IEEE P802.11  
Wireless LANs

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| TGbe 2020 November to January teleconference minutes | | | | |
| Date: 2020-11-05 | | | | |
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|  |  |  |  |  |

Abstract

This document contains the minutes for November 2020 to January 2021 TGbe teleconferences.

Revisions:

* Rev0: First revision of the document. Added reference to teleconference calls 2nd of November. Added minutes to teleconference call 4th of November.
* Rev1: Added references to MAC teleconference call 5th of November. Added minutes to teleconference call 9th of November.
* Rev2: Added minutes to teleconference call 11th of November. Some typological updates, thanks to Alfred Asterjadhi. Added

# Monday 02 November, 19:00 – 21:00 ET

Split PHY and MAC.

* PHY: <https://mentor.ieee.org/802.11/dcn/20/11-20-1767-00-00be-minutes-for-tgbe-phy-ad-hoc-cc-nov-2020-to-jan-2021.docx>
* MAC: <https://mentor.ieee.org/802.11/dcn/20/11-20-1765-02-00be-minutes-for-tgbe-mac-ad-hoc-teleconferences-in-nov-2020-and-jan-2021.docx>

# Wednesday 04 November, 9:00 – 11:00 ET

**Introduction**

1. The Chair, Alfred Asterjadhi (Qualcomm), calls the meeting to order at 9:00 ET. The Chair notifies that the agenda is in 1615r7.
2. IEEE 802 and 802.11 IPR policy and procedure. 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 please speak up now. Nobody speaks/writes up.
3. The Chair goes through **Patent, Participation and policy related subclause.**
4. Attendance reminder.

* Participation slide: <https://mentor.ieee.org/802-ec/dcn/16/ec-16-0180-05-00EC-ieee-802-participation-slide.pptx>
* Please record your attendance during the conference call by using the IMAT system:
  + 1) login to [imat](https://imat.ieee.org/attendance), 2) select “802.11 Telecons (<Month>)” entry, 3) select “C/LM/WG802.11 Attendance” entry, 4) click “TGbe <MAC/PHY/Joint> conference call that you are attending.
* If you are unable to record the attendance via [IMAT](https://imat.ieee.org/attendance) then please send an e-mail to Dennis Sundman ([dennis.sundman@ericsson.com](mailto:dennis.sundman@ericsson.com)) and Alfred Asterjadhi ([aasterja@qti.qualcomm.com](mailto:aasterja@qti.qualcomm.com))
* Please ensure that the following information is listed correctly when joining the call:
  + "[voter status] First Name Last Name (Affiliation)"

1. Agenda approved with unanimous consent.
2. Announcements:
3. Technical Submissions**-Sounding**
   1. [**1436r5**](https://mentor.ieee.org/802.11/dcn/20/11-20-1436-05-00be-ndpa-and-mimo-control-field-design-for-eht.pptx)**, “NDPA and MIMO Control Field Design for EHT” – Sameer Vermani**

**Summary:** The authors provide explicit design proposals for how to extend NDPA and MIMO control fields for EHT.

**Discussion:**

C: It looks like 7 bits are enough for the BW indication, but you mention 9 bits.

A: Some people seem to prefer a bitmap rather than a table, and in that case 9 bits are required.

C: Regarding the MIMO Control Field, have you thought about the single vs multi-AP case for this field?

A: No. I would think the reserved bits should suffice.

C: From slide 6, what is the special information?

A: I have nothing particular in mind, but when everything is filled up, we are left with only 2 bytes.

C: On slide 7, you suggest to indicate multi-AP and single-AP sounding.

A: I don’t want to go into detailed designs. If certain information needs to be indicated, it should be possible to convey it here. You could use the special STA Info Version field.

**SP2:**

Do you agree the design of STA Info field as shown below

* Partial BW Info field (naming is TBD) can be 7-9 bits [the figure will be modified accordingly if the field size is different from 9 bits]
* Size of codebook size may increase, and the location of the Nc and Codebook Size fields are TBD



**Result:** Yes/No/Abstain/No-answer: 97/27/62/158.

**SP 3:**

Do you agree with the EHT MIMO Control Field Design shown below?



