IEEE P802.11  
Wireless LANs

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| D1.0 Comment Resolution – Clause 22.3.10 – CIDs 2241, 2443, 2444, 2445, 2448, 2449, 2451, 2452, 2453, 2454, 2456, 2696, 2697, 2698, 2966, 3147, 3148, 3149, 3150, 3152, 3153, 3154, 3156, 3157, 3467, 3631, 3634, 3648, 3660, 3681 | | | | |
| Date: Oct. 6 2011 | | | | |
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Abstract

This document provides resolutions for CIDs 2241, 2443, 2444, 2445, 2448, 2449, 2451, 2452, 2453, 2454, 2456, 2696, 2697, 2698, 2966, 3147, 3148, 3149, 3150, 3152, 3153, 3154, 3156, 3157, 3467, 3631, 3634, 3648, 3660, 3681

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| **CID** | **Page** | **Clause** | **Comment** | **Proposed Change** | **Resolution** |
| 2241 | 169.26 | 22.3.10.9.3 | Add "i\_seg =0 " |  | AGREE. See 11/1365r0. |
| 2451 | 169.26 | 22.3.10.9.3 | iSeg in LHS not defined | Set to 0, or append ", iSeg = 0" to RHS | (Duplicate of CID 2241.)  AGREE. See 11/1365r0. |
| Commenter:  Dehghan, Hossein (2241)  Hart, Brian (2451)  Discussion:  In Clause 22.3.10.9.3, Equations 22-76 and 22-77 list *iSeg* values but Equation 22-75 does not. For consistency Equation 22-75 should do so.  Changes:    TGac editor: modify the D1.0 text from P169L26 (D1.2 text from P210L26), as follows:  Add  *, iSeg = 0*  at end of line. | | | | | |

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| 3147 | 159.56 | 22.3.10.5.3 | "Based on the above equation, the initial estimate of the longest symbol length can be obtained by" should be reworded to "Based on the above equation, the initial estimate of the largest number of symbols is obtained by" | As in comment | AGREE IN PRINCIPLE. See 11/1365r0. |
| Commenter:  Perahia, Eldad  Discussion:  The usage varies throughout this section and it might be good to rewrite it to make it consistent. On lines 29-30, the usage is “the transmitter computes ...”, then on line 56 it’s “the initial estimate ... can be obtained by”, and thenon line 62 it becomes a command, “compute ...”.  These are all internal calculations and so the usage should all be descriptive: we’re trying to define what the answer should be, not how the steps should be carried out.  To resolve this comment, the commenter’s proposed text does indeed seem better than the current text (“can be obtained” sounds tentative). The proposed resolution makes one further change: change “obtained”to “defined”.  Changes:  TGac editor: modify the D1.0 text from P159L56 (D1.2 text from P201L29), as follows:  Change  “Based on the above equation, the initial estimate of the longest symbol length can be obtained by”  to  “Based on the above equation, the initial estimate of the largest number of symbols is defined by” | | | | | |

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| 2443 | 159.59 | 22.3.10.5.3 | In a sense this eqn (22-52) and also (22-54) are misleading, and a lot of this content needs to move to 22.4.3. This is because it is the \*MAC's\* responsibility to pad everything appropriately, so that by the time the per user array of PSDUs reach the PHY, and this part of the flow, all users' PSDUs have the same Nsym\_init,u and/or Nsym,u. No "max" is needed. Then, what the MAC needs is a call to the PHY ahead of PHY-TXSTART: i.e. "given these (per-user) arrays of pre-padding octets, NSTS's and MCS's, what is the number of padding octets that the MAC needs to provide? This is akin to the TXTIME question (what should the MAC fill in for Duration/ID field given #octets, NSTS, MCS), and hence my suggestion for a new array parameter within the PLME-TXTIME.confirm primitive. And the calculation of this array parameter (with max's) belongs in 22.4.3 | As in comment | DISAGREE. See 11/1365r0. |
| Commenter:  Hart, Brian  Discussion:  The commenter has sent a further message saying the comment should be declined: “The MAC does the padding as per the comment, but the LENGTH parameter the MAC passes (being renamed APEP\_LENGTH) is not the length of the PSDU, it is still the pre-padded length, so the PHY needs to recalc the #symbols and so forth.”  Changes:    None. | | | | | |

