IEEE P802.11
Wireless LANs

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| IEEE 802.11 Task Group AYJanuary 2017 Atlanta Interim Meeting Minutes |
| Date: 2017-1-15 |
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Abstract

Task Group AY meeting minutes from the IEEE 802.11 Atlanta interim session, January 15-20, 2017.

**IEEE 802.11 Task Group AY**

**January 2017 Atlanta Interim**

**January 15-20, 2017**

**Monday, January 16, 2017, AM2 Session (10:30-12:30)**

1. The IEEE 802.11ay task group meeting was called to order at 10:30 by the Chair, Edward Au (Huawei).
2. Agenda Doc. IEEE 802.11-16/1566r1.
3. Chair introduced the TG leadership: Vice Chair: Sang Kim (LG Electronics), Secretary: Jeorge Hurtarte (Teradyne) and Editor: Carlos Cordeiro (Intel)
4. Chair reviewed the IEEE-SA patent policy, logistics, and reminders on Task Group rules, including meeting guidelines and attendance recording procedures.
	1. Chair asked if anyone has any questions about the IEEE-SA patent policy, logistics or reminders. No questions.
	2. Chair asked if anybody has any disclosures related to the patent policy. None.
	3. Chair asked if there were any questions on any of the above items. None.
	4. Chair reminded all to record their attendance.
	5. Chair reminded all to upload their presentations.
5. Chair introduced the leadership of the Task Group (slide 12).
6. Chair reviewed the meeting time slots, locations and agenda items for the week (see slides 13-14 of the agenda document).
7. Chair proceeded to discuss the agenda items for the Monday, January 16, 2017, Tuesday AM2 session (slide 16).
8. Chair reviewed the progress of the Task Group AY and related documents (slides 17-18).
9. Motion #142: Motion to approve the November 2016 San Antonio meeting minutes
	1. Move: Assaf Kasher (Qualcomm)
	2. Second: George Calcev (Huawei)
	3. No objections noted. Unanimous consent.
	4. The November 2016 meeting minutes were approved.
10. Chair reviewed Task Group Documents and amendment text submissions (slides 20-25).
11. Chair reviewed the list of presentations submitted (slides 26-32) and schedule for presenting those during the week.
	1. Chair asked if there were any additional presentations submissions or changes to the agenda items. None.
12. Chair reviewed the agenda setting for the week (slide 33).
13. Chair reviewed the timeline the task group approved in November 2016, slide 34.
	1. Chair asked if there were any comment or question. None.
14. Discussion on motions timing and procedure. Currently all motions done at the end of the session. Opened the floor for discussion. Agreed to continue as is, with all motions done at the last one or two sessions.
15. Presentations
	1. Presentation by Carlos Cordeiro (Intel), Specification Framework for TGay, P802.11ay/Draft 0.1, Amendment 7: Enhanced throughput for operation in license-exempt bands above 45 GHz
		1. Overview of editorial changes in P802.11ay/Draft 0.1
		2. Opened the floor for discussion.
	2. Presentation by Lei Huang (Panasonic), Scheduling allocations over multiple channels, Doc. IEEE 11-16/1565r0.
		1. Opened the floor for discussion.
		2. Straw Poll #1. Do you agree to add the following text into SFD? “For an allocation that does not include the primary channel, its allocation information shall be completely and only included in the EDMG Extended Schedule element.”
			* + Yes: 27
				+ No: 0
				+ Abstain: 11
				+ Straw poll passed
		3. Straw Poll #2. Do you agree to add the following text into SFD? “A Scheduling Type subfield shall be added into each Channel Allocation field of the EDMG Extended Schedule element to indicate whether an allocation is based on incremental signaling or complete signaling.”
			* + Yes: 21
				+ No: 0
				+ Abstain: 13
				+ Straw poll passed
	3. Presentation by Assaf Kasher (Qualcomm), TRN-field-cyclic-extension, Doc. IEEE 11-17/0063r0.
		1. Opened the floor for discussion.
		2. Straw Poll #1. See slide 8 of the presentation.
			* Yes: 24
			* No: 0
			* Abstain: 13
			* Straw poll passed
	4. Presentation by Hiroyuki Motozuka (Panasonic), L-Header spoofing for EDMG SC PPDU, Doc. IEEE 11-17/0105r0.
		1. Opened the floor for discussion.
		2. Straw Poll #1. Do you agree to add the following to the SFD:

“For an EDMG SC PPDU, the Length field in the L-Header is set so that the spoofing error shall be smaller than one symbol block (512\*Tc) and non-negative, where:

Spoofing error = (TXTIME calculated based on L-Header) – (TXTIME)”

* + - * + Yes: 26
				+ No: 0
				+ Abstain: 8
				+ Straw poll passed.
	1. Presentation by Tao Wu (Huawei), EDMG PHY Header-A for
	DCM SQPSK Over Two Channel Aggregation in 11ay, Doc. IEEE 11-17/0061r0.
		1. Opened the floor for discussion.
		2. Straw Poll #1. Do you agree to add the following field to the SFD: ‘DCM SQPSK over two aggregated channels field (1 bit)’ in the EDMG-header-A for an EDMG SU PPDU:
			+ A value of 1 indicates that DCM SQPSK over two aggregated channels is applied.
			+ A value of 0 indicates that DCM SQPSK over two aggregated channels is not applied.
			+ Reserved if either TX or RX does not support DCM SQPSK over two aggregated channels.”
				- Yes: 36
				- No: 0
				- Abstain: 7
				- Straw poll passed.
1. Meeting recessed at 12:28 and will resume on Tuesday AM1.

