IEEE P802.11  
Wireless LANs

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| IEEE 802.11 TGax  March 2016 Macau PHY Ad Hoc Meeting Minutes | | | | |
| Date: 2016-01-21 | | | | |
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Abstract

TGax meeting minutes for the IEEE 802.11 Macau PHY ad hoc session, March, 2016.

**IEEE 802.11 Task Group ax PHY Ad Hoc**

**March 2016 Macau Meeting**

**Tuesday, March 15th, 2016, AM2 TGax Session**

1. **Meeting called to order by Jianhan Liu (MediaTek)** 
   1. The agenda is contained in 11-16/0421r0 which is on the server.
2. **Administrative Items**
   1. Chair reminded the IEEE 802 and IEEE 802.11 Policy and Procedure.
   2. Chair also reminded to do attendance.
3. **Set and approve agenda**
4. **Presentations**

**16/0319 Decoupled OFDM: A Solution To I/Q Imbalance**

Withdraw

**4.1**

**16/0335r0 HE-STF Sequences for 160/80+80MHz**

**Eunsung Park** (LG) presented.

**Discussions:**

**SP #1:**

* **Do you agree to add the following 1x/2x HE-STF sequences for 160/80+80MHz to the 11ax SFD?**
  + 1x HE-STF160MHz(-1008:16:1008) = [*M*, 1, -*M*, 0, -*M*, 1, -*M*, 0, -*M*, -1, *M*, 0, -*M*, 1, -*M*] \*(1+*j*)/sqrt(2)
    - M = {-1 -1 -1 +1 +1 +1 -1 +1 +1 +1 -1 +1 +1 -1 +1}
  + 1x HE-STF80+80MHz = [1x HE-STF80MHz,Prime, 1x HE-STF80MHz,Second]
    - 1x HE-STF80MHz,Prime(-496:16:496) = [*M*, 1, -*M*, 0, -*M*, 1, -*M*] \*(1+*j*)/sqrt(2)
    - 1x HE-STF80MHz, Second(-496:16:496) = [-*M*, -1, *M*, 0, -*M*, 1, -*M*] \*(1+*j*)/sqrt(2)
  + 2x HE-STF160MHz(-1016:8:1016) = [*M*, -1, *M*, -1, -*M*, -1, *M*, 0, -*M*, 1, *M*, 1, -*M*, 1, -*M*, 0,

-*M*, 1, -*M*, 1, *M*, 1, -*M*, 0, -*M*, 1, *M*, 1, -*M*, 1, -*M*] \*(1+*j*)/sqrt(2)

* + - 2x HE-STF160MHz(±1016) = 0
    - 2x HE-STF160MHz(±8) = 0
  + 2x HE-STF80+80MHz = [2x HE-STF80MHz,Prime, 2x HE-STF80MHz,Second]
    - 2x HE-STF80MHz,Prime(-504:8:504) = [*M*, -1, *M*, -1, -*M*, -1, *M*, 0, -*M*, 1, *M*, 1, -*M*, 1, -*M*] \*(1+*j*)/sqrt(2)
      * 2x HE-STF80MHz,Prime(±504) = 0
    - 2x HE-STF80MHz, Second(-504:8:504) = [-*M*, 1, -*M*, 1, *M*, 1, -*M*, 0, -*M*, 1, *M*, 1, -*M*, 1, -*M*] \*(1+*j*)/sqrt(2)
      * 2x HE-STF80MHz,Second(±504) = 0

**SP Result: 28Y/0N/10A; SP passed.**

**4.2**

**16/0343 Spectral Mask Discussion**

**Hongyuan Zhang** (Marvell) presented.

**SP**

* Do you agree to add the following text in SFD chapter 3.4?
  + For 20MHz PPDU, the transmit spectrum shall not exceed the maximum of the interim transmit spectral mask and –53 dBm/MHz at any frequency offset, for both 2.4GHz and 5GHz bands.
  + For 40MHz PPDU, the transmit spectrum shall not exceed the maximum of the interim transmit spectral mask and –56 dBm/MHz at any frequency offset, for both 2.4GHz and 5GHz bands.
  + For 80MHz and 160MHz PPDUs, the transmit spectrum shall not exceed the maximum of the interim transmit spectral mask and –59 dBm/MHz at any frequency offset.

