IEEE P802.11
Wireless LANs

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| IEEE 802.11 TGaxJuly 2015 Hawaii PHY Ad Hoc Meeting Minutes |
| Date: 2015-07-14 |
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Abstract

TGax meeting minutes from the IEEE 802.11 Hawaii PHY Ad hoc session, July, 2015.

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

**May 2015 Vancouver Meeting**

**Tuesday, July 14th, 2015, AM2 TGax Session (10:20-12:40)**

1. **Meeting called to order by Bo Sun (ZTE) at 10:20.**
	1. The agenda is contained in 11-15/0898r0 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**
	1. Proposed agenda for Tuesday AM2:
		1. Call Meeting to order
		2. IEEE 802 and 802.11 IPR Policy and procedure.
		3. Presentations follow the order of DCN.
		4. Recess
	2. Chair asked for approval of the proposed agenda. – Agenda approved.
4. **Presentations**
	1. IEEE 11-15/0822r0 **SIG-A Structure in 11ax Preamble**

 **Jianhan Liu** (Mediatek Inc.) presented.

**Discussions:**

Sigurd (Quantenna): Why disallows UL user to select its MCS?

Jianhan (Mediatek): Because MCS is related to power. Without accurate power control, UL MU transmission fails easily.

Sigurd (Quantenna): How many users for MU should support for 11ax?

Jianhan (Mediatek): it is up to the group to decide.

Young Hoon (Newracom): do you allow SU to transmit UL packet with arbitrary bandwidth without trigger frame?

Jianhan (Mediatek): Allowing this kind of transmission could create collision and interoperabe problems.

Daewon (Newracom): How many early indications are needed?

Jianhan (Mediatek): For our proposed structure, we need 2 early indications.

**SP #1:**

**Do you agree to add to 11ax SFD that HE-SIG-A is present in all 11ax packets and is two OFDM symbols long when it uses MCS0?**

* + Information bits in HE-SIGA are jointly encoded as in VHT-SIG-A (using 48 tones or 52 tones is TBD).
	+ SU packets and UL Trigger based packets do not contain HE-SIG-B symbols.

**SP Result:**

**99Y/4N/22A**

**SP passed.**

**SP #2:**

**Do you agree to add to 11ax SFD that the data field in UL Multi-user transmissions shall immediately follow the HE-LTF section?**

**SP Result:**

**94Y/1N/26A**

**SP passed.**

* 1. **11-15-0826-00-00ax-HE-SIG-A transmission for range extension**

**Jiayin Zhang (Huawei) presented.**

**Discussions:**

Daewon(Newracom): Is repetition of SIG-A for SU only?

Jiayin (Huawei): It is for both SU and MU.

Younghu(Newracom): How much gain you can get just improve HE, but not non-HE format?

Jiayin(Huawei): Only HE STAs support outdoor better.

**SP1:**

**Do you support that HE-SIG-A have a repetition mode for range extension?**

* + In the repetition mode, HE-SIG-A symbols are repeated once in time. The bit interleaver is bypassed in the repeated HE-SIG-A symbols?
	+ The repetition mode should be indicated before HE-SIG-A.

**SP Result:**

**87Y/31N/4A**

**SP failed.**

* 1. **11-15-0805r2- SIG-B Field for HEW PPDU**

**Young Hoon Kwon (Newracom) presented.**

**Discussions:**

None.

* 1. **11-15-0821r1-** **HE-SIG-B Structure**

 **Joonsuk Kim (Apple) presented.**

**Discussions:**

Sigurd (Quantenna): Seems 11ax going back from 11ac.User specific information still goes to everyone.

Joonsuk (Apple): Each user just needs to know its own information.

Ron (Broadcom): Higher MCS for HE-SIGB, then not every user can decode HE-SIGB.

Kome (Interdigital): SIG-A has repetition, if HE-SIGB using MCS 0.

Joonsuk (Apple): HE-SIGB MCS is open.

**No time for SPs.**

**Wednesday, July 15th, 2015, PM1 TGax Session (13:20-15:40)**

* 1. **11-15-0824-00-00ax**-**Pilot Design for 11ax Downlink Transmissions**

Yujin Noh (Newracom) presented the contribution.