**Tuesday, January 17, 2017, AM1 Session (08:00-10:00)**

1. The meeting was called to order at 08:00 by the Chair, Edward Au (Huawei).
2. Agenda Doc. IEEE 802.11-16/1566r3.
3. Presentations
	1. Presentation by Artyom Lomayev (Intel), EDMG TRN Subfields Definition for SC PHY, Doc. IEEE 11-16/1636r0.
		1. This presentation proposes BRP TRN subfields definition for EDMG SC PHY for MIMO with CB based on the design proposed in [1].
		2. The proposed design reuses the same Golay Sequence Set (GSS) already defined in the SFD for EDMG-STF/CEF/GI, [2].
		3. Opened the floor for discussion.
		4. Straw Poll #1. Do you agree to add to the SFD: “EDMG TRN subfield for CB = 1, 2, 3, 4 and MIMO NSS = 1, 2, … 8, shall have a structure shown on slide #9. The GaN/GbN sequence length is defined as N = 128 \* CB. All sequences GaN/GbN are defined in the SFD.”
			* + Yes: 26
				+ No: 0
				+ Abstain: 9
				+ Straw poll passed.
	2. Presentation by Claudio da Silva (Intel), Training Field Structure Definition, Doc. IEEE 11-17/0007r1.
		1. Discussion and proposals on AGC and TRN structures for the EDMG single-carrier and control modes.
		2. Opened the floor for discussion.
		3. Straw Poll #1. Do you agree that (1) the AGC field currently defined for single-carrier and control mode EDMG PPDUs shall be removed and (2) the training field of EDMG PPDUs shall be defined as shown in slide 16 for the single-carrier and control modes? In the proposed structure, the number of TRN sequences used for channel estimation (that is, transmitted with the same AWV as the preamble/data fields) (P) and for BF training (which may use different AWV settings depending on whether transmit or receive training is used) (M) in a TRN-Unit is configurable.”
			* + Yes: 23
				+ No: 1
				+ Abstain: 11
				+ Straw poll passed.
		4. Straw Poll #2. Do you agree to incorporate the additions to the BRP Request Field (slide 11), EDMG Header A bits (slide 12), Mandatory features (slide 13), and Capabilities element (slides 14 and 15) to the SFD?
			* + Yes: 19
				+ No: 0
				+ Abstain: 14
				+ Straw poll passed.
	3. Presentation by Takenori Sakamoto (Panasonic), EDMG A-PPDU for 11ay SC mode, Doc. IEEE 11-17/0051r1.
		1. In this presentation, EDMG A-PPDU is proposed for 11ay SC mode
		2. Opened the floor for discussion.
		3. Straw Poll #1. Do you agree to insert the following in the 11ay SFD? "11ay specification shall define EDMG SU PPDU aggregation."
			* + Yes: 27
				+ No: 0
				+ Abstain: 8
				+ Straw poll passed.
		4. Straw Poll #2. Do you agree with the EDMG A-PPDU formats shown in slide 3 and 5 of 11-17/0051r0 for 11ay SC mode?
			* + Yes: 28
				+ No: 0
				+ Abstain: 6
				+ Straw poll passed.
		5. Straw Poll #3. Do you agree to add “Additional EDMG PPDU field” to the EDMG-Header-A? See slide 12.
			* + Yes: 26
				+ No: 0
				+ Abstain: 6
				+ Straw poll passed.
		6. Straw Poll #4. Do you agree with the coding and modulation method shown in slide 7 of 11-17/0051r0 for EDMG-Header-A within the EDMG A-PPDU transmitted with the same bandwidth as the corresponding data field in 11ay SC mode? See slide 13.
			* + Yes: 26
				+ No: 0
				+ Abstain: 8
				+ Straw poll passed.
	4. Presentation by Kome Oteri (InterDigital), Beam Tracking for 802.11ay, Doc. IEEE 11-17/0040r0.
		1. In this contribution, it is proposed an analog and a digital baseband channel tracking as possible tracking phases to allow for tracking and channel update purposes. A common framework for both SU-MIMO and MU-MIMO tracking is used.
		2. Opened the floor for discussion.
4. Meeting recessed at 10:00 and will resume on Wednesday AM1.

**Wednesday, January 18, 2017, AM1 Session (08:00-10:00)**

1. The meeting was called to order at 08:00 by the Chair, Edward Au (Huawei).
2. Agenda Doc. IEEE 802.11-16/1566r5.
3. Chair reminded all about the IEEE-SA patent policy, logistics, and reminders on Task Group rules.
	1. Chair asked if anybody has any disclosures related to the patent policy. None.
	2. Chair reminded all to record their attendance.
4. Presentations
	1. Presentation by Oren Kedem (Intel), Channel Width selection within TXOP, Doc. IEEE 11-17/0119r1.
		1. Presented the implications of available options for TXOP Owner to set/change PPDU channel width during TXOP.
		2. Provided recommendation for the above rules
		3. Opened the floor for discussion.
		4. Straw Poll #1. Do you agree to include in SFD the following:
			* TXOP Owner may reduce the PPDU occupied channel width only when transmitting EDMG PPDU.
			* A TXOP owner shall not increase the PPDU occupied channel width within the same TXOP.

Yes: 27

No: 0

Abstain: 7

Straw poll passed.

* 1. Presentation by Claudio da Silva (Intel), EDMG-CEF Extension for SC MIMO, Doc. IEEE 11-17/0149r1.
		1. This presentation proposes an extension of EDMG-CEF design for SC MIMO currently defined in the SFD.
		2. The proposed extension allows accurate channel estimation in time domain for the number of spatial streams NSS greater than 2.
		3. Opened the floor for discussion.
		4. Straw Poll #1. Do you agree to apply cyclic extension of EDMG-CEF field as defined on slide #6?

