

# TGax September 2015 Meeting Agenda

Date: 2015-08-04

## Authors:

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# **IEEE 802.11 TGax: High Efficiency WLAN Task Group**

## **Bangkok, Thailand September 13-19, 2015**

**Chair: Osama Aboul-Magd (Huawei Technologies)**

**Vice Chair: Simone Merlin (Qualcomm)**

**Vice Chair: Ron Porat (Broadcom)**

**Secretary: Yasuhiko Inoue (NTT)**

**Technical Editor: Robert Stacey (Intel)**

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# Meeting Protocol

- **Please announce your affiliation when you first address the group during a meeting slot**

# Attendance

- <http://newton.meeting.verilan.com>

**1. Register**

**2. Indicate attendance**

**See document 11-15-0xxxr0 for more details**

# Attendance, Voting & Document Status

- **Make sure your badges are correct**
- **If you plan to make a submission be sure it does not contain company logos or advertising**
- **Questions on Voting status, Ballot pool, Access to Reflector, Documentation, member's area**
  - see Jon Rosdahl – [jrosdahl@ieee.org](mailto:jrosdahl@ieee.org)
- **Cell Phones Silent or Off**

# Patent Policy

- **Following 5 slides**

## Instructions for the WG Chair

**The IEEE-SA strongly recommends that at each WG meeting the chair or a designee:**

- **Show slides #1 through #4 of this presentation**
- **Advise the WG attendees that:**
  - The IEEE's patent policy is described in Clause 6 of the *IEEE-SA Standards Board Bylaws*;
  - Early identification of patent claims which may be essential for the use of standards under development is strongly encouraged;
  - There may be Essential Patent Claims of which the IEEE is not aware. Additionally, neither the IEEE, the WG, nor the WG chair can ensure the accuracy or completeness of any assurance or whether any such assurance is, in fact, of a Patent Claim that is essential for the use of the standard under development.
- **Instruct the WG Secretary to record in the minutes of the relevant WG meeting:**
  - That the foregoing information was provided and that slides 1 through 4 (and this slide 0, if applicable) were shown;
  - That the chair or designee provided an opportunity for participants to identify patent claim(s)/patent application claim(s) and/or the holder of patent claim(s)/patent application claim(s) of which the participant is personally aware and that may be essential for the use of that standard
  - Any responses that were given, specifically the patent claim(s)/patent application claim(s) and/or the holder of the patent claim(s)/patent application claim(s) that were identified (if any) and by whom.
- The WG Chair shall ensure that a request is made to any identified holders of potential essential patent claim(s) to complete and submit a Letter of Assurance.
- It is recommended that the WG chair review the guidance in *IEEE-SA Standards Board Operations Manual* 6.3.5 and in FAQs 14 and 15 on inclusion of potential Essential Patent Claims by incorporation or by reference.

Note: **WG** includes Working Groups, Task Groups, and other standards-developing committees established by the IEEE-SA Standards Board.

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## Participants, Patents, and Duty to Inform

All participants in this meeting have certain obligations under the IEEE-SA Patent Policy.

- **Participants [Note: Quoted text excerpted from IEEE-SA Standards Board Bylaws subclause 6.2]:**
  - **“Shall inform the IEEE (or cause the IEEE to be informed)” of the identity of each “holder of any potential Essential Patent Claims of which they are personally aware” if the claims are owned or controlled by the participant or the entity the participant is from, employed by, or otherwise represents**
  - **“Should inform the IEEE (or cause the IEEE to be informed)” of the identity of “any other holders of potential Essential Patent Claims” (that is, third parties that are not affiliated with the participant, with the participant’s employer, or with anyone else that the participant is from or otherwise represents)**
- **The above does not apply if the patent claim is already the subject of an Accepted Letter of Assurance that applies to the proposed standard(s) under consideration by this group**
- **Early identification of holders of potential Essential Patent Claims is strongly encouraged**
- **No duty to perform a patent search**

## Patent Related Links

All participants should be familiar with their obligations under the IEEE-SA Policies & Procedures for standards development.

Patent Policy is stated in these sources:

IEEE-SA Standards Boards Bylaws

*<http://standards.ieee.org/develop/policies/bylaws/sect6-7.html#6>*

IEEE-SA Standards Board Operations Manual

*<http://standards.ieee.org/develop/policies/opman/sect6.html#6.3>*

Material about the patent policy is available at

*<http://standards.ieee.org/about/sasb/patcom/materials.html>*

If you have questions, contact the IEEE-SA Standards Board Patent Committee Administrator at [patcom@ieee.org](mailto:patcom@ieee.org) or visit <http://standards.ieee.org/about/sasb/patcom/index.html>

This slide set is available at  
<https://development.standards.ieee.org/myproject/Public/mytools/mob/slideset.ppt>

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## Call for Potentially Essential Patents

- **If anyone in this meeting is personally aware of the holder of any patent claims that are potentially essential to implementation of the proposed standard(s) under consideration by this group and that are not already the subject of an Accepted Letter of Assurance:**
  - Either speak up now or
  - Provide the chair of this group with the identity of the holder(s) of any and all such claims as soon as possible or
  - Cause an LOA to be submitted

## Other Guidelines for IEEE WG Meetings

- **All IEEE-SA standards meetings shall be conducted in compliance with all applicable laws, including antitrust and competition laws.**
  - **Don't discuss the interpretation, validity, or essentiality of patents/patent claims.**
  - **Don't discuss specific license rates, terms, or conditions.**
    - Relative costs, including licensing costs of essential patent claims, of different technical approaches may be discussed in standards development meetings.
      - Technical considerations remain primary focus
  - **Don't discuss or engage in the fixing of product prices, allocation of customers, or division of sales markets.**
  - **Don't discuss the status or substance of ongoing or threatened litigation.**
  - **Don't be silent if inappropriate topics are discussed ... do formally object.**

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See *IEEE-SA Standards Board Operations Manual*, clause 5.3.10 and “Promoting Competition and Innovation: What You Need to Know about the IEEE Standards Association’s Antitrust and Competition Policy” for more details.

# Agenda Items for the Week

- **Approve TG and Telecons minutes since January meeting.**
- **Continue to advance task group documents.**
  - Simulation Scenarios
  - Evaluation Methodology
  - Channel Model
  - Function Requirements
  - Specification Framework
- **Ad Hoc group meetings**
- **Technical Presentations and related straw polls and/or motions**
- **Schedule Telecon times.**

# General Flow of the Meeting

- **Monday Sep 14, 10:30 – 12:30**
  - Call Meeting to order
  - IEEE 802 and 802.11 IPR Policy and procedure.
  - Review from November 2014 meeting
  - Call for submissions
  - Agenda setting and approval
  - TG Motions
  - Presentations
  - Recess
- **Monday Sept 14 , 13:30 – 15:30**
  - Ad Hoc Group Meetings
- **Tuesday Sept 15, 10:30 – 12:30**
  - Ad Hoc Group Meetings
- **Tuesday Sept 15, 13:30 – 15:30**
  - Ad Hoc Group Meetings
- **Tuesday Sept 15. 16:00 – 18:00**
  - Call Meeting to order
  - IEEE 802 and 802.11 IPR Policy and procedure.
  - Presentations
  - Recess
- **Wednesday Sept 16 , 08:00 – 10:00**
  - Call Meeting to order
  - IEEE 802 and 802.11 IPR Policy and procedure.
  - Presentations
  - Recess
- **Wednesday Sept 16 , 13:30 – 15:30**
  - Ad Hoc Group Meetings
- **Wednesday Sept 16 , 14:00 – 16:00**
  - Ad Hoc Group Meetings
- **Thursday Sept 17, 08:00 – 10:00**
  - Call Meeting to order
  - IEEE 802 and 802.11 IPR Policy and procedure.
  - Presentations
  - Recess
- **Thursday Sept 17, 13:30 – 15:30**
  - Call Meeting to order
  - IEEE 802 and 802.11 IPR Policy and procedure.
  - Presentations
  - TG Motions
  - Goals for May 2015
  - Telecons Schedule
  - Adjourn

