

# TGax May 2016 Meeting Agenda

Date: 2016-04-05

## Authors:

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

## **Big Island, Hawaii, USA May 15-20, 2016**

**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)**

## 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

## **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 with a PAR approved by the IEEE-SA Standards Board.

## 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>

## 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.**

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 March meeting.
- Confirmation of the TG leadership
- Resolution of comments received on draft D0.1
- Ad Hoc group meetings
- Technical Presentations and related straw polls and/or motions
- Schedule Telecon times.

# General Flow of the Meeting

- **Monday May 16, 10:30 – 12:30**
  - Call Meeting to order
  - IEEE 802 and 802.11 IPR Policy and procedure.
  - Review from March 2016 meeting
  - Call for submissions
  - Agenda setting and approval
  - TG Motions
  - Presentations
  - Recess
- **Monday May 16, 16:00 – 18:00**
  - Ad Hoc Group Meetings
- **Tuesday May 17, 10:30 – 12:30**
  - Ad Hoc Group Meetings
- **Tuesday May 17, 14:00 – 16:00**
  - Ad Hoc Group Meetings
- **Tuesday May 17, 19:30 – 21:30**
  - Call Meeting to order
  - IEEE 802 and 802.11 IPR Policy and procedure.
  - Presentations
  - Recess
- **Wednesday May 18, 13:30 – 15:30**
  - Ad Hoc Group Meetings
- **Wednesday May 18, 16:00 – 18:00**
  - Ad Hoc Group Meetings
- **Thursday May 19, 10:30 – 12:30**
  - Call Meeting to order
  - IEEE 802 and 802.11 IPR Policy and procedure.
  - Presentations
  - TG Motions
  - Recess
- **Thursday May 19, 16:00 – 18:00**
  - Call Meeting to order
  - IEEE 802 and 802.11 IPR Policy and procedure.
  - Presentations
  - TG Motions
  - Goals for March 2016
  - Telecon Schedule
  - Adjourn

# TGax Schedule in a Glance

	Monday	Tuesday	Wednesday	Thursday
<b>AM1</b>				
<b>AM2</b>	<b>TGax</b>	PHY MAC/SR		<b>TGax</b>
<b>PM1</b>			PHY MAC/SR	
<b>PM2</b>	PHY MAC/SR	PHY MU	PHY MAC/SR	<b>TGax</b>
<b>EVE</b>	PHY MU	<b>TGax</b>		

\* Ad Hoc group is tbd

# PHY Submissions

DCN	Title	Author	Ad Hoc
11-16/0608	Beamforming Feedback Report Structure	Sameer Vermani	PHY
11-16/0610	CR HE-SIG-A Part I	Ross Jian Yu	PHY
11-16/0611	Remaining Issues in Trigger Frame Design	Sameer Vermani	PHY
11-16/0613	SIG-B Related Issues	Lochan Verma	PHY
11-16/0614	Comment Resolution on Clause 26.1.1 Part 1	Lochan Verma	PHY
11-16/0615	Comment Resolution on Clause 26.3.12 Part 1	Lochan Verma	PHY
11-16/0617	Remaining Topics in Power Control	Bin Tian	PHY
11-16/0618	11ax CSD Design	Bin Tian	PHY
11-16/0619	PAPR Reduction of HE-SIGB	Bin Tian	PHY
11-16/0620	DCM PHY Parameters	Hongyuan Zhang	PHY
11-16/0621	DCM Interleaver	Tianyu Wu	PHY
11-16/0622	16 QAM Mapping for DCM	Sudhir Srinivasa	PHY
11-16/0623	CR on Section 26.3.10.12	Bin Tian	PHY
11-16/0625	CR on Section 26.3.6	Bin Tian	PHY
11-16/0626	Feedback Element Compression for 802.11ax	Kome Oteri	PHY
11-16/0633	Left over Issues in RU Signaling for HE-SIGB	Yan Zhang	PHY
11-16/0634	11ax Comment Resolutions for Clauses 26.3.2	Yan Zhang	PHY
11-16/0635	BW indication for Non-contiguous Channel Bonding	Yunbo Li	PHY
11-16/0636	TXOP Duration field in HE-SIG-A	Jeongki Kim	PHY
11-16/0637	Load balancing indication for MU-MIMO over 484-tone and larger RU in OFDMA	Ming Gan	PHY
11-16/0638	Discussions for Non-contiguous Channel Bonding	John Son	PHY
11-16/0639	Follow-up on HE-SIG-B user-specific field	Jinsoo Choi	PHY
11-16/0649	Feedback Tone Map and Quantization	Sriram Venkateswaran	PHY
11-16/0652	Power scaling of 4 extra tones	Xiaogang Chen	PHY
11-16/0653	CR on section 26.3.3	Xiaogang Chen	PHY
11-16/0654	CP and LTF Options and Signaling	Ron Porat	PHY
11-16/0655	On MCS0 DCM Modulation and DCM Capability	Jianhan Liu	PHY
11-16/0656	1024QAM Modulation	Jianhan Liu	PHY
11-16/0658	CR on 26.3.7.1	Jinsoo Choi	PHY
11-16/0659	CR on 26.3.9.9 and 26.3.5	Eunsung Park	PHY
11-16/0663	CR on Section 26.2.2	Ke Yao	PHY
11-16/0681	Comment Resolution CID 215 2486	Daewon Lee	PHY
11-16/0682	CR CID on PHY data field other	Daewon Lee	PHY

33 Submissions

# MAC Submissions

DCN	Title	Author	Ad Hoc
11-16/0583	Backoff Procedure Handling Upon TF Reception	Yu Wang	MAC
11-16/0584	Need of SDU Fragmentation to Reduce Padding Ratio in UL-OFDMA Transmission	Yu Wang	MAC
11-16/0588	Channel State Estimation based Bidirectional Initialized Random Access	Bo Li	MAC
11-16/0590	Multi-BSS Association for Edge Users; Throughput Improvements	Mao Yang	MAC
11-16/0616	BlockAck generation and selection rules	Alfred Asterjadhi	MAC
11-16/0627	ROM Recovery Rules	Jayh Hyunhee Park	MAC
11-16/0628	Buffer Status Report in HE Control field	Jayh Hyunhee Park	MAC
11-16/0640	BSS Color Collision	Geonjung Ko	MAC
11-16/0641	Regarding HE fragmentation	Woojin Ahn	MAC
11-16/0643	HE Control Scheduling	Liwen Chu	MAC
11-16/0644	SS Allocation in Trigger	Liwen Chu	MAC
11-16/0645	MU Minimum MPDU Start Spacing	Liwen Chu	MAC
11-16/0646	HE Beamforming Feedback	Liwen Chu	MAC
11-16/0657	In-device Multi-radio Coexistence and UL MU operation	Robert Stacey	MAC
11-16/0673	Multi-User EDCA	Jinsoo Ahn	MAC
11-16/0674	EIFS excess problem of Acknowledgement for UL MU procedure	Hanseul Hon	MAC
11-16/0675	comment resolution for CID2383	Yonggang Fang	MAC
11-16/0684	Channel Access Efficiency	Evgeny	MAC

18 Submissions

# MU Submissions

DCN	Title	Author	Ad Hoc
11-16/0582	Random Access RU Allocation in the Trigger Frame	Evgeny Khorov	MU
11-16/0591	Issues related to OCW management	Patrice Nezou	MU
11-16/0592	Follow up on Issue related to unused UL OFDMA Rus	Stephane Baron	MU
11-16/0648	MU-RTS/CTS PHY Format	Po-Kai Huang	MU
11-16/0661	Adaptive Random Access UL OFDMA	Leonardo Lanante	MU
11-16/0662	Further consideration on channel access rule to facilitate MU transmission opportunity	Jing Ma	MU
11-16/0664	Consideration on backoff procedure for UL MU transmission	Jing Ma	MU
11-16/0665	Some Notes on Interference Alignment for Downlink Multi-User MIMO	Dzevdan Kapetanovic	MU
11-16/0667	Signaling of Multi-TID Aggregation Limit	Chittabrata Ghosh	MU