Yes: 21

No: 0

Abstain: 5

Straw poll passed.

* 1. Presentation by Sungjin Park (LG Electronics), 11ay Short SSW Feedback & ACK, Doc. IEEE 11-17/0109r0.
		1. In this contribution, it is proposed the modification of existing SSW-Feedback frame and SSW-ACK-frame when Short SSW packet is used.
		2. Opened the floor for discussion.
		3. Straw Poll #1. Do you agree to add the following text to the SFD: “If the Short SSW packet is transmitted during ISS and RSS and then SSW-Feedback frame and SSW-ACK frame are transmitted, SSW Feedback field within SSW-Feedback frame and SSW-ACK frame is interpreted as the figure in slide 4.
			+ Sector Select subfield (6bits) is interpreted as CDOWN Select 1 subfield (6bits).
			+ DMG Antenna Select subfield (2bits) is interpreted as RF Chain Select subfield (2bits).
			+ Reserved bits (5bits) are interpreted as CDOWN Select 2 subfield (5bits).
				- Yes: 17
				- No: 0
				- Abstain: 10
				- Straw poll passed.
	2. Presentation by Jinmin Kim (LG Electronics), Short SSW Frame for A-BFT, Doc. IEEE 11-17/0107r0.
		1. Short SSW frame is introduced for fast sector sweep for 11ay.
		2. This contribution intends to investigate which parameter of A-BFT is needed to modify to support transmission of short SSW frame in A-BFT.
		3. Opened the floor for discussion.
		4. Straw Poll #1. Do you agree to add the following text into SFD: “Short SSW frame can be transmitted by associated STAs in A-BFT for 11ay”?
			+ - Yes: 25
				- No: 0
				- Abstain: 8
				- Straw poll passed.
		5. Straw Poll #2. Do you agree to add the following text into SFD: “If short SSW frame is transmitted in A-BFT, SSW slot time for short SSW frame is the same as 11ad”?
			+ - Yes: 22
				- No: 0
				- Abstain: 5
				- Straw poll passed.
	3. Presentation by Jinmin Kim (LG Electronics), Signaling for 11ay Spatial Sharing, Doc. IEEE 11-17/0108r0.
		1. This contribution intends to suggest concrete signaling for 11ay spatial sharing.
		2. Opened the floor for discussion.
		3. Straw Poll #1. Do you agree to add the signaling for multi-channel and multiple RX antenna SPSH using Optional Sub-elements in Directional Channel Quality Request/Report frame (shown on slides 6-7) into the SFD?
			+ - Yes: 20
				- No: 0
				- Abstain: 5
				- Straw poll passed.
	4. Presentation by Rui Yang (InterDigital), Performance Evaluation of
	Multi-DFT-spread OFDM for 802.11ay, Doc. IEEE 11-17/0048r0.
		1. In this contribution, we demonstrate the benefits of the waveform with multi-DFT-spread operation via simulation results and compare it with single carrier (SC) and CP-OFDM.
		2. Opened the floor for discussion.
		3. Straw Poll #1. Do you agree that the TGay should further study the feasibility of including multi-DFT-spread OFDM as an additional waveform for 11ay?
			+ - Yes: 7
				- No: 0
				- Abstain: Many
				- Straw poll passed.
	5. Presentation by Alexander Maltsev (Intel Corporation), Enhanced SLS BF flow for efficient AP-STA access in dense environment, Doc. IEEE 11-17/0067r1.
		1. Opened the floor for discussion.
1. Meeting recessed at 10:02 and will resume on Wednesday PM2.

**Wednesday, January 18, 2017, PM2 Session (16:00-18:00)**

1. The meeting was called to order at 16:00 by the Chair, Edward Au (Huawei).
2. Agenda Doc. IEEE 802.11-16/1566r7.
3. Chair reminded all about the IEEE-SA patent policy, logistics, and reminders on Task Group rules.
	1. Chair asked if anybody has any disclosures related to the patent policy. None.
	2. Chair reminded all to record their attendance.
4. Presentations
	1. Presentation by Christopher Hansen (Peraso), TX Masks Overview, Doc. IEEE 11-17/0101r0.
		1. TX Masks for 802.11ay to cover all bandwidths are provided along with technical justification
		2. Opened the floor for discussion.
	2. Presentation by Christopher Hansen (Peraso), Draft text for TX Masks, Doc. IEEE 11-16/1627r0.
		1. Opened the floor for discussion.
	3. Presentation by Christopher Hansen (Peraso), Draft text for EDMG Capabilities, Doc. IEEE 11-16/1626r0.
		1. Opened the floor for discussion.
	4. Presentation by Kome Oteri (InterDigital), Beam Tracking for 802.11ay, Doc. IEEE 11-17/0040r2.
		1. Opened the floor for discussion.
		2. Straw Poll #1. Do you agree to add the following text to the 802.11ay SFD: “An EDMG STA may support hybrid precoding (defined as a combination of analog beamforming and digital baseband precoding) for SU-MIMO” and “An EDMG STA may support hybrid precoding (defined as a combination of analog beamforming and digital baseband precoding) for MU-MIMO”?

Yes: 24

No: 0

Abstain: 4

Straw poll passed.

* + 1. Straw Poll #2. Do you agree to add the following text to the SFD: “An EDMG STA may support Digital Baseband Channel Tracking in addition to Analog Beam Tracking for SU-MIMO and MU-MIMO”?

Yes: 14

No: 0

Abstain: 21

Straw poll passed.

