IEEE P802.11  
Wireless LANs

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| LB 205 Comment Resolution for 10.44d | | | | |
| Date: 2015-12-01 | | | | |
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Abstract

This submission proposes resolutions for comments in 10.44d of TGah Draft 3.0 with the following CIDs:

* 5115, 5116, 5346

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 TGah Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGah Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

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

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| **CID** | **Commenter** | **P.L** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 5115 | Osama Aboulmagd | 361.37 | 10.44d | "An S1G STA receiving an Activity Specification element...", since this element is transmitted in the Probe Request and (Re) Association Request, shouldn't S1G STA be replaced by S1G AP STA? | clarify | Revised–  Note: The comment points to P361L37 however the quoted text is in P361L44 and reads as follows.  The terminology “S1G STA” is correct because the EL STA may send the Activity Specification element via the DLS Response frame or the TDLS Setup Response frame a T(D)LS STA.  However, while the Activity Specification element is indicated as present in 8.6.4 (DLS Action frame details) and 8.6.13 (TDLS Action field formats) the normative part of this specification is missing in this subclause. Proposed resolution is to add the missing normative behaviour.  TGah editor to make the changes shown in 11-14/0055r0 under all headings that include CID 5115. |
| 5116 | Osama Aboulmagd | 361.23 | 10.44d | what is the difference between an EL STA and a sensor STA? is there really the need for two different definitions? | Clarify | Rejected –  The comment fails to identify a technical issue and is asking a question.  As a response to the comment: A sensor STA is a non-AP STA that associates to an AP and declares to be a sensor STA by setting the corresponding capability bit to 1 (a sensor STA can expect its associated AP to support certain types of features such as the support for EL operation if the AP supports sensor STAs).  An EL STA is an S1G STA that is powered by a small energy supply and is limited in terms of its ability to transmit and receive in certain intervals of time and as such needs to schedule max awake intervals and recovery intervals to be able to interact with the peer STA. |
| 5346 | Alfred Asterjadhi | 361.47 | 10.44d | "following the most recent transition".. Actually if more than one transition occurs during a max awake interval plus eventually the recovery interval then the AP should not update its counter based on the most recent transition but rather keep it unchanged. | Make sure that the counter at the AP is not updated every event that occurs but rather only in those that would allow the EL STA to recover. Similar observation also for the recovery time counter when multiple events occur. | Revised –  Agree in principle with the comment. Proposed resolution accounts for the suggested change and clarifies the instants of time and the conditions that need to be satisfied for the counter to be updated. Also added a figure which should clarify these timer settings.  TGah editor to make the changes shown in 11-14/0055r0 under all headings that include CID 5346. |

**Discussion:** *None.*

10.44dSupport for energy limited STAs

An energy limited (EL) STA is an S1G STA with dot11S1GActivityEnabled equal to true that is powered by a small energy supply and is limited in terms of its ability to transmit or receive in certain intervals of time. An EL STA may indicate these limitations to an S1G STA that intends to communicate with it by using the signalling described in this subclause. The procedure described below increases the likelihood that frame exchanges between these two STAs are performed successfully.

**TGah Editor: *Change the paragraphs below as follows (#5115):***

An EL STA shall include an Activity Specification element in Probe Request, DLS Request, DLS Response, TDLS Setup Request, TDLS Setup Response, and (Re) Association Request frames and may send Activity Specification frames.

**TGah Editor: *Change the paragraphs below as follows (#5346, Ed):***

An S1G AP that sets the STA Type Support in the S1G Capabilities element to 2 (i.e. supports only non-sensor STAs), as described in 10.44c.7 (S1G BSS type and STA type), may refuse (re) association or can disassociate an EL STA. The S1G AP that refuses (re) association or disassociates an EL STA shall set the Status Code field in the (Re) Association Response or in the Disassociation frame to ENERGY\_LIMITED\_OPERATION\_NOT\_SUPPORTED.