* Size of codebook information may increase
* Reserved bits (number and location) may change
* Sounding Dialogue Token and Feedback Segment related bits are TBD
* Partial BW Info field (naming is TBD) can be 7-9 bits [the figure will be modified accordingly if the field size is different from 9 bits]

**Result:** Yes/No/Abstain/No-answer: 113/6/70/156

* 1. [**1643r1**](https://mentor.ieee.org/802.11/dcn/20/11-20-1643-01-00be-implicit-sounding-performance.pptx)**, “Implicit Sounding Performance” – Oren Kedem**

**Summary:** The authors have performed MU-MIMO tests in lab with focus on channel aging and calibration error. Channel aging is not much of an issue in the static case, however in the far and near movement scenario the EVM shows a drop. Whey claim that when calibration error is equal or smaller than -30dB, implicit sounding has better performance than explicit sounding. Explicit and implicit sounding performance becomes similar when sounding interval increases. The authors believe it is not hard to obtain -30dB calibration error.

1. Motions (concentrated within the second 60 mins of the call). [841r33](https://mentor.ieee.org/802.11/dcn/20/11-20-0841-33-00be-tgbe-motions-list-for-teleconferences.pptx) Motions list for teleconferences
   1. **Move to approve TGbe minutes of teleconferences listed below:**
      * Teleconferences Sept-Nov: <https://mentor.ieee.org/802.11/dcn/20/11-20-1496-08-00be-sep-nov-tgbe-teleconference-minutes.docx>

**Move:** Michael Montemurro, **Second:** Bin Tian

**Discussion: No discussion.**

**Result: Approved with unanimous consent.**

* 1. **Motion 137**

Move to add to the 11be SFD, candidate specification text in [11-20/566r86](https://mentor.ieee.org/802.11/dcn/20/11-20-0566-86-00be-compendium-of-straw-polls-and-potential-changes-to-the-specification-framework-document.docx) that is identified with the following tags:

* + SP244, SP245, SP246, SP247, SP248, SP249, SP250, SP251, SP252, SP253,
  + SP254, SP255, SP256, SP257, SP258, SP259, SP262, SP263,
  + SP264, SP265, SP266, SP267, SP268, SP269, SP270, SP271, SP272, SP273,
  + SP274, SP275, SP276, SP277, SP278, SP279, SP280, SP281, SP282, SP283,
  + SP284, SP285, SP286, SP287, SP288, SP289, SP290, SP291, SP292, SP293,
  + SP294, SP295.

**Move:** Stephen McCann, **Second:** Subir Das

**Discussion:** No discussion.

**Result:** Approved with unanimous consent.

Note: These are all candidate SFD texts highlighted in yellow that have NOT received a request for further discussion

* 1. **Motion 138**

Move to accept changes to the TGbe draft as specified in the following documents:

* + [1650r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1650-00-00be-proposed-tbd-fix-for-mld-association-sa-query.docx)

**Move:** Po-Kai Huang, **Second:** Rojan Chitrakar

**Discussion:** No discussion.

**Result:** Approved with unanimous consent.

Note: These are all proposed draft texts (PDTs) that obtained ≥ 75% support during the straw poll phase and that have NOT received a request for further discussion

* 1. **Motion 139**

Move to add to the 11be SFD, candidate specification text in [11-20/566r63](https://mentor.ieee.org/802.11/dcn/20/11-20-0566-63-00be-compendium-of-straw-polls-and-potential-changes-to-the-specification-framework-document.docx) that is identified with the following tag:

* + SP175

**Move:** Ron Porat, **Second:** Bin Tian

**Discussion:** No discussion.

**Result:** Approved with unanimous consent.

*SP175: Do you agree to the proposed RU table as attached on slide 5 of 1138r4?*

*[20/1138r4 (Large M-RU Table, Ron Porat, Broadcom), SP#3, Y/N/A: 30/9/8]*

* 1. **Motion 140**

Move to change the paragraph below in 36.3.18.3 of TGbe D0.1 as follows:

* Transmit center frequency and the symbol clock frequency for all transmit antennas and frequency segments shall be derived from the same reference oscillator. The symbol clock frequency and transmit center frequency tolerance shall be ±20 ppm in the 5 GHz and 6 GHz bands and ±25 ppm in the 2.4 GHz band. EHT TB PPDU format is subject to additional requirements as defined in 36.3.14 (Non-HT duplicate transmission)