* 1. Presentation by Kome Oteri (InterDigital), BRP Optimization in 802.11ay, Doc. IEEE 11-17/0041r1.
		1. Opened the floor for discussion.
		2. Straw Poll #1. Do you agree to add the following text to the 802.11ay SFD? “The 802.11ay BRP protocol should allow negotiation of the value of the BRPIFS parameter.” See slide 10.

Yes: 2

No: 8

Abstain: 22

Straw poll failed.

* 1. Presentation (continued) by Christopher Hansen (Peraso), TX Masks Overview, Doc. IEEE 11-17/0101r1.
		1. Opened the floor for discussion.
		2. Straw Poll #1. Do you agree to instruct the editor to incorporate the text in document 11-16-1627r0 TX Masks into IEEE 802.11ay draft 0.1?
			+ Yes: 27
			+ No: 0
			+ Abstain: 4
			+ Straw poll passed.
		3. Straw Poll #2. Do you agree to instruct the editor to incorporate the draft text in document 11-16-1626-00-EDMG Capabilities into IEEE 802.11ay draft 0.1, and edit the text as necessary to be compatible with the DMG Capabilities element in IEEE 802.11-2016?
			+ Yes: 27
			+ No: 0
			+ Abstain: 3
			+ Straw poll passed.
	2. Presentation (continued) by Alexander Maltsev (Intel Corporation), Enhanced SLS BF flow for efficient AP-STA access in dense environment, Doc. IEEE 11-17/0067r1.
		1. Opened the floor for discussion.
		2. Straw Poll #1. To deal with asymmetric DMG antenna configurations, the 11ay specification shall define an enhanced SLS protocol that enables beamforming training between an AP or PCP and non-AP or non-PCP STAs that includes the following steps:

Adding TRN-R subfields to DMG Beacon frames transmitted in the BTI;

Beamforming training between the PCP/AP and non-PCP/non-AP STAs (as shown in slide 8-9);

Scheduling of directional allocations in the DTI  (as shown in slides 11-12)

* + - * + Yes: 21
				+ No: 0
				+ Abstain: 5
				+ Straw poll passed.
	1. Presentation by Claudio da Silva (Intel), Spoofing of EDMG Control Mode PPDUs, Doc. IEEE 11-16/0053r0.
		1. Proposing a maximum spoofing error requirement for EDMG Control Mode PPDUs
		2. Opened the floor for discussion.
		3. Straw Poll #1. Do you agree that the spoofing error for EDMG control mode PPDUs shall be defined to be non-negative and less than or equal to 150ns, except between 611713 𝑇\_𝑐 (approx. 347.56 μs) and 612351 𝑇\_𝑐 (approx. 347.93 μs) and between 614401 𝑇\_𝑐 (approx. 349.10 μs) and 617343 𝑇\_𝑐 (approx. 350.76 μs) when the spoofing error shall be non-negative and less than or equal to 639 𝑇\_𝑐 (approx. 364 ns) and 2943 𝑇\_𝑐 (approx. 1.67 μs), respectively? Spoofing error is defined as (TXTIME calculated based on L-Header) – (TXTIME).
			+ Yes: 18
			+ No: 0
			+ Abstain: 3
			+ Straw poll passed.
1. Meeting recessed at 17:56 and will resume on Thursday PM1.