9 submissions

# SR Submissions

DCN	Title	Author	Ad Hoc
11-16/0581	Proposed changes to SR clause	Soma Tayamon	SR
11-16/0589	actional-Backoff Procedure and Dynamic CCA	Bo Li	SR
11-16/0647	Consideration of Spatial Reuse for Trigger Frame	Po-Kai Huang	SR

3 submissions

# TG submissions

DCN	Title	Author	Ad Hoc
11-16/0571	QoS Handling of Trigger Frame	Yu Wang	TG
11-16/0597	Indoor Enterprise Scenarios, Color, DSC and TPC	Graham Smith	TG
11-16/0604	Simulation-based evaluation of DSC in enterprise scenario	Tanguy Ropitault	TG
11-16/0609	HE NDPA Frame Format	Ross Jian Yu	TG
11-16/0612	Mandatory/Optional Support Issues for 802.11ax	Sameer Vermani	TG
11-16/0629	Box5 Calibration Results	Andrew Tsai	TG

6 submissions

## Agenda for Monday May 16, 10:30 – 12:30

- Call meeting to order
- Patent policy, etc.
- Call for submissions
- Set Ad Hoc Groups schedule and approve agenda
- Affirmation vote for the TG leadership
- TG motions
  - Approve TG meeting and Telecon minutes since November meeting.
- Comment Resolution Status – Robert Stacey
- Summary since March 2016 meeting
- Timeline
- The End of the SFD process
- PAR Reminder
- Presentations and Comment Resolution
  - 11-16/0571
  - 11-16/0597
  - 11-16/0604
- Recess

# Confirmation of the TG Leadership

- From 802.11 Operation Manual
  - <https://mentor.ieee.org/802.11/dcn/14/11-14-0629-14-0000-802-11-operations-manual.docx>

See next page



**Task Group Chair**

The TG Chair shall be appointed by the WG Chair and confirmed by a WG majority approval. The TG Chair is re-affirmed every 2 years: one session after the WG Chair is elected.

The TG Chair is required to confirm that the function of secretary is performed for each TG meeting. TG meetings are not allowed to function without a secretary.

**Task Group Vice-Chair**

TG Vice-Chair is elected by a TG majority approval and confirmed by a WG majority approval. The TG Vice-Chair is reaffirmed every 2 years; one session after the WG Chair is elected.

**Task Group Secretary**

The TG Secretary shall be appointed by the TG Chair and confirmed by a TG motion that is approved with a minimum 50% majority. The TG Secretary is re-affirmed every 2 years; one session after the WG Chair is elected.

The minutes of meetings taken by the TG Secretary (or designee) are to be provided to the TG Chair in time to be available to the WG Chair for publication 30- days after close of the session.

The minutes of the meeting are to include documents produced by the voting process and document list. See section 10 of this document ([802.11 Guidelines for Secretaries](#)) for details on content and form of minutes.

**Task Group Technical Editor**

The TG Technical Editor shall be appointed by the TG Chair and confirmed by a TG majority approval.

The TG Technical Editor is responsible for:

Organizing, maintaining the draft standards for the TG in the format used by the IEEE standards department.

Preparing technical drafts following the editor's guidelines in section 11 of this document.

Preparing an update of the draft standard as soon after a session as possible, as directed by the TG.

Proof reading and coordinating changes of documents edited by IEEE staff.

Sending the TG Chair the following:

The Adobe Acrobat PDF file of the standard ([lother3](#)).

A word processing document file in a format that is acceptable by the IEEE standards department.

## **Confirmation of the TG Leadership**

- **Confirmation of the TG Chairs will be done by the WG Chair on Friday.**
- **The TG need to confirm the Vice Chairs, Secretary, and Technical Editor**

## Confirmation of Vice Chairs, Secretary, and Technical Editor

Position	Name
1 <sup>st</sup> Vice Chair	Simone Merlin
2 <sup>nd</sup> Vice Chair	Ron Porat
Secretary	Yasuhiko Inoue
Technical Editor	Robert Stacey

- **Move to confirm Simone Merlin, Ron Porat, Yasuhiko Inoue, and Robert Stacey for the positions of 1<sup>st</sup> Vice Chair, 2<sup>nd</sup> Vice Chair, Secretary, and Technical Editor respectively.**
- **Move: Al Petric      Second: Bin Tian**
- **Y/N/A**
- **Approved with no objection**

## Ad Hoc Group Chairs

MAC	PHY	MU	Spatial Reuse
Eric Wong (Apple)	Bo Sun (ZTE)	Sigurd Schelstraete (QAT)	Laurent Cariou (Orange)
Reza Hedayat (NEWRACOM)	Jianhan Liu (MTK)	Kiseon Ryu (LG)	Guido Hiertz (Ericsson)
Brian Hart (Cisco)	<b>Yakun Sun</b> (MRVL)	Kaushik Josiam (Samsung)	Jae Seung Lee (ETRI)

# Ad Hoc Group Chairs

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Eric Wong (Apple)	Bo Sun (ZTE)	Sigurd Schelstraete (QAT)	Laurent Cariou (Orange)
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Brian Hart (Cisco)	Hongyuan Zhang (MRVL)	Kaushik Josiam (Samsung)	Jae Seung Lee (ETRI)

## Summary since March 2016 Meeting

- **Approved TG draft D0.1 and started a 21-day comment collection period.**
- **The comment collection period closed on April 11. 2919 comments were received.**
- **Held a three of Telecons (April 14 and April 21, May 5). All comments are assigned.**

# Approval of TG Minutes ( March 2016 Meeting and Telecon Minutes)

- Approve TGax minutes of meetings and teleconferences from March 2016 interim meeting to today:
  - <https://mentor.ieee.org/802.11/dcn/16/11-16-0415-01-00ax-tgax-march-2016-macau-meeting-minutes.docx>
  - <https://mentor.ieee.org/802.11/dcn/16/11-16-0536-02-00ax-tgax-teleconference-minutes-april-14th-2016.docx>
  - <https://mentor.ieee.org/802.11/dcn/16/11-16-0568-01-00ax-tgax-teleconference-minutes-april-21st-2016.docx>
  - <https://mentor.ieee.org/802.11/dcn/16/11-16-0575-01-00ax-tgax-teleconference-minutes-may-5th-2016.docx>
  - <https://mentor.ieee.org/802.11/dcn/16/11-16-0537-00-00ax-spatial-reuse-ad-hoc-group-march-2016-minutes.docx>
  - <https://mentor.ieee.org/802.11/dcn/16/11-16-0509-00-00ax-tgax-march-2016-macau-phy-ad-hoc-meeting-minutes.docx>
  - <https://mentor.ieee.org/802.11/dcn/16/11-16-0439-01-00ax-mar-2016-macau-tgax-mac-ad-hoc-meeting-minutes.docx>
  - <https://mentor.ieee.org/802.11/dcn/16/11-16-0466-00-00ax-tgax-mu-ad-hoc-meeting-minutes-march-2016.docx>

• ~~Move: Simone Merlin~~  
Submission

~~Second: Al Petrick~~  
Slide 28  
Osama Aboul-Magd (Huawei Technologies)

- **Accented with no obiaction**

# Comment Resolution Status (Editor Report)

- Robert Stacey

## Timeline

### Current Timeline

- **May 2014:** start of the TG
- **Nov. 2014:** First draft of the TG SFD was approved
- **Jan. 2016:** proposed TG draft
- **March 2016:** Draft D0.1 was approved and CC started
- **July 2016: Draft 1.0 and WG letter ballot**
- **March 2017:** Draft 2.0 and recirculation
- **Jan 2018:** Sponsor Ballot

### Proposed Timeline

- **May 2014:** start of the TG
- **Nov. 2014:** First draft of the TG SFD was approved
- **Jan. 2016:** proposed TG draft
- **March 2016:** Draft D0.1 was approved and CC started
- **September 2016: Draft 1.0 and WG letter ballot**
- **March 2017:** Draft 2.0 and recirculation
- **July 2017: MDR (Mandatory Document Review)**
- **November 2017: Formation of SB pool**
- **March 2018: Sponsor Ballot**
- **December 2018: RevCom**

## Ad Hoc Group Rules

- A straw poll needs to achieves 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.