Y41N0A3 SP passes

**4.3**

**16/0344 PHY Padding Related Issues**

**Hongyuan Zhang** (Marvell) presented.

**SP1**

* Do you agree to replace *Table-3 NSD.short* in 3.3.5 Padding and packet extension of SFD to the following table?

|  |  |  |
| --- | --- | --- |
| **RU Size** | ***DCM=0: NSD.short*** | ***DCM=1: NSD.short*** |
| 26 | 6 | **2** |
| 52 | 12 | 6 |
| 106 | 24 | 12 |
| 242 | 60 | 30 |
| 484 | 120 | 60 |
| 996 | 240 | 120 |
| 996x2 | 492 | 246 |

Y40 N0 A5 SP passes

**SP2**

* Do you agree to add the following text in SFD 3.3.5
  + The post-FEC bits are un-specified by 11ax spec
  + The content of PE field is un-specified by 11ax spec

Y41 N0 A5 SP passes

**4.4**

**15/1345r2 SIGA fields and Bitwidths**

**Ron Porat** (Broadcom) presented.

Q: how much Doppler to handle?

A: We used ITU, and SCM channel model in different generation of dot11. The general concept is to support some Doppler in 11ax. The proposal is just to ensure it can be handled.

**SP1**

Do you agree to add a Doppler bit in SIGA for HE SU and HE SU extended range, in TBD location for HE MU and in the trigger frame?

Y41 N0 A5 SP Passes

**SP2**

Do you agree to add to the spec framework:  1bit is added for STBC indication in SIGA of the MU PPDU?

* This bit indicates STBC for all users in the payload and doesn’t apply to SIGB

STBC is not applied in MU-MIMO RUs

Y39 N 0 A4 SP Passes

**SP3**

Do you agree to add to the TG Specification Frame work document: in trigger based UL PPDUs, multiple SR fields (>=2) are signaled, where each SR field corresponds to a different subband of the PPDU?

Y38 N0 A5 SP Passes

**4.5**

**11-16/0346 11ax Pilot Sequence**

**Bin Tian** (Qualcomm) presented

**SP1**

**Do you agree that 11ax pilot sequences shall reuse the 11ac/ah pilot sequences as shown in slides 13 and 14?**

Y43 N0 A3 SP Passes

**SP2**

**Do you agree that 11ax pilot sequence shall be applied in the same way as in 11ac SSP**

* + Pilot values are shifted on pilot tones from symbol to symbol for each RU
  + Overlaying pilot polarity value: same as in 11ac

Y46 N0 A3 SP Passes

**4.6**

**11-16/0203 Signalling Support for Full Bandwidth MU-MIMO Compressed SIG-B Mode**

**Lei Huang** (Panasonic) presented

SP is merged into 0349r1

**4.7**

**11-16/0349r1 HE-SIG-B Compression Mode**

Kaushik Josiam (Samsung) presented

**SP1**

* **Do you agree to add the following description to the SIGB number of symbols fields in Table 2 in the SFD: HE-SIG-A fields for the HE MU PPDU of the SFD?**



Y42 N0 A4 SP Passes

**SP2**

**Do you agree to made the following modifications on TGax SFD?**

* + In an HE MU PPDU the HE-SIG-A field shall indicate the number of STAs when full bandwidth MU-MIMO compressed SIG-B mode is indicated. Details are TBD. The SIGB Number of Symbols field in the SIG-A shall be used to indicate the number of STAs instead of the number of SIG-B symbols when full bandwidth MU-MIMO compressed SIG-B mode is indicated.

Y42 N0 A4 SP Passes

**SP3**

* **Do you agree to modify the HE-SIG-B compression mode description in the SFD [Page 9, line 15-20 in 11-15-0132-15-00ax-spec-framework.docx] as follows:**

**A compression bit is carried in the HE-SIG-A MU format to differentiate full BW MU-MIMO from OFDMA MU PPDU. In case of full BW MU-MIMO, the following conditions hold:**

* + - Only applicable for RU sizes 242, 484, 996, 2\*996
    - The RU information in HE-SIG-B common field is not signaled
    - For bandwidths > 20 MHz, the user specific sub-fields are split equitably between the two HE-SIG-B Channels i.e., For user MU-MIMO PPDU, user specific sub-fields in HE-SIG-B channel 1 and user specific sub-fields in HE-SIG-B channel 2

Y43 N0 A3 SP Passes

**4.8**

**11-16/0367 Power Scaling of L-LTF and L-STF**

**Yakun Sun** (Marvell) presented

**SP**

Do you support to modify the current SFD as the following?