An S1G STA keeps two timers, ELMaxAwakeTimer and ELRecoveryTimer, for each EL STA and these timers are initialized upon successful reception of an Activity Specification element from the EL STA:

* The ELMaxAwakeTimer is set to 0
* The ELRecoveryTimer is set to the value of the Recovery Time Interval field of the Activity Specification element.

These timers uniformly count down to 0 when their values are non-zero. Figure xyz (EL STA operation) shows an example of the EL STA frame exchanges with the S1G STA.



**Figure xyz - EL STA operation**

The S1G STA shall not transmit to the EL STA, or cause the EL STA to transmit, an individually addressed PPDU whose duration would exceed the value of the ELMaxAwakeTimer.

The S1G STA shall set the ELMaxAwakeTimer to the value of the Max Awake Interval field of the most recently received Activity Specification element from the EL STA and the ELRecoveryTimer to 0 when a start-triggering event occurs (see Figure xyz for an example). A start-triggering event occurs when the ELMaxAwakeTimer is 0, and one of the following events that identify a transition of the EL STA from Doze to Awake state occurs:

—An (NDP) PS-Poll or trigger frame sent by the EL STA is received by the S1G STA

—A TWT starts for the EL STA, where the TWT corresponds to any TWT agreement that the EL STA has setup with the S1G STA

—A RAW slot allocated for the EL STA starts, where the RAW slot is scheduled in a RAW scheduled for the EL STA by the S1G STA

—A T(S)BTT at which the EL STA has to be awake is due, where the T(S)BTT is the time the S1G STA sends an S1G Beacon frame that is intended to be received by the EL STA

NOTE-- An EL STA can send a frame that is not a trigger frame to the S1G STA anytime and the reception of this frame from the S1G STA does not qualify as a start-triggering event.

The S1G STA shall not schedule a transmission of a PPDU carrying an individually addressed MPDU intended for the EL STA, or cause the EL STA to transmit an individually addressed PPDU until the ELRecoveryTimer has reached 0.

The S1G STA shall set the ELRecoveryTimer to the value of the Recovery Time Interval field of the most recently received Activity Specification element from the EL STA and the ELMaxAwakeTimer to 0 when an end-triggering event occurs (see Figure xyz for an example). An EL STA may indicate the Recovery Time Interval by including the Recovery Time Interval in the Duration field of an NDP (PS-Poll-)Ack frame with Idle Indication set to 1. An end-triggering event occurs when the ELRecoveryTimer is 0 and one of the following events that identify a transition of the EL STA to Doze state occurs:

—An acknowledgment is received from the EL STA as a response to the transmission of a BU, where the BU is sent by the S1G STA in response to an (NDP) PS-Poll or trigger frame generated by the EL STA

—An acknowledgment is received from the EL STA as a response to a frame with EOSP field equal to 1, where the frame is sent by the S1G STA

—An NDP (PS-Poll-)Ack frame is received from the EL STA as a response to a frame generated by the S1G STA, where the NDP (PS-Poll-)Ack frame has an Idle Indication field equal to 1 and a non-zero value of the Duration field

* In this case the ELRecoveryTimer is set to the value of the Duration field of the NDP (PS-Poll-)Ack frame when the Idle Indication field is 1

—The adjusted nominal minimum wake duration for a TWT has ended, where the TWT corresponds to any TWT agreement that the EL STA has setup with the S1G STA

—The RAW slot allocated for the EL STA has ended, where the RAW slot was scheduled in a RAW for the EL STA by the S1G STA

—The transmission of an S1G Beacon frame has ended, where the S1G Beacon is sent at a T(S)BTT at which the EL STA was expected to be awake

—The transmission of group addressed BU(s) has ended, where the group addressed BU(s) are expected to be received by the EL STA following a DTIM Beacon.

When the S1G STA cannot complete frames exchanges within ELMaxAwakeTimer, a new back-off procedure is invoked after stopping the current transmission and once the ELRecoveryTimer has expired.