# TGax Schedule in a Glance

	Monday		Tuesday		Wednesday		Thursday
AM1					TGax		TGax
AM2	TGax		PHY	MAC			
PM1	PHY	MAC	SR	MU	PHY	SR	TGax
PM2			TGax		TGax		
EVE	PHY	MAC	SR	MU			

# Submissions (PHY)

11-15/0579	preamble design and autodetection	Hongyuan Zhang	PHY
11-15/0580	11ax Coding Discussion	Hongyuan Zhang	PHY
11-15/810	HE PHY Padding and Packet Extension	Hongyuan Zhang	PHY
11-15/1031	DL MU Signalling	Katsuo Yunoki	PHY
11-15/1051	HE NDP frame for sounding	Young Hoon Kwon	PHY
11-15/1059	SIG-B Encoding Structure Part II	Ron Porat	PHY
11-15/1066	HE-SIG-B Contents	Kaushik Josiam	PHY
11-15/1068	Reliable Transmission Schemes for HE-SIG-B and Data	Jianhan Liu	PHY
11-15/1070	1024 QAM Proposal	??	PHY
11-15/1075	Number of BSS Color bits	Yasuhiko Inoue	PHY
11-15/0826	HE-SIG-A transmission for range extension	Jiayin Zhang	PHY
11-15/1077	HE-SIG-A Content	Jiayin Zhang	PHY
11-15/0853	Extensible Preamble Format Design	Leonardo Lanante	PHY
11-15/1088	LTF Design for Uplink MU-MIMO	Daewon Lee	PHY
11-15/1089	Considerations on PHY Padding and Packet Extension in 11ax	Yujin Noh	PHY
11-15/1091	Considerations on Range Extension with SIG-A Repetition	Yujin Noh	PHY
11-15/1092	Support of 1x/2x/4x OFDM Symbol in HE SU PPDU	Heejung Yu	PHY
11-15/1106	SIG-B Structure	Reza Hedayat	PHY
11-15/1111	SIG-B Resource unit allocation coding	Amin Jafarian	PHY
11-15/1119	Discussions on HE SIG-A Structure	John Son	PHY
11-15/1122	Identifiers in HE PPDUs for power saving	Alfred Asterjadhi	PHY
11-15/0602	HE-LTF squence for UL MU-MIMO	Xiaogang Chen	PHY
11-15/0823	Preamble Design and Auto-Detection for 11ax	Sungho Moon	PHY
11-15/1071	Tone Grouping Factors and NDP format for 802.11ax	Sameer Vermani	PHY

# Submissions (MAC)

DCN	Title	Author	Ad Hoc
11-15/1013	802.11ae & 802.11ax	Guido R. Hiertz	MAC
11-15/1014	Multiple BSSID Element	Guido R. Hiertz	MAC
11-15/1015	Proxy ARB in 802.11ax	Guido R. Hiertz	MAC
11-15/1033	Data field in HE PDU	Yongho Seok	MAC
11-15/1034	Notification of Operating Mode Changes	Yongho Seok	MAC
11-15/1044	Further Study of 11ax Multicast	Kazuyuki Sakoda	MAC
11-15/1052	Bandwidth for UL MU transmission	Young Hoon Kwon	MAC
11-15/1060	Receive Operating Mode Indication for Power Save	Eric Wong	MAC
11-15/1063	11ax Channel access procedure	Chao-Chun Wang	MAC
11-15/1067	MU TXOP truncation	Jeongki Kim	MAC
11-15/1096	Recovery Procedures in Cascading Sequences	John Son	MAC
11-15/1098	ACK/BA frame for UL MU under cascading structure	Narendar Madhavan	MAC
11-15/1114	Airtime Analysis of EDCA	Sean Coffey	MAC
11-15/1115	High Efficiency in Accessing the Medium	Sean Coffey	MAC
11-15/1116	Trigger Frame Channel Access	Jinsoo Ahn	MAC
11-15/1120	Buffer Status Report	Alfred Asterjadhi	MAC
11-15/1121	HE A-Control field	Alfred Asterjadhi	MAC
11-15/1137	Triggered OFDMA Random Access Observations	Russell Huang	MAC

# Submissions (MU)

DCN	Title	Author	Ad Hoc
11-15/1043	Overall Protocol of UL MU BA for Multicast Transmission	Kazuyuki Sakoda	MU
11-15/1047	RU selection process upon TF-R reception	Stephane Baron	MU
11-15/1053	Multiuser Block ACK Request (MU-BAR)	Guoqing Li	MU
11-15/1057	Multiple Resource Unit Allocation for TGax OFDMA	Kome Oteri	MU
11-15/1062	NAV Consideration for UL MU Response to Trigger frame	Po-Kai Huang	MU
11-15/1065	11ax uplink Multi-TID aggregation	Chao-Chun Wang	MU
11-15/1086	Consideration on multi-STA BA frame indication	Jing Ma	MU
11-15/1097	Reducing Channel Sounding Protocol Overhead for 11ax	Narendar Madhavan	MU
11-15/1102	Fragmentation with MU Operation	Chittabrata Ghosh	MU
11-15/1103	DL Sounding Sequence with UL MU Feedback	Chittabrata Ghosh	MU
11-15/1105	UL OFDMA-based Random Access Procedure	Chittabrata Ghosh	MU
11-15/1107	Power Save with Random Access	Chittabrata Ghosh	MU
11-15/1117	Regarding UL MU protection	Woojin Ahn	MU
11-15/1123	Acknowledgement to DL MU	Liwen Chu	MU
11-15/1129	Feedback overhead in DL-MU-MIMO	Filippo Tosato	MU
11-15/1058	CCA consideration for UL MU transmission	Kiseon Ryu	MU

# Submissions (SR)

DCN	Title	Author	Ad Hoc
11-15/1045	Dynamic CCA control and TPC Simulation Result with SS1-SS3	Takeshi Itagaki	SR
11-15/1069	Adaptive CCA and TPC	James Wang	SR
11-15/1081	Further consideration on receive behaviour based on the cascading structure and the BSS color scheme	Jing Ma	SR
11-15/1082	Analysis of BSS and ESS Structure During Concurrent SR Transmissions	Chuck Lukaszewski	SR
11-15/1083	Cost/Benefit Analysis of SR Techniques	Chuck Lukaszewski	SR
11-15/1101	DSC/DCCA Calibration with TGax Agreed Scenarios	Masahito Mori	SR
11-15/1104	TXOP Considerations for Spatial Reuse	Reza Hedayat	SR
11-15/1109	OBSS NAV and PD Threshold Rule for Spatial Reuse	Rossi Jun Luo	SR
11-15/1110	BSS TXOP	Amin Jafarian	SR
11-15/1118	Discussions on Spatial Reuse Enhancement	Geonjung Ko	SR
11-13/1138	To DSC or not to DSC	Filip Mestanov	SR
11-13/1136	Discussion on AP Coordinated Concurrent STA-to-STA Transmissions in 11ax	Der-Jiunn Deng	SR

