IEEE P802.11  
Wireless LANs

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| (LB200) TGah D1.0 PHY Comment Resolutions on Clause 24.3.11 | | | | |
| Date: 2014-03-03 | | | | |
| Author(s): | | | | |
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| Hongyuan Zhang | Marvell |  |  |  |
| Minho Cheong |  |  |  |  |

This document provides PHY resolutions for CIDs on Clause 24.3.11: CIDs 1617, 1328, 1329.

| **CID** | **Commenter** | **Page** | **Clause** | **Assignee** | **Comment** | **Proposed Change** | **Resolution** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1617 | Brian Hart | 326.35 | 24.3.11 | Minho | The NDP description and organization within clause 24 needs to be massively improved.  A lot of 24.3.11 defines an alternate SIG encoding so this content - including figs 24-39/40 - belongs within 24.3.8.2.1.4 and 24.3.8.3.4.  For the existing 24.3.8.2.1.4 and 24.3.8.3.4 content, for each SIG field, we should be saying something like "this field has this encoding UNLESS NDP encapsulating a MAC frame within the PLCP header, and then this PHY field doesn't exist".  As well the cross-references are poor: e.g. the references to 8.3.5 in Tables 24-11/18 should first point to Tables 24-11/18 and thence 8.3.5. After these proposed changes, 24.3.11 should only focus on the absence of a Data field | As in comment | REVISE.  TGah editor to make changes as shown in doc. 14/0371r0. |
| <Discussion>  Changed the related sub-clauses to make those consistent one another, as the commenter pointed out. | | | | | | | |
| 1328 | Adrian Stephens | 327.07 | 24.3.11 | Minho | "uses the following settings in SIG field" -- is this how an NDP is identified, or a constraint on the settings of these fields. If the latter, it should be a "shall" statement, and if so, where should this go. | Clarify if this is a rule or a description resulting from some other rule. If it is a rule, is it for the MAC or the PHY? If it is a rule, reword to "shall". If it is for the MAC, reword to use TXVECTOR parameters and move into the MAC. | REVISE.  TGah editor to make changes as shown in doc. 14/0371r0. |
| <Discussion>  Because these are PHY specific rules for transmiting an S1G NDP sounding PPDU, I changed its expressions into “shall’ statements as the commenter pointed out. | | | | | | | |
| 1329 | Adrian Stephens | 328.04 | 24.3.11 | Minho | Fonts withing figures should be Arial. | Change fonts in Figures 24-39 and 40 to Arial. | ACCEPT.  TGah editor to make changes as shown in doc. 14/0371r0. |
| <Discussion>  Changed fonts as the commenter pointed out. | | | | | | | |

**TGah editor: modify the D1.2 text from P060L32, as follows**

* NDP MAC frames

Several NDP MAC frame formats are defined to decrease MAC protocol overhead for S1G STAs. An NDP MAC frame is indicated by setting the value of the NDP Indication subfield to 1 in the SIG field. Subclause 8.3.4a describes the NDP MAC frame body content in each of NDP MAC frame types defined in Table 8-41 (NDP MAC frame type field values). The PHY preamble format for transmission of NDP MAC frames is defined in 24.3.11 (S1G preamble format for NDPs).

**TGah editor: modify the D1.2 text from P332L41, as follows**

* SIG definition

The SIG field carries information required to interpret S1G format PPDUs sent with a short preamble. The structure of the SIG field for the fist symbol (SIG-1) is shown in Figure 24-27 (SIG-1 structure) and for the second symbol (SIG-2) is shown in Figure 24-28 (SIG-2 structure). The SIG field format of NDP MAC frames is described in Figure 24-41 (SIG field format for >=2MHz NDP MAC frame).

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| B0 | B1 | B2 | B3 B4 | B5 B6 | B7 B15 | B16 | B17 B18 | B19 B22 | B23 |
| reserved | STBC | Uplink  Indicatio | BW | Nsts | ID | SGI | Coding | MCS | Smoothing |
| Figure 24-27 - SIG-1 structure | | | | | | | | | |

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| --- | --- | --- | --- | --- | --- | --- |
| B0 | B1 B9 | B10 B11 | B12 | B13 | B14 B17 | B18 B23 |
| Aggregation | Length | Response  Indication | Doppler | NDP  Indication | CRC | Tail |
| Figure 24-28 - SIG-2 structure | | | | | | |

The SIG field of S1G format PPDUs sent with a short preamble contains the fields listed in Figure 24-27 (SIG-1 structure) amd Figure 24-28 (SIG-2 structure).

