IEEE P802.11
Wireless LANs

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| CR for OPS |
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Abstract

This document provides CR for CIDs: 22223 22224 22225 22251 22252 22254 22255 22256 22257

1. **Introduction**

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. The introduction and the explanation of the proposed changes are 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.***

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| **CID** | **Commenter** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 22223 | Mark RISON | 434.05 | 26.14.3.1 | "In the unscheduled mode, an OPS AP sends an OPS frame or a FILS discovery frame at any time to provide the scheduling information" ... sounds like a scheduled mode! | Change "unscheduled" to "aperiodic" and "scheduled" to "periodic", when not preceded by "TWT", in 9.4.2.5.1 (2x), 26.8.3.1, 26.14.3.1 (4x), 26.14.3.2 (3x), 26.14.3.3 (2x) | Accepted |
| 22224 | Mark RISON | 44.33 | 3.2 | "opportunistic power save (OPS) station (STA): A non-access point (AP) high efficiency (HE) STA thatsupports the opportunistic power save mechanism." -- this is a bad definition, because the convention is that "STA" includes APs. However, the term "OPS STA" is not used anywhere | Delete the cited text | Revised – replace the following sentence in section 3.2 from "opportunistic power save (OPS) station (STA): A non-access point (AP) high efficiency (HE) STA thatsupports the opportunistic power save mechanism." by the following sentence: "opportunistic power save (OPS) non-access point (AP) station (STA): A non-AP high efficiency (HE) STA thatsupports the opportunistic power save mechanism." |
| 22225 | Mark RISON | 44.22 | 3.2 | "opportunistic power save (OPS) access point (AP): An AP that supports the opportunistic power savemechanism." is missing the "HE" qualifier (cf. "An OPS AP is an AP HE STA that sets the OPS Support subfield in the HE MAC Capabilities Informationfield in HE Capabilities element to 1.") | Change the cited definition to "opportunistic power save (OPS) access point (AP): A high efficiency (HE) AP that supports the opportunistic power savemechanism." | Accepted |
| 22251 | Mark RISON | 434.30 | 26.14.3.2 | "If the OPS AP sets the bit corresponding to an OPSnon-AP STA in the traffic indication virtual bitmap field carried by the Partial Virtual Bitmap of the TIMelement of the OPS frame or FILS Discovery frame to 0, the AP should send neither individually addressedframes to the STA nor Trigger frames with a User Info field that addresses the STA during the OPS period." -- the "should" should be a "shall", since otherwise OPS is broken | As it says in the comment | Revised – agree with the commenter in principle Apply the changesmarked as #22251 in this document. |
| 22252 | Mark RISON | 434.51 | 26.14.3.2 | "If the OPS AP sets the bit correspondingto an OPS non-AP STA in the traffic indication virtual bitmap carried in the Partial Virtual Bitmap field ofthe TIM element of the TIM frame or FILS Discovery frame to 0, the AP should send neither individuallyaddressed frames to the STA nor Trigger frames with a User Info field that addresses the STA during theTWT SP and until the next TWT SP with the Broadcast TWT Recommendation field set to 3." -- the "should" should be a "shall", since otherwise OPS is broken | As it says in the comment | Revised – agree with the commenter in principle Apply the changesmarked as #22252 in this document. |
| 22254 | Mark RISON | 434.02 | 26.14.3.2 | " and to allow OPS non-AP STAs that are in PS mode to be in doze state to save power for adefined period" -- but a STA in PS mode is always allowed to be in doze state (except when it has sent a PS-Poll or U-APSD trigger), so this is redundant/confusing | Delete the cited text | Revised – revise the sentence to clarify when this can be used for STAs in PS mode. Apply the changes marked as #22254 in this document. |
| 22255 | Mark RISON | 434.09 | 26.14.3.2 | " and the OPS non-AP STAs that are in PS mode may be indoze state during the OPS period" -- but a STA in PS mode is always allowed to be in doze state (except when it has sent a PS-Poll or U-APSD trigger), so this is redundant/confusing | Delete the cited text | Reject – the commenter acknowledges in his comment that the STA in PS mode is not always allowed to be in doze state. The current sentence is therefore correct. |
| 22256 | Mark RISON | 434.15 | 26.14.3.2 | " andthe OPS non-AP STAs that are in PS mode may be in doze state until the next TWT SP" -- but a STA in PS mode is always allowed to be in doze state (except when it has sent a PS-Poll or U-APSD trigger), so this is redundant/confusing | Delete the cited text | Reject – the commenter acknowledges in his comment that the STA in PS mode is not always allowed to be in doze state. The current sentence is therefore correct. |
| 22257 | Mark RISON | 434.63 | 26.14.3.3 | " or may be in doze state if theSTA is in PS mode" -- but a STA in PS mode is always allowed to be in doze state (except when it has sent a PS-Poll or U-APSD trigger), so this is redundant/confusing | Delete the cited text | Reject – the commenter acknowledges in his comment that the STA in PS mode is not always allowed to be in doze state. The current sentence is therefore correct. |
| 22258 | Mark RISON | 435.11 | 26.14.3.3 | " or may be in doze state if theSTA is in PS mode" -- but a STA in PS mode is always allowed to be in doze state (except when it has sent a PS-Poll or U-APSD trigger), so this is redundant/confusing | Delete the cited text | Reject – the commenter acknowledges in his comment that the STA in PS mode is not always allowed to be in doze state. The current sentence is therefore correct. |