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| 3634, 3660 | 160.01 | 22.3.10.5.3 | The equation 22-53 Npld should be Npld,u .Npld is different for user as the Ndbps is different and number of symbols is same | change the text to :"Then, for each LDPC user in the MU packet, compute the LDPC encoding parameters based on steps (a)through (d) in 19.3.11.7.5 (LDPC PPDU encoding process), with the exception that Equation (22-53) is used to compute Npld,u instead of Equation (19-35). Npld,u=Nsym\_max\_init\*Ndpbs,u Ndbps,u is the Ndbps for user u" | AGREE IN PRINCIPLE. See 11/1365r0. |
| Commenter:  Sun, Bo (both 3634 and 3660)  Discussion:  Yes, *Npld* should be *Npld,u* (two places).  Changes:  TGac editor: modify the D1.0 text from P159L64, and P160L01 (D1.2 text from P201L38 and P201L41), as follows:  Change  *Npld*  to  *Npld,u* | | | | | |

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| 3148 | 160.52 | 22.3.10.5.3 | It’s not clear to me how in MU we pad BCC users if LDPC users caused an additional symbol to be added. | Please clarify | AGREE IN PRINCIPLE. See 11/1365r0. |
| Commenter:  Perahia, Eldad  Discussion:  After some email discussions with the commenter, it seems the current specification is (mostly) correct but could do with a little more explanation.  Equation (22-51) first calculates *NSYM\_init, u* for all users, with the mixed encoder case explicitly included. From this, *NSYM\_max\_init* is calculated using Equation (22-52). Then *NSYM,u* is defined for LDPC users according to (D1.0) P160L4 and for BCC users according to (D1.0) P160L12. Finally we get *NSYM*using Equation (22-54).  The text cited by the commenter (D1.0 P160L52 and following paragraph) says that the PHY follows the padding procedure in Clause 22.3.10.1 (General) to fill up *NSYM* symbols, where *NSYM* is computed in Equation (22-54). From the above discussion this *NSYM* calculation also includes the MU case with mixed encoders.  Changes:  TGac editor: modify the D1.0 text from P160L52 (D1.2 text from P202L24), as follows:  Change  “When constructing the Data field for users encoded using BCC, the MAC follows the padding procedure described in 9.12.6 (A-MPDU padding for VHT format PPDU) and delivers a PSDU that contains PSDU\_LENGTH*u* octets.”  to  “When constructing the Data field for users encoded using BCC, the MAC follows the padding procedure described in 9.12.6 (A-MPDU padding for VHT format PPDU) and delivers a PSDU that contains PSDU\_LENGTH*u* octets (cf. 22.4.3 (TXTIME and PSDU\_LENGTH calculation)).”  TGac editor: modify the D1.0 text from P160L54 (D1.2 text from P202L27), as follows:  Change  “The PHY follows the padding procedure described in 22.3.10.1 (General) to fill up *NSYM* symbols computed in Equation (22-54).”  to  “The PHY follows the padding procedure described in 22.3.10.1 (General) to fill up *NSYM* symbols, where *NSYM* is defined in Equation (22-54).” | | | | | |

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| 3149 | 160.63 | 22.3.10.5.3 | Its strange that this paragraph comes after the BCC paragraph, since this only applies to LDPC. | Either move the paragraph near LDPC paragraph or state in the paragraph that it only applies to LDPC. | DISAGREE. See 11/1365r0. |
| Commenter:  Perahia, Eldad  Discussion:  The paragraph is  “In addition, if *NSYM* computed in Equation (22-54) is greater than *NSYM\_max\_init* computed in equation (22-52), then B3 of VHT-SIG-A2 shall be set to 1. Otherwise B3 of VHT-SIG-A2 shall be set to 0.”  (D1.0) P160L12 says that *NSYM,u* = *NSYM\_init,u* for BCC users. But *NSYM* and *NSYM\_max\_init* are maxima over all users, including (from Equation (22-52)) both BCC and LDPC users.  Changes:  None. | | | | | |