# Submissions (TG)

DCN	Title	Author	Ad Hoc
11-15/1039	Spatial Reuse Measurements	Chuck Lukaszewski	TG
11-15/801	DCCA/DSC Reference Simulation Result	Masahito Mori	TG
11-15/1046	MAC calibration results	Stephane Baron	TG
11-15/1048	On TGax Scenario 4 channel model	Marcin Filo	TG
11-15/1049	Implications of wrap-around for TGax Scenario 3 and Scenario 4	Marcin Filo	TG
11-15/1056	Clarifying Link Level Simulator Assumptions	Kome Oteri	TG
11-15/1087	MU BFee Interference channel feedback	Sigurd Schelstraete	TG
11-15/1095	OFDMA performance in 11ax	Suhwook Kim	TG
11-15/1099	Power Save Simulation Result	Hyeyoung Choi	TG
11-15/1100	Discussion on Deep and Shallow Sleep States	Chittabrata Ghosh	TG
11-15/1113	Box5 Calibration results	Vida Ferdowsi	TG
11-15/1134	11ax Support for IoT	Shimi Shilo	TG
11-15/1135	Result for SS6 calibration case for single BSS and OBSS	Esa Tuomaala	TG

## Requested by WG Leadership

- **Attendance count at the midpoint of each timeslot**
  - Required to be done during TG and ad hoc slots

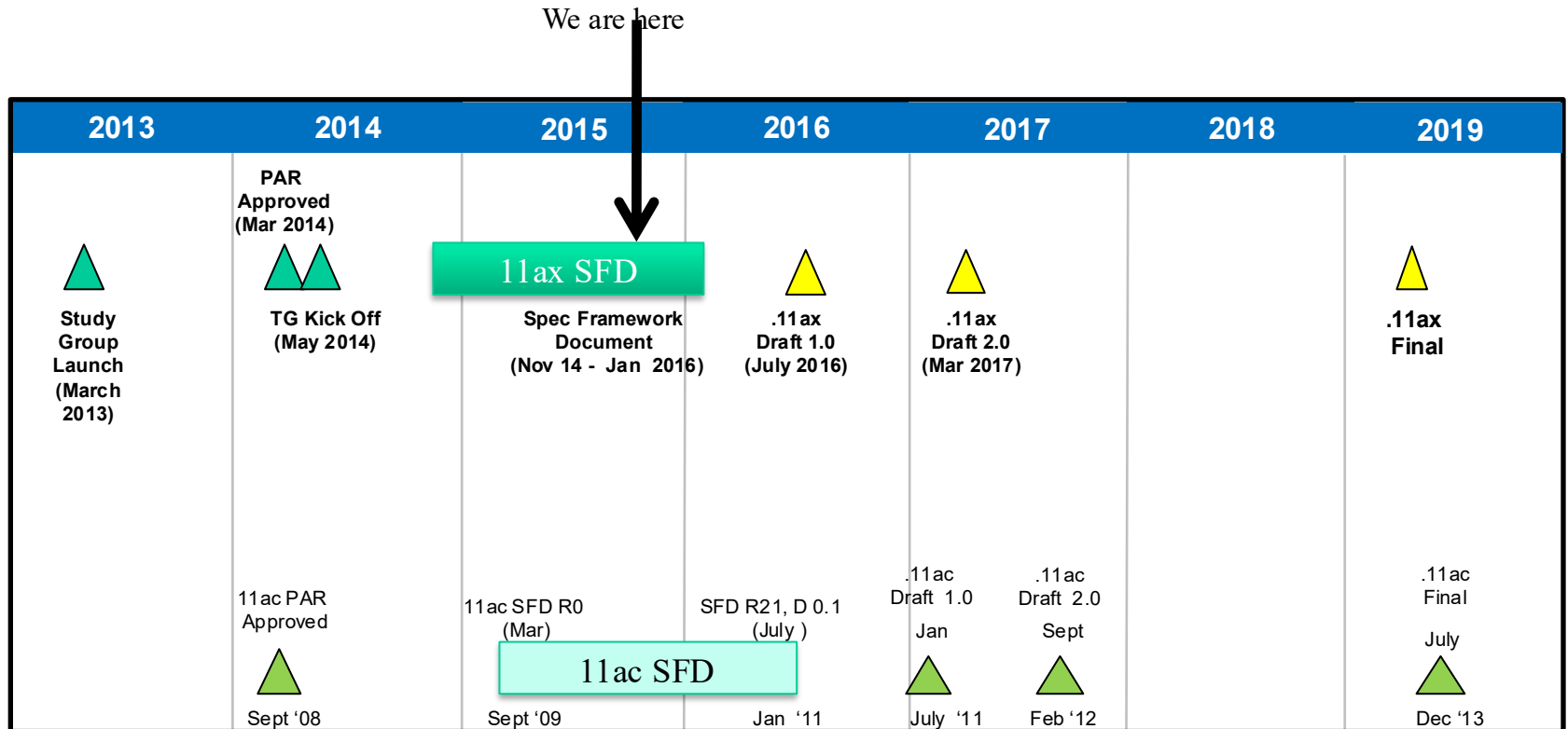
# Agenda for Monday September 14 , 10:30 – 13:30

- **Call meeting to order**
- **Patent policy, etc.**
- **Call for submissions**
- **Set Ad Hoc Groups schedule and approve agenda**
- **Summary from May 2015 meeting**
- **Timeline**
- **SFD review – Editor**
- **TG motions**
  - Approve TG meeting and Telecon minutes since July meeting.
  - Approve the latest SFD revision
- **Ad Hoc group Rules**
- **Presentations**
- **Recess**

# Summary from July 2015 Meeting

- **Passed a number of motions affecting the TG Specification Framework. Motions passed related to PHY, MAC, and MU.**
- **Latest revision (not yet approved) of the Specification Framework is available at;**
  - <https://mentor.ieee.org/802.11/dcn/15/11-15-0132-07-00ax-spec-framework.docx>
- **Approved new revisions of the Evaluation Methodology TG documents.**
  - <https://mentor.ieee.org/802.11/dcn/14/11-14-0571-10-00ax-evaluation-methodology.docx>
  - <https://mentor.ieee.org/802.11/dcn/14/11-14-0980-14-00ax-simulation-scenarios.docx>
- **Other TG documents**
  - <https://mentor.ieee.org/802.11/dcn/14/11-14-0882-04-00ax-tgax-channel-model-document.docx>
  - <https://mentor.ieee.org/802.11/dcn/14/11-14-1009-02-00ax-proposed-802-11ax-functional-requirements.doc>

# Timeline



# SFD Review

- **Editor**

- <https://mentor.ieee.org/802.11/dcn/15/11-15-0132-07-00ax-spec-framework.docx>

# Approval of TG Minutes (July 2015 Meeting and Telecon Minutes)

- **Approve TGax minutes of meetings and teleconferences from July 2015 Plenary meeting to today:**
  - <https://mentor.ieee.org/802.11/dcn/15/11-15-0884-01-00ax-tgax-july-2015-waikoloa-meeting-minutes.docx>
  - <https://mentor.ieee.org/802.11/dcn/15/11-15-0971-01-00ax-july-meeting-minutes-of-the-spatial-reuse-ad-hoc-group.docx>
  - <https://mentor.ieee.org/802.11/dcn/15/11-15-0949-01-00ax-july-2015-hawaii-tgax-mu-ad-hoc-meeting-minutes.docx>
  - <https://mentor.ieee.org/802.11/dcn/15/11-15-0922-01-00ax-july-2015-hawaii-tgax-mac-ad-hoc-meeting-minutes.docx>
  - <https://mentor.ieee.org/802.11/dcn/15/11-15-0913-00-00ax-ieee-802-11-tgax-july-2015-hawaii-phy-ad-hoc-meeting-minutes.docx>