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| --- | --- | --- | --- | --- |
| * Fields in the SIG field of short preamble | | | | |
| Symbol | Bit | Field | Number of bits | Description |
| SIG-1 | B0 | Reserved | 1 | Reserved. Set to 1. |
| B1 | STBC | 1 | Set to 1 if all spatial streams have space time block coding and set to 0 if no spatial stream has space time block coding. |
| B2 | Uplink Indication | 1 | Set to the value of the TXVECTOR parameter UPLINK\_INDICATION. |
| B3-B4 | BW | 2 | Set to 0 for 2 MHz, 1 for 4 MHz, 2 for 8 MHz, 3 for 16 MHz |
| B5-B6 | Nsts | 2 | Set to 0 for 1 space time stream  Set to 1 for 2 space time streams  Set to 2 for 3 space time streams  Set to 3 for 4 space time streams |
| B7-B15 | ID | 9 | If Uplink Indication is not present or set to 1, set to the value of the TXVECTOR parameter PARTIAL\_AID. PARTIAL\_AID provides an abbreviated indication of the intended recipient(s) of the PSDU(see Table 9.17b (Group ID, partial AID, Uplink Indication and Color in S1G PPDUs))). If Uplink Indication is set to 0, B7-B9 are set to the value of the TXVECTOR parameter COLOR and B10-B15 are set to the value of the TXVECTOR parameter PARTIAL\_AID. |
| B16 | Short GI | 1 | Set to 0 if short guard interval is not used in the Data field.  Set to 1 if short guard interval is used in the Data field. |
| B17-B18 | Coding | 2 | B17 set to 0 for BCC and 1 for LDPC  If B17 is 1, B18 is set to 1 if the LDPC PPDU encoding process (of an SU PPDU), results in an extra  OFDM symbol (or symbols) as described in 22.3.10.5.4 (LDPC coding), otherwise set to 0.  If B17 is 0, B18 is reserved and set to 1. |
| B19-B22 | MCS | 4 | MCS Index |
| B23 | Smoothing | 1 | A value of 1 indicates that channel smoothing is recommended.  A value of 0 indicates that channel smoothing is not recommended. |
| SIG-2 | B0 | Aggregation | 1 | Set to 1 when aggregation is ON (A-MPDU), and 0 otherwise.  Note: S1G PPDUs shall be transmitted with aggregation ON whenever PHY payload size is greater than 511 octets |
| B1-B9 | Length | 9 | Denotes the length of PPDU in number of symbols when aggregation bit is set to 1, and in number of octets when aggregation bit is set to 0. |
| B10-B11 | Response Indication | 2 | This field indicates the presence and type of frame a SIFS after the current frame transmission.  Set to 0 if No Response.  Set to 1 if NDP Response.  Set to 2 if Normal Response.  Set to 3 if Long Response. |
| B12 | Doppler | 1 | Set to 1 to indicate traveling pilots usage in packet. Otherwise 0 to indicate regular pilot tone locations. |
| B13 | NDP Indication | 1 | Used to indicate that frame is a Control NDP frame. If set to 1, then the SIG field format is as in Figure 24-41 (SIG field format for >=2MHz NDP MAC frame) and the SIG field contents follow the description in 8.3.5 (NDP MAC frames) |
| B14-B17 | CRC | 4 | CRC calculated as in 24.3.8.2.1.5 (CRC calculation for S1G SIGA fields). |
| B18-B23 | Tail | 6 | Used to terminate the trellis of the convolutional decoder.  Set to 0. |

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**TGah editor: modify the D1.2 text from P355L03, as follows**

* SIG definition

The SIG field carries information required to interpret S1G\_1M PPDUs. The structure of the 6 symbol SIG field (which carries 6 information bits per symbol) is shown in Figure 24-36 (Structure of the 6 symbol SIG field of S1G\_1M PPDU). Note that unlike other SIG field structures the indexing of the bits incorporates all the SIG symbols. i.e., B0-B5 denote the first symbol, B6-B11 the second, and so on. The SIG field format of NDP MAC frames is described in Figure 24-40 (SIG field format for 1MHz NDP MAC frame).

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| B0 B1 | B2 | B3B4 | B5 | B6 | B7 B10 | B11 | B12 B20 | B21B22 | B23 | B24 | B25 | B26 B29 | B30 B35 |
| Nsts | SGI | Coding | STBC | reserved | MCS | Aggregation | Length | Response  Indication | Smoothing | Doppler | NDP Indication | CRC | Tail |
| Figure 24-36 - Structure of the 6 symbol SIG field of S1G\_1M PPDU | | | | | | | | | | | | | |

The SIG field of S1G\_1M PPDUs contains the fields listed in Table 24-18 (Fields in the SIG field of S1G\_1M PPDU).