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| 3150 | 161.02 | 22.3.10.6 | We should state that the stream parser operation is performed per user for MU. | As in comment | AGREE. See 11/1365r0. |
| Commenter:  Perahia, Eldad  Discussion:  The paragraph is  “After coding and puncturing, the data bit streams at the output of the FEC encoders are rearranged into *NSS* blocks of *NCBPS* bits. This operation is referred to as “stream parsing” and is described in this section.”  As the commenter points out, this language is SU-centric. It could be rewritten so that every parameter that could vary across users had *,u* added in the subscript throughout the section. But this would be painful, and not really clearer, and is not proposed by the commenter, hence the proposed resolution below.  Changes:  TGac editor: modify the D1.0 text from P161L02 (D1.2 text from P202L43), as follows:  Change  “After coding and puncturing, the data bit streams at the output of the FEC encoders are rearranged into *NSS* blocks of *NCBPSS* bits. This operation is referred to as “stream parsing” and is described in this section.”    to  “After coding and puncturing, the data bit streams per user at the output of the FEC encoders are rearranged into *NSS* blocks of *NCBPSS* bits(*NSS,u* blocks of *NCBPSS,u* bits in the case of an MU-MIMO transmission). This operation is referred to as “stream parsing” and is described in this section.  The description is given in terms of an SU transmission. For MU transmissions, the rearrangements are carried out in the same way per user.”  Other changes: add a definition for *NCBPSS,u* in Table 22-5. | | | | | |

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| 2444 | 161.20 | 22.3.10.6 | *iSS* starts at 0 but elsewhere indexing starts at 1 (e.g. P161L48, P164L65) | Delete summation or range is 1 … *NSS* | AGREE. See 11/1365r0. (See resolution of CID 3151.) |
| Commenter:  Hart, Brian  Discussion:  Having a summation in which every term is the same seems unduly fussy, so the better approach seems to be to delete it.  (Already adopted in D1.2, from CID 3151.)  Changes:  None | | | | | |

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| 3152 | 162.29 | 22.3.10.6 | We added a few more MCS's after this Note was written. Please check whether the new MCS's apply to this situation. | As in comment | DISAGREE. See 11/1365r0. |
| Commenter:  Perahia, Eldad  Discussion:  A check via Excel revealed no new MCS exceptions. (“Disagree” = “no change”.)  Changes:  None. | | | | | |

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| 3153 | 162.39 | 22.3.10.7 | We should state that the stream parser operation is performed per user for MU. | As in comment | AGREE IN PRINCIPLE. See 11/1365r0. |
| Commenter:  Perahia, Eldad  Discussion:  This comment is analogous to CID 3150.  The first sentence is:  “For a contiguous 160MHz or a non-contiguous 80+80 MHz, the output bits of each stream parser are first divided into blocks of *NCBPSS* bits.”  Actually from the resolution of CID 3150, the stream parsing operation has already been defined to be per user, so there is no need to say that again. But in an MU transmission, *NCBPSS* is undefined, so this should be changed.  Changes:  TGac editor: modify the D1.0 text from P162L39 (D1.2 text from P204L07), as follows:  Change  “For a contiguous 160MHz or a non-contiguous 80+80 MHz, the output bits of each stream parser are first divided into blocks of *NCBPSS* bits.”  to  “For a contiguous 160MHz or a non-contiguous 80+80 MHz, the output bits of each stream parser are first divided into blocks of *NCBPSS* bits (*NCBPSS,u* bits in the case of an MU-MIMO transmission).  The remaining description is given in terms of an SU transmission. For MU transmissions, the rearrangements are carried out in the same way per user.””  Other changes (also requested in proposed resolution to CID 3150): add a definition for *NCBPSS,u* in Table 22-5. | | | | | |