1. **Proposed changes**

***TGax editor: Modify the following subclause 26.14.3.1 General as follows for the following CIDs #2225. The sentences changes corresponding to a CID are marked with #CID\_number:***

* General

An OPS non-AP STA is a non-AP HE STA that sets the OPS Support subfield in the HE MAC Capabilities Information field of the HE Capabilities element to 1.

An OPS AP is an AP HE STA that sets the OPS Support subfield in the HE MAC Capabilities Information field in HE Capabilities element to 1.

Opportunistic power save mechanism has the objective to allow OPS non-AP STAs that are in active mode to be unavailable and to allow OPS non-AP STAs that are in PS mode and have to be in the awake state because of the power management mode they use to be in doze state to save power for a defined period. The opportunistic power save mechanism has two modes: unscheduled and scheduled. (#22254)

In the unscheduled mode, an OPS AP sends an OPS frame or a FILS Discovery frame(#22193) at any time to provide the scheduling information for all OPS non-AP STAs for the OPS period that follows the transmission of the OPS frame or FILS Discovery frame(#22193). Based on this information, the OPS non-AP STAs that are in active mode may be unavailable during the OPS period and the OPS non-AP STAs that are in PS mode may be in doze state during the OPS period.

In the scheduled mode, an OPS AP splits a beacon interval into several periodic broadcast TWT SPs and provides, at the beginning of each SP, the scheduling information for all OPS non-AP STAs. Based on this information, the OPS non-AP STAs that are in active mode may be unavailable until the next TWT SP and the OPS non-AP STAs that are in PS mode may be in doze state until the next TWT SP.

***TGax editor: Modify the following subclause 26.14.3.2AP operation for opportunistic power save as follows for the following CIDs #22251, #22252. The sentences changes corresponding to a CID are marked with #CID\_number:***

* AP operation for opportunistic power save

To enable unscheduled opportunistic power save, an OPS AP shall schedule for transmission an OPS frame or a FILS Discovery frame with the RA field set to the broadcast address that includes a TIM element (see 9.4.2.5 (TIM element)) and an OPS element (see 9.4.2.256 (OPS element)). The AP should transmit a FILS Discovery frame instead of an OPS frame if the target transmission time closely aligns with the transmission time of a FILS Discovery frame. The OPS Duration field in the OPS element shall be set to the duration of the OPS period that immediately follows the transmission of the OPS frame or FILS Discovery frame. The TIM element is encoded specifically as defined in 9.4.2.5 (TIM element) in order to provide the information of which STAs are not scheduled during the OPS period. If the OPS AP sets the bit corresponding to an OPS non-AP STA in the traffic indication virtual bitmap field carried by the Partial Virtual Bitmap of the TIM element of the OPS frame or FILS Discovery frame to 0, the AP shall not schedule for transmission individually addressed frames to the STA or Trigger frames with a User Info field that addresses the STA during the OPS period. (#22251)

To enable scheduled opportunistic power save, an OPS AP shall include a TWT element in beacons to set a periodic Broadcast TWT SP with the following information:

* The Broadcast TWT Recommendation field set to 3
* The Broadcast TWT ID subfield is set to 0

At the beginning of these periodic TWT SPs with the Broadcast TWT Recommendation field set to 3, the AP shall schedule for transmission a TIM frame or a FILS Discovery frame with the RA field set to the broadcast address that includes a TIM element (see 9.4.2.5 (TIM element)). The FILS Discovery frame may include an OPS element. The AP should transmit a FILS Discovery frame instead of a TIM frame if the TWT SP start time closely aligns with the transmission time of a FILS Discovery frame. If the OPS AP also operates with TIM Broadcast and uses TIM frames for opportunistic power save(#22253), the OPS AP should align the transmission time of a TIM frame for TIM Broadcast, with the start time of the broadcast TWT SP with the Broadcast TWT Recommendation field set to 3. If the OPS AP sets the bit corresponding to an OPS non-AP STA in the traffic indication virtual bitmap carried in the Partial Virtual Bitmap field of the TIM element of the TIM frame or FILS Discovery frame to 0, the AP shall not schedule for transmission individually addressed frames to the STA or Trigger frames with a User Info field that addresses the STA during the TWT SP and until the next TWT SP with the Broadcast TWT Recommendation field set to 3. (#22252)