IEEE P802.11
Wireless LANs

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| IEEE 802.11 TGax, MU Ad hocSeptember 2015 Bangkok TGax MU Ad hoc Meeting Minutes |
| Date: 2015-09-15 |
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Abstract

The meeting minutes from the MU Ad Hoc group meeting of TGax in the IEEE 802.11 Bangkok session, September 14th – 18th, 2015.

**IEEE 802.11 Task Group ax, MU Ad hoc**

**September 2015 Bangkok Meeting**

**September 14th – 18th, 2015**

**MU Adhoc Session #1**

**Tuesday, September 15th, 2015, PM1 TGax Session (1:30 – 3:30PM)**

1. **The meeting called to order by Kiseon Ryu (LG Electronics), the co-chair of the TGax MU Ad hoc**
	1. At 2:30 pm, 83 people are present.
2. **Announcement**
	1. Agenda Doc.11-15/1141 on the server. Rev. 0 is the working document.
	2. Meeting Protocol: The Chair asked to state name and affiliation when speaking for the first time.
	3. Attendance reminder.
		1. The attendance server: https://imat.ieee.org/
3. **The chair reviewed the mandatory 5 slides of P&P.**
	1. Instructions from the WG Chair. [reviewed~~, did not review~~]
	2. Participants, Patents, and Duty to Inform. [reviewed~~, did not review~~]
	3. Patent Related Links. [reviewed, ~~did not review~~]
	4. Call for potentially essential patents.
		1. Chair asked if anyone is aware of potentially essential patents

 [Asked. ~~Did not ask~~]

* + 1. Potentially essential patents

 [None reported. ~~Reported as follows~~]

* 1. Other Guidelines for IEEE WG Meetings.
1. **The Chair identified 16 presentations assigned by the TGax chair to be treated in MU Ad hoc**
	1. No new presentations, other than those listed in the agenda, were requested.

1. **The Chair asked for approval of the agenda**
	1. No objection raised
2. **Presentation of contributions**
	1. 1043 Overall Protocol of UL MU BA for Multicast Transmission
		1. Strawpoll #1 (pre-motion): *The amendment shall include a mechanism to multiplex acknowledgment frames to Multicast transmission*

		Y/N/A: 11/0/Many 🡪 **SP passes**
		2. Strawpoll #2: *Do you agree that Multi-STA variant of BAR aggregated with Trigger Frame can be BAR design for UL MU BA in GCR BAR and BA frame Exchange?*

		Y/N/A: 3/0/Many (not intended for SFD)
	2. 1047 RU selection process upon TF-R reception
		1. Strawpoll #1: *The spec shall define a procedure for random resource unit selection in a UL OFDMA TXOP (triggered by a TF-R), respectful of EDCA (including Access Category management), that is based on the backoff count(s) of any .11ax station willing to transmit*

		Y/N/A: deferred
	3. 1053 Multiuser Block ACK Request (MU-BAR)
		1. Strawpoll #1 (pre-motion): *The spec shall define a MU-BAR frame to solicit BA/ACKs from multiple STAs in UL MU transmissions*Y/N/A: 57/0/4 🡪 **SP passes**
	4. 1057 Multiple Resource Unit Allocation for TGax OFDMA
		1. Strawpoll #1 (pre-motion): *The amendment shall allow multiple RUs to be allocated to a single user*

Y/N/A: 14/23/22 🡪 **SP fails**

* + 1. Strawpoll #2: *The design of the interleaver shall be updated to allow for multiple RU allocations that are not captured in the current interleaver design*

		SP not run
		2. Strawpoll #3 (pre-motion): *The amendment shall allow for non-contiguous allocation of multiple RUs to a single user*

		SP not run
	1. CCA consideration for UL MU transmission
		1. Strawpoll #1 (pre-motion): *STA shall consider CCA to respond to a Trigger frame under a non-null TBD set of conditions*

		Y/N/A: 47/0/13 🡪 **SP passes**
	2. 1062 NAV Consideration for UL MU Response to Trigger frame
		1. Strawpoll #1 (pre-motion):

A STA that is polled from a trigger frame for UL MU transmission considers the NAV in determining whether to respond unless one of the following conditions is met:

* + - * + the NAV was set by a frame originating from the AP sending the trigger frame
				+ the response contains ACK/BA and the duration of the UL MU transmission is below a TBD threshold
				+ Other condition TBD

Y/N/A: 46/3/13 🡪 **SP passes**

* 1. 1065 11ax uplink Multi-TID aggregation
		1. Strawpoll #1 (pre-motion):
	+ The spec shall allow multiple TIDs in a single PSDU between AP and a STA for DL/UL OFDMA/MU-MIMO
	+ Multiple TIDs aggregation rules are TBD if necessary

Y/N/A: 39/0/12 🡪 **SP passes**

* 1. 1097 Reducing Channel Sounding Protocol Overhead for 11ax
		1. Strawpoll #1 (pre-motion): *The amendment shall define a mechanism to enable multiplexing of the Compressed Beamforming Action frame (CSI feedback) from multiple stations using UL MU(MIMO or OFDMA) mode*

		Y/N/A: 🡪 SP deferred
		2. Strawpoll #2 (pre-motion): *The amendment shall define a new channel sounding sequence that includes trigger information in order to facilitate UL MU mode of Compressed Beamforming Action frame from multiple STAs*
		Y/N/A: 🡪 SP deferred
		3. Strawpoll #3: *Which option do you prefer for enabling UL MU mode in the channel sounding sequence in order to obtain CSI feedback from multiple stations simultaneously*

1/2/3/A: 🡪 SP deferred

* 1. 1102 Fragmentation with MU Operation
		1. Strawpoll #1 (pre-motion):  *the spec shall support fragmentation negotiation in A-MPDUs for HE STAs*

		Y/N/A: 51/0/9 🡪 **SP passes**
1. The Chair announced the end of the MU ad hoc session at 3:30 pm.

