IEEE P802.11
Wireless LANs

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| D0.3 Comment Resolution Short Guard Interval indication |
| Date: 2011-04-28 |
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##### Baseline draft 11ac D0.3.

PHY CIDs addressed: 1325, 1499, 108, 110, 138, 1026, 1141, 1253, 1326, 1411, 1456, 1480, 929

***PHY***

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1325 | van Zelst, Allert | 7.3.2.61.2 | 29 | 33 | TR | Short GI capability can be signalled by only 1 bit | Use B5 for the signalling and make B6 reserved, or renumber the bits starting at B6 and add one reserved bit at the end.  |
| 1499 | RISON, Mark | 7.3.2.61.2 | 29 | 36 | TR | Allowing only 2 bits for Short GI capability indication is insufficient to allow each bandwidth to have a different capability, as in 11n. | Increase field size to 4 bits. |
| 108 | Au, Edward (Kwok Shum) | 7.3.2.61.2 | 29 | 31~50 | TR | In order to indicate clearly the bitmap for the Short GI with different bandwidths, we propose to extend the Short GI for 20/40/80/160 field to 4 bits.  | B5-B8 are used to indicate Short GI for 20/40/80/160 field. The original B7 to B21 are then shifted to the right by 2 bits, and B24-B31 are reserved. Definition of these bits can be found in our comment related to line 27 of page 30. |
| 110 | Au, Edward (Kwok Shum) | 7.3.2.61.2 | 30 | 27 | TR | Clarify the encoding of Short GI for 20/40/80/160 field. | Change TBD to:"A 4 bit bitmap indicates the support of short guard interval on 20MHz, 40MHz, 80MHz and 160MHz/80+80MHz bandwidths. Bit 0 sets to 1 to indicate that short GI is supported on 20MHz bandwidth. Bit 1 sets to 1 to indicate that short GI is supported on 40MHz bandwidth. Bit 2 sets to 1 to indicate that short GI is supported on 80MHz bandwidth. Bit 3 sets to 1 to indicate that short GI is supported on 160MHz/80+80MHz bandwidth." |
| 138 | Banerjea, Raja | 7.3.2.61.2 | 30 | 27 | TR | SGI value is not defined. | Define 00 - SGI Not supported for all BW01 - SGI supported for 20 & 40 MHz BW10 - SGI supported for 20, 40 and 80 MHz BW11 - SGI supported for 20,40,80 and 80+80/160 MHz BW |
| 1026 | Seok, Yongho | 7.3.2.61.2 | 30 | 27 | TR | TBD in the Encoding of Short GI for 20/40/80/160 | Add value  |
| 1141 | Stacey, Robert | 7.3.2.61.2 | 30 | 27 | TR | Replace TBD with something meaningful |  |
| 1253 | Stephens, Adrian | 7.3.2.61.2 | 30 | 27 | TR | Resolve the TBDs on this page. | As in comment |
| 1326 | van Zelst, Allert | 7.3.2.61.2 | 30 | 27 | TR | Fill in the TBD for short GI | Change TBD to "Set to 0 if not supported; Set to 1 if supported" |
| 1411 | Kang, Byeongwoo | 7.3.2.61.2 | 30 | 27 | TR | TBD' is remained. | Add value  |
| 1456 | Lee, Daewon | 7.3.2.61.2 | 30 | 27 | TR | TBD in the Encoding of Short GI for 20/40/80/160 | Finalize |
| 1480 | Lv, Kaiying | 7.3.2.61.2 | 30 | 27 | TR | HT capability field shall be supported by 11ac devices，it's natural to re-use short GI indication in HT Capabilities Info field to indicate short GI capability for 20MHz and 40MHz respectively. | In line 27-29 of figure 7-10, modify as " TBDB5 set to 0 if Short GI for 80/80+80MHz is not supported; B5 set to 1 if Short GI for 80/80+80MHz is supported; B6 set to 0 if Short GI for 160MHz is not supported; B6 set to 1 if Short GI for 160MHz is supported; The Short GI support for 20MHz and 40MHz refers to Short GI for 20MHz subfied and Short GI for 40MHz subfield in HT Capabilities Info field." |
| 929 | Santosh Abraham, Simone Merlin | 7.3.2.61.2 | 30 | 28 | TR | Encoding for Short GI capability: the field is not defined; also 2 bits are not necessary  | set the field to 1 bit and define the meaning: 1=short GI, 0=Long GI |

**Proposed resolution: Accept in principle**

**Discussion:**

1. IEEE 802.11n used 2 bits to indicate support for short GI. B5 in the HT capabilities element indicates support for Short GI in 20 MHz and B6 support for Short GI in 40 MHz.
2. VHT has introduced new channel bandwidths 80 MHz, 160 MHz and 80+80 MHz
3. A device may choose to indicate support for short GI in any of the channel bandwidths
4. As suggested by one commenter the HT capability bits for Short GI could be used to indicate support of short GI in 20 and 40 MHz VHT devices also.
5. VHT Capability element to indicate support for short GI in 80, 80+80 and 160 MHz

Further Changes are required in section 9.16 “Short GI Operation” which describes transmission of frames with Short GI.