**Discussions:**

None

**No straw poll.**

* 1. **11-15-0810-00-00ax-** **HE PHY Padding and Packet Extension**

Hongyuan Zhang (Marvell) presented the contribution.

**Discussion:**

Heejung (Yeungnam Univ.): How is the capability signaling?

Hongyuan (Marvell): There will be a signaling. It is just one time signaling.

**SP #1**

* **Do you agree to add the following text into Section 3.4 HE Data Field of the current SFD:**
	+ An 11ax SU  PPDU should apply the MAC/PHY pre-FEC padding scheme as in 11ac, to pad toward the nearest of the four possible boundaries (“*a*” factor) in the last Data OFDM symbol(s), and then use post-FEC padding bits to fill up the last OFDM symbol(s).
	+ Packet Extension (PE) field is defined at the end of 11ax PPDUs.
		- PE should have the same average power as data field.

**SP Result:**

**56Y/28N/6A**

**SP failed.**

* 1. **11-15-0877-03-00ax- Efficient padding for last OFDM Symbol**

Heejung (Yeungnam Univ.) presented the contribution.

**Discussions:**

Hongyuan (Marvell): Using 1x symbol padding will not reduce the overhead. How your schemes in LDPC case?

Heejung (Yeungnam Univ.): I have to go back to check LDPC encoding procedure.

Mao Yu (Marvell): How do your padding schemes achieve efficiency?

Heejung (Yeungnam Univ.): Our schemes cad padding with ¼, 1/8 length for efficiency.

**SP1**

**Do you support the concept that**

 HE shall include mechanisms to enhance the MAC/PHY padding efficiency by adjusting OFDM symbol duration in the last OFDM symbol for SU transmissions?

**Discussion:**

Jianhan (Mediatek): Do you have another padding scheme for MU transmissions?

Heejung (Yeungnam Univ.): We do not.

Hongyuan(Marvell): Just reminder that the authors even do not know how their padding schemes work in LDPC encoding.

**SP Result:**

**23Y/52N/13A**

**SP failed.**

* 1. **11-15-0817-00-00ax-** **P Matrix for HE-LTF**

Yakun Sun (Marvell) presented the contribution.

**Discussions:**

None

**SP1:**

* **Do you agree to add the SFD in section x.x.x**

- In an OFDMA PPDU, using *N* HE-LTF symbols, an RU with *Nsts,total* shall use the first *Nsts,total* rows of the *N × N* P matrix?

**Discussion:**

None

**SP Result:**

**64Y/0N/14A**

 **SP passed**

* 1. **11-15-0845-00-00ax-11ax-** **LTF Design for Uplink MU-MIMO**

Daewon (Newracom) presented the contribution.

**Discussions:**

Xiaogang (Intel): How about do not apply CSD?

Daewon (Newracom): It is worth more investigation.

Leo (Broadcom): I agree with your PAPR analysis. But after apply the P-matrix, PAPR increased.

Qinghua (Intel): CSD is not discussed for 11ax. You use 11ac CSD scheme. I do not think it is very convincing.

Daewon (Newracom): But CSD do have an impact and we can not ignore.

**SP1:**

* **Do you agree that more analysis of implementation complexity and performance on various scenarios is needed for uplink MU-MIMO LTF design?**

**Discussion:**

Hongyuan (Marvell): what do you mean implementation complexity?

Daewon (Newracom): Different people have different ideas on complexity.

**SP Result:**

**37Y/5N/32A**

**SP passed but will not be convert to a motion.**

**Wednesday, July 15th, 2015, PM2 TGax PHY Ad Hoc Session (15:50-18:10)**

* 1. **11-15-0602-04-00ax-HE-LTF Sequence for UL MU-MIMO**

Qinghua Li (Intel) presented the contribution.

**Discussions:**

None

**SP1 (r4):**

* **Do you agree to add to TGax Specification Framework Document?**
	+ The HE-LTF sequences for UL MU-MIMO shall be generated as follows. For each stream, a common sequence shall be masked repeatedly in a piece-wise manner by a distinct row of the 8x8 P matrix. When the length of the LTF sequence is not divisible by 8, the last M elements of the LTF sequence (M being the remainder after the division of LTF length by 8) shall be masked by the first M elements of the P matrix row.

**Discussions:**

Daewon (Newracom): How do you do the beamforming?

