IEEE P802.11  
Wireless LANs

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| (LB200) TGah D1.0 PHY Comment Resolutions on Clause 24.2.2 | | | | |
| Date: 2014-05-03 | | | | |
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This document provides PHY resolutions for CIDs on Clause 24.2.2.

| **CID** | **Commenter** | **Page** | **Clause** | **Assignee** | **Comment** | **Proposed Change** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1622 | Brian Hart | 240.21 | 24.2.2 | Minho | TXVECTOR parameters are not properly tied to MAC/PHY content. E.g. does DOPPLER (TXVECTOR) map to Doppler (SIG)? RESPONSE\_INDICATION to Response Indication? Also BEAM\_CHANGE -> Beam\_Change, SMOOTHING->smoothing, etc | Ensure each TXVECTOR parameter is referred to in the MAC clauses. Ensure each TX/RXVECTOR parameter is used within clause 24. | REVISE.  Please refer to doc. 14/0597r1. |
| <Discussion>  List of all the TXVECTOR/RXVECTOR is as follows: FYI, it has been a long custom in 802.11 draft to denote TXVECTOR/RXVECTOR as capital letters.   * **FORMAT:** long-used parameter since previous drafts. * **PREAMBLE\_TYPE**: long-used parameter since previous draft such as 802.11REVmc. * **MU\_SU:** it mathes to MU/SU in the PHY SIG field, that is, which type of preamble will be selected between S1G\_LONG preamble SU PPDU and S1G\_SHORT preamble MU PPDU, whose formats & compositions of PHY SIG field are quite different each other. * **NDP\_FRAME:** It matches to “NDP Indication” in the PHY SIG field. So, it needs to change its name into “NDP\_INDICATION” * **NDP\_FRAME\_CONTENTS**: In order to match to “NDP MAC frame body” which is used in 8.3.5 (NDP MAC frames) and Figure 24-40 (SIG field format for 1MHz NDP MAC frame) and Figure 24-41 (SIG field format for >= 2MHz NDP MAC frame), it needs to change its name into “NDP\_MAC\_FRAME\_BODY”. * **SMOOTHING**: long-used parameter since previous drafts. It matches to “Smoothing” in the PHY SIG field. * **AGGREGATION**: long-used parameter since previous drafts. It matches to “Aggregation” in the PHY SIG field. * **SECTOR\_ID**: It matches to “Sector ID” as described in clause 8.4.2.170f (Sector Operation Element). Though “Sector ID” is also one of “NDP\_FRAME\_CONTENTS” in the NDP CTS frame when used as Sector Sounding, Sector ID is still needed as a separateTXVECTOR for all the other types of sectored transmissions except but NDP CTS. * **N\_TX**: long-used parameter since previous drafts. * **EXPANSION\_MAT\_TYPE**: long-used parameter since previous drafts. * **EXPANSION\_MAT**: long-used parameter since previous drafts. * **CHAN\_MAT\_TYPE**: long-used parameter since previous drafts. * **CHAN\_MAT**: long-used parameter since previous drafts. * **DELTA\_SNR**: long-used parameter since previous drafts. * **RCPI**: long-used parameter since previous drafts. * **SNR**: long-used parameter since previous drafts. * **FEC\_CODING**: long-used parameter since previous drafts. It matches to “Coding” in the PHY SIG field. * **STBC**: long-used parameter since previous drafts. It matches to “STBC” in the PHY SIG field. * **GI\_TYPE**: long-used parameter since previous drafts. It matches to “Short GI” in the PHY SIG field. * **TXPWR\_LEVEL**: long-used parameter since previous drafts. * **RSSI:** long-used parameter since previous drafts. * **MCS**: long-used parameter since previous drafts. It matches to “MCS” in the PHY SIG field. * **REC\_MCS**: long-used parameter since previous drafts. * **CH\_BANDWIDTH**: long-used parameter since previous drafts. It matches to “BW” in the PHY SIG field. * **LENGTH**: long-used parameter since previous drafts. It matches to “Length” in the PHY SIG field. * **PSDU\_LENGTH**: long-used parameter since previous draft such as 802.11ac. * **NUM\_STS**: long-used parameter since previous drafts. It matches to “N\_STS” in the PHY SIG field. * **GROUP\_ID**: long-used parameter since previous drafts. It matches to “G\_ID” in the PHY SIG field. * **PARTIAL\_ID**: long-used parameter since previous drafts. It matches to “PARTIAL\_AID” which is included in “ID” in the PHY SIG field. * **NUM\_USERS**: long-used parameter since previous drafts. * **BEAM\_CHANGE**: It matches to “Beam Change” in the PHY SIG field. * **RESPONSE\_INDICATION**: It matches to “Response Indication” in the PHY SIG field. * **DOPPLER**: It matches to “Doppler” in the PHY SIG field. * **TIME\_OF\_DEPARTER\_REQUESTED**: long-used parameter since previous drafts. * **UPLINK**: It matches to “Uplink Indication” in the PHY SIG field. So, it needs to change its name into “UPLINK\_INDICATION” * **COLOR**: It matches to “COLOR” which is included in “ID” in the PHY SIG field. | | | | | | | |