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| --- | --- | --- | --- | --- |
| * Fields in the SIG field of S1G\_1M PPDU | | | | |
| Symbol | Bit | Field | Number of bits | Description |
| SIG-1 | B0-B1 | NSTS | 2 | Set to 0 for 1 space time stream  Set to 1 for 2 space time streams  Set to 2 for 3 space time streams  Set to 3 for 4 space time streams |
| B2 | Short GI | 1 | Set to 0 if short guard interval is not used in the Data field.  Set to 1 if short guard interval is used in the Data field. |
| B3-B4 | Coding | 2 | B3 set to 0 for BCC and 1 for LDPC  If B3 is 1, B4 is set to 1 if the LDPC PPDU encoding process (of an SU PPDU), results in an extra OFDM symbol (or symbols) as described in 22.3.10.5.4 (LDPC coding), otherwise set to 0.  If B3 is 0, B4 is reserved and set to 1. |
| B5 | STBC | 1 | Set to 1 if all spatial streams have  space time block coding and set to 0 if no spatial stream has space time block coding. |
| SIG-2 | B6 | Reserved | 1 | Reserved. Set to 1. |
| B7-B10 | MCS | 4 | MCS Index |
| B11 | Aggregation | 1 | Set to 1 when aggregation is ON (A-MPDU), and 0 otherwise.  Note- S1G PPDUs shall be transmitted with aggregation ON whenever PHY payload size is greater than 511 octets |
| SIG-3 and SIG-4 | B12-B20 | Length | 9 | Denotes the length of PPDU in number of symbols when aggregation bit is set to 1, and in number of octets when aggregation bit is set to 0. |
| B21-22 | Response Indication | 2 | This field indicates the presence and type of frame a SIFS after the current frame transmission.  Set to 0 if No Response.  Set to 1 if NDP Response.  Set to 2 if Normal Response.  Set to 3 if Long Response. |
| B23 | Smoothing | 1 | A value of 1 indicates that channel smoothing is recommended.  A value of 0 indicates that channel smoothing is not recommended. |
| SIG-5 | B24 | Doppler | 1 | Set to 1 to indicate traveling pilots usage in packet. Otherwise 0 to indicate regular pilot tone locations. |
| B25 | NDP Indication | 1 | Used to indicate that frame is a Control NDP frame. If set to 1, then the SIG field format is as in Figure 24-40 (SIG field format for 1MHz NDP MAC frame) and the SIG field contents follow the description in 8.3.5 (NDP MAC frames) |
| B26-B29 | CRC | 4 | CRC calculated as in 24.3.8.2.1.5 (CRC calculation for S1G SIGA fields). |
| SIG-6 | B30-B35 | Tail | 6 | Used to terminate the trellis of the convolutional decoder.  Set to 0. |

**TGah editor: modify the D1.2 text from P372L07, as follows**

* S1G preamble format for NDPs

An NDP may be used for sounding or for NDP MAC frames. In the case of NDP sounding, the SIG field in an NDP shall indicate multiple space-time streams and more than one LTF fields; NDP MAC frames only contain single space-time stream with one LTF field.

NDP is the only S1G sounding format.

NDP for sounding is defined only using the S1G\_SHORT, and NDP for sounding is not allowed for 1MHz transmissions. NDP MAC frames may either use an S1G\_SHORT or an S1G\_1M.

The format of an S1G NDP PPDU for sounding is shown in Figure 24-37 (S1G NDP for Sounding Format).

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| **Figure 24-37 - S1G NDP for Sounding Format** |
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NOTE—The number of LTF symbols in the NDP is determined by the NSTS subfield in SIG field.

Transmission of an S1G NDP PPDU for sounding shall comply with the following rules: :

* shall use the S1G PPDU format but without the Data field
* shall use the S1G\_SHORT
* shall use the following settings in SIG field:
* MCS field is set to 0
* Length/Duration field is set to 0
* Bandwidth field is set to the same value as the TXVECTOR parameter CH\_BANDWIDTH in the preceding S1G NDP Announcement frame.
* NSTS field indicates two or more space-time streams
* Partial AID field is set as described in 9.17b (Group ID, partial AID, Uplink Indication and Color in S1G PPDUs)
* The NDP indication bit is set to 0

The format of an S1G NDP MAC frame in 2MHz, 4MHz, 8MHz or 16MHz is shown in Figure 24-38 (S1G NDP MAC frame for >=2MHz).

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| Figure 24-38 - S1G NDP MAC frame for ≥2MHz |

The format of an S1G NDP MAC frame in 1MHz is shown in Figure 24-39 (S1G NDP MAC frame for 1MHz).

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| Figure 24-39 - S1G NDP MAC frame for 1MHz |

Transmission of an S1G NDP MAC frame shall comply with the following rules:

* shall use the S1G PPDU format but without the Data field
* shall use either the S1G\_SHORT or the S1G\_1M
* shal use the following settings in SIG field:
* The NDP indication bit is set to 1
* shall contain only one LTF field

The SIG field formats of NDP MAC frames are as in Figure 24-40 (SIG field format for 1MHz NDP MAC frame) and Figure 24-41 (SIG field format for >=2MHz NDP MAC frame).

*To Editor: please change fonts in Figure 24-40 & Figure 24-41 into Arial.*

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| --- | --- | --- | --- |
| B0 B24 | B25 | B26 B29 | B30 B35 |
| NDP MAC frame body | NDP Indication | CRC | Tail |
| Figure 24-40 - SIG field format for 1MHz NDP MAC frame | | | |

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| --- | --- | --- | --- |
| B0 B36 | B37 | B38 B41 | B42 B47 |
| NDP MAC frame body | NDP Indication | CRC | Tail |
| Figure 24-41 - SIG field format for >=2MHz NDP MAC frame | | | |

The NDP MAC frame body field is described in 8.3.5 (NDP MAC frames).

The NDP Indication field is set to 1.

The CRC field is described in 24.3.8.2.1.5 (CRC calculation for S1G SIGA fields). Tail field is set to 0.