## SFD Process

- **This meeting is the last meeting where we consider changes to SFD.**
- **Going forward all submissions should target the TG draft**

## PAR Reminder

- This amendment defines standardized modifications to both the IEEE 802.11 physical layers (PHY) and the IEEE 802.11 Medium Access Control layer (MAC) that enable at least one mode of operation capable of supporting at least four times improvement in the average throughput per station (measured at the MAC data service access point) in a dense deployment scenario, while maintaining or improving the power efficiency per station.
- This amendment defines operations in frequency bands between 1 GHz and 6 GHz. The new amendment shall enable backward compatibility and coexistence with legacy IEEE 802.11 devices operating in the same band.

# Agenda for Monday May 16, 16:00 – 18:00

- Ad Hoc Group Meetings
  - PHY → Kona 4/5
  - MAC → Queens 4

## **Agenda for Monday May 16, 19:30 – 21:30**

- **Ad Hoc Group Meetings**
  - PHY → Kona 4/5
  - MU → Queens 4

# Agenda for Tuesday May 17, 10:30 – 12:30

- **Ad Hoc Group Meetings**
  - Ad Hoc #1
  - Ad Hoc #2

# Agenda for Tuesday May 17, 16:00 – 18:00

- **Ad Hoc Group Meetings**
  - Ad Hoc #1
  - Ad Hoc #2

## **Agenda for Tuesday May 17, 19:30 – 21:30**

- **TG Meeting**
- **Call Meeting to order**
- **IEEE 802 and 802.11 IPR Policy and procedure.**
- **Progress Review**
- **Presentations**
  - 11-16/0604- Simulation-based Evaluation of DSC
  - SP from 11-16/0597
  - 11-16/0609 – NDPA frame format
  - 11-16/0612 – Mandatory and Optional Support for 11ax
  - 11-16/0629 – Box 5 calibration
  - 11-16/0665 – Notes on Interference Alignment
- **Recess**

# Agenda for Wednesday May 18, 13:30 – 15:30

- **Ad Hoc Group Meetings**
  - Ad Hoc #1
  - AD Hoc #2

# **Agenda for Wednesday May 18, 16:00 – 18:00**

- **Ad Hoc Group Meeting**
  - Ad Hoc #1
  - Ad Hoc #2

# Agenda for Thursday May 19, AM2 and PM2

- **TG Meeting**
- **Call Meeting to order**
- **IEEE 802 and 802.11 IPR Policy and procedure.**
- **Presentations (if any)**
- **TG Motions**
  - Timeline Motion
  - PHY, MAC, MU, and SR motions
  - Comment Resolution Motions
- **Goals for July 2016**
- **Telecon Schedule**
- **AoB**
- **Adjourn**

## Timeline Motion

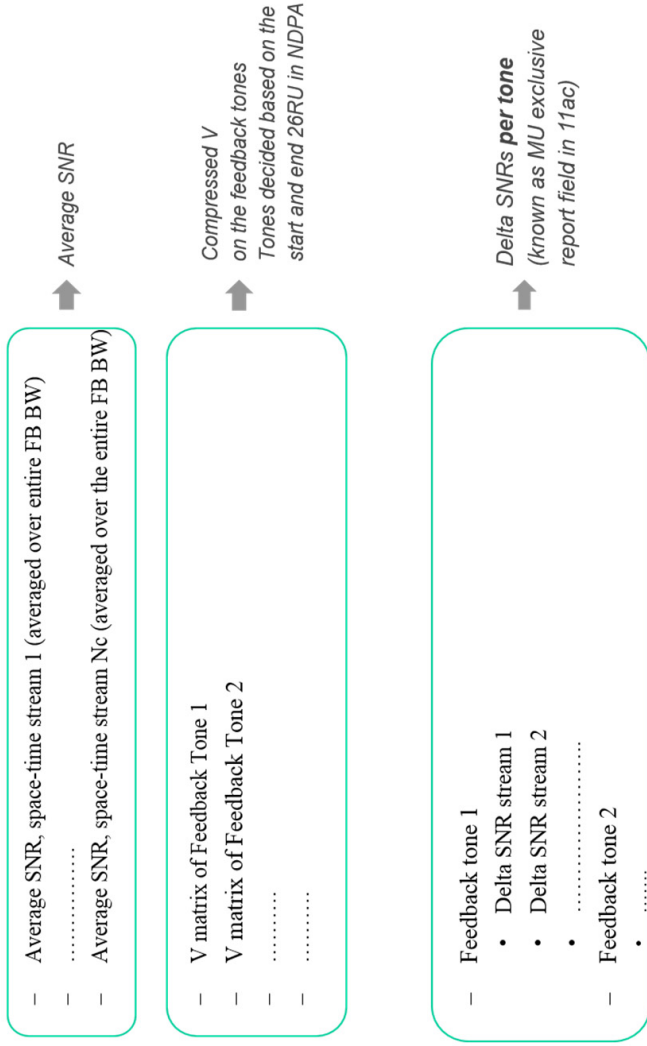
- **Move to accept the proposed timeline in slide #30 as the official TG timeline.**
- **Move: Simone Merlin      Second: Rolf de Vegt**
- **Y/N/A**
- **Motion accepted with no objection**

## PHY Motion #156

- **Move to modify the TG specification framework as in slide 44 to slide 80**
- **Move: Ron Porat Second: Bin Tian**
- **Y/N/A**
- **Accepted with no objection**