**Thursday, January 19, 2017, PM1 Session (13:30-15:30)**

1. The meeting was called to order at 13:30 by the Chair, Edward Au (Huawei).
2. Agenda Doc. IEEE 802.11-16/1566r8.
3. Chair reminded all about the IEEE-SA patent policy, logistics, and reminders on Task Group rules.
	1. Chair asked if anybody has any additional presentations for the meeting. None.
	2. Chair reminded all to record their attendance.
4. Presentations
	1. Presentation by Alexander Maltsev (Intel), Channel models for IEEE 802 11ay, Doc. IEEE 11-15/1150r8.
		1. Opened the floor for discussion.
	2. Presentation by Robert Müller (TU Ilmenau), Large Indoor Scenario for 11ay Channel Model, Doc. IEEE 11-17/0100r0.
		1. Opened the floor for discussion.
	3. Presentation by Rob Sun (Huawei), Short SSW frame with optimized addressing scheme, Doc. IEEE 11-17/0022r2.
		1. Conducted a collision rate analysis and showed that current solutions[1] suffered from significant performance degradation in OBSS environment.
		2. The proposed method which uses Dual AID with the short scrambled BSSID (SS-BSSID) improves the performance in OBSS, as well as provides means for avoiding consistent collisions.
		3. If the TA/RA is the AP itself, the TA/RA AID field should be filled with the 8 bits of the EDMG BSS AID
		4. Opened the floor for discussion.
		5. Straw Poll #1. Do you agree to define in the SFD: “The 16 bits of address field within Short SSW frame to contain RA and TA AID fields. If the TA or RA is the AP itself, the TA or RA AID field should be filled with the 8 bits of the EDMG BSS AID. In case of ISS and Unicast, the Short SSW Feedback field should be replaced by the Short Scrambled BSSID (SS-BSSID) field”?
			* + Yes: 28
				+ No: 0
				+ Abstain: 8
				+ Straw poll passed.
		6. Straw Poll #2. Do you agree to add the following to the SFD:
		“The BSSID values are scrambled with the following formula before the calculation of SS-BSSID in the Short SSW packet: scrambled i-th word = (i-th word + scramble pattern) mod 216, where each word is the part of the BSSID which is split by 16 bits, and + is integer addition”?
			* + Yes: 27
				+ No: 0
				+ Abstain: 5
				+ Straw poll passed.
		7. Straw Poll #3. Do you agree to add the following to the SFD:
		“Scramble patterns for SS-BSSID calculation are defined as follows: Scramble pattern = (0x5795 \* seed) mod 215. The seed is the scrambler initialization in the PHY header of the Short SSW packet.”?
			* + Yes: 26
				+ No: 0
				+ Abstain: 6
				+ Straw poll passed.
	4. Presentation by Dana Ciochina (Sony), Signaling and Capabilities for Non-Uniform Constellations, Doc. IEEE 11-17/0057r0.
		1. This presentation shows a NUC signaling and a NUC capabilities proposal
		2. Opened the floor for discussion.
		3. Straw Poll #1. Do you agree to add the following to the SFD? “The EDMG core capabilities shall contain NUC capabilities which indicate support of NUC and differentiate between NUC transmission and reception.”
			* + Yes: 27
				+ No: 0
				+ Abstain: 3
				+ Straw poll passed.
		4. Straw Poll #2. Do you agree to add the following to the SFD? “EDMG header-A and header-B shall have an indication to signal use of non-uniform constellation. The indication consists of a single bit in each header and rules of slide #5 apply.”
			* + Yes: 28
				+ No: 0
				+ Abstain: 4
				+ Straw poll passed.
	5. Presentation by Hiroshi Mano (KDTI), FILS for TGay, Doc. IEEE 11-17/0147r0.
		1. FILS mechanism significantly improve the efficiency of .11ay in high dense environment.
		2. FILS mechanism was specified by 802.11ai that is already incorporated in the basement document of 11ay.
		3. 11ad is not supported by 11ai because of DMG link state machine.
		4. Recommend to incorporate FILS mechanism for 11ay.
		5. Opened the floor for discussion.
		6. Straw Poll #1. Do you support to incorporate FILS function to 11ay to reduce the link setup time?
			* + Yes: 14
				+ No: 0
				+ Abstain: 16
				+ Need more information: 3
				+ Straw poll passed.
	6. Presentation by Claudio da Silva (Intel), Header-A Definition for EDMG Control Mode, Doc. IEEE 11-17/0052r1.
		1. Proposing a definition for the EDMG-Header-A of EDMG control mode PPDUs
		2. Opened the floor for discussion.
		3. Straw Poll #1. Do you agree with the EDMG-Header-A definition proposed in slide 7 of this presentation?
			* + Yes: 15
				+ No: 0
				+ Abstain: 7
				+ Straw poll passed.
	7. Presentation by Yutaka Murakami (Panasonic), EDMG capabilities for Open Loop Spatial Multiplexing in SU-MIMO, Doc. IEEE 11-17/0059r1.
		1. Opened the floor for discussion.
		2. Straw Poll #1.
			* + Yes: 21
				+ No: 0
				+ Abstain: 6
				+ Straw poll passed.
5. Meeting recessed at 15:18 and will resume on Thursday PM2.

**Thursday, January 19, 2017, PM2 Session (16:00-18:00)**

1. The meeting was called to order at 14:00 by the Chair, Edward Au (Huawei).
2. Agenda Doc. IEEE 802.11-16/1566r9.
3. Presentations
	1. Presentation by Dzevdan Kapetanovic (Ericsson), UL Training Protocol for DL MU-MIMO in 802.11ay, Doc. IEEE 11-17/0064r1.
		1. DL MU-MIMO is included in 11ay
		2. An essential part of DL MU-MIMO operation is the obtaining of channel information (at the AP) for proper user pairing and pre-coding
		3. Depending on the scenario, UL training may be more efficient (lower overhead etc.) than explicit (DL) training, and vice versa; other 5G communities are adopting UL training for mmWave.
		4. Opened the floor for discussion.
		5. Straw Poll #1. Do you agree to continue working on the principles of Uplink training (as outlined on slide 17 of this presentation) into the 802.11ay draft?
			* Yes: 20
			* No: 0
			* Abstain: 8
			* Straw poll passed.
	2. Presentation by Carol Ansley (ARRIS)/Zabed Iqbal (GSU), Comparison of Simulation and Actual Results In a Residential Setting, Doc. IEEE 11-17/0024r1.
		1. Opened the floor for discussion.
4. Chair asked if no objection from the group to continue with the AY Draft document work only and stop SFD document edits. No objections.
	1. **Thus, all mentions to SFD in the motions below are thus referring to the AY Draft document instead as only the DRAFT document will be maintained.**
5. Motion #143. Do you agree to insert the following in draft? “The 11ay specification shall enable BSS discovery through transmitted DMG Beacon frames based on:
* Setting the Quasi-omni TX subfield to one in transmitted DMG Beacon frames to indicate the potential for discovery based on quasi-omni transmission
* Appending TRN-R subfields to transmitted DMG Beacon frames
* Transmit antenna training by an EDMG STA based on TRN-R subfields appended to a received DMG Beacon frame that has the Quasi-omni TX subfield equal to one.”

Note 1: Contribution number: 16/1571r0

Note 2: Straw poll results: 7 Yes, 0 No, 0 Abstain

* 1. Move: Hiroyuki Motozuka
	2. Second: Claudio da Silva
	3. Result: The motion is passed (17 Yes; 0 No; 7 Abstain).
1. Motion #144. Do you agree to insert the following in draft? “The 11ay specification shall enable BSS discovery through Probe Request based on:
* Appending TRN-R subfields to a Probe Request frame transmitted with quasi-omni antenna pattern
* Transmit antenna training by an EDMG STA based on TRN-R subfields appended to a received Probe Request frame transmitted with a quasi-omni antenna pattern.”

Note 1: Contribution number: 16/1571r0

Note 2: Straw poll results: 7 Yes, 0 No, 0 Abstain

* 1. Move: Hiroyuki Motozuka
	2. Second: Claudio da Silva
	3. Result: The motion is passed with unanimous consent (24 Yes; 0 No; 0 Abstain).
1. Motion #145. Do you agree to add the following text into draft? “For an allocation that does not include the primary channel, its allocation information shall be completely and only included in the EDMG Extended Schedule element.”