Qinghua Li (Intel): we just do SVD.

**SP Result:**

**39Y/23N/10A**

**SP failed.**

* 1. **11-15-0580-01-00ax-** **11ax Coding Discussions**

Hongyuan Zhang (Marvell) presented the contribution.

**Discussion:**

Minho (Newracom): I think it is good direction to going forward.

**SP1:**

* **Do you agree to add the following text into 11ax SFD?**
	+ “LDPC is the only coding scheme in the 11ax Data field for allocation sizes 996 tones and 996\*2 tones.”

**SP Result:**

**68Y/0N/8A**

**SP passed**

**SP2:**

* **Do you agree to add the following text into 11ax SFD?**
	+ Support of BCC code is limited to less than or equal to four spatial streams (per user in case of MU-MIMO), and is mandatory (for both TX and RX) for RU sizes less than or equal to 242 tones (20MHz).
	+ Support of LDPC code for both TX and RX is mandatory for HE STAs declaring support for at least one of HE 80/160/80+80 SU-PPDU bandwidths, or for HE STAs declaring support for more than 4 spatial streams. Otherwise, support of LDPC code for either TX or RX is optional.

**SP Result:**

**60Y/0N/11A**

 **SP passed**

* **Do you agree to add the following text into 11ax SFD?**
	+ 11ax MCS table shall not have any MCS exclusion, and when LDPC is applied, *NDBPS* is computed as follows

**Discussions:**

Daewon (Newracom): Seems any MCS claim limits the future.

Hongyuan Zhang (Marvell): We cannot think of any case which causes MCS exclusion.

**SP Result:**

**52Y/0N/16A**

 **SP passed**

* 1. **11-15-0816-00-00ax-** **Interleaver and Tone Mapper for OFDMA**

Yakun Sun (Marvell) presented the contribution.

**Discussions:**

Daewon (Newracom): 26-tones RU you have 1dB loss. I would think you should have a tome mapper for 26-tones RU.

Yakun Sun (Marvell): removing the 26-tones mapper simplifies implementation.

**SP1:**

**Do you agree to add into 11ax SFD the following BCC interleaver and LDPC tone mapper parameters to be defined in the table?**

|  |  |  |
| --- | --- | --- |
| **RU (tones)**  | **BCC**  | **LDPC**  |
| Ncol  | Nrot  | DTM  |
| 26 | 8  | 2  | 1  |
| 52 | 16  | 11  | 3  |
| 106  | 17  | 29  | 6  |
| 242 | 26  | 58  | 9  |
| 484  |  | 12  |
| 996  |  | 20  |

**SP Result:**

**59Y/0N/7A**

 **SP passed**

* 1. **11-15-0813-00-00ax-CP Indication for UL MU Transmission**

Zhigang Rong (Huawei) presented the contribution.

**Discussion:**

Newracom: Why need short CP for outdoor scenarios?

Zhigang Rong (Huawei): In outdoor scenarios, different STA can be close or far from AP. Using different CPs can enhance efficiency.

**SP1:**

* **Do you agree to add the following text into 11ax SFD?**

3.y.z CP length of UL OFDMA/MU-MIMO transmission shall be explicitly indicated by AP in the Trigger frame that allocates resources for the UL OFDMA/MU-MIMO transmission. The value of CP length for all users addressed by the Trigger frame shall be the same

**SP Result:**

**57Y/1N/7A**

 **SP passed**

* 1. **11-15-0832-00-00ax-** **Performance evaluation of SU/MU-MIMO in OFDMA**

Jiyong Pang (Huawei) presented the contribution.

**Discussions:**

Daewon (Newracom): What are the RU allocations in your simulations?

Jiyong Pang (Huawei): RU allocation is continuous.

Daewon (Newracom): Your results shows that using 52 has significant gain over 106, so why you choose 106 tones as the minimum RU for MU-MIMO?

Jiyong Pang (Huawei): We also consider the feedback overheads.

Jiayin (Huawei): Too many combinations of MU complicate the scheduling.

Bin (Qualcomm): We agree that 106 tones.

**SP1:**

**Do you agree to add the following text in 11ax SFD:**

 **MU-MIMO shall only be supported on allocations sizes>=106 tones?**

**SP Result:**

**57Y/0N/16A**

 **SP passed**