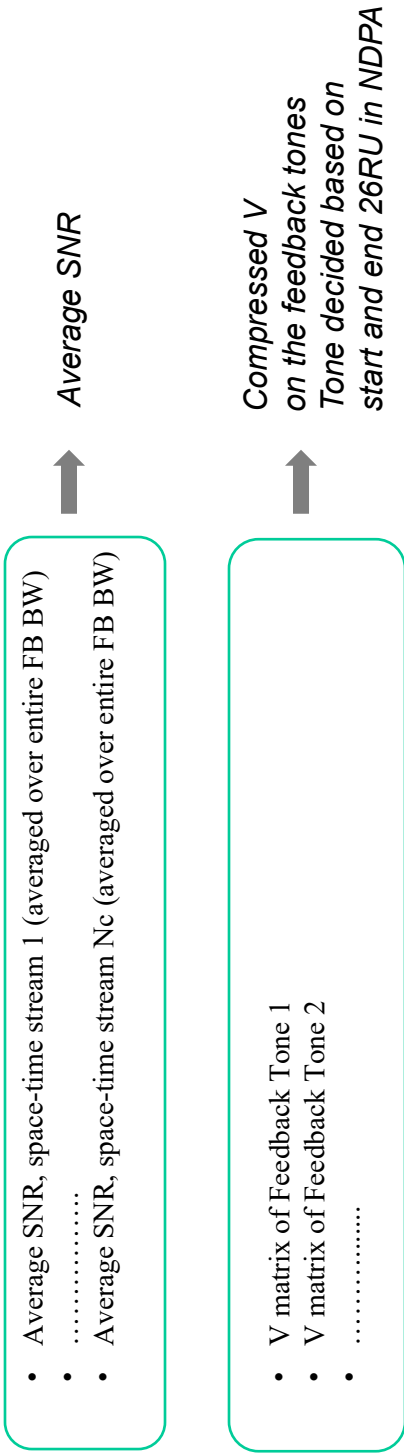
# 11-16/0608r0

- add the following feedback structure for MU type feedback to 1



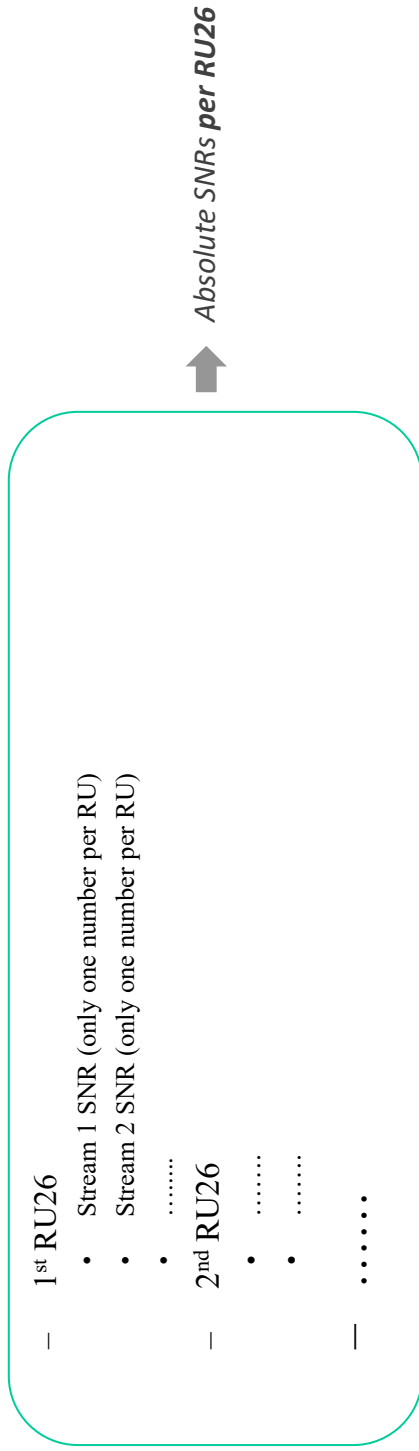
# 11-16/0608r0

- **Add the following feedback structure for SU type feedback to 11ax SFD**



# 11-16/0608r0

- add the following feedback structure for CQI feedback to 11ax SFD :



- Each SNR is an absolute number represented by 6 bits, with 1 dB granularity and a range of -10 dB to 53 dB

# 11-16/0608r0

- Adopt the following design for the HE-MIMO control field and add it to the 11ax SFD

Nc Index	Nr Index	BW	Grouping	Codebook Information	Feedback Type	Remaining Feedback Segments	First Feedback Segment	RU Start Index	RU End Index	Sounding Dialog Token Number	Reserved
Bits: 3	3	2	1	1	2	3	1	7	7	6	4

### Changes from VHT are listed below

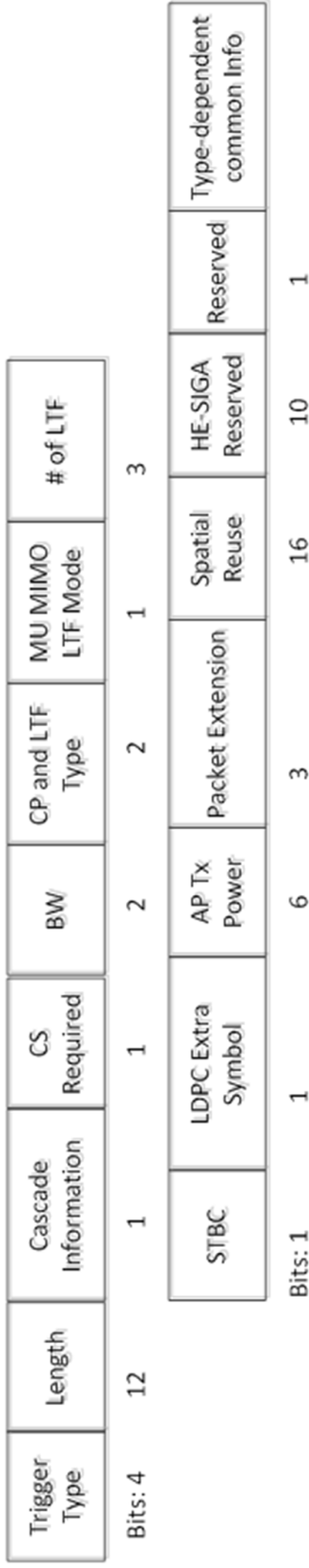
- BW (2 bits) – Same meaning as channel width field of VHT
- RU\_Start\_Index (7 bits) : The index of the first RU26 of the feedback being sent
- RU\_End\_Index (7 bits) : The index of the last RU26 of the feedback being sent
- Grouping is 1 bit
  - 0: Ng=4, 1: Ng=16
- Feedback type is 2 bits
  - 0: SU, 1: MU, 2: CQI only, 3: Reserved
- 4 bits unused (reserved)

## 11-16/0611r0

- **Add the following to the SFD**
  - “BW subfield length in the Common Info Field of the Trigger frame is 2 bits”
  - “PE subfield length in the Common Info Field of the Trigger frame is 3 bits”
  - ‘CP and LTF Type’ subfield length in the Common Info Field of the Trigger frame is 2 bits”
  - The AP specifies in the Trigger frame, the value of SR and Reserved bits which is used by the STA in HE-SIG-A of a trigger-based PPDU.
  - The HE AP shall set the MU MIMO LTF Mode bit in the trigger to indicate:
    - Single-stream pilots for any OFDMA transmission (including the case where MU-MIMO happens on part of the BW)
    - The appropriate LTF mode (single stream pilots or masked LTFs) for full BW

# 11-16/0611r2

- Add the following ordering of the common info fields of the trigger frame to the SFD



## 11-16/0613r0

- **Add the following to the 11ax SFD ?**
  - AID value of 2046 is reserved to indicate unallocated RUs in the user-specific HE-SIG-B content blocks”
  - For an 80 MHz and 160 MHz PPDU, in each SIG-B content channel, the HE-SIG-B common blocks of the multiple 20MHz channels that the content channel corresponds to, are transmitted in an increasing order of the absolute frequency”
  - For MU-MIMO allocations of RU sizes larger than 242 tones, user specific content blocks are ordered across the two SIG-B content channels from left to right on the 1<sup>st</sup> SIG-B content channel, followed by left to right on 2<sup>nd</sup> SIG-B content channel”
  - For HE MU PPDU transmissions on the UL, the STA-ID field of the HE-SIG-B per-user field shall carry the AID of the transmitter assigned by the AP”

## 11-16/0617r0

- **Add the following text to 11ax SFD**
  - The AP Tx power is signaled in trigger frame using 6 bits.
  - Value 0 to 60 maps to -20dBm to 40dBm with 1dB resolution.
  - Value 61, 62 and 63 are reserved.
  - AP Tx power is defined as the averaged power in 20MHz unit and is the combined power over all Tx antennas.

## 11-16/0617r0

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

The target received power (RSSI) in trigger frame is signaled using 7 bits.

- Value 0 to 90 maps to -110 to -20dBm target received signal level with 1dB resolution.
- Value 127 indicates STA to transmit at its max power allowed for the assigned MCS
- Other values are reserved.