| 1795 | G Rajendra Kumar | 240.34 | 24.2.2 | Minho | In Table 24-1, parameter FORMAT should also have S1G\_DUP\_2M in list of enumerated types in Value column | Add "S1G\_DUP\_2M indicates S1G 2MHz Duplicate PPDU format" as the third item in the enumerated list in Value Column | ACCEPT.  Please refer to doc. 14/0597r1. |
| <Discussion>  S1G\_DUP\_2M could not be shown in the table of draft 1.0~1.2 due to not enough size of the row, though it already has been in the table. So, I tried to make the size of the row enough to have S1G\_DUP\_2M. | | | | | | | |
| 2554 | Mitsuru Iwaoka | 240.00 | 24.2.2 | Minho | Table 20-1 and/or Table 22-1 are referred in multiple 'otherwise' rows of Table 24-1. They are parameters for an HT or VHT STA and not applicable to an S1G STA. The all PPDU format supported in the S1G STA is listed, and no 'otherwise' condition exists. | Remove all 'otherwise' rows in Table 24-1. | REJECT.  Please refer to doc. 14/0597r1.  Including otherwise for other FORMAT parameter has been long used in the previous drafts such 802.11ac and 802.11af.  FYI, the table of TXVECTOR and RXVECTOR in 802.11ac draft has also numerous otherwise’s which are applied to different FORMAT parameters such as NON\_HT, HT\_MF, HT-GF etc. In addition, 802.1af draft also has many otherwise’s in its TXVECTOR/RXVECTOR table such as EXPANSION\_MAT and CHAN\_MAT\_TYPE etc. though those otherwise’s are not applied to TVWS devices. |
| <Discussion>  Including otherwise for other FORMAT parameter has been long used in the previous drafts such 802.11ac and 802.11af.  FYI, the table of TXVECTOR and RXVECTOR in 802.11ac draft has also numerous otherwise’s which are applied to different FORMAT parameters such as NON\_HT, HT\_MF, HT-GF etc. In addition, 802.1af draft also has many otherwise’s in its TXVECTOR/RXVECTOR table such as EXPANSION\_MAT and CHAN\_MAT\_TYPE etc. though those otherwise’s are not applied to TVWS devices. | | | | | | | |
| 1619 | Brian Hart | 241.35 | 24.2.2 | Minho | "not for channel sounding" hides a whole lot of capability | Need to provide the reader with the hint that this is a MAC frame encapsulated in the PLCP header | REVISE.  Please refer to doc. 14/0597r1. |
| <Discussion>  As the commenterd pointed out, I changed its expression to make it clearer by referring to the expression used in 8.3.5 (NDP MAC frames). | | | | | | | |
| 1616 | Brian Hart | 241.43 | 24.2.2 | Minho | "Determine the contents of S1G NDP MAC Frame. Set to concatenated bit fields for the SIG of the corresponding NDP MAC Frame" is very vague - what is happening here? Are the bit fields supposed to be the numeric fields in Table 8-41? ... upon further reading, actually no. Basically this is very unhelpful as written ... | Need to make this more clear "For NDP PPDUs this contains a terse MAC frame (see 8.3.5 and subclauses) to be encapsulated within the SIG field | REVISE.  Please refer to doc. 14/0597r1. |
| <Discussion>  As the commenterd pointed out, I changed its expression to make it clearer by referring to the expression used in 8.3.5 (NDP MAC frames). | | | | | | | |
| 1621 | Brian Hart | 241.43 | 24.2.2 | Minho | NDP \_FRAME\_CONTENTS exists in the table but doesn't appear anywhere else in the spec | Tie this parameter to other MAC and PHY content. Ditto, not enough around NDP\_FRAME either. | REVISE.  Please refer to doc. 14/0597r1. |
| <Discussion>  As the commnter pointed out, I changed its name into “NDP\_MAC\_FRAME\_BODY” which is used by expressions in 8.3.5 (NDP MAC frames) several times and 24.3.11 (S1G preamble format for NDPs). | | | | | | | |
| 1796 | G Rajendra Kumar | 241.00 | 24.2.2 | Minho | In Table 24-1, there is no entry for S1G FORMAT and S1G SHORT PREAMBLE for MU\_SU parameter | Add an new entry under MU\_SU parameter as below Condition: FORMAT is S1G and PREAMBLE\_TYPE is S1G\_SHORT\_PREAMBLE and CH\_BANDWIDTH is CBW2 or CBW4 or CBW8 or CBW16) Value: Set to SU TX Vector: Y RX Vector: Y | Reject.  MU\_SU is valid only for long preamble. The current table states it correctly that for other cases, this field is not present. |
| 2068 | Jens Tingleff | 242.04 | 24.2.2 | Minho | (and many places in Table 24-1) Entries AGGREGATION, SMOOTHING, STBC and others. Many duplications in "Value" column where surely a combination of "Condition" could be merged into one row? | Merge entries | REJECT.  Please refer to doc. 14/0597r1.  Though combination of conditions can be also possible, it seems better to keep as it is because merging various conditions may make desciprtions less readable, I think.  FYI, in 802.11ah, we have multiple FORMAT parameters in the TXVECTOR and more fundamental parameters such as bandwidth which selects a totally different preamble structure. |
