IEEE P802.11
Wireless LANs

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| CC9 Resolutions for 9-32k |
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Abstract

Addressing CIDs for 9.32k Subchannel Selective Transmission of TGah Call for Comments 9.

**Revision Notes**

**R5:**

CID xx Added a few more lines of clarification to behaviour at the end of the set of changes.

**R0:**

Initial

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| **CID** | **Commenter Name** | **P.L** | **SC** | **Comment** | **Proposed Change** | **Resolution** |
| 421 | Minho Cheong | 149.29 | 9.32k.1 | It is needed to describe in detail how to report the selected best sub-channel to AP | as in the comment | Revise – TGah editor to make the changes shown in 11-13-1142r1 |
| 420 | Minho Cheong | 149.29 | 9.32k.1 | Sounding for SST operation in a beacon interval is desirable to be defined in an unified way with other needs of sounding such as sectorization sounding or beamforming sounding | as in the comment | Revise – TGah editor to make the changes shown in 11-13-1142r1 |
| 435 | Minho Cheong | 149.24 | 9.32k | It is needed to define how to expand the BW in the SST and whether we continue to use the conventional primary/secondary channel concept and its restriction even in the SST operation. | as in the comment | Revise – TGah editor to make the changes shown in 11-13-1142r1 |
| 424 | Minho Cheong | 149.29 | 9.32k.1 | It is needed to define a very short effcient packet to report the selected sub-channel to AP when SST operation. It may be better if we can protect those packets in a RAW (report RAW). | as in the comment | Revise – TGah editor to make the changes shown in 11-13-1142r1 |
| 423 | Minho Cheong | 149.29 | 9.32k.1 | It is needed to define how to transmit NDP packets for SST sounding in detail | as in the comment | Revise – TGah editor to make the changes shown in 11-13-1142r1 |

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| **CID** | **Commenter Name** | **P.L** | **SC** | **Comment** | **Proposed Change** | **Resolution** |
| 200 | Hongyuan Zhang | 149.24 | 9.32k | For apple to apple comparison, the NDPs for different subchannels need to maintain same power levels--this is similar to the requirement of antenna selection in 802.11n. | add requirement that the TXVECTOR TXPWR\_LEVEL should be identical across different training NDP frames--copy similar sentences from 11n. | Revise – TGah editor to make the changes shown in 11-13-1142r1 |
| 129 | Anna Pantelidou | 149.54 | 9.32k.1 | The notion of a local Beacon is unclear | Please explain what a local Beacon is and how it is different from a normal Beacon. Does it indicate different rules of access so that SST STAs cannot transmit if a local beacon is not received after TBTT? | Reject – there is a definition of local beacon in the text which appears before the first use of the term. |
| 857 | Timo Koskela | 149.54 | 9.32k.1 Overview | What is the purpose of having a term local beacon. It would assumed that STA only obeys the informatino that it receives from the AP that it is associated to anyway | remove "local" since it has no actual meaning | Reject – The assumption is incorrect; While it is true that for many fields in a beacon, the information relates only to BSS members, there are some fields and bits in beacons that are obeyed by any STA receiving them, regardless of their BSS membership. |
| 810 | Simone Merlin | 149.27 | 9.32k.1 | There are various aspects of the FST protocol that are not defined or ambiguous:- L36: how are the beacon sent on multiple channels?- L42: what does 'presence of activity' means?- L42: seletion of an operating ... channel?- L46: how is a STA permitted to transmit? ned be clear on allowed PPDU formats and BW- L61: why describe the behavio of a non-FST STA? just refer to appropriate section to avoid ambiguities/inconsistencies. | clearly define the protocol. See document XXXX | Revise – TGah editor to make the changes shown in 11-13-1142r1 |
| 885 | Yongho Seok | 149.54 | 9.32k.1 | What is a difference between a Beacon and a local Beacon?It seems that the local Beacon is transmitted within a BI and the local Beacon may be transmitted in a non-primary channels (e.g., permitted SST channels).If my understanding is correct, change the sentence as the following."A local Beacon is one that is transmitted on a non-primary channels (e.g., permitted SST channels) within a BI by the AP with which a STA is associated." | Change the sentence (P149 L54) as the following."A local Beacon is one that is transmitted on a non-primary channels (e.g., permitted SST channels) within a BI by the AP with which a STA is associated." | Revise – TGah editor to make changes shown in 11-13-1142r1 - apparently, even though the local beacon definition was in the text, a lot of people missed it – so the change is to separate the definition from all other text by making the definition its own paragraph. |
| 918 | Young Hoon Kwon | 149.36 | 9.32k.1 | SST can be operated in short beacon based too. | Throughout the subclause 9.32k.1, modify the word "beacon" to "(short) beacon", and modify the word "TBTT" to "T(S)BTT". | Accept |
| 554 | Mitsuru Iwaoka | 149.24 | 9.32k | Description of 9.32k Subchannel Selective Transmission (SST) is not sufficient. | Provide enough description of SST. If enough description cannot be provided, delete SST functionality from this specification. | Revise - TGah editor to make changes shown in 11-13-1142r1 |
| 678 | Ronald Murias | 149.30 | 9.32k.1 | typographical error: "selected advertised" | use "selected" or "advertised" | Revise – TGah editor to make changes shown in 11-13-1142r1 – “indicated” is the best choice. |

**Discussion**

**Proposed Changes:**

***TGah editor, modify the indicated paragraph of subclause 9.32k.1 Overview, as shown:***

**9.32k Subchannel Selective Transmission (SST)**

**9.32k.1 Overview**

S1G STAs that are associated with an S1G AP transmit and receive on the channel or channels that are indicated by the AP as the allowed operating channels for the BSS. An SST STA is a S1G STA that is associated with an AP and that chooses a subset of the allowed operating channels for the BSS on which to operate when SST operation is permitted by the AP as indicated in the Subchannel Selective Transmission element. The set of permitted SST channels indicated by the AP is dynamic.