- **Move: Lei Wang**

- **Second: Guido**

- **Approved with no objection**

## **SFD Motion**

- **Move to accept document 11-15/0132r7 as the current revision of the TG Specification Framework document.**
  
- **Move           Second:**

# Ad Hoc Group Rules

- **A straw poll needs to achieve at least 75% at the ad-hoc level to be converted to a motion at the TG level.**
- **In the case a consensus can not be reached within an Ad Hoc group (a stalemate that prohibits further progress), the subject is moved to the Task group, if an Ad Hoc straw poll vote to move the subject to the Taskgroup achieves > 50% approval.**
- **A straw poll affecting the Spec Framework has to start with,**
  - **Do you agree to add to the TG Specification Framework document?**
    - **x.y.z. <feature description>**
- **For further details, please see 11-15-0075r0**
- **Minutes of the Ad Hoc group meetings will be available on mentor.**

# Agenda for Monday September 14 , 13:30 – 15:30

- **Ad Hoc Group Meetings**
  - PHY – World Ballroom B
  - MAC – World Ballroom C

# Agenda for Monday September 14 , 19:30 – 21:30

- **Ad Hoc Meetings**
  - PHY: World Ballroom B
  - MAC: World Ballroom C

# Agenda for Tuesday September 15, 10:30 – 12:30

- **Ad Hoc Group Meetings**
  - PHY: World Ballroom B
  - MAC: World Ballroom C

# Agenda for Tuesday September 15, 13:30 – 15:30

- **Ad Hoc Group Meetings**
  - MU: World Ballroom B
  - SR: World Ballroom C

# **Agenda for Tuesday September 15, 16:00 – 18:00**

- **TG Meeting**
- **Call Meeting to order**
- **IEEE 802 and 802.11 IPR Policy and procedure.**
- **Progress Review**
- **Presentations (TG Presentations)**
- **Recess**

# Agenda for Tuesday September 15, 19:30 – 21:30

- **Ad Hoc Meetings**
  - TBD
  - TBD

# Agenda for Wednesday September 16, 08:00 – 10:00

- **TG Meeting**
- **Call Meeting to order**
- **IEEE 802 and 802.11 IPR Policy and procedure.**
- **Update on TG Progress**
  - 2 MAC
  - 1 MU
  - 7 PHY
  - 4 SR
- **Presentations**
- **Recess**

# Remaining TG Submissions

DCN	Title	Author	Ad Hoc
11-15/1039	Spatial Reuse Measurements	Chuck Lukaszewski	TG
11-15/801	DCCA/DSC Reference Simulation Result	Masahito Mori	TG
11-15/1046	MAC calibration results	Stephane Baron	TG
11-15/1048	On TGax Scenario 4 channel model	Marcin Filo	TG
11-15/1049	Implications of wrap-around for TGax Scenario 3 and Scenario 4	Marcin Filo	TG
11-15/1056	Clarifying Link Level Simulator Assumptions	Kome Oteri	TG
11-15/1087	MU BFee Interference channel feedback	Sigurd Schelstraete	TG
11-15/1095	OFDMA performance in 11ax	Suhwook Kim	TG
11-15/1099	Power Save Simulation Result	Hyeyoung Choi	TG
11-15/1100	Discussion on Deep and Shallow Sleep States	Chittabrata Ghosh	TG
11-15/1113	Box5 Calibration results	Vida Ferdowsi	TG
11-15/1134	11ax Support for IoT	Shimi Shilo	TG
11-15/1135	Result for SS6 calibration case for single BSS and OBSS	Esa Tuomaala	TG
11-15/1052	Bandwidth for UL MU transmission	Young Hoon Kwon	MAC
11-15/1137	Triggered OFDMA Random Access Observations	Russell Huang	MAC
11-15/1086	Consideration on multi-STA BA frame indication	Jing Ma	MU

# Agenda for Wednesday September 16, 13:30 – 15:30

- **Ad Hoc Group Meetings**
  - PHY: World Ballroom B
  - SR: World Ballroom C

# Agenda for Wednesday September 16, 16:00 – 18:00

- **TG Meeting**
- **Call Meeting to order**
- **IEEE 802 and 802.11 IPR Policy and procedure.**
- **Update on TG Progress**
- **Presentations**
  - 11-15/1086
  - 11-15/1134
- **Recess**

# Agenda for Thursday September 17, 08:00 – 10:00 and 13:30-15:30

- **TG Meeting**
- **Call Meeting to order**
- **IEEE 802 and 802.11 IPR Policy and procedure.**
- **TG Motions – starting at 8:30 am**
- **SSD and EVM Motions**
- **Goals for November 2015**
- **Telecon Schedule**
- **Presentations**
- **Adjourn**

## PHY Motion #36

- **Move to make the following text changes in 11ax SFD (3.3.3 Coding)**
  - *LDPC is the only coding scheme in the HE PPDU Data field for allocation sizes of 484 tones, 996 tones and 996\*2 tones.*
  - ....
  - *Support of LDPC code for both TX and RX is mandatory for HE STAs declaring support for at least one of HE 40/80/160/80+80 SU-PPDU bandwidths, .....*

• **Move: Hongyuan Zhang      Second: Ron Porat**

• **Accepted with no objection**

• **DCN: 11-15/0580r2**

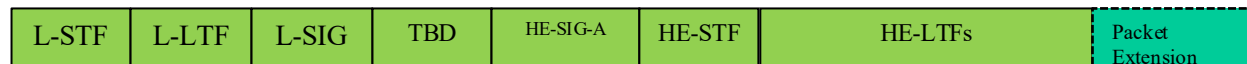
**SP Result: 40/0/18**

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# PHY Motion #37

- **Move to add to the TG Specification Framework:**
  - 4.y.z The spec shall define an HE-NDP for DL Sounding. The frame format of HE-NDP is based on the 11ax SU PPDU format and is shown in the diagram below. The presence and duration of packet extension at the end of HE-NDP is TBD.

*Format of HE-NDP*



- **Move: Young Hoon Kwon                      Second: Ron Porat**
- **Accepted with no objection**
- **DCN: 11-15/1051r1                      SP Result:38/0/4**

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## PHY Motion #38

- **Move to add the following text to the TGax spec framework document:**

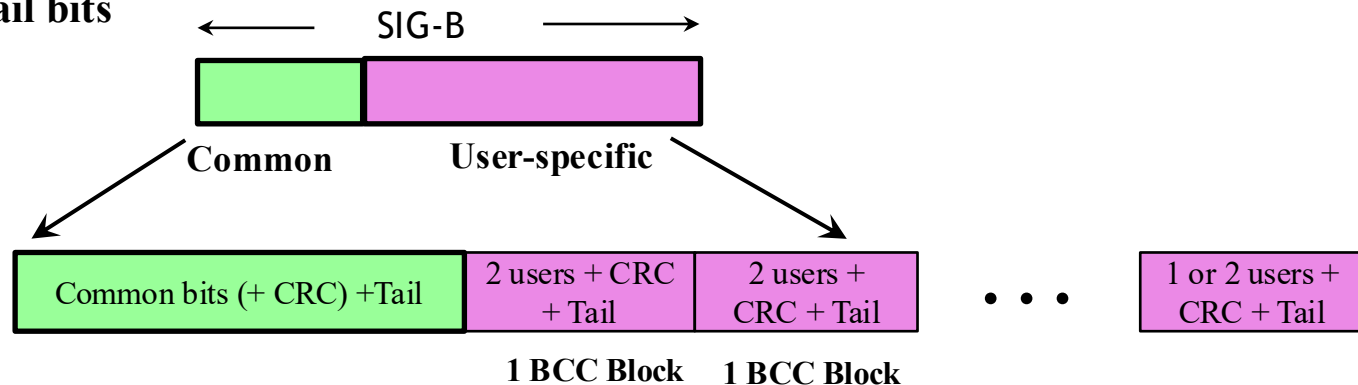
*“802.11ax spec shall not support  $N_g=1$  for sounding feedback. Note that the tone grouping factor,  $N_g$  is defined with respect to data tones of the 11ax PPDU. ”*