| <Discussion>  Though combination of conditions can be also possible, it seems better to keep as it is because merging various conditions may make desciprtions less readable, I think.  FYI, in 802.11ah, we have multiple FORMAT parameters in the TXVECTOR and more fundamental parameters such as bandwidth which selects a totally different preamble structure. | | | | | | | |
| 2166 | Kenichi Mori | 245.26 | 24.2.2 | Minho | Technical term "LENGTH" may not be correct because "LENGTH" parameter is used only when AGGREGATION is AGGREGATED. This should be "PSDU\_LENGTH." The same thing can be said for other parts of CHAN\_MAT\_TYPE and CHAN\_MAT. | Change "LENGTH" to "PSDU\_LENGTH." | ACCEPT.  Please refer to doc. 14/0597r1. |
| <Discussion>  As the commenterd pointed out, I changed accordingly.  FYI, LENGTH is in symbols or octects depending on conditions, but, PSDU\_LENGTH is in octets all the time.  And previous draft such as 802.11ac also has used “PSDU\_LENGTH” instead of “LENGTH” in its CHAN\_MAT\_TYPE and CHAN\_MAT parameters in the TXVECTOR/RXVECTOR. | | | | | | | |
| 2167 | Kenichi Mori | 246.35 | 24.2.2 | Minho | Section number of "Received channel power indicator (RCPI)" is wrong. Correct section number is 20.3.20.6 (not 20.3.21.6). | Change section number from 20.3.21.6 to 20.3.20.6. | ACCEPT.  Please refer to doc. 14/0597r1. |
| <Discussion>  Corrected as the commnenter pointed out. | | | | | | | |
| 2168 | Kenichi Mori | 246.43 | 24.2.2 | Minho | Section number 8.4.1.48.1 seems not to be correct because there is no explanation of SNR in this section. Section 8.4.1.28 should be correct. | Change section number from 8.4.1.48.1 to 8.4.1.28. | REVISE.  Please refer to doc. 14/0597r1. |
| 2169 | Kenichi Mori | 246.50 | 24.2.2 | Minho | Section number 8.4.1.48.1 seems not to be correct because there is no explanation of SNR in this section. Section 8.4.1.28 should be correct. | Change section number from 8.4.1.48.1 to 8.4.1.28. | REVISE.  Please refer to doc. 14/0597r1. |
| 2170 | Kenichi Mori | 246.58 | 24.2.2 | Minho | Section number 8.4.1.48.1 seems not to be correct because there is no explanation of SNR in this section. Section 8.4.1.28 should be correct. | Change section number from 8.4.1.48.1 to 8.4.1.28. | REVISE.  Please refer to doc. 14/0597r1. |
| <Discussion>  Section 8.4.1.28 isn’t appropriate as a reference either, because it talks about non-compressed beamforming.  So, it seems a good way to just comply with the same description in the 802.11ac draft, that is, referring to section 8.4.1.48 (VHT Compressed Beamforming Report field).  FYI, sub-section 8.4.1.48.1 (VHT Compressed Beamforming Report Field in S1G Band) also belongs to section 8.4.1.48. | | | | | | | |
| 1308 | Adrian Stephens | 251.38 | 24.2.2 | Minho | Pretty red colour | Make it boring black colour. Ditto line 42. | ACCEPT  Please refer to doc. 14/0597r1. |
| <Discussion>  Colored black as the commenter pointed out. | | | | | | | |
| 2071 | Jens Tingleff | 252.28 | 24.2.2 | Minho | I thought that MU\_SU was derived from NUM\_USERS, but I learn that MU\_SU gates the meaning of NUM\_USERS. This is inconsistent. I'm not sure you need a MU\_SU parameter (if it is derived as simply as p 241 l 4. Also, does MU\_SU not need to MU if you have NUM\_USERS = 1 and 1 < NUM\_STS (which looks to me like it is legal in clause 22)? | Make up your minds if MU\_SU is a parameter of it it is dereived from parameters to TXVECTOR | Reject.  MU\_SU parameter is used to match with the same subfield in SIGA field of long preamble. |
| 1615 | Brian Hart | 254.30 | 24.2.2 | Minho | Semantics of COLOR are not defined | What does the integer 0-7 mean? Explain | REVISE.  Please refer to doc. 14/0597r1. |
| <Discussion>    As the commenter pointed out, tried to describe more clearly with an expression used in clause 9.17b (Group ID, partial AID, Uplink Indication and Color in S1G PPDUs). | | | | | | | |

**TGah editor: modify the D1.0 text table 24-1, as follows**

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| --- | --- | --- | --- | --- |
| * TXVECTOR and RXVECTOR parameters (continued) | | | | |
| Parameter | Condition | Value | TXVECTOR | RXVECTOR |
| FORMAT |  | Determines the format of the PPDU.  Enumerated type:  S1G indicates S1G PPDU format.  S1G\_DUP\_1M indicates S1G 1MHz Duplicate PPDU format  S1G\_DUP\_2M indicates S1G 2MHz Duplicate PPDU format | Y | Y |
| **…….** | ……. | **…….** |  |  |
| NDP\_INDICATION | FORMAT is S1G | Determine the type of S1G Frame.  Set to 1 if this packet is one of NDP MAC Frames as defined in 8.3.5 (NDP MAC frames).  Set to 0 otherwise. | Y | Y |
| FORMAT is S1G\_DUP\_1M | Determine the type of S1G 1MHz Duplicate Frame.  Set to 1 if this packet is one of ~~NDP duplicate frames not for channel sounding~~ NDP MAC Frames as defined in 8.3.5 (NDP MAC frames).  Set to 0 otherwise. | Y | Y |
| Otherwise | Not present  Note) NDP Frame of the type of 2MHz Duplicate Frame is not allowed in the S1G PHY specification as described in 24.3.9.12.2 (2MHz duplicate transmission). | N | N |