Note 1: Contribution number: 16/1565r0

Note 2: Straw poll results: 27 Yes, 0 No, 11 Abstain

* 1. Move: Hiroyuki Motozuka
	2. Second: Claudio da Silva
	3. Result: The motion is passed with unanimous consent (24 Yes; 0 No; 0 Abstain).
1. Motion #146. Do you agree to add the following text into the draft? “A Scheduling Type subfield shall be added into each Channel Allocation field of the EDMG Extended Schedule element to indicate whether an allocation is based on incremental signaling or complete signaling.”

Note 1: Contribution number: 16/1565r0

Note 2: Straw poll results: 21 Yes, 0 No, 13 Abstain

* 1. Move: Hiroyuki Motozuka
	2. Second: Claudio da Silva
	3. Result: The motion is passed with unanimous consent (24 Yes; 0 No; 0 Abstain).
1. Motion #147. Do you agree to add the following into daft?



Note 1: Contribution number: 17/0063r0

Note 2: Straw poll results: 24 Yes, 0 No, 13 Abstain

* 1. Move: Assaf Kasher
	2. Second: Claudio da Silva
	3. Result: The motion is passed with unanimous consent (24 Yes; 0 No; 0 Abstain).
1. Motion #148. Do you agree to add the following into the draft? “For an EDMG SC PPDU, the Length field in the L-Header is set so that the spoofing error shall be smaller than one symbol block (512\*Tc) and non-negative, where Spoofing error =
(TXTIME calculated based on L-Header) – (TXTIME).”

Note 1: Contribution number: 17/0105r0

Note 2: Straw poll results: 26 Yes, 0 No, 8 Abstain

* 1. Move: Hiroyuki Motozuka
	2. Second: Claudio da Silva
	3. Result: The motion is passed with unanimous consent (24 Yes; 0 No; 0 Abstain).
1. Motion #149. Do you agree to add the following field ‘DCM SQPSK over two aggregated channels field (1 bit)’ in the EDMG-header-A for an EDMG SU PPDU to the draft?
* A value of 1 indicates that DCM SQPSK over two aggregated channels is applied.
* A value of 0 indicates that DCM SQPSK over two aggregated channels is not applied.
* Reserved if either TX or RX does not support DCM SQPSK over two aggregated channels.

Note 1: Contribution number: 17/0061r6

Note 2: Straw poll results: 36 Yes, 0 No, 7 Abstain

* 1. Move: Tao Wu
	2. Second: Yan Xin
	3. Result: The motion is passed with unanimous consent (24 Yes; 0 No; 0 Abstain).
1. Motion #150. Do you agree to add to the draft? “EDMG TRN subfield for CB = 1, 2, 3, 4 and MIMO NSS = 1, 2, … 8, shall have a structure shown on slide #9 of 16/1636r0. The GaN/GbN sequence length is defined as N = 128 \* CB. All sequences GaN/GbN are defined in the draft.

Note 1: Contribution number: 17/0061r6

Note 2: Straw poll results: 26 Yes, 0 No, 9 Abstain

* 1. Move: Alexander Maltsev
	2. Second: Rob Sun
	3. Result: The motion is passed with unanimous consent (24 Yes; 0 No; 0 Abstain).
1. Motion #151. Do you agree that (1) the AGC field currently defined for single-carrier and control mode EDMG PPDUs shall be removed and (2) the training field of EDMG PPDUs shall be defined as shown below for the single-carrier and control modes? In the proposed structure, the number of TRN sequences used for channel estimation (that is, transmitted with the same AWV as the preamble/data fields) (P) and for BF training (which may use different AWV settings depending on whether transmit or receive training is used) (M) in a TRN-Unit is configurable.

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Note 1: Contribution number: 17/0007r1

Note 2: Straw poll results: 23 Yes, 1 No, 11 Abstain

* 1. Move: Claudio da Silva
	2. Second: Rob Sun
	3. Result: The motion is passed with unanimous consent (24 Yes; 0 No; 0 Abstain).

1. Motion #152. Do you agree to incorporate the additions to the BRP Request Field (slide 11 of 17/0007r1), EDMG Header A bits (slide 12 of 17/0007r1), Mandatory features (slide 13 of 17/0007r1), and Capabilities element (slides 14 and 15 of 17/0007r1) to the draft?

Note 1: Contribution number: 17/0007r1

Note 2: Straw poll results: 19 Yes, 0 No, 14 Abstain

* 1. Move: Claudio da Silva
	2. Second: Yan Xin
	3. Result: The motion is passed with unanimous consent (24 Yes; 0 No; 0 Abstain).

1. Motion #153. Do you agree to insert the following in the 11ay Draft? 11ay specification shall define EDMG SU PPDU aggregation.

Note 1: Contribution number: 17/0051r3

Note 2: Straw poll results: 27 Yes, 0 No, 8 Abstain

* 1. Move: Takenori Sakamoto
	2. Second: Hiroyuki Motozuka
	3. Result: The motion is passed with unanimous consent (24 Yes; 0 No; 0 Abstain).
1. Motion #154. Do you agree with the EDMG A-PPDU formats shown in slides 3 and 5 of 11-17/0051r3 for 11ay SC mode?

Note 1: Contribution number: 17/0051r3

Note 2: Straw poll results: 28 Yes, 0 No, 6 Abstain

* 1. Move: Takenori Sakamoto
	2. Second: Claudio da Silva
	3. Result: The motion is passed with unanimous consent (24 Yes; 0 No; 0 Abstain).
1. Motion #155. Do you agree to add “Additional EDMG PPDU field” to the EDMG-Header-A?

