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Wireless LANs

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| 802.11bc LB264 – Resolution for CID 3011 |
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 Abstract

This submission proposes resolutions for the following CIDs submitted during LB264 for 11bc D3.0: 3011

**11.49** **Reduced neighbor report**

A Reduced Neighbor Report element contains information on neighbor APs, co-located APs, or a combination of both. An AP that operates in the 2.4 GHz or 5 GHz band and that is in the same co-located AP set as one or more 6 GHz APs shall follow the rules in 11.53 (Out-of-band discovery of a 6 GHz BSS(11ax)) for including a Reduced Neighbor Report element in Beacon and Probe Response frames. A Reduced Neighbor Report element might not be exhaustive either by choice or by the fact that there may be neighbor APs not known to the reporting AP. An AP that intends to report neighboring or co-located APs may include more than one Reduced Neighbor Report element in a Beacon, Probe Response, or FILS Discovery frame if the reported APs do not all fit in a single Reduced Neighbor Report element; otherwise, it shall not include more than one Reduced Neighbor Report element.(11ax)

(11ax)An AP with dot11MultiBSSIDImplemented equal to true shall not include a Reduced Neighbor Report element in the Nontransmitted BSSID Profile subelement of the Multiple BSSID element.

NOTE 1—The Beacon, Probe Response, or FILS Discovery frame of an AP with dot11MultiBSSIDImplemented equal to true can carry a Reduced Neighbor Report element. In this case, the values of the fields in the Reduced Neighbor Report element apply to all the BSSs in the multiple BSSID set, except for the Same SSID subfield(s), whose value applies only to the BSS corresponding to the transmitted BSSID.

(11ax)If an AP reported in a TBTT Information field in a Reduced Neighbor Report element is not part of a multiple BSSID set, then the BSS Parameters subfield, if included, shall have the Multiple BSSID subfield set to 0. If an AP reported in a TBTT Information field in a Reduced Neighbor Report element is a transmitted BSSID, then the BSS Parameters subfield, if included, shall have the Multiple BSSID subfield set to 1 and the Transmitted BSSID subfield set to 1. If an AP reported in a TBTT Information field in a Reduced Neighbor Report element is a nontransmitted BSSID, then the BSS Parameters subfield, if included, shall have the Multiple BSSID subfield set to 1 and the Transmitted BSSID subfield set to 0.

(11ax)An HE AP with dot11MultiBSSIDImplemented equal to true may advertise one or more nontransmitted BSSIDs in the multiple BSSID set by including the Reduced Neighbor Report element in its Beacon, Probe Response, or FILS Discovery frames with the BSS Parameters subfield of the TBTT Information field containing the Co-Located subfield set to 1, the Multiple BSSID subfield set to 1, and the Transmitted BSSID subfield set to 0 and with the Operating Class and Channel Number subfields of the Neighbor AP Information field set to the operating class and channel number, respectively, of the transmitting AP (i.e., the transmitted BSSID).

(11ax)A reporting AP should set the OCT Recommended subfield to 1 in the BSS Parameters subfield of a TBTT Information field in a Reduced Neighbor Report element if both the reporting AP and the reported AP have dot11OCTOptionImplemented equal to true and the Co-Located AP subfield is 1 in the BSS Parameters subfield corresponding to the reported AP. A reporting AP may set the OCT Recommended subfield to 1 in the BSS Parameters subfield of a TBTT Information field in a Reduced Neighbor Report element if both the reporting AP and the reported AP have the same SSID and have dot11OCTOptionImplemented equal to true and the Co-Located AP subfield is 0 in the BSS Parameters subfield corresponding to the reported AP. If the OCT Recommended subfield is 1 and the Co-Located AP subfield is 1 in the Neighbor AP Information field describing a reported HE AP in the Reduced Neighbor Report element, then a non-AP STA that has dot11OCTOptionImplemented equal to true should use the OCT procedure described in 11.31.5 (On-channel Tunneling (OCT) operation) to perform active scanning, authentication, and/or association with the reported AP through over-the-air transmissions with the AP that sent the Reduced Neighbor Report element. If the OCT Recommended subfield is 1 and the Co-Located AP subfield is 0 in the Neighbor AP Information field describing a reported HE AP in the Reduced Neighbor Report element, then a non-AP STA that has dot11OCTOptionImplemented equal to true may use the OCT procedure described in 11.31.5 (On-channel Tunneling (OCT) operation) to perform active scanning, authentication, and/or association with the reported AP through over-the-air transmissions with the AP that sent the Reduced Neighbor Report element.

The Reduced Neighbor Report element contains a list of operating classes and primary channels along with TBTT information for the reported neighbor APs on each operating class and primary channel. The operating class is selected from values in Table E-4 (Global operating classes) filtered by the requirement that, together with the Channel Number field, the primary channel be identifiable.

NOTE 2—For instance, this excludes operating class 128–130.