## 11-16/0617r0

- **Do you support adding the following text (in red) to 11ax SFD after the paragraph**

“STA sets its Tx power per the following equation

$$Tx_{pwr}^{STA}(dBm) = PL_{DL}(dB) + Target_{RSSI}(dBm)$$

$PL_{DL}(dB)$  is the DL path loss computed by the STA based on the AP transmit power signaled in the Trigger message and the measured RSSI of the Trigger message

$Target_{RSSI}(dBm)$  is signaled by the AP in the trigger message”

**The STA’s actual Tx power is further subject to its minimum and maximum TX power limit due to hardware capability, regulatory requirements as well as non-802.11 in-device coexistence requirements**

## 11-16/0617r0

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

STA's power headroom is signaled using 6bits

- 5 bits indicate the headroom value of [0 31]dB with resolution of 1dB
- 1 bit flag indicates whether the minimum TX power of the current MCS is reached by the STA (=1: transmit at its minimum capable Tx power for current MCS)

where a STA's headroom is defined as:  $HR_{STA} = TX_{pwr}^{MAX} - TX_{pwr}^{STA}$ , where

- $TX_{pwr}^{MAX}$  is the potential transmit power of the STA when target RSSI is set to value of 127, i.e. max power, for current MCS and current UL packet
- $TX_{pwr}^{STA}$  is the transmit power of the current UL packet

# 11-16/0617r0

- **Do you agree to make the following changes (highlighted in red) to 11ax SFD**

STAs that participate in HE trigger-based PPDU shall support the following absolute Tx power requirements and the RSSI measurement accuracy requirements for the two device classes:

- Class A:
  - Tx power accuracy: +/-3dB
  - RSSI measurement accuracy: ~~±2dB~~**+/- 3dB**
- Class B:
  - Tx power accuracy: +/-9dB
  - RSSI accuracy: +/-5dB

**The RSSI accuracy requirements shall be applied to receive signal level range from -82dBm to -20dBm (2.4GHz) or -30dBm (5GHz). The requirement is stated for nominal (room) temperature conditions. RSSI is measured over legacy preamble**

## 11-16/0618

- Reuse the 11ac per stream CSD values for all HE PPDU
- UL MU-MIMO transmission the per stream CSD value is based on global stream index
- Per antenna CSD values for in Pre HE modulation
  - Reuse the 11ac per antenna CSD values when beam change =1
  - Not specified (absorbed in the Q matrix) when beam\_change=0
- In UL MU transmission the per antenna CSD value is based on the antenna index of each STA (i.e. local index)?

## 11-16/0619r0

- **The following PAPR reduction scheme for HE SIG-B**
  - Phase rotation is applied to the HE SIG-B data tones after constellation mapping. For the  $k$ th data tone in the HE SIG-B, the phase rotation pattern is defined as
    - 1 for  $0 \leq k < 26$  and  $(-1)^k$  for  $26 \leq k < 52$
  - For DCM + MCS0, since the same rotation has already been applied in the DCM BPSK bit mapping, this step of phase rotation after constellation mapping shall be skipped
  - Legacy gamma rotation still applies among different 20MHz channels

# 11-16/0620

- **Add the following text to the SFD**

- When  $DCM = 1$ , the  $N_{SD}$ ,  $N_{CBPS}$ , and  $N_{DBPS}$  are set by the following expressions:

$$N_{SD} = N_{SD}^{(DCM=0)} / 2,$$

where  $N_{SD}^{(DCM=0)}$  is the number of data subcarriers of the current RU size when  $DCM = 0$

$$N_{CBPS} = N_{SD} \cdot N_{BFSCS}$$

$$N_{DBPS} = \lfloor N_{CBPS} \cdot R \rfloor$$

- In the case of MCS0,  $DCM=1$ ,  $N_{ss}=1$ , 106-RU or 242-RU, if the coding is BCC, then for each OFDM symbol 1 bit is padded after the  $N_{DBPS} \cdot 2$  BCC encoded bit before going into the BCC interleaver; if the coding is LDPC, LDPC encoding flow should be based on  $N_{DBPS}$  and  $N_{CBPS}$  as defined in the above equations

## 11-16/0620r0

- **Make the following changes to D0.1 MCS Tables:**
  - When DCM=1, change the  $N_{SD}$  parameter to be  $\frac{1}{2}$  of DCM=0 cases for the same RU size.
  - When DCM=1, change the  $N_{CBPS}$  parameter to be  $\frac{1}{2}$  of DCM=0 case.
  - When DCM=1, change the  $N_{DBPS}$  parameter to be  $\frac{1}{2}$  of DCM=0 case, or take the floor for the two cases: 106-RU, MCS0, DCM=1, Nss=1, and 242-RU, MCS0, DCM=1, Nss=1.
  - When DCM=1, change the coding rate  $R$  parameter to be identical to the DCM=0 case.
  - Limit DCM=1 only to the allowed Nss.

## 11-16/0621r0

- **Add the following text to the 11ax SFD**
  - DCM+MCS0 has same transmission flow as other DCM MCSs.

# 11-16/0621r0

- **Add the following text to 11ax SFD**
  - The interleaver parameters for DCM are given in the following table:

Parameter for DCM	RU Size (tones)			
	26	52	106	242
$N_{COL}$	4	8	17	13
$N_{ROW}$	$3 \times N_{BPSCS}$	$3 \times N_{BPSCS}$	$3 \times N_{BPSCS}$	$9 \times N_{BPSCS}$
$N_{ROT}$	2	2	11	29

Value of  $N_{BPSCS}$  for DCM modulations equals to  $N_{BPSCS}$  of non DCM modulations with same constellation size.

## 11-16/0621r0

- **Add the following text to 11ax SFD**
  - The interleaver parameters for HE SIG B with DCM are given in the following table:

Parameter	HE SIG B (tones)
	56
$N_{COL}$	13
$N_{ROW}$	$2 \times N_{BPSCS}$

## 11-16/0655r0

Add the 11ax SFD the following MCS0 DCM constellation mapping for data subcarriers  $k$  and  $k+N_{SD}$

$S_k$  is BPSK modulated

$$S_{k+N_{SD}} = S_k e^{j(k+N_{SD})\pi} \quad k = 0, 1, \dots, N_{SD} - 1$$

**Note:**  $N_{SD}$  is defined for DCM which is half of  $N_{SD}^{DCM=0}$ .

## 11-16/0655r0

- **Add the following usage of DCM to 11ax SFD**
  - DCM is only applied to MCS0, MCS1, MCS3 and MCS4.
  - DCM is only applied to 1 and 2 spatial streams.
  - DCM is only applied to HE SU PPDU, HE extend range SU PPDU, and SU RUs in HE MU PPDU.
  - DCM is not applied to MU-MIMO. The DCM field in the HE-SIGB per user for MU-MIMO is changed to a reserved field.
  - DCM is not applied to STBC.

## 11-16/0655r0

- **Add the following capability field of DCM to 11ax SFD**
  - Max constellation supported: 2 bits.
    - 00: does not support DCM; 01: BPSK; 10: QPSK; 11: 16QAM
  - Max number of streams supported: 1 bit.
    - 0: 1stream; 1: 2 streams

## 11-16/0622r0

- **Do you support to add the following to the 11ax SFD?**
  - When DCM=1, 16QAM constellation mapping is done by swapping  $b_0$  and  $b_1$ , and also  $b_2$  and  $b_3$  for the second half of tones, where  $b_0 \sim b_3$  are the encoded bits that maps to one 16QAM constellation for the first half of the tones, i.e.:

$$s_n = Q(b_0 b_1 b_2 b_3), \quad s_{n+N_{SD}} = Q(b_1 b_0 b_3 b_2)$$

where  $N_{SD}$  is defined for DCM=1, which is half of the  $N_{SD}$  value for the same RU size when DCM=0.