- **Move: Sameer Vermani**                      **Second: Ron Porat**
- **Accepted with no objection**
- **DCN:11-15/1071r2**                      **SP Result:Unanimous**

# PHY Motion #39

**Move to add the following text to the SFD: The encoding structure of each BCC in SIG-B is as shown in the figure and as described below:**

- **2 users are grouped together and jointly encoded in each BCC block in the user specific section of HE SIG-B**
- **The CRC in the common block is TBD**
- **The last user information is immediately followed by tail bits (regardless of whether the number of users is odd or even) and padding bits are only added after those tail bits**



- **Move: Ron Porat**
- **Accepted with no objection**
- **DCN: 11-15/1059r1**

**Second: Yasu Inoue**

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**SP Result: 43/0/21**

# PHY Motion #40

- **Move to add the following text to the 11ax SFD:**
  - The user specific subfields of HE-SIG-B containing the per user dedicated information include the following fields
    - STA-ID
    - For single-user allocations in a RU: NSTS (Number of Spatial Streams), TxBF (transmit beamforming ), MCS (Modulation and Coding Scheme) and Coding (Use of LDPC)
    - For each user in a multi-user allocation in a RU: Spatial Configuraiton Fields, MCS and Coding.
      - Other fields are TBD.
- **Move: Yasu Inoue Second: Ron Porat**
- **Accepted with no objection**
- **DCN:11-15/1066r0**                      **SP Result: 43/0/16**

# PHY Motion #41

- **Move to add the following text to the 11ax SFD:**
  - For MU-MIMO allocation of RU size  $> 20\text{MHz}$ , the user-specific subfields is dynamically split between two HE-SIG-B content channels(1/2) and the split is decided by the AP (on a per case basis)
- Move: Yasu Inoue Second: Ron Porat**
- Accepted with no objection**
- DCN: 11-15/1066r0                      SP Result: 39/0/15**

## PHY Motion #42

- **Move to add the following text to the 11ax SFD:**
  - 1024 QAM is used as an optional feature for SU and MU using resource units equal to or larger than 242 tones in 11ax
- **Move: Eunsung Park** **Second: Ron Porat**
- **Accepted with no objection**
- **DCN:11-15/1070r3** **SP Result: 35/0/18**

# PHY Motion #43

- **Move to add to SFD**
  - HE-SIG-A shall include the following fields in SU PPDU.
    - The size of each field is TBD
    - The other fields are TBD

Format indication
TXOP duration
BW
Payload GI
PE
MCS
coding
LTF compression
Nsts
STBC
BF
CRC
tail

- **Move: Jiayin Zhang**
- **Second: Ron Porat**
- **Accepted with no objection**
- **DCN:11-15/1077r0**
- **SP Result: 53/14/6**

# PHY Motion #44

- **Move to add to SFD**
  - HE-SIG-A shall include the following fields in MU DL PPDU.
    - The size of each field is TBD
    - The other fields are TBD
- Move: Jiayin Zhang
- Second: Ron Porat
- Accepted with no objection
- DCN:11-15/1077r0
- SP Result: 56/14/4

Format indication
TXOP duration
Number of HE-SIG-B symbols
MCS of SIGB
CRC
tail

# PHY Motion #45

- **Move to add to SFD**
  - HE-SIG-A shall include the following fields in MU UL PPDU.
    - The size of each field is TBD
    - The other fields are TBD
- Move: Jiayin Zhang
- Second: Ron Porat
- Accepted with no objection
- DCN: 11-15/1077r0
- SP Result: 52/0/16

Format indication
TXOP duration
CRC
tail



## PHY Motion #47

- **Move to add the following rules to the SFD:**
  - An HE non-AP STA may enter the Doze state until the end of an HE DL MU PPDU if:
    - the value of the PPDU's BSS COLOR field is equal to the BSS COLOR of its BSS, and
    - the value derived from any of the STA Identifiers in the SIG-B field does not match its own identifier or that of a broadcast/multicast identifier
  - An HE non-AP STA may enter the Doze state until the end of an HE UL MU PPDU if:
    - the value of the PPDU's BSS COLOR field is equal to the BSS COLOR of its BSS

- **Move:** Alfred Asterjadhi

**Second:** Ron Porat

- **Accepted with no objection**

- **DCN:11-15/1122r0**

**SP Result:52/0/9**

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## PHY Motion # 50

- **Move to assign **at least** 6 bits for BSS Color field**
- **Move:** Yasuhiko Inoue      **Second:** Ron Porat
- **Y/N/A: 52/18/24**
- **Motion fails**
- **DCN:11-15/1075r1**                      **SP Result: 43/0/6**

## Motion to Defer

- **Move to defer PHY Motion #50**
- **Move: Chuck      Second Sean Coffey**
- **Y/N/A: 28/35/32**
- **Motion fails**

## Motion to Amend

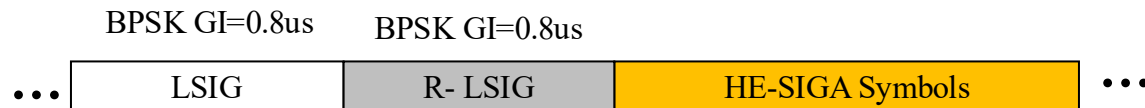
- **Amend PHY motion #50 to:**
- **Move to assign **at least** 6 bits for BSS Color field**
- **Move: Yasu Inoue**
- **Second: Chuck**
- **Y/N/A: 31/23/40**
- **Motion passes**

# PHY Motion #51

Move to add to the SFD as below:

1 lax preamble shall have a 4us symbol repeating the L-SIG content, right after the legacy section

- This symbol shall be modulated by BPSK and rate  $\frac{1}{2}$  BCC.



- **Move: Hongyuan Zhang**
- **Accepted with no objection**
- **DCN: 11-15/0579r4**

**Second: Ron Porat**

**SP Result: 74/16/5**

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## PHY Motion #52

- **Move to insert the following in SFD:**
  - In L-SIG, the L-LENGTH field is set to a value not divisible by 3.
  - The value of L\_LENGTH mod 3 will be used for signaling of one bit of TBD information.

• **Move: Hongyuan Zhang**

**Second: Ron Porat**

• **Accepted with no objection**

• **DCN: 11-15/0579r4**

**SP Result: 71/12/4**

## PHY Motion #53

- **Move to add dual sub-carrier modulations (DCM) as optional modulation schemes for HE-SIGB and Payload to 11ax SFD**
  - Dual sub-carrier modulation (DCM) are only applied to BPSK, QPSK and 16QAM modulations.