| NDP\_MAC\_FRAME\_BODY | NDP\_INDICATION is 1 | Set to concatenated bit fields which describe the NDP MAC frame body content in one of NDP MAC frame types defined in Table 8-38a (NDP MAC frame type field values).  (See 8.3.5 (NDP MAC frames)). | Y | Y |
| Otherwise | Not present |  |  |
| SMOOTHING | FORMAT is S1G and (CH\_BANDWIDTH equals CBW2 or CBW4 or CBW8 or CBW16) and PREAMBLE\_TYPE equals S1G\_SHORT\_PREAMBLE | Indicates whether frequency-domain smoothing is recommended as part of channel estimation.  Set to 1 if frequency-domain smoothing is recommended.  Set to 0 otherwise. | Y | Y |
| FORMAT is S1G\_DUP\_2M and PREAMBLE\_TYPE equals S1G\_SHORT\_PREAMBLE | Indicates whether frequency-domain smoothing is recommended as part of channel estimation.  Set to 1 if frequency-domain smoothing is recommended.  Set to 0 otherwise. | Y | Y |
| FORMAT is S1G\_DUP\_1M | Indicates whether frequency-domain smoothing is recommended as part of channel estimation.  Set to 1 if frequency-domain smoothing is recommended.  Set to 0 otherwise. | Y | Y |
| FORMAT is S1G and CH\_BANDWIDTH equals CBW1 | Indicates whether frequency-domain smoothing is recommended as part of channel estimation.  Set to 1 if frequency-domain smoothing is recommended.  Set to 0 otherwise. | Y | Y |
| FORMAT is S1G and (CH\_BANDWIDTH equals CBW2 or CBW4 or CBW8 or CBW16) and PREAMBLE\_TYPE equals S1G\_LONG\_PREAMBLE | If NUM\_STS is larger than 1, indicates whether frequency-domain smoothing is recommended as part of channel estimation.  Set to 1 if frequency-domain smoothing is recommended.  Set to 0 otherwise. | Y | Y |
| FORMAT is S1G\_DUP\_2M and PREAMBLE\_TYPE equals S1G\_LONG\_PREAMBLE | If NUM\_STS is larger than 1, indicates whether frequency-domain smoothing is recommended as part of channel estimation.  Set to 1 if frequency-domain smoothing is recommended.  Set to 0 otherwise. | Y | Y |
| Otherwise | See corresponding entry in Table 20-1 and Table 22-1. | | |
| AGGREGATION | FORMAT is S1G | Indicates whether the PSDU contains an A-MPDU.  Enumerated type:  AGGREGATED indicates this packet has A-MPDU aggregation.  NOT\_AGGREGATED indicates this packet does not have A-MPDU aggregation. | Y | Y |
| FORMAT is S1G\_DUP\_2M | Indicates whether the PSDU contains an A-MPDU.  Enumerated type:  AGGREGATED indicates this packet has A-MPDU aggregation.  NOT\_AGGREGATED indicates this packet does not have A-MPDU aggregation. | Y | Y |
| FORMAT is S1G\_DUP\_1M | Indicates whether the PSDU contains an A-MPDU.  Enumerated type:  AGGREGATED indicates this packet has A-MPDU aggregation.  NOT\_AGGREGATED indicates this packet does not have A-MPDU aggregation. | Y | Y |
| Otherwise | See corresponding entry in Table 20-1 and Table 22-1. | | |
| N\_TX | FORMAT is S1G | Indicates the number of transmit chains. | Y | N |
| FORMAT is S1G\_DUP\_2M | Indicates the number of transmit chains. | Y | N |
| FORMAT is S1G\_DUP\_1M | Indicates the number of transmit chains. | Y | N |
| Otherwise | See corresponding entry in Table 20-1 and Table 22-1. | | |
| EXPANSION\_MAT\_TYPE | FORMAT is S1G and EXPANSION\_MAT is present | Set to COMPRESSED\_SV | Y | N |
| FORMAT is S1G\_DUP\_2M and EXPANSION\_MAT is present | Set to COMPRESSED\_SV | Y | N |
| FORMAT is S1G\_DUP\_1M and EXPANSION\_MAT is present | Set to COMPRESSED\_SV | Y | N |
| Otherwise | See corresponding entry in Table 20-1 and Table 22-1. | | |
| EXPANSION\_MAT | FORMAT is S1G | Contains a vector in the number of selected subcarriers containing feedback matrices as defined in 24.3.10.2 (Beamforming Feedback Matrix V) based on the channel measured during the training symbols of a previous S1G NDP PPDU. | MU | N |
| FORMAT is S1G\_DUP\_2M | Contains a vector in the number of selected subcarriers containing feedback matrices as defined in 24.3.10.2 (Beamforming Feedback Matrix V) based on the channel measured during the training symbols of a previous S1G NDP PPDU. | MU | N |
| FORMAT is S1G\_DUP\_1M | Contains a vector in the number of selected subcarriers containing feedback matrices as defined in 24.3.10.2 (Beamforming Feedback Matrix V) based on the channel measured during the training symbols of a previous S1G NDP PPDU. | Y | N |
| Otherwise | See corresponding entry in Table 20-1 and Table 22-1. | | |
| CHAN\_MAT\_TYPE | FORMAT is S1G and PSDU\_LENGTH equals 0 and NDP\_INDICATION equals 0 | Set to COMPRESSED\_SV | N | Y |
| FORMAT is S1G\_DUP\_2M and PSDU\_LENGTH equals 0 and NDP\_INDICATION equals 0 | Set to COMPRESSED\_SV | N | Y |
| FORMAT is S1G\_DUP\_1M and PSDU\_LENGTH equals 0 and NDP\_INDICATION equals 0 | Set to COMPRESSED\_SV | N | Y |
| FORMAT is S1G and PSDU\_LENGTH equals 0 and NDP\_INDICATION equals 1 | Not present | N | N |