## 11-16/0633r3

- **Add the following to the current SFD:**
  - For full BW 80MHz, add 1 bit to indicate if center 26-tone RU is allocated in the common block fields of both SIGB content channels with same value.
  - For full BW160, 80+80 MHz, add 1 bit to indicate if center 26-tone RU is allocated for one individual 80MHz in common block fields of both SIGB content channels.

## 11-16/0633r3

- **Use 36 “Definition TBD” entries in Table 4 in the current SFD 3.2.5 HE-SIG-B sub-clause to indicate most frequently used partial bandwidth allocations, as shown in slide 16**

## 11-16/0636r2

- **Add the following into SFD**
  - In HE-SIG-A of HE (extended range) SU PPDU/HE MU PPDU/HE trigger-based PPDU, the size of TXOP Duration field is 7btis and 1 bit is reserved

## 11-16/0635r1

- **Add to the SFD that**
  - 3 bits are used for the BW field in SIG-A of HE\_MU PPDU

## 11-16/0637

- **Add the following entries in 8-bit table to the IEEE 802.11ax SFD**
  - two entries to indicate ‘Zero STA for 484-tone RU’ and ‘Zero STA for 996-tone RU’ respectively

## 11-16/0639r0

- **Add the following text to 11ax SFD**
  - The user-specific field for center 26-tone RU in  $BW \geq 80\text{MHz}$  is located at the end of the user specific fields in either SIGB content channel 1 or SIGB content channel 2 channel, if assigned?
    - SIGB content channel 1 in 80MHz BW
    - SIGB content channel 1 for lower 80MHz and SIGB content channel 2 for upper 80MHz in 160MHz BW

## 11-16/0649r0

- Add to the 11ax SFD
- For all feedback types, the AP shall use 7 bits each to signal the *start* and *end* 26 RU for partial bandwidth feedback
- The index used to signal a 26 RU increases with frequency, with the minimum value of the index being 0. For NDP bandwidths of 20, 40, 80, 160 MHz, the maximum value of the index shall be 8, 17, 36 and 73 respectively.
- The *start* and *end* 26 RUs in the HE MIMO Control Field shall use the same indexing as above

## 11-16/0649r0

- Do you agree add to the 11ax SFD
- The STA feeds back the channel on all tones from the feedback roster (Table 1, document 11-16/0649r0, on slide 13 ) between
- “S” tone corresponding to *start* 26 RU index
- and
- “E” tone corresponding to *end* 26 RU index
- where the “S” and “E” tones are defined as function of RU index in Table 2a for Ng = 4 and Table 2b for Ng = 16 (document 11-16/0649r0 on slide 13)
- **Note:** For 160 MHz, to determine the “S” and “E” tones, RUs 37-73 occupying the higher 80 MHz use the same table as RUs 0-36 occupying the lower 80 MHz

## 11-16/0649r0

- Add to the 11ax SFD
- The only quantization resolutions for the Givens angles  $\phi$ ,  $\psi$  in
  - MU feedback shall be (9,7) and (7,5) bits
  - SU feedback shall be (6,4) and (4,2) bits
- Note: MU resolution with  $N_g = 16$  is limited to (9,7)

## 11-16/0652r2

- Add to the TG Specification Frame work document?
  - For the extended range SU PPDU,
    - L-LTF per-tone power is boosted by 3 dB relative to HE-SIG-A, L-STF is transmitted with the same total power as L-LTF;
    - The extra four tones on the edge of L-SIG/RL-SIG in 20MHz band have the same per-tone transmission power as the per-tone transmission power of L-LTF tones, while the other populated tones in L-SIG and RL-SIG have 3dB lower per-tone transmission power than L-LTF tones.

## 11-16/0654r0

- **Add to the SFD**
- **change the bit width of the CP+LTF field in SIGA for SU and MU to 2 bits**
- **add 4x LTF + 3.2uS as an optional mode for the NDP frame**
- **define the following options to be signaled in the trigger frame for UL Trig PPDU**
  - 2x LTF + 1.6 uS (mandatory)
  - 4x LTF + 3.2 uS (mandatory)
  - 1x LTF + 1.6 uS for full BW only. TBD whether mandatory to transmit in UL Trig PPDU

## 11-16/0656r1

- **Add 11ax SFD that 1024QAM uses uniform constellation with Gray mapping**

## 11-16/0612r1

- **Add the following to the 11ax SFD:**
  - For an 11ax device, the support of DL and UL OFDMA (non MU-MIMO) shall be mandatory.
  - For an 11ax device
    - Support of  $N_{ss} > 1$  is optional
    - Support of STBC is optional.
  - For an 11ax device
    - Support for single spatial stream HE-MCSs 0 to 7 (transmit and receive) is mandatory in all supported channel widths and RU sizes
    - Transmit and receive support for HE-MCSs 8, 9, 10 and 11 is optional
  - For an 11ax AP, support for DL MU-MIMO transmission, where MU-MIMO is being done on the entire PPDU BW, shall be mandatory if the AP supports  $Tx N_{ss} \geq 4$

## 11-16/0612r1 (cntd)

- Full BW DL MU-MIMO reception shall be mandatory at a non-AP STA. For the receiving STA, max Nss (per STA) supported for DL MU-MIMO shall be equal to the minimum of 4 and the max Nss supported for SU PPDU. The  $N_{\text{STS, total}}$  that the STA can support in NDP sounding and in the DL MU-MIMO packet is a capability, 4 being the minimum value for both.

## **PHY Motion #157**

- **Move to change TG draft D0.1 as in document 11-16/0736r0**
- **Move: Bin Tian    Second: Jianhan Liu**
- **Accepted with no objection**

## MAC Motion #84

- **Move to modify the TG specification framework as in slide 83 to slide 99**
- **Move: Simone Merlin    Second: Reza Hedayat**
- **Y/N/A**
- **Accepted with no objection**

# 11-16/0616r1

- Add to the 11ax SFD the following mapping for the FN subfield of BA frames

Fragment Number subfield		BA Bitmap Length field [Octets]-Fragmentation L3 [ON/OFF]	Maximum number of MSDUs/A-MSDUs that can be acknowledged
B3	B2 B1 B0	Compressed Block Ack	Multi-STA Block Ack
0	0 0 0	Bitmap [8 Octets] – Frag [OFF]	Bitmap [8 Octets] – Frag [OFF]
0	1 0 0	Reserved	Bitmap [16 Octets] – Frag [OFF]
0	2 0 0	Bitmap [32 Octets] – Frag [OFF]	Bitmap [32 Octets] – Frag [OFF]
0	3 0 0	Reserved	Bitmap [4 Octets] – Frag [OFF]
0	0 1 1	Bitmap [8 Octets] – Frag [ON]	Bitmap [8 Octets] – Frag [ON]
0	1 1 1	Reserved	Bitmap [16 Octets] – Frag [ON]
0	2 1 1	Bitmap [32 Octets] – Frag [ON]	Bitmap [32 Octets] – Frag [ON]
0	3 1 1	Reserved	Bitmap [4 Octets] – Frag [ON]
1	Any	Reserved	Reserved

## 11-16/0616r1

- Add to the 11ax SFD:
- The BA Bitmap length of BA frames generated during a BA session is negotiated during the BA setup
  - If the negotiated buffer size is within  $[1, X]$  then a BA Bitmap length of  $X$  bits will be used during the BA session for the negotiated TID
  - If the negotiated buffer size is within  $[X+1, Y]$  then a BA Bitmap length of  $Y$  bits will be used during the BA session for the negotiated TID
  - Note:  $X$  and  $Y$  correspond to the agreed BA Bitmap lengths of the respective BA frame (e.g., 32, 64, etc.)
  - Per-PPDU BA selection rules within a BA session for the BA Bitmap length of the BA frames is TBD for  $\langle RA, TA, TID \rangle$