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| 3631 | 163.15 | 22.3.10.7 | in equation 22-61, the k =0,1,…[Ncbpss/2s\*Nes]/s\*Nes-1, the second devision should be a multiplication . And in the second equation 2s\*[k/s] part ,the k should be k-s\*Nes[k/s\*Nes] | As in comment | AGREE IN PRINCIPLE. See 11/1365r0. |
| Commenter:  Sun, Bo  Discussion:  The comment refers to the action of the segment parser when *NCBPSS* is not divisible by *2s . NES*. First there’s a description in words of what happens (D1.0 P163 LL 1-11), and then there’s a “that is,” followed by a formula, Equation (22-61). The formula should say the same thing, but doesn’t.  For the first part of the comment, the commenter notes that on the rhs, the upper limit of the first range and the lower limit of the second range contain the term  and as the commenter points out, this makes no sense (it’s not even an integer in general), and we should be multiplying instead of dividing. In effect we’re rounding *NCBPSS / 2* down to the nearest multiple of *s . NES.*  For the second part of comment, the commenter suggests, in effect, that in the second part of the equation *k* should be replaced by its residue mod *s . NES*. This is correct (I think): the range of k has a large lower limit, taken care of in the first term in the subscript at left, and the second term shouldn’t also include this large lower limit. (Well spotted.)  Expanding on this, let *NCBPSS* = 2*s* . *NES* . *m* + *r*, with 0 ≤ *r* < 2*s* . *NES*. The second part of Equation (22-61) deals with the last *r* bits to be assigned by the segment parser, and the range of *k* for this part of the equation can be written *m* . *s* . *NES* ≤ *k* < *m* . *s* . *NES* + *t*, where *t* = *r* / 2, < *s* . *NES*. The first term in the subscript of *x* (in this part of the equation) is the total number of bits that have been assigned, across both subblocks, by the first part of the equation, i.e., is equal to *m* . 2*s* . *NES*. The logic of the rest of this part of the equation is that the remaining bits are assigned in the same way as in the first part of the equation, but with *s* . *NES* replaced by *s*. So we use the same form as the first part of the equation, with *s* . *NES* replaced by *s* and with *k* replaced by *k* – *m*. *s*. *NES*. The second term in the subscript was incorrect in D1.0, and needs *k* to be replaced as above. Since, as above, *m* . *s* . *NES* ≤ *k* < *m* . *s* . *NES* + *t*, where *t* < *s* . *NES*, we have*k* – *m*. *s*. *NES* =*k*mod *s . NES*.    Also there’s an extra ‘ at the end of the subscript on each line, which should be removed.  Changes:  TGac editor: modify the D1.0 text from P163L15 (Equation (22-61)) (D1.2 text from P204L51 (Equation (22-70)), as follows:   1. On the rhs, both lines, change “ / *2s . NES* “ to “ / (*2s . NES*) “ 2. On the rhs, both lines, change the division by *s . NES* to a multiplication by *s . NES* 3. On the lhs, second line, second term of subscript, change *2s* . to *2s* . 4. On the lhs, both lines, end of subscript and just before the comma, delete ‘ | | | | | |

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| 2445 | 163.01 | 22.3.10.7 | "If not divisible …" I see about 17 MCSs with that property. It would be useful if they were listed as per 22.3.10.7, or at least one example provided (to help with testing) | As in comment | DISAGREE. See 11/1365r0. |
| Commenter:  Hart, Brian  Discussion:  The suggested resolution is “Disagree”, but clearly there’s nothing actually wrong with “Agree” either: it’s a matter of taste on how this should be written. Here are the arguments for ‘’Disagree”:  The more messy and liable to be misinterpreted a formula, the stronger the case for adding a table. In this case the property discussed is “if *NCBPSS* is not divisible by *2s . NES*”; relatively speaking, this isn’t that complicated, and if we add a table for this we’ll have to add many more tables. Also, other factors being equal, we should resist the temptation to describe things in multiple different ways in a specification: the more we do this, the greater the chance of multiple inconsistent descriptions of the same item creeping in. And furthermore we can certainly list and verify all combinations as part of an eventual test plan: it doesn’t necessarily have to be done in the specification itself.  Changes:  None. | | | | | |

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| 3154 | 163.39 | 22.3.10.8 | We should state that the stream parser operation is performed per BCC user for MU. And perhaps emphasize this for Eq 22-65 and 22-66 where its not clear whether what N\_SS refers to. | As in comment | AGREE IN PRINCIPLE. See 11/1365r0. |
| Commenter:  Perahia, Eldad  Discussion:  From the proposed resolution to CID 3150, the stream parser section should already state that the stream parser operation is performed per user. As the commenter points out, the remaining language in this section is all SU-centric and a clarifying note should be added.  Changes:  TGac editor: modify the D1.0 text from P163L39 (D1.2 text from P205L12), as follows:  Add a new paragraph after the first one in Clause 22.3.10.8, as follows:  “For ease of explanation, the operation of the interleaver is described for the SU case. In an MU transmission, the interleaver operates in the same way on the output bits for each user from the stream parser. That is, the operation of the interleaver is the same as if the transmission were an SU one, consisting of bits from that user only.” | | | | | |