| FORMAT is S1G\_DUP\_2M and PSDU\_LENGTH equals 0 and NDP\_INDICATION equals 1 | Not present | N | N |
| FORMAT is S1G\_DUP\_1M and PSDU\_LENGTH equals 0 and NDP\_INDICATION equals 1 | Not present | N | N |
| FORMAT is S1G and PSDU\_LENGTH is greater than 0 | Not present | N | N |
| FORMAT is S1G\_DUP\_2M and PSDU\_LENGTH is greater than 0 | Not present | N | N |
| FORMAT is S1G\_DUP\_1M and PSDU\_LENGTH is greater than 0 | Not present | N | N |
| Otherwise | See corresponding entry in Table 20-1 and Table 22-1. | | |
| CHAN\_MAT | FORMAT is S1G and PSDU\_LENGTH equals 0 and NDP\_INDICATION equals 0 | Contains a set of compressed beamforming feedback matrices as defined in 24.3.10.2 (Beamforming Feedback Matrix V) based on the channel measured during the training symbols of the received S1G NDP PPDU. | N | Y |
| FORMAT is S1G\_DUP\_2M and PSDU\_LENGTH equals 0 and NDP\_INDICATION equals 0 | Contains a set of compressed beamforming feedback matrices as defined in 24.3.10.2 (Beamforming Feedback Matrix V) based on the channel measured during the training symbols of the received S1G NDP PPDU. | N | Y |
| FORMAT is S1G\_DUP\_1M and PSDU\_LENGTH equals 0 and NDP\_INDICATION equals 0 | Contains a set of compressed beamforming feedback matrices as defined in 24.3.10.2 (Beamforming Feedback Matrix V) based on the channel measured during the training symbols of the received S1G NDP PPDU. | N | Y |
| FORMAT is S1G and PSDU\_LENGTH equals 0 and NDP\_INDICATION equals 1 | Not present | N | N |
| FORMAT is S1G\_DUP\_2M and PSDU\_LENGTH equals 0 and NDP\_INDICATION equals 1 | Not present | N | N |
| FORMAT is S1G\_DUP\_1M and PSDU\_LENGTH equals 0 and NDP\_INDICATION equals 1 | Not present | N | N |
| FORMAT is S1G and PSDU\_LENGTH is greater than 0 | Not present | N | N |
| FORMAT is S1G\_DUP\_2M and PSDU\_LENGTH is greater than 0 | Not present | N | N |
| FORMAT is S1G\_DUP\_1M and PSDU\_LENGTH is greater than 0 | Not present | N | N |
| Otherwise | See corresponding entry in Table 20-1 and Table 22-1. | | |
| DELTA\_SNR | FORMAT is S1G and (CH\_BANDWIDTH is CBW2 or CBW4 or CBW8 or CBW16) | Contains an array of delta SNR values as defined in 8.4.1.49 (MU Exclusive Beamforming Report field) based on the channel measured during the training symbols of the received S1G NDP PPDU.  NOTE—In the RXVECTOR this parameter is present only for S1G NDP PPDUs for MU sounding. | MU | Y |
| FORMAT is S1G\_DUP\_2M | Contains an array of delta SNR values as defined in 8.4.1.49 (MU Exclusive Beamforming Report field) based on the channel measured during the training symbols of the received S1G NDP PPDU.  NOTE—In the RXVECTOR this parameter is present only for S1G NDP PPDUs for MU sounding. | MU | Y |
| FORMAT is S1G SU and (CH\_BANDWIDTH is CBW2 or CBW4 or CBW8 or CBW16) | Not present | N | N |
| FORMAT is S1G\_DUP\_2M and MU\_SU equals SU | Not present | N | N |
| FORMAT is S1G\_DUP\_1M | Not present | N | N |
| Otherwise | See corresponding entry in Table 20-1 and Table 22-1. | | |
| RCPI |  | Is a measure of the received RF power averaged over all the receive chains in the Data field of a received PPDU.  Refer to 20.3.20 .6 (Received channel power indicator (RCPI)  measurement) for the definition of RCPI. | N | Y |
| SNR | FORMAT is S1G | Contains an array of measures of the received SNR for each spatial stream. SNR indications of 8 bits are supported. SNR shall be the sum of the decibel values of SNR per tone divided by the number of tones represented in each stream as described in 8.4.1.48 (VHT Compressed Beamforming Report field) | N | Y |
| FORMAT is S1G\_DUP\_2M | Contains an array of measures of the received SNR for each spatial stream. SNR indications of 8 bits are supported. SNR shall be the sum of the decibel values of SNR per tone divided by the number of tones represented in each stream as described in 8.4.1.48 (VHT Compressed Beamforming Report field) | N | Y |
| FORMAT is S1G\_DUP\_1M | Contains an array of measures of the received SNR for each spatial stream. SNR indications of 8 bits are supported. SNR shall be the sum of the decibel values of SNR per tone divided by the number of tones represented in each stream as described in 8.4.1.48 (VHT Compressed Beamforming Report field) | N | Y |
| Otherwise | See corresponding entry in Table 20-1 and Table 22-1. | | |
| FEC\_CODING | FORMAT is S1G | Indicates which FEC encoding is used.  Enumerated type:  BCC\_CODING indicates binary convolutional code.  LDPC\_CODING indicates low-density parity check code. | MU | Y |
| FORMAT is S1G\_DUP\_2M | Indicates which FEC encoding is used.  Enumerated type:  BCC\_CODING indicates binary convolutional code.  LDPC\_CODING indicates low-density parity check code. | MU | Y |