Note 1: Contribution number: 17/0051r3

Note 2: Straw poll results: 26 Yes, 0 No, 6 Abstain

* 1. Move: Takenori Sakamoto
	2. Second: Claudio da Silva
	3. Result: The motion is passed with unanimous consent (24 Yes; 0 No; 0 Abstain).
1. Motion #156. Do you agree with the coding and modulation method shown in slide 7 of 11-17/0051r3 for EDMG-Header-A within the EDMG A-PPDU transmitted with the same bandwidth as the corresponding data field in 11ay SC mode?

Note 1: Contribution number: 17/0051r3

Note 2: Straw poll results: 26 Yes, 0 No, 8 Abstain

* 1. Move: Takenori Sakamoto
	2. Second: Claudio da Silva
	3. Result: The motion is passed with unanimous consent (24 Yes; 0 No; 0 Abstain).
1. Motion #157. Do you agree to include in draft the following?
* TXOP Owner may reduce the PPDU occupied channel width only when transmitting EDMG PPDU.
* A TXOP owner shall not increase the PPDU occupied channel width within the same TXOP.

Note 1: Contribution number: 17/0119r1

Note 2: Straw poll results: 27 Yes, 0 No, 7 Abstain

* 1. Move: Claudio da Silva
	2. Second: Yan Xin
	3. Result: The motion is passed with unanimous consent (24 Yes; 0 No; 0 Abstain).
1. Motion #158. Do you agree to apply cyclic extension of EDMG-CEF field as defined on slide #6 of 17/0149r2?

Note 1: Contribution number: 17/0149r2

Note 2: Straw poll results: 21 Yes, 0 No, 5 Abstain

* 1. Move: Claudio da Silva
	2. Second: Yan Xin
	3. Result: The motion is passed with unanimous consent (24 Yes; 0 No; 0 Abstain).
1. Motion #159. Do you agree to add the following text to the Draft? “If the Short SSW packet is transmitted during ISS and RSS and then SSW-Feedback frame and SSW-ACK frame are transmitted, SSW Feedback field within SSW-Feedback frame and SSW-ACK frame is interpreted as the figure in slide 4 of 17/0109r1.
	* Sector Select subfield (6bits) is interpreted as CDOWN Select 1 subfield (6bits).
	* DMG Antenna Select subfield (2bits) is interpreted as RF Chain Select subfield (2bits).
	* Reserved bits (5bits) are interpreted as CDOWN Select 2 subfield (5bits).

Note 1: Contribution number: 17/0109r1

Note 2: Straw poll results: 17 Yes, 0 No, 10 Abstain

* 1. Move: SungJin Park
	2. Second: JinMin Kim
	3. Result: The motion is passed with unanimous consent (24 Yes; 0 No; 0 Abstain).
1. Motion #160. Do you agree to add the following text into draft? “Short SSW frame can be transmitted by associated STAs in A-BFT for 11ay.”

Note 1: Contribution number: 17/0107r0

Note 2: Straw poll results: 25 Yes, 0 No, 8 Abstain

* 1. Move: JinMin Kim
	2. Second: Claudio da Silva
	3. Result: The motion is passed with unanimous consent (24 Yes; 0 No; 0 Abstain).
1. Motion #161. Do you agree to add the following text into draft? “If short SSW frame is transmitted in A-BFT, SSW slot time for short SSW frame is the same as 11ad.”

Note 1: Contribution number: 17/0107r0

Note 2: Straw poll results: 22 Yes, 0 No, 5 Abstain

* 1. Move: JinMin Kim
	2. Second: Claudio da Silva
	3. Result: The motion is passed with unanimous consent (24 Yes; 0 No; 0 Abstain).
1. Motion #162. Do you agree to add the signaling for multi-channel and multiple RX antenna SPSH using Optional Sub-elements in Directional Channel Quality Request/Report frame (shown on slides 6-7 of 17/0108r0) into the Draft?

Note 1: Contribution number: 17/0108r0

Note 2: Straw poll results: 20 Yes, 0 No, 5 Abstain

* 1. Move: JinMin Kim
	2. Second: Claudio da Silva
	3. Result: The motion is passed with unanimous consent (24 Yes; 0 No; 0 Abstain).
1. Motion #163. Do you agree to add the following text to the 802.11ay draft?
* An EDMG STA may support hybrid precoding (defined as a combination of analog beamforming and digital baseband precoding) for SU-MIMO.
* An EDMG STA may support hybrid precoding (defined as a combination of analog beamforming and digital baseband precoding) for MU-MIMO.

Note 1: Contribution number: 17/0040r2

Note 2: Straw poll results: 24 Yes, 0 No, 4 Abstain

* 1. Move: Kome Oteri
	2. Second: Rui Yang
	3. Result: The motion is passed with unanimous consent (24 Yes; 0 No; 0 Abstain).
1. Motion #164. Do you agree to instruct the editor to incorporate the text in document 11-16-1627r0 TX Masks into IEEE 802.11ay draft 0.1?

Note 1: Contribution number: 16/1627r0

Note 2: Straw poll results: 27 Yes, 0 No, 4 Abstain

* 1. Move: Claudio da Silva
	2. Second: Yan Xin
	3. Result: The motion is passed with unanimous consent (24 Yes; 0 No; 0 Abstain).
1. Motion #165. Do you agree to instruct the editor to incorporate the draft text in document 11-16-1626-00-EDMG Capabilities into IEEE 802.11ay draft 0.1, and edit the text as necessary to be compatible with the DMG Capabilities element in IEEE 802.11-2016?

