1. IEEE P802.11
Wireless LANs

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Abstract

[This document is provided as part of resolution to CID 6001]

In order to avoid redundant BF retraining during CBAP operation, the direction bit which indicated who’s the initiator of the ScS is returned to the ScS frame.

 The motivation for the change is explained in the following diagram:

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* In the example above STA-A receives STA-B initiator ScS as a responder ScS.
* STA-A consider a WRONG BS feedback
* This leads to a erroneous ScS flow which will result in loss of several mSecs
	+ Bad network efficiency
* NO, this is not a corner case in CBP
* The direction bit prevents from this erroneous flow to happen

### 8.4a.1 Sector Sweep field

The format of the sector sweep (ScS) field is shown in Figure 84.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Figure 84 ScS field format



The Direction field is set to 0 to indicate that the frame is transmitted by the initiator and set to 1 to

indicate that the frame is transmitted by the responder.

The CDOWN field is a down-counter indicating the number of remaining DBand Beacon frame transmissions to the end of the TXSS, or the number of remaining ScS frame transmissions to the end of the TXSS/RXSS. This field is set to 0 in the last frame DBand Beacon and ScS frame transmission. Possible values range from 0-511.

The Sector ID field is set to indicate the sector number through which the frame containing this ScS field is transmitted.

The DBand antenna ID field indicates the DBand antenna the transmitter is currently using for this transmission.

The RXSS Length field is valid only when transmitted in a CBAP and is reserved otherwise. The RXSS Length field specifies the length of a receive sector sweep as required by the transmitting STA, and is defined in units of a ScS frame. The value of this field is in the range 0–62, with odd values being reserved.

NOTE – In a CBAP a transmitting STA with multiple DBand antennas might not know the capabilities of the receiving STA, and hence the size of the RXSS Length field is defined to cover for a single DBand antenna of the receiving STA.

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##### 8.4.2.130.2 DBand STA Capability Information field

The DBand STA Capability Information field, shown in Figure 36, represents the transmitting STA capabilities irrespective of the role of the STA.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0 | B1 | B2 | B3 | B4-B5 | B6 | B7-B13  |
|  | Reverse Direction | Higher Layer Timer Synchronization | TPC  | SSH and Interference Mitigation | Number of DBand Antennas | Reserved | Total Number of Sectors |
| Bit: | 1 | 1 | 1 | 1 | 2 | 1 | 7 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | B14-B19 | B20 | B21-B26 | B27 |
|  | RXSS Length | DBand Antenna Reciprocity  | A-MPDU Parameters  | BA with Flow Control  |
| Bit: | 6 | 1 | 6 | 1 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | B28-B51 | B52 | B53 | B54 | B55 | B56 | B57-B63 |
|  | Supported MCS Set | DTP Supported | A-PPDU Supported | Null  | Heartbeat  | Antenna Pattern Reciprocity | Reserved |
| Bit: | 24 | 1 | 1 | 1 | 1 | 1 | 6 |

Figure 36 DBand STA Capability Information field format

The Reverse Direction field is set to 1 if the STA supports RD as defined in 9.25 and is set to 0 otherwise.

The Higher Layer Timer Synchronization field is set to 1 if the STA supports Higher Layer Timer Synchronization as defined in 10.23.5 Timing measurement procedure, and is set to 0 otherwise.

The TPC field is set to 1 if the STA supports the TPC as defined in 10.8 and is set to 0 otherwise.

The SSH and Interference Mitigation field is set to 1 if the STA is capable of performing the function of SSH and Interference Mitigation and if dot11RadioMeasurementActivated is true, and is set to 0 otherwise (see 10.31).

The Number of DBand Antennas field indicates the total number of DBand antennas of the STA. The value of this field is in the range 1–4, with the value being equal to the bit representation plus 1.

The Total Number of Sectors field indicates the total number of sectors the STA uses in a sector sweep combined over all DBand antennas. The value of this field is in the range 1–128, with the value being equal to the bit representation plus 1.

The value represented by the RXSS Length field specifies the total number of receive sectors combined over all receive DBand antennas of the STA. The value represented by this field is in the range 2-128 and is given by (RXSS Length+1)×2. The maximum number of ScS frames transmitted during an RXSS is equal to the value of (RXSS Length+1)×2 times the total number of transmit DBand antennas of the peer device.

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### 8.4a.5 Beamforming Control field

The beamforming control field is formatted as shown in Figure 89.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | B0 | B1 | B2 | B3-B8 | B9 | B10-B15 |
|  | Beamforming Training | isInitiatorTXSS | isResponderTXSS | RXSS Length | RXSSTxRate | Reserved |
| Bit: | 1 | 1 | 1 | 6 | 1 | 6 |

Figure 89 BF Control field format

The Beamforming Training field is set to 1 to indicate that the source DBand STA intends to initiate beamforming training with the destination DBand STA at the start of the SP/TXOP and set to 0 otherwise. If the Beamforming Training field is set to 0, the isInitiatorTXSS, isResponderTXSS, and RXSS Length fields are reserved.

The isInitiatorTXSS field is set to 1 to indicate that the source DBand STA starts the beamforming training with an initiator TXSS. This field is set to 0 to indicate that the source DBand STA starts the BF training with an initiator RXSS.

The isResponderTXSS field is set to 1 to indicate that the destination DBand STA starts the RSS with a responder TXSS. This field is set to 0 to indicate that the destination DBand STA is to initiate the RSS with a responder RXSS. If the isInitiatorTXSS field is set to 0, the isResponderTXSS field is set to 1. If the isResponderTXSS field is set to 0, the isInitiatorTXSS field is set to 1 (see 9.35.2.2.1).

The RXSS Length field is valid only if at least one of isInitiatorTXSS field or isResponderTXSS field is equal to 0 and is reserved otherwise. The value represented by the RXSS Length field specifies the total number of receive sectors combined over all receive DBand antennas of the STA. The value represented by this field is in the range 2–128 and is given by (RXSS Length+1)×2. The maximum number of ScS frames transmitted during an RXSS is equal to the value of (RXSS Length+1)×2 times the total number of transmit DBand antennas of the peer device. If the RXSS Length field is set with respect to the source DBand STA, it is set to the value of the RXSS Length field in the source DBand STA’s DBand Capabilities element. If the RXSS Length field is set with respect to the destination DBand STA, it is set to the value of the RXSS Length field in the destination DBand STA’s DBand Capabilities element.

The RXSSTxRate field is valid only if the RXSS Length field is valid and the value of the RXSS Length field is greater than 0. Otherwise, the RXSSTxRate field is reserved. The RXSSTxRate field is set to 0 to indicate that all frames transmitted as part of the RXSS use the DBand Control modulation class (9.7.5a.1 Usage of DBand Control modulation class). The RXSSTxRate field is set to 1 to indicate that only the first frame transmitted as part of the RXSS use the DBand Control modulation class and the remaining frames use MCS1 of the DBand SC modulation class.