| FORMAT is S1G\_DUP\_1M | Indicates which FEC encoding is used.  Enumerated type:  BCC\_CODING indicates binary convolutional code.  LDPC\_CODING indicates low-density parity check code. | Y | Y |
| Otherwise | See corresponding entry in Table 20-1 and Table 22-1. | | |
| STBC | FORMAT is S1G | Indicates whether or not STBC is used.  0 indicates no STBC (*NSTS=NSS* in the Data field).  1 indicates STBC is used (*NSTS=2NSS* in the Data field)*.* | Y | Y |
| FORMAT is S1G\_DUP\_2M | Indicates whether or not STBC is used.  0 indicates no STBC (*NSTS=NSS* in the Data field).  1 indicates STBC is used (*NSTS=2NSS* in the Data field)*.* | Y | Y |
| FORMAT is S1G\_DUP\_1M | Indicates whether or not STBC is used.  0 indicates no STBC (*NSTS=NSS* in the Data field).  1 indicates STBC is used (*NSTS=2NSS* in the Data field)*.* | Y | Y |
| Otherwise | See corresponding entry in Table 20-1 and Table 22-1. | | |
| GI\_TYPE | FORMAT is S1G | Indicates whether a short guard interval is used in the transmission of the Data field of the PPDU.  Enumerated type:  LONG\_GI indicates short GI is not used in the Data field of the PPDU.  SHORT\_GI indicates short GI is used in the Data field of the PPDU. | Y | Y |
| FORMAT is S1G\_DUP\_2M | Indicates whether a short guard interval is used in the transmission of the Data field of the PPDU.  Enumerated type:  LONG\_GI indicates short GI is not used in the Data field of the PPDU.  SHORT\_GI indicates short GI is used in the Data field of the PPDU. | Y | Y |
| FORMAT is S1G\_DUP\_1M | Indicates whether a short guard interval is used in the transmission of the Data field of the PPDU.  Enumerated type:  LONG\_GI indicates short GI is not used in the Data field of the PPDU.  SHORT\_GI indicates short GI is used in the Data field of the PPDU. | Y | Y |
| Otherwise | See corresponding entry in Table 20-1 and Table 22-1. | N | N |
| TXPWR\_LEVEL | FORMAT is S1G | The allowed values for the TXPWR\_LEVEL parameter are in the range from 1 to numberOfO-ctets(dot11TxPowerLevelExtended)/2. This parameter is used to indicate which of the available transmit output power levels defined in dot11TxPowerLevelExtended shall be used for the current transmission. | Y | N |
| FORMAT is S1G\_DUP\_2M | The allowed values for the TXPWR\_LEVEL parameter are in the range from 1 to numberOfOctets(dot11TxPowerLevelExtended)/2. This parameter is used to indicate which of the available transmit output power levels defined in dot11TxPowerLevelExtended shall be used for the current transmission. | Y | N |
| FORMAT is S1G\_DUP\_1M | The allowed values for the TXPWR\_LEVEL parameter are in the range from 1 to numberOfOctets(dot11TxPowerLevelExtended)/2. This parameter is used to indicate which of the available transmit output power levels defined in dot11TxPowerLevelExtended shall be used for the current transmission. | Y | N |
| Otherwise | See corresponding entry in Table 20-1 and Table 22-1. | | |
| RSSI | FORMAT is S1G | The allowed values for the RSSI parameter are in the range 0 to 255 inclusive. This parameter is a measure by the PHY of the power observed at the antennas used to receive the current PPDU measured during the reception of the LTF field. RSSI is intended to be used in a relative manner, and it is a monotonically increasing function of the received power. | N | Y |
| FORMAT is S1G\_DUP\_2M | The allowed values for the RSSI parameter are in the range 0 to 255 inclusive. This parameter is a measure by the PHY of the power observed at the antennas used to receive the current PPDU measured during the reception of the LTF field. RSSI is intended to be used in a relative manner, and it is a monotonically increasing function of the received power. | N | Y |
| FORMAT is S1G\_DUP\_1M | The allowed values for the RSSI parameter are in the range 0 to 255 inclusive. This parameter is a measure by the PHY of the power observed at the antennas used to receive the current PPDU measured during the reception of the LTF field. 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 20-1 and Table 22-1. | | |
| MCS | FORMAT is S1G and (CH\_BANDWIDTH equals CBW2 or CBW4 or CBW8 or CBW16) | Indicates the modulation and coding scheme used in the transmission of the PPDU.  Integer: range 0 to 9 | MU | Y |
| FORMAT is S1G\_DUP\_2M | Indicates the modulation and coding scheme used in the transmission of the PPDU.  Integer: range 0 to 9 | MU | Y |
| FORMAT is S1G and CH\_BANDWIDTH equals CBW1 | Indicates the modulation and coding scheme used in the transmission of the PPDU.  Integer: range 0 to 10 | Y | Y |
| FORMAT is S1G\_DUP\_1M | Indicates the modulation and coding scheme used in the transmission of the PPDU.  Integer: range 0 to 10 | Y | Y |
| Otherwise | See corresponding entry in Table 20-1 and Table 22-1. | | |
| REC\_MCS | FORMAT is S1G and (CH\_BANDWIDTH equals CBW2 or CBW4 or CBW8 or CBW16) | Indicates the MCS that the STA’s receiver recommends.  Integer: range 0 to 9 | N | O |
