IEEE P802.11
Wireless LANs

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| D1.0 Comment Resolution – PHY Miscellaneous Part 2 |
| Date: Nov. 1 2011 |
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Abstract

This document provides resolutions for CIDs 3595, 2349, 2746, 3037 and 3759.

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** | **Owing Ad-hoc** |
| 2349 | 108.35 | 22.2.2 | "Scramber init, 7 zero bits + 9 reserved bits" but P156L5 refers to "scrambler init bits" yet as written here it is not clear if the operator "+" or "," has higher precedence, and by default "+" would, so then this does not make sense.  | Change to "Scrambler init (7 zero bits) + 9 reserved zero bits. Repeat 3 times for SERVICE | AGREE. See doc. 11/1440r0. | PHY |
| 3595 | 108.35 | 22.2.2 | The service parameter is utterly meaningless. It is describes as containing a varying number of zero bits and reserved bits. In what sense is this a parameter?(It's a slightly more sophisticated version of the game, "choose any number from 1 to 1" which keeps me amused for hours).In the non-HT case, it is also misleading, because the scrambler initialization is more complex than 7 zero bits and 9 reserved bits when bandwidth signalling is performed. | We really should knock this meaningless parameter on the head. Either provide access to the service field, and use this parameter as a transport mechanism (i.e., both rx an tx), or remove it entirely. I prefer the latter.The same logic applies to clause 19 and 17. Remove the parameter from those interfaces too - or if the group decides this is a bridge too far, in Table 22-2, indicate that the VHT PHY Parameter is not present, and the Clause 17 SERVICE parameter is set to 7 zero bits + 9 reserved bits, except when bandwidth signalling takes place, in which case some somthing truly mysterious happens. | DISAGREE. See doc. 11/1440r0. | PHY |
| <Discussion>Agreed that normative statements may not belong in an interface description. Also agreed that the TXVECTOR/RXVECTOR may not be the best place for this, because the Service field is intended to be constructed and consumed by the PHY layer only. But, I prefer to have it in the TXVECTOR/RXVECTOR as it currently is for the following reasons:1. If we do not list SERVICE parameter in the TXVECTOR/RXVECTOR, we inevitably need some other similar definition text about the scrambler initialization which should be referred by related paragraphs such Table 22-20 (SERVICE field), because there are no definition text on the scrambler initialization in the entire Draft 1.2. Note that the scrambler init (that equals 7 zeros + 1 or 9 bits reserved as zero) is a different topic than the scrambler seed or scrambler sequence (that carries the BW indication), since these are 2 separate things that are xor-ed together. So we don’t have anything useful in the 802.11ac draft.
2. The lack of MAC text is not a new problem in 11ac. And indeed, arguably MAC text is not needed since the TXVECTOR actually completely defines the contents of the scrambler field from understanding the related 11a/n text. So, it seems OK to have a parameter here
3. There is another example of a TXVECTOR/RXVECTOR parameter which is newly extended VHT, that is, “RSSI”, while it does not actually need the corresponding MAC text. It is not a bad idea to keep sync with this kind of approach. FYI, this is already passed in TGac task group motion as a resolution to CID 2357 based on TGac Draft 1.0 as follows:

***Resolution to CID2357 in 11/954r1***The language on “RSSI” parameter in the TXVECTOR/RXVECTOR is modified to be harmonized with the language in the RX procedure. Move this VHT normative language to a) a new PLCP section that converts PMD\_RSSI/RSSI into RXVECTOR/RSSI or b) the PMD interface or c) both, as appropriate.***Resultant text in the TXVECTOR/RXVECTOR***

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| RSSI | FORMAT IS VHT | The allowed values for the RSSI parameter are in the range from 0 through RSSI maximum. This parameter is a measure by the PHY of the power observed at the antennas used to receive the current PPDU during the reception of the VHT-LTFs. RSSI is intended to be used in a relative manner, and it is a monotonically increasing function of the received power. | N | Y |
| Otherwise | See corresponding entry in Table 19-1 |

***Newly introduced section as a result*****22.3.19.6 RSSI** The RSSI parameter returned in the RXVECTOR shall be calculated from the values of the RSSI parameter provided by the PMD\_RSSI.indication primitive during the reception of the VHT-LTFs such that RSSI parameter returned in the RXVECTOR shall be a monotonically increasing function of the received power.Thus, I tried to modify the SERVICE parameter in the TXVECTOR/RXVECTOR and its related section (22.3.10.2 SERVICE field) in a similar way, while it does not need actually MAC text either. Since we don’t want to change clause 20 too much, split this TXVECTOR row into “VHT” and “Otherwise”, so we only need to address the VHT issue.  **TGac editor: modify the D1.2 text from P143L62, as follows**As a resolution to CID 2349, a parenthesis is introduced here.