**MU Adhoc Session #2**

**Tuesday, September 15th, 2015, EVE TGax Session (7:30 – 9:30PM)**

1. **The meeting called to order by Sigurd Schelstraete (Quantenna), the co-chair of the TGax MU Ad hoc**
	1. At 8:30 pm, 76 people are present.
2. **Announcement**
	1. Agenda Doc.11-15/1141 on the server. Rev. 2 is the working document.
	2. Meeting Protocol: The Chair asked to state name and affiliation when speaking for the first time.
	3. Attendance reminder.
		1. The attendance server: https://imat.ieee.org/
3. **The chair reviewed the mandatory 5 slides of P&P.**
	1. Instructions from the WG Chair.

 [reviewed~~, did not review~~]

* 1. Participants, Patents, and Duty to Inform.

[reviewed~~, did not review~~]

* 1. Patent Related Links. [reviewed, ~~did not review~~]
	2. Call for potentially essential patents.
		1. Chair asked if anyone is aware of potentially essential patents

 [Asked. ~~Did not ask~~]

* + 1. Potentially essential patents

 [None reported. ~~Reported as follows~~]

* 1. Other Guidelines for IEEE WG Meetings.
1. **The Chair identified 7 presentations that remain to be treated in MU Ad hoc**
	1. No new presentations, other than those listed in the agenda, were requested.

1. **The Chair asked for approval of the agenda**
	1. No objection raised
2. **Presentation of Contributions**
	1. 1103 DL Sounding Sequence with UL MU Feedback
	2. SPs from 1097r0 Reducing Channel Sounding Protocol Overhead for 11ax
		1. Strawpoll #1 (pre-motion)

Do you agree to add to the TG Specification Framework:

x.y.z. :

*The amendment shall define a mechanism to enable multiplexing of the Compressed Beamforming Action frame (CSI feedback) from multiple stations using UL MU(MIMO or OFDMA) mode*

24Y/0 N/8 A 🡪 passes

* + 1. Strawpoll #2 (pre-motion)

Do you agree to add to the TG Specification Framework:

x.y.z. :

*The amendment shall define a new channel sounding sequence that includes trigger information in order to facilitate UL MU mode of Compressed Beamforming Action frame from multiple STAs.*

21 Y/0 N/14 A 🡪 Passes

* 1. SPs from 1103 DL Sounding Sequence with UL MU Feedback
		1. Strawpoll #1(pre-motion)

*Do you agree to include the DL sounding sequence illustrated in Slide 15 (of 802.11-15/1103r0) to the spec framework?*

40 Y/ 0N/ 7A 🡪 Passes

* 1. 1105 UL OFDMA-based Random Access Procedure
		1. Strawpoll #1 (pre-motion)

*Do you agree to include the random access procedure illustrated in Slide 12 (of 802.11-15/1105r0) to the spec framework?*

31Y/5N/8A 🡪 Passes

* 1. 1107 Power Save with Random Access
		1. Strawpoll #1 (pre-motion)

*Do you agree to add to the spec framework?*

*The spec shall indicate cascaded sequence of Trigger frames for random access by using a bit in the Trigger frame.*

41 Y/0/N/11A 🡪 Passes

* + 1. Strawpoll #2 (pre-motion)

*Do you agree to add to the spec framework?*

*The spec shall include a mechanism that allows the Beacon frame to indicate the target transmission time(s) of one or more Trigger frame(s) that allocates resources for random access.*

40Y/0N/11A 🡪 Passes

* 1. 1047 RU selection process upon TF-R reception
		1. Strawpoll #1(pre-motion):

*The spec shall define a procedure for random resource unit selection in a UL OFDMA TXOP (triggered by a TF-R), respectful of EDCA (including Access Category management), that is based on the backoff count(s) of any .11ax station willing to transmit*

Strawpoll withdrawn

* 1. 1117 Regarding UL MU protection
		1. StrawpolL #2: (pre-motion)

Do you agree to add to the TG Specification Frame work document?

4.2.z. The spec shall define a function that Trigger frame solicits simultaneous CTS responses from multiple STAs to protect UL MU transmission. In case of UL MU protection with simultaneous CTS, UL MU Data transmission follows the simultaneous CTS after xIFS (IFS is TBD).

7Y/21N/18A 🡪 fails

* 1. 1123 **Acknowledgement to DL MU**
		1. Strawpoll #1: (pre-motion)

Do you agree to add the following to the SFD?

The spec shall allow that the schedule information for OFDMA acknowledgement from STAs is contained in the MAC header of DL MPDU.

33Y/0N/14A 🡪 passes

* + 1. Strawpoll #2: (pre-motion)

Do you agree to add the following to the SFD?

The scheduling information content of OFDMA acknowledgement from STAs with the other scheduling information TBD:

UL PPDU Length (9 bits) + RU Allocation (TBD).

33Y/0N/10A 🡪 Passes

* 1. 1129 **Feedback overhead in DL-MU-MIMO**
		1. Strawpoll #1 (pre-motion)

Do you agree to add the following to the IEEE 802.11 TGax Specification Framework (sec 4.1)?

The amendment shall define a mechanism to reduce the MIMO compressed beamforming feedback overhead

29Y/0N/13A 🡪 Passes

1. The Chair announced the end of the MU ad hoc session at 9:35 pm