IEEE P802.11  
Wireless LANs

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| Resolutions for some comments on 11bn/D0.1 (CC50) | | | | |
| Date: 2025-07-31 | | | | |
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Abstract

This submission proposes resolutions for various CIDs on 11bn/D0.1. Green indicates material agreed to in the group, yellow material to be discussed, red material rejected by the group and cyan material not to be overlooked. The “Final”/“No Markup” view should be selected in Word (this means Word comments can be disregarded by the Editor).

r1: Clarified AP MLD behaviour.

r2: Updated following presentation and discussion in Helsinki: rename to Bounded ESS, use AP Channel Report element rather than Channel Usage element, don’t use the term “roaming scan” but instead “scan for other APs of the same ESS”, don’t use the term “at all times” but instead “proactively”, clarify that motion is relative to the frame of reference of the AP.

r3: Only need to identify peer APs whose BSA overlaps. Remove parentheses in “AP (MLD)” to avoid confusion. Single AP MLD is not “corner” case.

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| --- | --- | --- | --- |
| Identifiers | Comment | Proposed change | Resolution |
| CID 3117  Mark RISON  37 | It would be helpful to have a signal that a BSS is the only one in an ESS. This would allow clients to skip performing roaming scans, and hence save power | As it says in the comment | REVISED  Make the changes shown under “Proposed changes” in <this document URL>, which add signalling to allow an AP to indicate all the channels the ESS the AP is a member of operates on (including the special case where the AP is the only one in the ESS), and allow an AP to indicate that it will use BTM to ensure associated STAs are at all times steered to the optimal AP. |
| CID 3118  Mark RISON  37 | It would be helpful to have a signal that all BSSes in an ESS (or a complete set of contiguous BSSes within an ESS) can be identified. This would allow clients to only perform roaming scans on the channels those BSSes are on, and hence save power | As it says in the comment | REVISED  Make the changes shown under “Proposed changes” in <this document URL>, which add signalling to allow an AP to indicate all the channels the ESS the AP is a member of operates on (including the special case where the AP is the only one in the ESS), and allow an AP to indicate that it will use BTM to ensure associated STAs are at all times steered to the optimal AP. |
| CID 3119  Mark RISON  37 | It would be helpful to have a signal that an AP commits to using BTM to steer a STA to another AP in the ESS where necessary. This would allow clients to skip performing roaming scans, and hence save power | As it says in the comment | REVISED  Make the changes shown under “Proposed changes” in <this document URL>, which add signalling to allow an AP to indicate all the channels the ESS the AP is a member of operates on (including the special case where the AP is the only one in the ESS), and allow an AP to indicate that it will use BTM to ensure associated STAs are at all times steered to the optimal AP. |
| CID 3120 Mark RISON  37 | It would be helpful to have a signal that an AP is mobile. This could influence a STA's scanning algorithm | As it says in the comment | REVISED  Agree in principle.  TGbn editor: please implement changes as shown in <this document URL> |

Discussion:

As discussed in 25/0863, it is useful to have:

* An indication that a BSS is the only one in the ESS, so that a STA knows it need not perform roaming scans
* An indication of all the channels on which there is a BSS of the ESS, so that a STA knows it need only perform roaming scans on these channels
* An indication that the AP is committed to using BTM to ensure the STA is always on the best AP, so that the STA knows it need not perform roaming scans

As per the 11bn technical scope, the 11bn provides a mechanism to reduce power consumption for Access Points (APs) (including mobile APs) and improved Peer-to-Peer (P2P) operation compared to Extremely High Throughput MAC/PHY operation.

As one of this effort, especially Dynamic Power Save (DPS), the following wording is included in D0.3 (in Subclause 9.4.2.aa1 and Subclause 37.15.1), which can be interpreted as considering commercial mobile APs (such as smartphones and tablets running Wi-Fi hotspots) as STA that is the target for the application of 11bn features.

*In Subclause 9.4.2.aa1 UHR Operation Element*

…

The DPS Enabled field is set to 1 if the AP sending a frame containing the UHR Operation Parameters field

is a mobile AP (TBD for non-mobile AP) and dynamic power save (DPS) is enabled at the AP and set to 0

otherwise.

*In Subclause 37.15.1 Dynamic power save (DPS) operation*

…

An AP may enable its DPS mode only under TBD conditions. A DPS AP shall have value 1 in its transmitted DPS Enabled field to announce that it has enabled DPS and 0 otherwise. The mechanism for enablement/disablement of DPS by an AP is TBD.

A DPS STA is either a DPS non-AP STA or a DPS mobile AP. It is TBD whether an AP that is not a Mobile

AP may be a DPS AP or not.

Therefore, in IEEE 11bn, if there is a technical difference between the NSTR mobile AP defined in 11be and the mobile AP mentioned in 11bn D0.3, it should be clearly specified. Additionally, a mechanism is needed for the AP to signal that it is a mobile AP.