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| 2966 | 164.46 | 22.3.10.8 | In equation (22-64), the operation of “+ NCBPSSI” is redundant in the sense of "mod s" operation. | Remove “+ NCBPSSI” in equation (22-64). | DISAGREE. See 11/1365r0. |
| Commenter:  Luo, Zhendong  Discussion:  The commenter is correct that the equation can be simplified a little, and no harm would be done in this case by accepting the proposed change. On the other hand, the equation as is matches the form of interleavers as they’ve been specified in 802.11 for a long time. E.g., the 11a interleaver in Clause 17.3.5.6 could have been simplified in the same way, but wasn’t. There is some value to keeping equations in familiar form and so the proposed resolution is to keep the equation as is.  Changes:  None. | | | | | |

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| 2696 | 165.05 | 22.3.10.8 | Incomplete equation (22-66). | "r = {j – J(iSS) \* NROT \* NBPSCS} mod NCBPSS, j = 0, 1,…, NCBPSS – 1" | AGREE. See 11/1365r0. (See resolution to CID 2447.) |
| Commenter:  Kim, Youhan  Discussion:  Equation (22-66) currently reads  and this is from the start of the sentence (not a continuation from the previous line). So “*r*” is missing from the beginning and “1” from the end.  (Already changed in D1.2, referencing CID 2447.)  Changes:  None. | | | | | |

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| 2448 | 168.01 | 22.3.10.9.1 | Range for *l* has mismatch with P168L35; no range for *i* | Correct - align with 22-71? | AGREE. See 11/1365r0. |
| Commenter:  Hart, Brian  Discussion:  As the commenter points out, there is a mismatch between (D1.0) P168L01, which says  and (D1.0) P168L35. Even clearer, the lines at the end of the previous page, describing the equation above (P168LL63-65), say “the stream of complex numbers in frequency subblock *l* (*l* = 0 for 20, 40 and 80 MHz, *l* = 0, 1 for 160 and 80+80 MHz) for user u are denoted ...”, so the equation above is just a misprint.  (Already partially changed in D1.2, referencing CID 2239. But to be complete, the definition of *l* should be added.)  Changes:    TGac editor: modify the D1.0 text from P160L01 (D1.2 text fromP209L01), as follows:  Change  to | | | | | |

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| 2697 | 168.42 | 22.3.10.9.2 | Missing sub-index 'i' in Equation (22-72). | Change to d"\_{t(k),i,l,n} = d'\_{k,i,n,l} (Refer to 684r0 for MS Word format of this.) | AGREE. See 11/1365r0. |
| 2449 | 168.43 | 22.3.10.9.2 | Index ordering is k,l,n or t(k),l,n yet everywhere else it is k,I,n,l | Reverse subscripts, 2x. Also subscript i is missing - add, 2x | AGREE. See 11/1365r0. (Duplicate of CID 2697.) |
| Commenter:  Kim, Youhan (2697)  Hart, Brian (2449)  Discussion:  Equation (22-72) currently reads (excluding descriptions of the parameter ranges):  but as the commenter points out, the rhs is undefined. Instead the previous equation (22-71) refers to , and the parameter ranges for Equation (22-72) include *i*.  (Already changed in D1.2, referencing CID 2240.)  Changes:  None. | | | | | |

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| 3156 | 169.19 | 22.3.10.9.3 | This could be misinterpreted as only performing segment deparser with LDPC. | reword to "For a 160 MHz VHT PPDU transmission, the two frequency subblocks at the output of the LDPC tone mapper for LDPC or constellation mapper for BCC are combined into one frequency segment as shown in Equation (22-75)." | AGREE. See 11/1365r0. |
| Commenter:  Perahia, Eldad  Discussion:  Yes. A separate comment via email (Youhan Kim) points out that the last paragraph of 22.3.10.9.2 defines what the LDPC tone mapper is supposed to do in the case of BCC transmissions, so strictly speaking the D1.0 text is correct as is. But the commenter’s proposed text is indeed clearer.  Changes:    TGac editor: modify the D1.0 text from P169L19 (D1.2 text from P210L21), as follows:  Change  “For a 160 MHz VHT PPDU transmission, the two frequency subblocks at the output of the LDPC tone mapper are combined into one frequency segment as shown in Equation (22-75).”  to  "For a 160 MHz VHT PPDU transmission, the two frequency subblocks at the output of the LDPC tone mapper for LDPC or constellation mapper for BCC are combined into one frequency segment as shown in Equation (22-75)." | | | | | |

