_point\_identifiers (as defined in 802.1Q) indicating only the single virtual point-to-point LANs for this data transfer, and thus the GLK links over which the MSDU was received.

The MSDU format parameter indicates if the received MSDU is in EDP or LDP format.

**Proposed resolution: Revised**

Make the changes as shown in 11-15/0462r0.