## 11-16/0616r1

- **Add to the 11ax SFD:**
- **The maximum number of TIDs of QoS data frames that an originator can aggregate in a multi-TID A-MPDU is indicated in the HE Capabilities element sent by the recipient**
  - A nonzero value also indicates that the recipient supports reception of multi-TID A-MPDUs
    - Note: A multi-TID A-MPDU allows the aggregation of an Action Ack frame as well
- **A STA that transmits a trigger-based PPDU as an immediate response to the Basic variant Trigger frame follows the indication of max number of TIDs contained in the Trigger Dependent Per User Info field of the Trigger frame addressed to the STA (i.e., AID of the Per User Info field is that of the STA) and can transmit an A-MPDU that contains a number of aggregated TIDs in the A-MPDU that is up to that value.**

## 11-16/0616r2

- **Add to the 11ax SFD:**
  - Multi STA BA frames shall be supported if either UL MU or multi-TID A-MPDU operation is supported
  - Originator indicates support for reception of ALL ACK signaling (Ack Type subfield set to 0 when responding to the soliciting A-MPDU) in Multi STA Block Ack frame that is sent as a response to the A-MPDU via a capability bit”

## 11-16/0616r2

- **Add to the 11ax SFD:**
  - HE STAs follow the solicitation/response rules listed in slides 17-20, (Document 11-16-616r2)
  - A STA shall not send a Multi TID BAR to a STA that has not indicated support for multi-TID A-MPDU.
    - Also applicable to each BAR information carried in the MU BAR variant Trigger frame”

## 11-16/0627r0

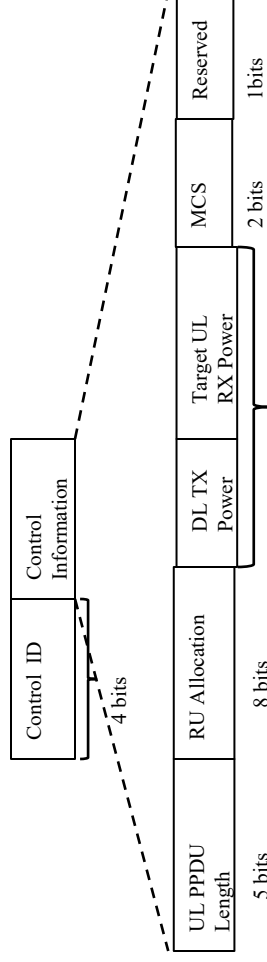
- **Add the following text to the 11ax Specification Frame work document clause 6.3 Power save**
- **For each of the ROMI parameters Rx NSS and Rx BW, the following rules are used:**
  - when the HE STA changes a parameter from higher to lower, it should make the change for that parameter only after receiving the ACK for the ROMI packet.
  - when the HE STA changes a parameter from lower to higher, it should make the change for that parameter right after the ACK timeout or receiving the ACK for the ROMI packet.

## 11-16/0628r1

- **Add the following text to the 11ax Specification Frame work document:**
  - An HE STA may send the buffer status report (BSR) in the HE variant HT Control field for one or more queues (whether content of queue is per TID or per AC is TBD) when the AP supports its reception
    - A new Control ID value of the HE variant HT Control field identifies a BSR
    - One or more (number is TBD) Queue Size subfields report the queue size
    - Identifier of AC/TID (and for which) is currently TBD

# 11-16/0643r0

- **Add the following text to 11ax SFD:**
  - The HE A-Control field for UL acknowledgement through OFDMA (acknowledgement through MU MIMO and MUMIMO in OFDMA are not supported) is defined as following:
    - 5-bit UL PPDU Length indicates OFDMA symbols of the Data field.
    - 5-bit DL TX Power indicates the transmission power of the Trigger frame in unit of 2db.
    - 5-bit Target UL RX Power indicates the target RX power in unit of 2db.
    - 8-bit RU Allocation which is same as Trigger frame.
    - 2-bit MCS indicates the MCS of the UL acknowledgement, MCS 0 to 3.
    - One SS is used for UL acknowledgement
    - The STAs that are the receivers of HE A-Control don't do CCA sensing before sending UL MU acknowledgement.
    - One HE LTF is used for UL acknowledgement
    - Spatial reuse is disallowed.
    - The CP+LTF Type is TBD.
    - The other missed parameters are same or derived from related parameters in DL MU transmission or some default value



## 11-16/0643r0

- **Add the following text to 11ax SFD**
  - HE A-Control field for UL acknowledgement is optional in RX

## 11-16/0644r0

- **Add the following text in 11ax SFD**
  - SS Allocation in Per User Info field is defined by Starting Spatial Stream (3 bits) and Spatial Stream Number (3 bits)

## 11-16/0645r0

- **Add the following text to 11ax SFD**
  - Trigger frame includes a two-bits MPDU MU Spacing Factor subfield in trigger dependent per-user info subfield within per-User Info field of the basic variant of trigger frame
  - A STA uses *Minimum MPDU Start Spacing (in AP's HT Capabilities element)* \* (MPDU MU Spacing Factor +1) as the MU minimum MPDU start spacing in UL MU transmission.

## 11-16/0646r1

- **Add the following text in 11ax SFD**
  - The HE beamformer shall have the supported MPDU size large enough to avoid fragmentation except if the MPDU size 11,454 B is reached assuming that RU, MCS, and PPDU length for beamforming feedback are large enough

## 11-16/0646r1

- **Add the following text in 11ax SFD**
  - The BRP variant of the Trigger frame includes 8-bit Feedback Segment Retransmission Bitmap in Per STA Info.

## 11-16/0657r0

- **Add the following to the SFD:**
  - The Receive Operating Mode A-Control field shall include an UL MU Disable field that allows an HE STA to suspend and resume being scheduled by a Trigger frame or UL MU resource scheduling A-Control field

## 11-16/0657r0

- **Add the following to the SFD**
  - The Receive Operating Mode A-Control field shall include the following transmit operating parameters: max Tx NSS and max Tx power
  - Editorial note: we may want to change the name since it would now include transmit operating parameters

## 11-16/0640r3

- **Add the following text into 11ax SFD:**
  - 5.1 When a STA, that receives an HE PPDU with the same BSS Color as the BSS Color announced by its associated AP, identified from MAC header fields that the frame is an inter-BSS frame, the STA shall treat the frame as an inter-BSS frame after the FCS has been verified, unless the frame is identified as TDLS frame

## **11-16/0609r1**

- **Add to the SFD the HE NDP A frame format as shown in slide 15 and 16 of 0609r1**

## MU Motion #56

- **Move to modify the TG specification framework as in slide 101 to slide 105**
- **Move: Evgeny      Second: Chitto**
- **Y/N/A**
- **Accepted with no objection**

## 11-16/0591r0

- **Add the following text in the SFD:**
  - An AP indicates the value of  $OCW_{\min}$  used by all STAs for the random RU allocation process for the next UL MU OFDMA transmissions. The value of  $OCW_{\min}$  is transmitted through a dedicated field in the beacon frame.

## 11-16/0648

- Add to the TG Specification Framework document
  - MU-RTS shall not be carried in an HE MU PPDU
  - The CTS response to an MU-RTS shall be carried in a non-HT or a non-HT duplicate PPDU

## 11-16/0662r2

- **Add to the following to 11ax TG SFD:**
  - Allow the AP to choose any access category for contending to send the trigger frame
  - The chosen AC may give to the AP higher priority in accessing the channel compared to its associated STAs

# 11-16/0667

## Add to the TGax SFD:

- the basic variant Trigger frame shall contain the TID Aggregation Limit subfield in the Trigger Dependent Per User Info field that indicates the limit of the number of TIDs that can be aggregated by a STA in a multi-TID A-MPDU carried in the responding Trigger-based PPDU

- The responding STA shall not aggregate QoS Data frames in the multi-TID A-MPDU with a number of TIDs that exceeds the value indicated in the TID Aggregation Limit sub-field intended to it

## 11-16/0582r3

- **Add the following text in SFD?**
  - The spec shall define that AID=0 in the User Identifier subfield of the Per User Info field in a Trigger Frame indicates the resource allocation can be used for random access by any STA.