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| 3157 | 169.44 | 22.3.10.9.4 | Perhaps state that STBC needs to be applied to all users or none of the users in MU | As in comment | AGREE. See 11/1365r0. |
| Commenter:  Perahia, Eldad  Discussion:  Agree.  Changes:    TGac editor: modify the D1.0 text from P169L44 (D1.2 text from P210L47), as follows:  At the end of the paragraph beginning on D1.0 P169L44 (D1.2 P210L47), add  “In an MU transmission, if STBC is applied to any user, STBC shall be applied to all users.” | | | | | |

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| 2698 | 171.31 | 22.3.10.10 | Psi in Table 22-17 does not have stream index. | Change 'Psi\_{1, n mod 8}' to 'Psi\_{n mod 8}' in Equation (22-80) | AGREE. See 11/1365r0. |
| 3681 | 171.31 | 22.3.10.10 | The pilot values in Equation 22-80 are given by PSI\_{1,n mod 8}, etc., but the 1 can be removed in the subscripts, such that the values read PSI\_{n mod 8} | As in comment. | AGREE. See 11/1365r0. |
| Commenters:  Kim, Youhan (2698)  Van Zelst, Allert (3681)  Discussion:  As the commenters point out, the notation switches (in mid-sentence). Equation (22-80) is:  “where Ψm is defined in Table 22-17”.  (Already changed in D1.2, referencing CID 2069.)  Changes:  None. | | | | | |

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| 2452 | 172.24 | 22.3.10.11.1 | D has subscript iSTS but STS summation is over m - change iSTS to m | As in comment | AGREE. See 11/1365r0. |
| Commenter:  Hart, Brian  Discussion:  Correct (and well spotted). Lines 40-41 on the same page define the notation for the subscripts of D, so that should change also.  (Already resolved in D1.2: see D1.2 P178L36 and P178L50.)  Changes:  None. | | | | | |

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| 2453 | 172.41 | 22.3.10.11.1 | Need reference for D. | Add "and is defined in (22-83) ..(22-86)" | AGREE. See 11/1365r0. |
| Commenter:  Hart, Brian  Discussion:  Yes: this is the only element of its list that’s missing the reference to the definition.  Changes:  TGac editor: modify the D1.2 text from P213L50 as follows:  Add "and is defined in Equations (22-92)-(22-95)" at the end of the line. | | | | | |

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| 2454 | 173.03 | 22.3.10.11.1 | For (22-83)-(22-86), replace BW by 20/40/80/160 as appropriate, and also in M terms below each equation (3\*4 changes in all) | As in comment | AGREE IN PRINCIPLE. See 11/1365r0. |
| Commenter:  Hart, Brian  Discussion:  The commenter suggests replacing “For a 20 MHz VHT transmission, = ...” with “For a 20 MHz VHT transmission, = ...” (i.e., since , why leave it as a variable?) and making other similar changes.  This is logical enough, but then the “For a 20MHz VHT transmission” would be superfluous (or at least the “20MHz”part). It seems more readable if these introductory phrases are left in. So the proposed resolution is to change BW to 20 on the right and below the equations, but leave the left as is (2 \* 4 changes).  Also *iSTS* is back in. It’s better to change this to *m* to match earlier notation.  Changes:  TGac editor: modify the D1.0 text from P173L01 (D1.2 text from P214L13), as follows:  In subscript, change to .  Also in subscript, change *iSTS* to *m.*  TGac editor: modify the D1.0 text from P173L08 (D1.2 text from P214L18), as follows:  Change to .  TGac editor: modify the D1.0 text from P173L13 (D1.2 text from P214L27), as follows:  In subscript, change to .  Also in subscript, change *iSTS* to *m.*  TGac editor: modify the D1.0 text from P173L19 (D1.2 text from P214L32), as follows:  Change to .  TGac editor: modify the D1.0 text from P173L25 (D1.2 text from P214L41), as follows:  In subscript, change to .  Also in subscript, change *iSTS* to *m.*  TGac editor: modify the D1.0 text from P173L31 (D1.2 text from P214L46), as follows:  Change to .  TGac editor: modify the D1.0 text from P173L37 (D1.2 text from P214L55), as follows:  In subscript, change to .  Also in subscript, change *iSTS* to *m.*  TGac editor: modify the D1.0 text from P173L43 (D1.2 text from P214L60), as follows:  Change to . | | | | | |