• **Move: Jianhan Liu                      Second: ron Porat**

• **Y/N/A:54/2/35**

• **Motion passes**

• **DCN: 11-15/1068r1**

**SP Result: 66/1/15**

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## **PHY Motion #54**

- **Move to add one bit DCM indication in HE-SIGA to 11ax SFD**
- **Move: Jianhan Liu                      Second: Ron Porat**
- **Accepted with no objection**
- **DCN: 11-15/1068r1                      SP Result: 64/1/12**



## PHY Motion #56

- **Move 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 an 8x8 orthogonal 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 orthogonal matrix row.
- **Move:**Xiaogang Chen **Second:** Ron Porat
- **Accepted with no objection**
- **DCN:**11-15/0602r6 **SP Result:** 59/1/12



## PHY Motion #58

- **Move 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.
- **Move: Hongyuan Zhang Second: Ron Porat**
- **Accepted with no objection**
- **DCN:11-15/0810r1**                      **SP Result: 73/0/17**

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# PHY Motion #59

## • Move to add the following text into SFD:

- 11ax shall define the max packet extension modes of  $8\mu\text{s}$  and  $16\mu\text{s}$ , correspond to the short symbol segment padding boundaries (“*a*-factor”) according to the following PE duration ( $T_{PE}$ ) values:
  - Max packet extension mode  $8\mu\text{s}$ :  $T_{PE} = [0\ 0\ 4\ 8]\ \mu\text{s}$  for  $a = 1\sim 4$  respectively;
  - Max packet extension mode  $16\mu\text{s}$ :  $T_{PE} = [4\ 8\ 12\ 16]\ \mu\text{s}$  for  $a = 1\sim 4$  respectively.
- HE Capability field shall define two constellation level thresholds ( $threshold_{16}$  and  $threshold_8$ ) for a given {NSS, BW} combination, to determine if and when max packet extension modes  $8\mu\text{s}$  and  $16\mu\text{s}$  are applied, i.e.
  - 3 bits are used to specify each threshold as the table below.
  - If constellation  $\geq threshold_{16}$  apply max PE  $16\mu\text{s}$  mode, else if constellation  $\geq threshold_8$  apply max PE  $8\mu\text{s}$  mode, else no packet extension.
  - If no PE is required for all constellations both  $threshold_8$  and  $threshold_{16}$  are set to 111
  - If only max PE  $8\mu\text{s}$  mode is required, set  $threshold_{16}$  to be 111, and  $threshold_8$  to be the constellation at which max PE  $8\mu\text{s}$  mode starts
  - If only max PE  $16\mu\text{s}$  mode is required, set  $threshold_{16}$  to be the constellation at which max PE  $16\mu\text{s}$  mode starts, and  $threshold_8$  to be 111
  - When  $\geq 80$  MHz is supported, no thresholds are defined for RU size less than or equal to 242 tones (20 MHz); otherwise, thresholds are defined down to a TBD RU size.

- Move: Hongyuan Zhang
- Second: Ron Porat
- Accepted with no objection
- DCN 11-15/0810r1
- SP Result: 68/13/5

Constellation	Threshold Encoding in HE Capability
BPSK	000
QPSK	001
16QAM	010
64QAM	011
256QAM	100
1024QAM (TBD)	101

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## PHY Motion #60

- **Move to add the following text into SFD:**
  - The number of uncoded bits for each of the first 3 short symbol segments ( $a=1\sim 3$ ) equals to the number of uncoded bits corresponding to  $N_{SD.short}$  subcarriers as specified by the following table, and the number of uncoded bits for the last short symbol segment ( $a=4$ ) equals to the number of bits of the whole OFDM symbol subtracting the total number of uncoded bits of the first three short symbol segments.

- Move: Hongyuan Zhang
- Second: Ron Porat
- Accepted with no objection
- DCN: 11-15/0810r1
- SP Result: 71/0/15

RU Size	$N_{SD.short}$
26	6
52	12
106	24
242	60
484	120
996	240
996x2	492

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# PHY Motion #61

- **Move to add the following text (this page and next page) into SFD:**

- HE-SIG-A field contains a “*a-factor*” field of 2 bits, and a “PE-Disambiguity” field of 1 bit, with setting methods as blow:
- In L-SIG, the L-LENGTH field is set by:

$$L\_LENGTH = \left\lceil \frac{TXTIME - 20}{4} \right\rceil \times 3 - 3 + m, \quad m = 1 \text{ or } 2$$

$$\text{where } TXTIME = T_{L\_PREAMBLE} + T_{HE\_PREAMBLE} + T_{HE\_DATA} + T_{PE}$$

$$T_{HE\_DATA} = T_{HE\_SYM} \times N_{SYM} = (12.8 + T_{GI}) \times N_{SYM}$$

$T_{PE}$  is the PE duration

- In HE-SIG-A:
- ***a-factor* field:**

a-factor value	a-factor field encoding
1	01
2	10
3	11
4	00

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# PHY Motion # 61 (Cntd)

– **PE Dis-ambiguity Field:**

- If  $T_{PE} + 4 \times \left( \left\lfloor \frac{TXTIME - 20}{4} \right\rfloor - \left( \frac{TXTIME - 20}{4} \right) \right) \geq T_{SYM}$ , where  $T_{SYM} = 12.8 + T_{GI}$ , set this field to 1; otherwise, set to 0.
- At receiver side, the following equations may be run to compute  $N_{SYM}$  and  $T_{PE}$  respectively:

$$N_{SYM} = \left\lfloor \left( \frac{L\_LENGTH - m + 3}{3} \times 4 - T_{HE\_PREAMBLE} \right) / T_{SYM} \right\rfloor - b_{PE\_Disambiguity}$$

$$T_{PE} = \left\lfloor \frac{\left( \frac{L\_LENGTH - m + 3}{3} \times 4 - T_{HE\_PREAMBLE} \right) - N_{SYM} \times T_{SYM}}{4} \right\rfloor \times 4$$

- **Move: Hongyuan Zhang Second: Ron Porat**
- **Accepted with no objection**
- **DCN:11-15/0810r1**      **SP Result: 71/0/15**

## PHY Motion #62

- **Move to add the following text into SFD:**
  - When the AP transmits DL-MU packets:
    - All users use the same  $N_{SYM}$  and *a-factor* values according to the user with the longest span.
    - Based on *a-factor* value and each user's PE capabilities, compute the PE duration for each user  $T_{PE,u}$ , and the PE duration of the whole DL-MU PPDU is  $T_{PE} = \max_u(T_{PE,u})$ .
    - In HE-SIG-A field, the “a-factor” field, the “PE Disambiguity” field, and the “LDPC extra symbol” field, are common for all users.
- **Move: Hongyuan Zhang Second: Ron Porat**
- **Accepted with no objection**
- **DCN:11-15/0810r1**      **SP result: 72/0/14**

## PHY Motion #63

- **Move to add the following text into SFD:**
  - For UL-MU packet transmission:
    - AP indicates its desired  $N_{sym}$ ,  $a$ -factor, LDPC Extra Symbol indication and  $PE$  duration values in trigger frame.
    - Possible PE values for UL-MU are TBD.
    - Each user when transmitting the UL-MU PPDU, shall encode and conduct PHY padding using the parameters:
      - $N_{SYM}$  as indicated in the trigger frame;
      - $a$ -factor as indicated in the trigger frame;
      - LDPC Extra Symbol as indicated in the trigger frame;
      - Append PE specified in the trigger frame.
- **Move: Hongyuan Zhang Second: Ron Porat**
- **Accepted with no objection**