| FORMAT is S1G\_DUP\_2M | Indicates the MCS that the STA’s receiver recommends.  Integer: range 0 to 9 | N | O |
| FORMAT is S1G and CH\_BANDWIDTH equals CBW1 | Indicates the MCS that the STA’s receiver recommends.  Integer: range 0 to 10 | N | O |
| FORMAT is S1G\_DUP\_1M | Indicates the MCS that the STA’s receiver recommends.  Integer: range 0 to 10 | N | O |
| Otherwise | See corresponding entry in Table 20-1 and Table 22-1. | | |
| CH\_BANDWIDTH | FORMAT is S1G | Indicates the channel width of the transmitted PPDU:  Enumerated type:  CBW1 for 1 MHz  CBW2 for 2 MHz  CBW4 for 4 MHz  CBW8 for 8 MHz  CBW16 for 16 MHz | Y | Y |
| FORMAT is S1G\_DUP\_2M | In TXVECTOR, indicates the channel width of the transmitted 2MHz Duplicate PPDU.  In RXVECTOR, indicates the estimated channel width of the 2MHz Duplicate received PPDU.  Enumerated type:  CBW4 for 4 MHz  CBW8 for 8 MHz  CBW16 for 16 MHz | Y | Y |
| FORMAT is S1G\_DUP\_1M | In TXVECTOR, indicates the channel width of the transmitted 1MHz Duplicate PPDU.  In RXVECTOR, indicates the estimated channel width of the 1MHz Duplicate received PPDU.  Enumerated type:  CBW2 for 2 MHz  CBW4 for 4 MHz  CBW8 for 8 MHz  CBW16 for 16 MHz | Y | Y |
| Otherwise | See corresponding entry in Table 20-1 and Table 22-1. | | |
| LENGTH | FORMAT is S1G and AGGREGATION is AGGREGATED | Indicates the packet duration in number of symbols in the S1G PSDU. | Y | Y |
| FORMAT is S1G\_DUP\_2M and AGGREGATION is AGGREGATED | Indicates the packet duration in number of symbols in the S1G 2MHz Duplicate PSDU. | Y | Y |
| FORMAT is S1G\_DUP\_1M and AGGREGATION is AGGREGATED | Indicates the packet duration in number of symbols in the S1G 1MHz Duplicate PSDU. | Y | Y |
| FORMAT is S1G and AGGREGATION is NOT\_AGGREGATED | Indicates the packet duration in number of octets in the S1G PSDU. | Y | Y |
| FORMAT is S1G\_DUP\_2M and AGGREGATION is AGGREGATED | Indicates the packet duration in number of symbols in the S1G 2MHz Duplicate PSDU. | Y | Y |
| FORMAT is S1G\_DUP\_1M and AGGREGATION is AGGREGATED | Indicates the packet duration in number of symbols in the S1G 1MHz Duplicate PSDU. | Y | Y |
| Otherwise | See corresponding entry in Table 20-1 and Table 22-1. | | |
| PSDU\_LENGTH | FORMAT is S1G | Indicates the number of octets in the S1G PSDU. A value of 0 indicates an S1G NDP PPDU | Y | Y |
| FORMAT is S1G\_DUP\_2M | Indicates the number of octets in the S1G 2MHz Duplicate PSDU. A value of 0 indicates an S1G NDP PPDU. | Y | Y |
| FORMAT is S1G\_DUP\_1M | Indicates the number of octets in the S1G 1MHz Duplicate PSDU. A value of 0 indicates an S1G NDP PPDU. | Y | Y |
| Otherwise | See corresponding entry in Table 20-1 and Table 22-1. | | |
| NUM\_STS | FORMAT is S1G | Indicates the number of space-time streams.  Integer: range 1-4 per user in the TXVECTOR and 0-4 in the RXVECTOR.  NUM\_STS summed over all users is in the range 1 to 4 for MU-MIMO. | MU | Y |
| FORMAT is S1G\_DUP\_2M | Indicates the number of space-time streams.  Integer: range 1-4 per user in the TXVECTOR and 0-4 in the RXVECTOR.  NUM\_STS summed over all users is in the range 1 to 4 for MU-MIMO. | MU | Y |
| FORMAT is S1G\_DUP\_1M | Indicates the number of space-time streams.  Integer: range 1-4 per user in the TXVECTOR and 0-4 in the RXVECTOR. | Y | Y |
| Otherwise | See corresponding entry in Table 20-1 and Table 22-1. | | |
| GROUP\_ID | FORMAT is S1G and MU\_SU equals MU | Indicates the group ID.  Integer: range 0-63 (see )) | Y | Y |
| FORMAT is S1G\_DUP\_2M and MU\_SU equals MU | Indicates the group ID.  Integer: range 0-63 (see )) | Y | Y |
| FORMAT is S1G and MU\_SU equals SU | Not present | N | N |
| FORMAT is S1G\_DUP\_2M and MU\_SU equals SU | Not present | N | N |
| FORMAT is S1G and CH\_BANDWIDTH equals CBW1 | Not present | N | N |
| FORMAT is S1G\_DUP\_1M | Not present | N | N |
| Otherwise | See corresponding entry in Table 22-1. | | |
| PARTIAL\_AID | FORMAT is S1G and MU\_SU equals SU | Provides an abbreviated indication of the intended recipient(s) of the PSDU (see 9.17b (Group ID, partial AID, UPLINK and Color in S1G PPDUs)).  Integer: range 0-511. | Y | Y |
| FORMAT is S1G\_DUP\_2M and MU\_SU equals SU | Provides an abbreviated indication of the intended recipient(s) of the PSDU (see 9.17b (Group ID, partial AID, UPLINK and Color in S1G PPDUs)).  Integer: range 0-511. | Y | Y |
| FORMAT is S1G and MU\_SU equals MU | Not present | N | N |
| FORMAT is S1G\_DUP\_2M and MU\_SU equals MU | Not present | N | N |
| FORMAT is S1G and CH\_BANDWIDTH equals CBW1 | Not present | N | N |
| FORMAT is S1G\_DUP\_1M | Not present | N | N |
| Otherwise | See corresponding entry in Table 22-1. | | |
| NUM\_USERS | FORMAT is S1Gand MU\_SU equals MU | Indicates the number of users with non-zero space-time streams.  Integer: range 1 to 4. | Y | N |