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| SERVICE | FORMAT is VHT | Scrambler initialization(7 zero bits) + 1 reserved zero bit | Y | N |
| Otherwise | See corresponding entry in Table 20-1 |

**TGac editor: modify the D1.2 text from P198L20 (22.3.10.2 SERVICE field), as follows**Determine the SERVICE parameter from the TXVECTOR as a pattern for the scrambler initialization before the scrambler seed is feeded. The eight LSBs of the SERVICE field shall be set to the value from this parameter prior to scrambling to enable estimation of the initial state of the scrambler in the receiver. |
| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** | **Owing Ad-hoc** |
| 2746 | 156.61 | 22.3.10.2 | The benefit of putting the VHT-SIGB CRC in the Service Field needs more investigation. I believe that the reason for putting VHT-SIGB CRC in the service field is for power saving (i.e. the PHY can ignore the rest of the A-MPDU once the SERVICE FIELD VHT-SIGB CRC is not equal to the computed CRC). But because the VHT-SIGB is more robust compared to DATA, most bad VHT-SIGB checksums is not because of VHT-SIGB decode error but because of DATA decode error. Now ignoring the rest of the A-MPDU because of a few DATA bit errors is inharmonious with the robust nature of A-MPDUs. Hence doing anything with the SIGB CRC bits in the SERVICE FIELD maybe counterproductive. | Because it's not clear whether VHT-SIGB CRC bits in the SERVICE field serve its intended purpose, it may be better to remove it to simplify transmitter design. | DISGREE. See doc. 11/1440r0. | PHY |
| 3037 | 157.52 | 22.3.10.3 | Placing of VHT-SIGB CRC in SERVICE field : Given that CRC of VHT-SIGB can have higher order modulations, the error probaility of VHT-SIGB CRC can be higher that the BPSK modulated VHT-SIGB. Given above, and add to the fact that clause 22.3.21 PLCP receive procedure does not mandate the VHT-SIGB CRC check, the usefull ness of VHT-SIGB CRC is circumspect.  | Not sure :-) | DISGREE. See doc. 11/1440r0. | PHY |
| <Discussion>VHT-SIG-B length is one of precious informations for VHT transmission by which per-user length value and MCS value per each user during MU transmissions can be obtained. If this 8 bit CRC is not OK due to error(s) in the correspoding VHT-SIG-B field (over 34 bits), instantaneous power saving just at PHY level can be additionally achieved. Without CRC check, all the PHY processing and transferring data to MAC interface would inevitably keep going until the end of A-MPDU length per each user. It is certain that VHT-SIG-B CRC can enhance the reliability of VHT-SIG-B field while it is a little depending on the modulation level of SERVICE field. Even in the case in which this CRC is not OK due to transmission error(s) in the CRC field itself, this CRC information can be used as a barometer of reliability of SERVICE field as well, including scrambler seed, which is quite crucial for subsequent VHT transmission, because it is hardly possible to have errors only in CRC not having in scrambler seed and in data field.Thus, VHT-SIG-B CRC check is quite valid as a coupling indicator of VHT-SIG-B’s reliability and SERVICE field’s validness as well, without any burden in both the transmitter and receiver. The current TGac draft also allows to omit this CRC check in the receiver as an implementer’s option because this function is not mandated in the receiver. But, in those cases, it inevitably may take burden to use all the MCS and length values across users as themselves whose reliabilities are not checked. And sacrifices a chance of instantaneous power saving as mentioned in the above.  **TGac editor:** No change |
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| 3759 | 174.00 | 22.3.11.1 | For SU-MIMO beamforming, mathematical equations describing the steering matrix Qk are given in 19.3.12.1 (General), where the subscript k denotes a subcarrier index. Typically, the steering matrix Qk is the same as the beamforming feedback matrix Vk that is sent back to beamformer by beamformee using the compressed beamforming matrix format as in 19.3.12.3.6 (Compressed beamforming feedback matrix). The feedback report format is described in 8.4.1.38 (VHT Compressed Beamforming Report field). But Qk here is not the same as the Qk in 19.3.12.3.6. | The description of the steering matrix is not correct. Make the changes as the description that is used in the REVmb\_D8.0. P1632 19.3.12.3.1. | AGREE IN PRINCIPLE. See doc. 11/1440r0. | PHY |
| <Discussion>Between the text here and that of 11mb which the commenter points out, I could not find any difference only except but the followings:* Only here (clause 22.3.11.1 of D1.2) - The steering matrix *Qk* is determined by the beamforming feedback matrix *Vk* that is sent back to beamformer by beamformee using the(#452) compressed beamforming matrix format as in 20.3.12.3.6 (Compressed beamforming feedback matrix)(Ed). The feedback report format is described in 8.4.1.47 (VHT Compressed Beamforming Report field)
* Only in 11mb (clause 20.3.12.1 of D10.0) - The beamforming steering matrix that is computed (or updated) from a new channel measurement replaces the existing *Qk* for the next beamformed data transmission. There are several methods of beamforming, differing in the way the beamformer acquires the knowledge of the channel matrices *Hk* and on whether the beamformer generates *Qk* or the beamformee provides feedback information for the beamformer to generate *Qk*.

While I still think the current text is OK, it seems better to prevent any ambiguity by putting limitations such as explicit beamforming and *V* feedback matrix type for VHT beeamforming. **TGac editor: modify the D1.2 text from P216L14, as follows**For SU-MIMO beamforming for VHT, the steering matrix *Qk* is determined by the beamforming feedback matrix *Vk* based on the channel measured during the training symbols of the received NDP, that is sent back to beamformer by beamformee using the(#452) compressed beamforming matrix format as in 20.3.12.3.6 (Compressed beamforming feedback matrix)(Ed). The feedback report format is described in 8.4.1.47 (VHT Compressed Beamforming Report field).  |