## SR Motion #8

- **Move to modify the TG specification framework as in slide 107 to slide 111**
- **Move: James Wang      Second: Yasu Inoue**
- **Y/N/A**
- **Motion accepted with no objection**

## 11-16/0647r0

- **Append SR Motion 1 in TG Specification Frame work document with the following text**
  - If the SR field in the HE-SIG-A of the HE SU PPDU or HE extended range SU PPDU is set to a TBD value, the medium condition for the STA shall indicate BUSY for the duration of the HE SU PPDU or HE extended range SU PPDU. Note that the TBD value of the SR field in the HE-SIG-A of the HE SU PPDU or HE extended range SU PPDU can be set when trigger frame is carried in the HE SU PPDU or HE extended range SU PPDU or under other TBD conditions.

## 11-16/0647r0

- **Append SR Motion 1 in TG Specification Framework document with the following text**
  - If the SR field in the HE-SIG-A of the HE MU PPDU is set to a TBD value, the spatial reuse transmission in the HE MU PPDU is limited to within the duration of the HE MU PPDU. Note that the TBD value of the SR field in the HE-SIG-A of the HE MU PPDU can be set when trigger frame is carried in the HE MU PPDU or under other TBD conditions.

## 11-16/0699r0

- **Add the following 4 bit SR field (in SIG A) for HE Trigger-Based PPDU**
- **One TBD value for SR Disallow Flag, (under TBD restrictions)**
- **One TBD value is reserved**
- **Remaining 14 values for SRP**
  - SRP = TX PWRAP + Acceptable Receiver Interference LevelAP
  - SR STA shall back-off its TX power based on
  - TX PWRSR STA < SRP –RSSItrigger frame@SR STA”

## 11-16/0699r0

- **Propose to include in SFD:**
  - For HE trigger-based PPDU, in HE SIG-A, 4 SR fields are signaled:
  - For 20MHz one SR field corresponding to entire 20MHz (other 3 fields indicate identical values)
  - For 40MHz two SR fields for each 20MHz (other 2 fields indicate identical values)
  - For 80MHz four SR fields for each 20MHz
  - For 160MHz four SR fields for each 40MHz
  - The exact location of each 20MHz for 80MHz BW is TBD”

## 11-16/0699r0

- **Add the 4 bits for SR field in SIG A of HE SU-PPDU and HE MU-PPDU, the SR field definition is TBD**

# **Comment Resolution Motions**

## Comment Resolution Motion #1

- **Move to accept the resolution of comment CID 2383 in document 11-16/0675r1**
- **Move: Reza Hedayat      Second: Bo Sun**
- **Y/N/A**
- **Accepted with no objection**

## CRM #2

- **Move to accept resolutions of comments**
  - 1682, 474, 1196, 1455, 2003, 844, 2122, 1197, 356, 2006, 2533, 2285, 1456, 1457, 1678, 1677, 912, 913, 1686, 1687, 1846, 2002, 843, 2121, 845, 296, 1007, 541, 2538, 2124, 524, 540, 2168, 2004
- **In document 11-16/0610r3**
- **Move: Ross Jian Yu      Second: Bo Sun**
- **Y/N/A**
- **Accepted with no objection**

## CRM #3

- **Move to accept resolutions to CIDs 2129, 2286, 2539, 2537, 2128, 2013, 2009, 2167, 2169, 865, 2127, 2125, 2534, 2008, 2014, 2015, 2018 in 11-16/0610r4**
- **Move: Ross Jian Yu      Second: Bo Sun**
- **Y/N/A**
- **Accepted wth no objection**

## CRM #4

- **Move to accept resolutions for the following CIDs in 11-16/0614r1:**
  - 348, 351, 466, 467, 877, 878, 879, 1030, 1185, 1451, 1605, 1606, 1607, 1757, 1922, 2352, 2507, 2511, 2512, 2513, 2514, 2515, 2516, 2828.
- **Move: Lochan Verma    Second: Bo Sun**
- **Y/N/A**
- **Accepted with no objection**

## CRM #5

- **Move to accept resolutions for the following CIDs in 11-16/0615r1:**
  - 852, 853, 948, 1786, 1872, 1873, 2126.
- **Move: Lochan Verma    Second: Bo Sun**
- **Accepted with no objection**

## CRM #6

- **Move to accept the resolutions for the following CIDs in 11-16/0623r1:**
  - 347, 531, 532, 533, 534, 535, 536, 850, 2093, 2094, 2095 .
- **Move: Bin Tian                      Second: Bo Sun**
- **Accepted with no objection**

## CRM #7

- **Move to accept resolutions for the following CIDs in 11-16/0625r2:**
  - 279, 280, 282, 283, 839, 872, 1041, 1045, 1188, 1189, 1190, 1191, 1934, 1935, 1936, 1937, 1938, 1939, 1940, 1941, 1942, 1943, 1944, 2345, 2364, 2520.
- **Move: Bin Tian    Second: Bo Sun**
- **Accepted with no objection**

## CRM #8

- **Move to accept resolutions for the following CIDs in 11-16/0634r1:**
  - 542, 837, 881, 1186, 1032, 1612, 1613, 1614, 1615, 1844, 1929
- **Move: Yan Zhang      Second: Bo Sun**
- **Accepted with no objection**

## CRM #9

- **Move to accept resolutions for the following CIDs in 11-16/0658r2:**
  - 353, 354, 1953, 2527, 2528, 2725, 888, 889, 890, 891, 893, 894, 895, 896, 897, 1954, 1955, 1956, 2529, 2530, 1111, 1112, 1192, 1193, 1758, 1851, 1852, 2346, 1951, 1964, 1952, 2367, 1789
- **Move: Kiseon Ryu      Second: Bo Sun**
- **Y/N/A**
- **Accepted with no objection**

## CRM #10

- **Move to accept resolutions for the following CIDs in 11-16/0659r1:**
  - 313, 316, 529, 848, 530, 849
  - 1933, 2518, 2154, 2155
- **Move: Kiseon Ryu      Second: Bo Sun**
- **Accepted with no objection**

## CRM #11

- **Move to accept resolutions for the following CIDs in 11-16/0663r4:**
  - 1925, 835, 870, 880, 1105, 1609, 2676, 2136, 2148, 2153, 2243, 2342, 2675
- **Move: Ke Yao      Second: Bo Sun**
- **Y/N/A**
- **Accepted with no objection**

## CRM #12

- **Move to accept resolutions for the following CIDs in 11-16/0681r3:**
  - 215, 2486
- **Move: Daewon Lee      Second: Bo Sun**
- **Y/N/A**
- **Accepted with no objection**

## CRM #13

- **Move to accept resolutions for the following CIDs in 11-16/0653r5:**
  - 277,519,521,838,886,1039,1187,1931, 2360, 2361, 2362, 2134
- **Move: Xiaogang Chen    Second: Bo Sun**
- **Accepted with no objection**

## CRM #14

- **Move to accept resolutions for the following CIDs in 11-16/0682r2:**
  - 2566, 2474, 2081, 2080, 2079, and 2078
  - 1866, 2087, 2086, 2089, and 2092
- **Motion: Daewon Lee    Second: Bo sun**
- **Accepted with no objection**

## Goals for July 2016

- **Continue with the comment resolutions.**

## **Conference call times**

- **June (2, 16, 30), July 14**      **10:00 – 12:00 ET**
- **June 23, July 7, August 4**      **20:00 – 22:00 ET**