Proposed changes:

**9.4.2.xxx UHR Capabilities element**

***Editor: in a spare field in the MAC portion of this element (or in a new octet at the end of this if there is no spare field) add a 1-bit field “Bounded ESS” and below this add the following para:***

The Bounded ESS field is set to 1 by an AP if the set of primary channels of the BSSs in the ESS the AP is a member of is fixed for the lifetime of the AP’s BSS and advertised (see 37.xx for the exact definition), and set to 0 otherwise. This field is reserved when transmitted by a non-AP STA.

***Editor: in a spare field in the MAC portion of this element (or in a new octet at the end of this if there is no spare field) add a 1-bit field “BTM Assurance” and below this add the following para:***

The BTM Assurance field is set to 1 by an AP if it uses BTM to ensure that associated STAs are proactively steered to an optimal AP in the ESS (see 37.xx), and set to 0 otherwise. This field is reserved when transmitted by a non-AP STA.

***Editor: in Table 9-65—Association Response frame body and Table 9-67—Reassociation Response frame body add a row immediately before the Vendor Specific row:***

|  |  |  |
| --- | --- | --- |
| *<next order number>* | AP Channel Report | One or more AP Channel Report elements are optionally present if dot11UHRImplemented is true. |

***Editor: add a new subclause to the UHR MAC clause:***

**37.xxx Bounded and BTM-assured ESSs, and mobile APs**

If an AP MLD is able to provide a complete list of the primary channels used, for the lifetime of the AP MLD’s BSSs, by all the other AP MLDs in the ESS it is a member of whose BSAs overlap with the AP MLD’s BSA, if any, it shall set the Bounded ESS field in the UHR Capabilities elements it transmits to 1, and shall include in the (Re)Association Response frames it transmits one or more AP Channel Report elements that give this list of channels. Otherwise, it shall set the Bounded ESS field to 0 and shall not include any AP Channel Report elements in the (Re)Association Response frames.

ALTERNATIVE

If an AP MLD is able to provide a complete list of the primary channels used, for the lifetime of the AP MLD’s BSSs, by all the other AP MLDs in the ESS it is a member of whose BSAs overlap with the AP MLD’s BSA, if any, it shall set the Bounded ESS field in the UHR Capabilities elements it transmits to 1, and shall include in the (Re)Association Response frames it transmits zero or more AP Channel Report elements that give this list of channels, where zero AP Channel Report elements shall be transmitted if the list is empty. Otherwise, it shall set the Bounded ESS field to 0 and shall not include any AP Channel Report elements in the (Re)Association Response frames.

AND THEN DELETE NOTE 2 BELOW OR REPLACE IT WITH

NOTE 2—In the case where the AP MLD is operating the only BSSs in the ESS (e.g. a mobile AP MLD or a single residential AP MLD), there is no AP Channel Report element. In this case, a non-AP STA might use this information to abstain from performing any scans for other APs of the same ESS.

NOTE 1—A non-AP STA might use this information to optimise scans for other APs of the same ESS, by only scanning those channels.

NOTE 2—In the case where the AP MLD is operating the only BSSs in the ESS (e.g. a mobile AP MLD or a single residential AP MLD), there is only one AP Channel Report element, and it has a zero-length Channel List field (and an arbitrary Operating Class field). In this case, a non-AP STA might use this information to abstain from performing any scans for other APs of the same ESS.

If an AP can and does use BTM to ensure all associated STAs that support BTM are proactively steered, using BTM, to an optimal AP in the ESS, it shall set the BTM Assurance field in the UHR Capabilities elements it transmits to 1, shall use BTM to ensure that all associated STAs are proactively steered to an optimal AP in the ESS, and shall not transmit a BSS Transition Management Request frame with the Disassociation Imminent field set to 1 unless least one of the BSS Termination Included, ESS Disassociation Imminent and Link Removal Imminent fields is set to 1. Otherwise, it shall set the BTM Assurance field to 0.  
NOTE 3—The means by which the AP determines at all times an optimal AP for the STA are outside the scope of the standard. The AP might provide information to the STA to justify a proposed BTM steer.

NOTE 4—A non-AP STA might use this information to abstain from performing any scans for other APs of the same ESS.

If a STA is an AP that is not fixed with respect to its immediate surroundings, it should set the Mobile AP bit in the Extended Capabilities elements it transmits to 1.  Otherwise, it shall not set this bit to 1.

NOTE 5—A non-AP STA might use this information to determine how frequently to scan for that AP’s presence.

***Editor: In Table 9-192—Extended Capabilities field, add a row immediately before the Reserved row (and renumber the Reserved row):***

|  |  |  |
| --- | --- | --- |
| <ANA> | Mobile AP | For an AP:  Set to 1 to indicate that the AP is not fixed w.r.t. its immediate surroundings. Set to 0 otherwise.  For a non-AP STA:  This subfield is reserved. |

**References:**

802.11bn/D0.1 except where otherwise specified