* + The L-SIG, RL-SIG, HE-SIG-A and HE-SIG-B fields are always transmitted with same total power per tone as L-LTF field (in cases when L-LTF is not being boosted). The L-STF has the same total power as the L-LTF

Y44 N0 A3 SP Passes

**4.9**

**11-16/0389 Sounding Design**

Sriram Venkateswaran (Broadcom) presented

**SP1**

**Do you support to add to the current SFD:**

**The tones used for channel feedback shall be a subset of the sets given below:**

NDP bandwidth 20 MHz:

Ng = 4 → [-120:4:-4, 4:4:120] + edge(±2,±122)

Ng = 16 → [-116:16:-4, 4:16:116] + edge(±2,±122)

NDP bandwidth 40 MHz:

Ng = 4/16 → [-244:Ng:-4, 4:Ng:244]

NDP bandwidth 80 MHz:

Ng = 4/16 → [-500:Ng:-4, 4:Ng:500]

Y43 N0 A4 SP Passes

**SP2**

**Do you support to add to the current SFD:**

2X HE-LTF sequence shall be the only mandatory mode for NDP. 4X HE-LTF shall not be supported in NDP.

Y39 N0 A4 SP Passes

**SP3**

**Do you support to add to the current SFD: The NDP**

* always has extension of 4uS
* shall support the CP values 0.8 us and 1.6 us

Y40 N0 A2 SP Passes

**SP4**

**Do you support to add to the current SFD:**

**AP can request beamforming feedback over partial BW which is less than the NDP BW. The indication of the feedback BW goes in NDPA.**

No objection SP Passes

**SP5**

**Do you support to add to the current SFD:**

**The granularity of channel feedback requested by the AP is a 26 tone RU. The AP signals *start* and *end* 26 tone RUs requested for feedback.**

No objection SP Passes

**SP6**

**Do you support to add to the current SFD:**

**The max Nc for sounding feedback that a BFee can support shall be negotiated through a capability exchange at association.**

No objection SP Passes

**SP7**

**Do you support to add to the current SFD:**

**AP shall control the Ng, quantization, and Nc of the sounding FB in NDPA except in the special case of a NDPA addressed to a single STA which requests SU type feedback. In the aforementioned special case, the STA controls these quantities.**

No objection SP Passes

**SP8**

**Do you support to add to the current SFD:**

**A channel quality indicator only (CQI-only) feedback (exact metric TBD) will be supported by the sounding protocol in 11ax. The request for CQI-only feedback goes in NDPA.**

No objection SP Passes

**Wednesday, March 16th, 2016, PM1 TGax Session**

1. **Meeting called to order by Jianhan Liu (MediaTek)** 
   1. The agenda is contained in 11-16/0421r0 which is on the server.
2. **Administrative Items**
   1. Chair reminded the IEEE 802 and IEEE 802.11 Policy and Procedure.
   2. Chair also reminded to do attendance.
3. **Set and approve agenda**
4. **Presentations**

**4.1**

**11-16/0397 HE-SIG-B Signaling Discussions**

**John Son (WILUS)** presented

**SP1**

* **Do you agree to add the following text into 11ax SFD?**
  + ***3.1 General***
  + *The non-contiguous channel bonding will be supported in 802.11ax by:*
    - *Transmitting using OFDMA PPDU format by nulling the tones of one or more secondary channels in 80 MHz and 160 (80+80) MHz;*
    - *Modes for non-contiguous channel bonding are TBD;*
    - *Non-contiguous channels within primary or secondary 80 MHz only exists at AP side.*
    - Signaling for non-contiguous channel bonding is contained in BW subfield of HE-SIG-A or RU allocation subfield in the common block of HE-SIG-B. Details are TBD.

Q: how many bits needed in SIGA?

A: 3-7 bits

Q: the sp does not provide any specific info.

Q: the sp does not add any new materials into spec. since those are the only two options.

A: there may be other options.

Q: so the only option that is removed is to signal in user specific field. We may want to come back with more specific option.

A: so far there is no other contribution.

Q: should it be “and/or” instead of “or”?

A: okay

Q: RU allocation subfield should be common field?

A: RU allocation subfield is a valid subfield.

Q: RU allocation signaling “in a common field”

A: yes

**Y:10 N:2 A:many SP passes**

**4.2**

**11-16/0395 Preamble transmission for Uplink OFDMA**

**Gan Ming (Huawei)** Presents

**SP1**

**Do you agree to add the following text to the IEEE 802.11ax SFD?**

UL pre-HE-STF preamble is sent only on the 20MHz- CH(s) where the HE modulated fields are located.

* + The UL pre-HE-STF preamble includes legacy preamble, RL-SIG and HE-SIG-A and HE modulated fields refer to HE-STF, HE-LTF and data fields.

Q: no HESIGB?

A: this is uplink MU, no HESIGB.

**Y:38 N:0 A:7 SP passes**