| FORMAT is S1G and MU\_SU equals SU | Set to 1 |  |  |
| FORMAT is S1G\_DUP\_2M and MU\_SU equals MU | Indicates the number of users with non-zero space-time streams.  Integer: range 1 to 4. | Y | N |
| FORMAT is S1G\_DUP\_2M and MU\_SU equals SU | Set to 1 |  |  |
| FORMAT is S1G and CH\_BANDWIDTH equals CBW1 | Set to 1 | Y | N |
| FORMAT is S1G\_DUP\_1M | Set to 1 | Y | N |
| Otherwise | See corresponding entry in Table 20-1 and Table 22-1. | | |
| BEAM\_CHANGE | FORMAT is S1G and MU\_SU equals SU and (CH\_BANDWIDTH equals CBW2 or CBW4 or CBW8 or CBW16) and PREAMBLE\_TYPE equals S1G\_LONG\_PREAMBLE and NUM\_STS is 1. (#190) | Set to 1 if the Q matrix is changed from the Omni portion to the Data portion of the long preamble, in at least one of the non-zero sub-carrier of the Omni portion as described in 24.3.8.2.2.1.4 (SIG-A definition).  Set to 0 if the Q matrix is unchanged in all the non-zero sub-carriers of the Omni portion.  NOTE—If BEAM\_CHANGE is 0 and PREAMBLE\_TYPE is S1G\_LONG\_PREAMBLE, the receiver may do channel smoothing. Otherwise, smoothing is not recommended. | Y | Y |
| FORMAT is S1G\_DUP\_2M and MU\_SU equals SU and PREAMBLE\_TYPE equals S1G\_LONG\_PREAMBLE and NUM\_STS is 1. (#190) | Set to 1 if the Q matrix is changed from the Omni portion to the Data portion of the long preamble, in at least on of the non-zero sub-carrier of the Omni portion as described in 24.3.8.2.2.1.4 (SIG-A definition).  Set to 0 if the Q matrix is unchanged in all the non-zero sub-carriers of the Omni portion.  NOTE—If BEAM\_CHANGE is 0 and PREAMBLE\_TYPE is S1G\_LONG\_PREAMBLE, the receiver may do channel smoothing. Otherwise, smoothing is not recommended. | Y | Y |
| Otherwise | Not present | N | N |
| RESPONSE\_INDICATION | FORMAT is S1G | Set to 0 if No Response.  Set to 1 if NDP Response.  Set to 2 if Normal Response.  Set to 3 if Long Response. | Y | Y |
| FORMAT is S1G\_DUP\_2M | Set to 0 if No Response.  Set to 1 if NDP Response.  Set to 2 if Normal Response.  Set to 3 if Long Response. | Y | Y |
| FORMAT is S1G\_DUP\_1M | Set to 0 if No Response.  Set to 1 if NDP Response.  Set to 2 if Normal Response.  Set to 3 if Long Response. | Y | Y |
| Otherwise | Not present | N | N |
| DOPPLER | FORMAT is S1G | Set to 1 if traveling pilots are used in the packet.  Set to 0 otherwise. | Y | O |
| FORMAT is S1G\_DUP\_2M | Set to 1 if traveling pilots are used in the packet.  Set to 0 otherwise. | Y | O |
| FORMAT is S1G\_DUP\_1M | Set to 1 if traveling pilots are used in the packet.  Set to 0 otherwise. | Y | O |
| Otherwise | Not present | N | N |
| TIME\_OF\_DEPARTURE\_REQUESTED |  | Boolean value:  True indicates that the MAC entity requests that the PHY entity measures and reports time of departure parameters corresponding to the time when the first PPDU energy is sent by the transmitting port.  False indicates that the MAC entity requests that the PHY entity neither measures nor reports time of departure parameters. | O | N |
| RX\_START\_OF\_ FRAME\_OFFSET | dot11MgmtOptionTimingMsmtActivated is true | 0 to 232– 1. An estimate of the offset (in 10 ns units) from the point in time at which the start of the preamble corresponding to the incoming frame arrived at the receive antenna port to the point in time at which this primitive is issued to the MAC. | N | Y |
| Otherwise | Not present |  |  |
| UPLINK\_INDICATION | NDP\_INDICATION  is 0 and FORMAT is S1G and CH\_BANDWIDTH is not equal to CBW1 | Set to 1 if the S1G PPDU is addressed to AP  Set to 0 otherwise (See 9.17b (Group ID, partial AID, Uplink Indication and Color in S1G PPDUs)). | Y | Y |
| Otherwise | Not present | N | N |
| COLOR | UPLINK\_INDICATION is 0 and NDP\_INDICATION is 0 and FORMAT is S1G or S1G\_DUP\_2M and CH\_BANDWIDTH is not equal to CBW1 ~~and UPLINK is 1~~ and MU\_SU is SU. | Set to a value of its choosing within the range 0 to 7 and shall maintain that value for the duration of the existence of the BSS (See 9.17b (Group ID, partial AID, Uplink Indication and Color in S1G PPDUs)). | Y | Y |
| Otherwise | Not present | N | N |
| NOTE 1—In the “TXVECTOR” and “RXVECTOR” columns, the following apply:  Y = Present;  N = Not present;  O = Optional;  MU indicates that the parameter is present once for an S1G SU PPDU and present per user for an S1G MU PPDU. Parameters specified to be present per user are conceptually supplied as an array of values indexed by *u*, where *u* takes values 0 to NUM\_USERS-1. | | | | |

**TGah editor: make global searches over Draft 1.0, and make the following replacements**

* **(Tx/RxVector) “NDP\_FRAME” is replaced by “NDP\_INDICATION”.**
* **(Tx/RxVector) “NDP\_FRAME\_CONTENTS” is replaced by “NDP\_MAC\_FRAME\_BODY”**
* **(Tx/RxVector) “UPLINK” is replaced by “NDP\_INDICATION”**