Note 1: Contribution number: 16/1626r0

Note 2: Straw poll results: 27 Yes, 0 No, 3 Abstain

* 1. Move: Claudio da Silva
	2. Second: Yan Xin
	3. Result: The motion is passed with unanimous consent (24 Yes; 0 No; 0 Abstain).
1. Motion #166. To deal with asymmetric DMG antenna configurations, the 11ay specification shall define an enhanced SLS protocol that enables beamforming training between an AP or PCP and non-AP or non-PCP STAs that includes the following steps:
* adding TRN-R subfields to DMG Beacon frames transmitted in the BTI;
* beamforming training between the PCP/AP and non-PCP/non-AP STAs (as shown in slides 8-9 of 17/0067r1);
* scheduling of directional allocations in the DTI  (as shown in slides 11-12 of 17/0067r1)

Note 1: Contribution number: 17/0067r1

Note 2: Straw poll results: 21 Yes, 0 No, 5 Abstain

* 1. Move: Alexander Maltsev
	2. Second: Claudio da Silva
	3. Result: The motion is passed with unanimous consent (24 Yes; 0 No; 0 Abstain).
1. Motion #167. 

Note 1: Contribution number: 17/0053r0

Note 2: Straw poll results: 18 Yes, 0 No, 3 Abstain

* 1. Move: Claudio da Silva
	2. Second: Yan Xin
	3. Result: The motion is passed with unanimous consent (24 Yes; 0 No; 0 Abstain).
1. Motion #168. Do you agree to define in the draft, the 16 bits of address field within Short SSW frame to contain RA and TA AID fields? If the TA or RA is the AP itself, the TA or RA AID field should be filled with the 8 bits of the EDMG BSS AID. In case of ISS and Unicast, the Short SSW Feedback field should be replaced by the Short Scrambled BSSID(SS-BSSID) field.

Note 1: Contribution number: 17/0022r2

Note 2: Straw poll results: 28 Yes, 0 No, 8 Abstain

* 1. Move: Rob Sun
	2. Second: Claudio da Silva
	3. Result: The motion is passed with unanimous consent (24 Yes; 0 No; 0 Abstain).
1. Motion #169. Do you agree to add the following to the draft? The BSSID values are scrambled with the following formula before the calculation of SS-BSSID in the Short SSW packet:

scrambled i-th word = (i-th word + scramble pattern) mod 216,
where each word is the part of the BSSID which is split by 16 bits, and + is integer addition.

Note 1: Contribution number: 17/0022r2

Note 2: Straw poll results: 27 Yes, 0 No, 5 Abstain

* 1. Move: Rob Sun
	2. Second: Claudio da Silva
	3. Result: The motion is passed with unanimous consent (24 Yes; 0 No; 0 Abstain).
1. Motion #170. Do you agree to add the following to the draft?
* Scramble patterns for SS-BSSID calculation are defined as follows:
	+ Scramble pattern = (0x5795 \* seed) mod 215
* The seed is the scrambler initialization in the PHY header of the Short SSW packet.

Note 1: Contribution number: 17/0022r2

Note 2: Straw poll results: 26 Yes, 0 No, 6 Abstain

* 1. Move: Rob Sun
	2. Second: Yan Xin
	3. Result: The motion is passed with unanimous consent (24 Yes; 0 No; 0 Abstain).
1. Motion #171. Do you agree to add the following to the draft? The EDMG core capabilities shall contain NUC capabilities which indicate support of NUC and differentiate between NUC transmission and reception.

Note 1: Contribution number: 17/0057r0

Note 2: Straw poll results: 27 Yes, 0 No, 3 Abstain

* 1. Move: Dana Ciochina
	2. Second: Claudio da Silva
	3. Result: The motion is passed with unanimous consent (24 Yes; 0 No; 0 Abstain).
1. Motion #172. Do you agree to add the following to the Draft? EDMG header-A and header-B shall have an indication to signal use of non-uniform constellation. The indication consists of a single bit in each header and rules of slide #5 of 17/0057r0 apply.

Note 1: Contribution number: 17/0057r0

Note 2: Straw poll results: 28 Yes, 0 No, 4 Abstain

* 1. Move: Dana Ciochina
	2. Second: Rob Sun
	3. Result: The motion is passed with unanimous consent (24 Yes; 0 No; 0 Abstain).
1. Motion #173. Do you agree with the EDMG-Header-A definition proposed in slide 7 of 17/0052r1?

Note 1: Contribution number: 17/0052r1

Note 2: Straw poll results: 15 Yes, 0 No, 7 Abstain

* 1. Move: Claudio da Silva
	2. Second: Alexander Maltsev
	3. Result: The motion is passed with unanimous consent (24 Yes; 0 No; 0 Abstain).
1. Motion #174. Do you agree to add the following capability information in the core capabilities field of the EDMG capabilities element regarding open loop precoding into the 11ay draft?
* Open Loop Precoding Supported field (1bit)

Note 1: Contribution number: 17/0059r1

Note 2: Straw poll results: 21 Yes, 0 No, 6 Abstain

* 1. Move: Hiroyuki Motozuka
	2. Second: Claudio da Silva
	3. Result: The motion is passed with unanimous consent (24 Yes; 0 No; 0 Abstain).
1. Chair reviewed the goals for the March 2017 wireless plenary meeting.
2. Chair reviewed the teleconference schedule, which is as follows: February 15 (Wednesday), 10:00am ET – 11:00am ET; February 22 (Wednesday), 10:00am ET – 11:00am ET; March 1 (Wednesday), 10:00am ET – 11:00am ET. No objections noted.
3. The Task Group AY Atlanta meeting was adjourned on January 19, 2017 at 17:40.