When the reporting AP cannot obtain an operating class that, together with the Channel Number field, identifies the primary channel from the neighboring AP, then the reporting AP shall report an operating class that, together with a channel number, identifies the primary channel of the reported BSS. Given a choice of operating classes that preserve the identification of the primary channel, the reporting AP should select an operating class that preserves as many behavior limits as possible are known to the reporting AP.

NOTE 3—An operating class might be unavailable because the neighboring AP does not transmit an operating class or the transmitted operating class does not indicate a primary channel.

A Reduced Neighbor Report element includes only channels that are consistent with the Country element in the frame in which the Reduced Neighbor Report element appears. The Reduced Neighbor Report element contents may be derived from the NeighborListSet parameter of the MLME-NEIGHBORREPRESP.request primitive. The contents of the Reduced Neighbor Report element might also be configured or obtained by other means beyond the scope of this standard.

If the Supported Operating Classes element of the STA is included in the Probe Request frame, the reduced neighbor report contains information on neighbor APs whose current operating class matches the supported operating classes in the Probe Request frame.

If the AP is a TVHT AP that transmits a Probe Response frame, the Filtered Neighbor AP subfield in the Neighbor AP Information field shall be set to 1 if the AP determines that the SSID corresponding to every AP in the Neighbor AP Information field matches the specific SSID in the corresponding Probe Response frame; otherwise it shall be set to 0.

NOTE 4—The Filtered Neighbor AP subfield is reserved when the Reduced Neighbor Report element is transmitted by a non-TVHT AP or by a TVHT AP in a frame other than a Probe Response frame (see 9.4.2.170.2 (Neighbor AP Information field)).

A serving AP shall include a value less than 255 in the Neighbor AP TBTT Offset subfield if it is able to guarantee an accumulated error of 1.5 TU or better.

If an EBCS AP has at least one other EBCS AP in the neighborhood or co-located with it that belongs to the same EBCS AP group or EBCS certificate group, then it shall include, in the Beacon and Probe Response frames that it transmits, a Reduced Neighbor Report element with the TBTT Information Field Type subfield set to 1 and one or more TBTT Information fields, each carrying an EBCS Info Frame Tx Countdown field, which provides information about each of those APs. The Reduced Neighbor Report element may also carry information about non-EBCS APs.

When an AP transmits a Reduced Neighbor Report element that includes more than one Neighbor AP Information field and they do not all carry the same value in the TBTT Information Field Type subfield, the AP shall order the Neighbor AP Information fields in increasing order of the values carried in the TBTT Information Field Type subfield.

A STA that receives a Neighbor AP Information field with an unrecognized TBTT Information Field Type subfield shall ignore the remainder of the Reduced Neighbor Report element.

(11ax)A STA that receives a Neighbor AP Information field with a recognized TBTT Information Field Type subfield but an unrecognized TBTT Information Length subfield has two possible ways of processing the received information:

1. Ignore that Neighbor AP Information field, and continue to process the subsequent Neighbor AP Information fields, or
2. Process the first 13 octets of each TBTT Information field of the Neighbor AP Information field as if the TBTT Information Length subfield had value 13, ignore the remaining TBTT Information Length minus 13 octets of each TBTT Information field of the Neighbor AP Information field, and continue to process the subsequent Neighbor AP Information fields.

(11ax)If the unrecognized TBTT Information Length value is less than or equal to 13, the STA shall follow alternative a). If the unrecognized TBTT Information Length value is greater than 13, an HE STA shall follow alternative b), and a non-HE STA shall follow either alternative a) or b).

(11ax)If an AP that operates in the 2.4 GHz or 5 GHz band advertises in Reduced Neighbor Report elements a 6 GHz AP that is in the same co-located AP set as itself, the AP shall include the 20 MHz PSD subfield in the TBTT Information field corresponding to that 6 GHz AP.

(11ax)When a 20 MHz PSD subfield is present in a TBTT Information field that reports a 6 GHz AP, its value shall be set such that the resulting allowed maximum transmit power for the primary 20 MHz channel is equal to the minimum of the regulatory client maximum transmit powers indicated by the Transmit Power Envelope element(s) transmitted by the reported AP in Beacon and Probe Response frames.

NOTE 5—Country-specific operating requirements that relate to use of the Reduced Neighbor Report element are defined in E.2.7 (6 GHz band(11ax)(#600)). (11ax)

NOTE 6—A 20 MHz PSD subfield in a Reduced Neighbor Report element sent in Beacon and Probe Response frames by an AP that is in the same co-located AP set as a 6 GHz AP can be used by a STA to determine a local transmit power limit for 20 MHz PPDUs corresponding to a 6 GHz AP, prior to having received a Beacon or Probe Response frame from that AP. The value in the 20 MHz PSD subfield can be used by any STA, although for some categories it may result in determination of a lower transmit power limit than would be determined by (subsequent) reception of a Transmit Power Envelope element. A STA might, for example, determine a transmit power limit based on this information when sending a Probe Request frame with 20 MHz PPDU bandwidth during active scanning on the 6 GHz AP's channel.(11ax)