# PHY Motion #64

- **Move to add the following text to the 11ax SFD:**
- - The RU allocation signaling in the common field of HE-SIG-B signals an 8 bit per 20MHz PPDU BW for signaling
    - The RU arrangement in frequency domain
    - Number of MU-MIMO allocations: The RUs allocated for MU-MIMO and the number of users in the MU-MIMO allocations.
      - The exact mapping of the 8 bit to the RU arrangement and the number of MU-MIMO allocations is TBD.
      - Signaling for the center 26 unit in 80MHz is TBD
- **Move: Yasu Inoue Second: Ron Porat**
- **Accepted with no objection**
- **DCN:11-15/1066r0 SP Result: 56/0/14**

# PHY Motion #65

- **Move to add the following text to the 11ax SFD:**
  - The length of the user specific subfield in HE-SIG-B for a single-user allocation is equal to the length of the user specific subfield of each user in a multi-user allocation.
- **Move: Yasu Inoue                      Second: Ron Porat**
- **Accepted with no objection**
- **DCN:11-15/1066r0                      SP Result: 54/0/15**

## MAC Motion #27

- **Moved to add to the end of Clause 6 (MAC) of the IEEE 802.11 TGax Specification Framework:**
  - “The amendment shall define a HE AP to implement Proxy ARP capability.”
- **Move: Guido Hiertz                      Second: Ron Porat**
- **Y/N/A:29/27/64**
- **Motion fails**
- **DCN:11-15/1015r1                      SP Result: 32/8/many**

## MAC Motion #28

- **Move to add the following to the IEEE 802.11 TGax Specification Framework**  
6.X.Y: “HE STAs shall support the Multiple BSSID Set.”

**Move:** Guido R. Hiertz

**Second:** Ron Porat

**Accepted with no objection**

**DCN:11-15/1014r0 SP Result: 17/2/3**

# MAC Motion #29

- **Move to add the TGax SFD:**

- 6.1 General

In a downlink MU HE PPDU, at most one A-MPDU is allowed to contain one or more MPDUs that solicit an immediate response, except when an immediate response is carried in UL MU PPDU.

In such case, one or more A-MPDUs are allowed to contain one or more MPDUs that solicit an immediate response carried in UL MU PPDU.

- **Move:** Yongho Seok                      **Second:** Ron Porat

- **Approved with no objection**

- **DCN: 11-15/1033r0**

**SP Result:17/0/28**

## MAC Motion #30

- **Move to add the TGax SFD:**
  - 6.2 Power Save  
HE STA may use a notification of its operating mode changes for 802.11ax power saving mechanism
- **Move: Yongho Seok            Second: Ron Porat**
- **Approved with no objection**
- **DCN:11-15/1034r0            SP Result: 5/0/39**

# MAC Motion #31

- **Move to add the TGax SFD:**
  - 6.2 Power Save

The 802.11ax Operating Mode Notification behavior should specify a clarification for

  - A channel width that a STA can transmit
  - A number of spatial streams (Tx NSS) that a STA can transmit
  
- **Move: Yongho Seok                      Second: Ron Porat**
- **Y/N/A:22/9/50**
- **Motion fails**
- **DCN:11-15/1034r0                      SP Result: 5/0/43**

# MAC Motion #32

- **Move to add to 11ax SFD:**
  - the spec shall define a mechanism for a transmitting STA to indicate its RX operating mode, i.e. RX NSS, RX channel width, in a transmitted DATA type MAC header, so that the responding STA shall not transmit a subsequent PPDU using an NSS or channel width value not indicated as supported in the RX operating mode of the transmitting STA.
  - The responding STA shall not adopt the new NSS and BW until a time TBD.
- **Move: Guoqing Li                      Second: Ron Porat**
- **Accepted with no objection**
- **DCN: 11-15/1060   SP Result:        24/0/12**





## MAC Motion #35

- Move to add the following text into 11ax SFD
- 4.1 In cascading sequence, when AP does not receive acknowledgements from a STA after sending DL Data MPDUs, AP may recover using one of the following procedures:
- Transmitting a BAR with SSN value set to the SN of the unacknowledged Data MPDUs
  - Retransmitting unacknowledged Data MPDUs
  - Transmitting additional Data MPDUs along with a BAR with SSN value set to the SN of the unacknowledged Data MPDUs
- **Move: John Son    Second: Jinsoo Ahn**
  - **Y/N/A: 10/17/49    Motion fails**
  - **DCN:11-15/1096r0**

**SP Result: 11/0/31**  
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## MAC Motion #36

- **Move to add to the TG Specification Framework document**
  - 4.1. DL-OFDMA may reuse the same sharing mechanism of an EDCA TXOP as DL MU-MIMO.
- **Move: Jinsoo Ahn Second: John Son**
- **Accepted with no objection**
- **DCN:11-15/1116r1** **SP Result:11/0/34**

## Move to Amend

- **Amend MAC motion #36 as:**
- **Do you agree to add to the TG Specification Framework work document?**
  - 4.1. DL-OFDMA shall reuse sharing an EDCA TXOP mechanism of DL MU-MIMO.
- **to**
- **Move to add to the TG Specification Framework document**
  - 4.1. DL-OFDMA may reuse the same sharing mechanism of an EDCA TXOP as DL MU-MIMO.
- **Move: Alfred                      Second: Jinsoo Ahn**
- **Y/N/A:14/0/51                      Motion passes**

## **MAC Motion #37**

- **Move to add the following to 11ax SFD**

**Non-AP STAs support using the QoS Control field in QoS Data and QoS Null frames to report per-TID Buffer Status information**

**Move:** Alfred Asterjadhi

**Second:** Ron Porat

**Accepted with no objection**

**DCN:11-15/1120r0**

**SP Result: 37/0/11**

## **MAC Motion #38**

- **Move to add the following to 11ax SFD**

**An AP can poll STAs for buffer status reports using the frame carrying the trigger info.**

- The poll can request for specific buffer status information with TBD granularity.

**Move:** Alfred Asterjadhi

**Second:** Ron Porat

**Accepted with no objection**

**DCN:11-15/1120r0**

**SP Result: 35/0/12**

## **MAC Motion #39**

- **Move to add the following to 11ax SFD**

**The spec shall define an HE variant (of the VHT variant) of the HT Control field that carries one or more control fields for HE control information**

- B0 and B1 of the HT Control field in this case are set to 1
- The control fields can be called HE Control field

**Move:** Alfred Asterjadhi

**Second:** Ron Porat

**Accepted with no objection**

**DCN:11-15/1121r0**

**SP Result: 30/0/18**

## MAC Motion #40

- **Move to modify sub-clause 4.1 of the TG Specification Framework as follows**
  - An AP shall not allocate UL subchannel in any 20 MHz channel that is not occupied by the **Trigger frame immediately preceding DL PPDU that contains trigger information**. In each 20 MHz channel occupied by the **Trigger frame immediately preceding DL PPDU that contains trigger information**, there is at least one allocated subchannel for UL transmission.
- **Move: Young Hoon Kwon                      Second: Reza Hedayat**
- **Accepted with no objection**
- **DCN: 11-15/1052r0                      SP Result: 45/3/22**

# MAC Motion #41

- **Move to add to the TG SFD:**
  - A HE AP is allowed to broadcast a TBD parameter in the trigger frame to the STAs so that STAs can initiate the random access process after the trigger frames
- **Move: Russell Huang      Second: Ron Porat**
- **Accepted with no objection**
- **DCN: 11-15/1137r1      SP Result: 87/0/19**



## MU Motion #12

- **Move to add to the TG Specification Framework document**
  - 4.y.z. The amendment shall include a mechanism to multiplex acknowledgment frames in response to Multicast receptions under GCR BA operation.
- **Move: Kazuyuki Sakoda    Second: Guido Hiertz**
- **Accepted with no objection**
- **DCN: 11-15/1043r1                      SP Result:11/0/many**

## MU Motion #13

- **Move to add to the TG SFD:**
  - The spec shall define a MU-BAR frame to solicit BA/ACKs from multiple STAs in UL MU transmissions
- **Move: Guoqing Li Second: Ron Porat**
- **Accepted with no objection**
- **DCN: 11-15/1053r1** **SP Result: 57/0/4**

# MU Motion #14

- **Move to add to the SFD**

- 4 Multi-user (MU) features

- 4.1 General

- STA shall consider CCA status to respond to a Trigger frame under a non-null TBD set of conditions.