***Change:***

**8.4.2.94.2 VHT Capabilities Info field**

**Change Figure 8-ac11—VHT Capabilities Info field as follows**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | B0-B1 | B2-B3 | B4 | B5 | B6 | B7 | B8 | B9 | B10 |
|  | Maximum A-MPDU Length | Supported Channel Width Set | LDPC Coding Capability | Short GI for 80 MHz | Short GI for 160 and 80 + 80 MHz | Tx STBC | Rx STBC | SU Beamformer Capable | SU Beamformee Capable |
| Bits: | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

***Change* Table 8-ac18—Subfields of the VHT Capabilities Info field as follows**

|  |  |  |
| --- | --- | --- |
| Short GI for 80 MHz | Indicates short GI support for the reception of packetstransmitted with TXVECTORparameterCH\_BANDWIDTH equalto HT\_CBW80 | Set to 0 if not supportedSet to 1 if supported |
| Short GI for 160 and 80+80 MHz | Indicates short GI support for the reception of packetstransmitted with TXVECTORparameterCH\_BANDWIDTH equalto HT\_CBW160 and HT\_CBW80+80 | Set to 0 if not supportedSet to 1 if supported |

**Add to Page 40 line 34**

Support for short GI for the reception of packets with TXVECTOR parameter CH\_BANDWIDTH equal to HT\_CBW20 and HT\_CBW40 is indicated in HT Capability Info field.

***Modify section 9.16 Short GI Operation***

A STA may transmit a frame with TXVECTOR parameters CH\_BANDWIDTH set to HT\_CBW20 and

GI\_TYPE set to SHORT\_GI only if all of the following conditions are met:

— The STA is an HT STA or VHT\_STA

— The TXVECTOR parameter FORMAT is equal to HT\_MF, HT\_GF or VHT.

— The RA of the frame corresponds to a STA for which the Short GI for 20 MHz subfield of the most

recently received HT Capabilities element contained a value of 1.

— dot11ShortGIOptionInTwentyActivated is present and is true.

A STA may transmit a frame with TXVECTOR parameters CH\_BANDWIDTH set to HT\_CBW40 and

GI\_TYPE set to SHORT\_GI only if all of the following conditions are met:

— The STA is an HT STA or VHT\_STA.

— The TXVECTOR parameter FORMAT is equal to HT\_MF, HT\_GF or VHT.

— The RA of the frame corresponds to a STA for which the Short GI for 40 MHz subfield of the most

recently received HT Capabilities element contained a value of 1.

— dot11ShortGIOptionInFortyActivated is present and is true.

A STA may transmit a frame with TXVECTOR parameters CH\_BANDWIDTH set to VHT\_CBW80 and

GI\_TYPE set to SHORT\_GI only if all of the following conditions are met:

— The STA is a VHT\_STA.

— The TXVECTOR parameter FORMAT is equal to VHT.

— The RA of the frame corresponds to a STA for which the Short GI for 80 MHz subfield of the most

recently received VHT Capabilities element contained a value of 1.

— dot11ShortGIOptionIn80Activated is present and is true.

A STA may transmit a frame with TXVECTOR parameters CH\_BANDWIDTH set to VHT\_CBW160 or VHT\_CBW\_80+80 and GI\_TYPE set to SHORT\_GI only if all of the following conditions are met:

— The STA is a VHT\_STA.

— The TXVECTOR parameter FORMAT is equal to VHT.

— The RA of the frame corresponds to a STA for which the Short GI for 160 or 80+80 MHz subfield of the most

recently received VHT Capabilities element contained a value of 1.

— dot11ShortGIOptionIn160or80+80Activated is present and is true.

An HT STA shall not transmit a frame with the TXVECTOR parameter FORMAT set to HT\_GF and the

GI\_TYPE parameter set to SHORT\_GI when the MCS parameter indicates a single spatial stream.

Further restrictions on TXVECTOR parameter values may apply due to rules found in 9.22 (Protection

mechanisms) and 9.7 (Multirate support).