At each T(S)BTT, an S1G AP may send (short) Beacons on more than one channel from the set of allowed operating channels for the BSS either in parallel (e.g. with a value of S1G\_DUP\_2M for the TXVECTOR parameter FORMAT and a value of CBW8 for the TXVECTOR parameter CH\_ BANDWIDTH in a BSS with an operating width of 8 MHz) or in series (e.g. sequential transmissions, each with a value of S1G\_DUP\_2M for the TXVECTOR parameter FORMAT and a value of CBW2 for the TXVECTOR parameter CH\_ BANDWIDTH and each transmitted on a different 2 MHz subchannel in a BSS with an 8 MHz operating width) or a combination of the two.

An S1G AP that wishes to allow SST operation within a beacon interval shall include the SST element in the (short) Beacon that immediately precedes the beacon interval. An S1G AP that wishes to indicate to SST STAs the expectation of the transmission of frames by the AP within a beacon interval that can be used by the SST STAs to estimate the channel parameters which can be used as input to an algorithm for the selection of an operating channel shall include the SST element in the (short) Beacon that immediately precedes the beacon interval, indicating the expected start times and channels of the transmissions in the Channel Activity Schedule field of the element. The AP may transmit sounding frames to SST STAs for the purpose of estimating channel parameters. The AP may transmit sounding frames for SST STA channel estimation either in parallel (e.g. with a value of S1G\_DUP\_2M for the TXVECTOR parameter FORMAT and a value of CBW8 for the TXVECTOR parameter CH\_ BANDWIDTH in a BSS with an operating width of 8 MHz) or in series (e.g. sequential transmissions, each with a value of S1G\_DUP\_2M for the TXVECTOR parameter FORMAT and a value of CBW2 for the TXVECTOR parameter CH\_ BANDWIDTH and each transmitted on a different 2 MHz subchannel in a BSS with an 8 MHz operating width) or a combination of the two.

An S1G AP may include a Subchannel Selective Transmission element in a (short) Beacon to indicate on which channels an SST STA is permitted to transmit within the BSS as described in 8.4.2.170m.

An S1G AP may indicate on which channels it intends to transmit following the transmission of a (short) Beacon by including a Subchannel Selective Transmission element in the (short) Beacon with a non-zero value in at least one Channel Activity bitmap subfield and a value of 1 in the corresponding DL Activity subfield.

If the frames that are transmitted by an S1G AP in response to an announcement of transmission activity within a Subchannel Selective Transmission element are sounding frames, the S1G AP shall use the same value for the TXPWER\_LEVEL parameter of the TXVECTOR for each of the sounding frame transmissions associated with the Subchannel Selective Transmission element announcement.

The AP may signal the presence of a RAW for the purpose of SST sounding for a group of STAs using a unified sounding RAW as indicated within a transmitted RPS information element. Such a Sounding RAW may be scheduled for periodic or non-periodic operation. An additional RAW may be scheduled after the Sounding RAW for the transmission of NDP frames (e.g., NDP PS-POLL) by SST STAs on their selected channel(s) for the purpose of communicating a selected subchannel to the AP.When the RAW Type is Sounding RAW nad the RAW Type Options subfield is set to SST is set to Sounding RAW in the RPS information element (See 8.4.2.170b (RPS element)) transmitted by the AP, the SST sounding sequence within the Sounding RAW comprises a series of PIFS-separated NDP frames (e.g., NDP CTS frames), each transmitted on one of the channels among those indicated by the Channel Indication field of the RAW, starting with lowest frequency channel. Non-AP STAs are prohibited from transmitting during the RAW but SST-capable devices may listen to the sounding sequence that is transmitted during the RAW.

A local Beacon is a (short) Beacon that is transmitted by the AP with which a STA is associated.

An SST STA may select one or more channels from the allowed operating channels of the BSS corresponding to the S1G AP with which it is associated and operate on those channels for the Beacon Interval following a T(S)BTT if a local Beacon with an SST element indicating the selected channel as permitted for SST operation has been received by the SST STA during that Beacon Interval. The STA shall not transmit frames on the indicated permitted channels with a bandwidth that is greater than the Maximum Transmission Width specified in the element. If no local Beacon is received following a T(S)BTT, then no SST STA transmission is allowed during the Beacon Interval that begins at that T(S)BTT. If an SST STA receives a local Beacon which contains no SST element, the SST STA may transmit on the primary channel of the BSS a PPDU of width up to the BSS bandwidth indicated in the (short) Beacon during the Beacon Interval that began at the T(S)BTT immediately previous to the reception of the (short) Beacon.

An SST STA which selected its best channel(s) may report its selection to the AP on the primary channel of the BSS.

An SST STA that has selected a channel of operation that is not the primary channel for the BSS shall operate on the selected channel as though the channel is the primary channel of the BSS, but only at the times permitted for operation on the selected channel as indicated in this subclause.

The transmission of frames on an allowed subchannel by an SST STA is an implicit indication to the AP as to the subchannel selection made by the SST STA. An SST STA may queue for transmission, a QoS NULL frame addressed to the AP for this purpose. To avoid ambiguity in which subchannel has been selected by the STA as its primary channel, the STA can send the frame using the minimum width channel for the band of operation.

An SST STA that has selected a subchannel for operation should operate on that subchannel during times indicated for permitted downlink and uplink operation according to the DL Activity and UL Activity fields and the Activity Start Time field in the SST element. An AP should transmit frames to SST STA on their selected subchannels.

**References:**

[1] 20130507r3-ETRI-Unified-Sounding