**Move: Kiseon Ryu Second: Jinsoo Choi**

**Accepted with no objection**

**DCN: 11-15/1058r0 SP Result: 47/0/13**

# MU Motion #15

- Move to add to the TG Specification Frame work document
  - x.y.z. 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
- Move: Po-Kai Huang      Second: Chitto
- Accepted with no objection
- DCN:11-15/1062r1 SP Result: 46/3/13

## MU Motion #16

- **Move to add to the SFD:**
  - 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
- **Move: Jianhan Liu                      Second: Hongyuan Zhang**
- **Accepted with no objection**
- **DCN: 11-15/1065r1                      SP Result: 39/0/12**

## MU Motion #17

- *Move 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
  - Move: Narendar Madhavan      Second: Ron Porat
  - Accepted with no objection
  - DCN: 11-15/1097r1      SP Result: 24/0/8

## MU Motion #18

- *Move 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.
  
  - Move: Narendar Madhavan      Second: Masahito Mori
  - Accepted with no objection
  - DCN: 11-15/1097r1      SP Result: 21/0/14

## MU Motion #19

- **Move to add to the TG SFD:**
  - The spec shall support fragmentation negotiation in A-MPDUs for HE STAs
- **Move: Chittabrata Ghosh Second: Po-Kai Huang**
- **Y/N/A: 49/4/31 Motion passes**
- **DCN: 11-15/1102r0 SP Result: 51/0/9**

## MU Motion #20

- **Move to include the DL sounding sequence illustrated in Slide 15 (of 802.11-15/1103r0) to the spec framework**
- **Move: Chittabrata Ghosh Second: Po-Kai Huang**
- **Accepted with no objection**
- **DCN:11-15/1103r0 SP Result: 40/0/7**

## MU Motion # 27

- **Move to include in the SFD the following random access procedure:**
  - When an STA has a frame to send, it initializes its OBO (OFDMA Back-off) to a random value in the range 0 to CWO (OFDMA Contention window)
  - For an STA with non-zero OBO value, it decrements its OBO by 1 in every RU assigned to AID value TBD within the TF-R
  - For an STA, its OBO decrements by a value, unless OBO=0, equal to the number of RUs assigned to AID value TBD in a TF-R
    - OBO for any STA can only be 0 once every TF-R
  - An STA with OBO decremented to 0 randomly selects any one of the assigned RUs for random access and transmits its frame
  
  - Move: Chittabrata Ghosh      Second: Po-Kai Huang
  - Accepted with no objection

• **DCN:11-15/1105r0**

**SP Result:31/5/8**

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## MU Motion #21

- **Move 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.*

- **Move: Chittabrata Ghosh    Second: Po-Kai Huang**
- **Accepted with no objection**
- **DCN: 11-15/1107r0            SP Result:41/0/11**

## MU Motion #22

- **Move 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.*

**Move: Chittabrata Ghosh      Second: Po-Kai Huang**

**Accepted with no objection**

**DCN: 11-15/1107      SP Result:40/0/11**

## MU Motion #23

### **Move 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.

- **Move: Lei Wang Second: Kiseon Ryu**
- **Accepted with no objection**
- **DCN: 11-15/1123r1 SP Result:33/0/14**

## MU Motion #24

### Move to add the following to the SFD

- **The contents of the scheduling information for an UL OFDMA ACK/BA includes;**
  - **UL PPDU Length (9 bits) + RU Allocation (TBD).**
- **Move: Lei Wang Second: Kiseon Ryu**
- **Accepted with no objection**
- **DCN: 11-15/1123r1 SP Result: 33/0/10**

## MU Motion #25

- **Move 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
- **Move: Filippo Tosato      Second: Ron Porat**
- **Accepted with no objection**
- **DCN: 11-15/1129r1      SP Result:29/0/13**

## MU Motion #26

### Move to add to the TG Specification Framework document

Use a reserved bit in BA control field to indicate that the frame is multi-STA BA frame.

Move: Yasu Inoue      Second: Guido Hiertz

Y/N/A: 18/13/50      Motion fails

DCN:11-15/1086r1      SP Result: 10/0/many

# SR Motion #1

- **Move to add to the TG Specification Framework document**
  - 5.1 Features for operation in dense environments [802.11ax SFD]

A STA should regard an Inter-BSS PPDU with a valid PHY header and that has a receive power/RSSI below the OBSS PD level used by the receiving STA and that meets additional TBD conditions, as not having been received at all (e.g., should not update its NAV), except that the medium condition shall indicate BUSY during the period of time that is taken by the receiving STA to validate that the PPDU is from an Inter-BSS, but not longer than the time indicated as the length of the PPDU payload

- The OBSS PD level is greater than the minimum receive sensitivity level

- **Move: Luojun      Second: Ron Porat**
- **Accepted with no objection**
- **DCN:11-15/1109r1      SP Result:39/0/12**

## SR Motion #2

- **Move to add to Section 5.1 of the SFD:**
  - “The amendment shall include one or more mechanisms to improve spatial reuse by allowing adjustments to one or more of the CCA-ED, 802.11 Signal Detect CCA, OBSS\_PD or TXPWR threshold values. The constraints on selecting threshold values are TBD.”
- **Move: Filip Mestanov      Second: Guido Hiertz**
- **Y/N/A: 35/5/36      Motion Passes**
- **DCN:11-15/1138r1      SP Result: 24/0/18**

## SR Motion #3

- Move to add to 11ax SFD:

The specification to consider a procedure that may revise the NAV depending on TBD conditions at the recipient of the ongoing OBSS frame.

Move: Reza Hedayat

Second: Ron Porat

Accepted with no objection

DCN:11-15/1104r3

SP Result: 16/0/26

## SR Motion #4

**Move to add the following text into 11ax SFD**

- **An 11ax STA regards a valid OBSS PPDU *as not having been received at all (e.g., should not update its NAV), except that the medium condition shall indicate BUSY during the period of time that is taken by the receiving STA to validate that the PPDU is from an Inter-BSS, but not longer than the time indicated as the length of the PPDU payload* if the RXPWR of the received PPDU is below the OBSS\_PD threshold and TBD conditions are met, noting that the OBSS\_PD threshold is accompanied by a TXPWR value and a reduction in the TXPWR may be accompanied by an TBD increase in the OBSS\_PD threshold value.**
- **Move: Tianyu Wu                      Second: Ron Porat**
- **Accepted with no objection**
- **DCN:11-15/1069r3                      SP Result: 38/1/18**

## Goals for November 2015

- **Continue to advance the TG documents based on submissions.**
  - With priority to the TG Specification Framework document.
- **Technical Presentations**

## Conference call times

- **Thursday October 15      10:00 – 12:00 ET**