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| 2456 | 173.52 | 22.3.10.11.1 | "averaged across" - what kind over averaging? Frobenius norm is like an RMS value, so "averaging" sounds like "RMS-averaging" but I'd expect "power/energy averaging” | "Squared Frobenius norm of NSTS,total\*NST when calculated across all the frequency tones"? | UNRESOLVED. See 11/1365r0. |
| Commenter:  Hart, Brian  Discussion:  The full sentence is  “ may be frequency dependent and has a Frobenius norm of when averaged across all frequency tones.”  This is mysterious. Not only is the method of averaging unclear, as the commenter notes, but it’s not even clear whether this is normative or informative. As worded, it’s not normative. But since the rest of the paragraph indicates that the *Q*’s are not restricted, how could it be informative?  This needs further discussion and clarification. As a placeholder resolution, simply delete “and has a Frobenius norm of when averaged across all frequency tones”, and make similar change in 22.3.7 (Mathematical description of signals).  Changes:  TGac editor: modify the D1.0 text from P173L52 (D1.2 text from P215L03), as follows:  Delete “and has a Frobenius norm of when averaged across all frequency tones” and add new sentence “Sounding PPDUs using spatial expansion shall use unitary Qk”.  (If not covered under CID 2218): TGac editor: modify the D1.0 text from P136L21 (D1.2 text from P176L14), as follows:  Delete “and has a Frobenius norm of when averaged across all frequency tones” and add new sentence “Sounding PPDUs using spatial expansion shall use unitary Qk”. | | | | | |

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| 3648 | 173.56 | 22.3.10.11.1 | There is no value of D and [Qk]NSTS for TX number 5、6、7、8 in section 19.3.11.11.2 in REVmb D9.0 | Modify as:  "……. that could be used for SU packets." | DISAGREE. See 11/1365r0. |
| Commenter:  Sun, Bo  Discussion:  There are (apparently–it’s not that clear) no normative requirements on the Q matrices, and the text referred to in the comment merely provides some examples. There should be no implication that the examples cover all possible cases.  Also the commenter’s proposed resolution was not clear, because the proposed text is already present.  Changes:  None. | | | | | |

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| 3467 | 173.54 | 22.3.10.11.1 | Clause 19.3.11.11.2 (HT OFDM) is referenced as a guildeline to what Qk to use for SU transmission. This clause says "Sounding PPDUs using spatial expansion shall use unitary Qk". However, I see no such requirement for VHT sounding PPDU. Could you clarify that this is no longer a requirement for VHT sounding? | Please clarify. | DISAGREE. See 11/1365r0. |
| Commenter:  Shi, Wei  Discussion:  The full sentence plus following sentence are:  “Refer to the examples of *Qk* listed in 19.3.11.11.2 (Spatial mapping) for examples of that could be used for SU packets. Note that implementations are not restricted to the spatial mapping matrix examples listed in 19.3.11.11.2 (Spatial mapping).”  The first sentence standing alone makes it clear enough that there is no normative requirement imported from the reference: “examples of *Qk* ... examples of ... could be used”. The second sentence says that implementations are not restricted to these examples. To see this as ambiguous, we’d have to see the text as saying that normative requirements were being imported in the first sentence (despite the “examples ... examples ... could be” language) and the second sentence was saying that the specific matrices didn’t have to be used but the imported normative requirement still stood. This seems far-fetched.  We shouldn’t have to spell out that items referred to as “examples” do not define normative requirements. Doing so here would set a bad precedent for all other examples in the specification. A reasonable change would be to delete the second sentence above, but the recommended resolution is to make no change.  Changes:  None. | | | | | |