**Move:** Wook Bong Lee, **Second:** Ross Jian Yu

**Discussion:** No discussion.

**Result:** Approved with unanimous consent.

*SP: Do you agree to change from +-2 ppm to +-25 ppm for 2.4 GHz band transmit center frequency tolerance? Note that it is a typo in section 36.3.18.3. Please refer 11-20/1252r2.*

*(SP result: Approved with unanimous consent)*

* 1. **Motion 141**

Move to add to the 11be SFD, the following text:

* + The allowed values of maximum NLTF receive capability for single-user transmission are 4, 8, and 16.
    - Note: The value of maximum NLTF=16 is available in R2
  + The allowed values of maximum NLTF receive capability for multiple-user transmission are 4, 8, and 16.
    - Note 1: This capability is for both OFDMA and non-OFDMA MU-MIMO transmission.
    - Note 2: The value of maximum NLTF=16 is available in R2

**Move:** Rui Cao, **Second:** Junghoon Suh

**Discussion:** No discussion.

**Result:** Approved with unanimous consent.

Note 1: These are all candidate SFD texts highlighted in yellow that have received a request for further discussion

Note 2: SP results are SP260: 34Y,2N,17A and SP261: 38Y, 2N, 15A: see next slide for SP content

1. **Amending agenda. To continue the sounding SPs is 1436r5. There is no objection to amend the agenda. Amended agenda approved.**
2. [**1436r5**](https://mentor.ieee.org/802.11/dcn/20/11-20-1436-05-00be-ndpa-and-mimo-control-field-design-for-eht.pptx)**, “NDPA and MIMO Control Field Design for EHT” – Sameer Vermani**

**SP4**

Do you agree that the U-SIG in NDP will carry the puncturing information for the entire PPDU BW?

* + Same 5 bit field as other non-OFDMA PPDUs

**Discussion:** No discussion.

**Result:** Yes/No/Abstain/No-answer: 107/2/53/179

**SP5**

Do you agree with the following two rules

* + - NDPA shall not request feedback on a 242RU that is signaled as punctured in the U-SIG of the NDP that follows it
    - MIMO Control Field’s Partial BW Info field (naming TBD) will be the same as the one in NDPA

**Discussion:** No discussion.

**Result:** Yes/No/Abstain/No-answer: 121/2/45/174

1. **AoB: None.**
2. **Recess at 10:57.**

# Thursday 05 November, 9:00 – 11:00 ET

Only MAC:

* MAC: <https://mentor.ieee.org/802.11/dcn/20/11-20-1765-02-00be-minutes-for-tgbe-mac-ad-hoc-teleconferences-in-nov-2020-and-jan-2021.docx>

# Monday 9 November, 9:00 – 11:00 ET

**Introduction**

1. The Chair, Alfred Asterjadhi (Qualcomm), calls the meeting to order at 9:01 ET. The Chair notifies that the agenda is in 1615r9.
2. IEEE 802 and 802.11 IPR policy and procedure. 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 please speak up now. Nobody speaks/writes up.
3. The Chair goes through **Patent, Participation and policy related subclause,** which is located at the bottom of the agenda document.
4. Attendance reminder.

* Participation slide: <https://mentor.ieee.org/802-ec/dcn/16/ec-16-0180-05-00EC-ieee-802-participation-slide.pptx>
* Please record your attendance during the conference call by using the IMAT system:
  + 1) login to [imat](https://imat.ieee.org/attendance), 2) select “802.11 Telecons (<Month>)” entry, 3) select “C/LM/WG802.11 Attendance” entry, 4) click “TGbe <MAC/PHY/Joint> conference call that you are attending.
* If you are unable to record the attendance via [IMAT](https://imat.ieee.org/attendance) then please send an e-mail to Dennis Sundman ([dennis.sundman@ericsson.com](mailto:dennis.sundman@ericsson.com)) and Alfred Asterjadhi ([aasterja@qti.qualcomm.com](mailto:aasterja@qti.qualcomm.com))
* Please ensure that the following information is listed correctly when joining the call:
  + "[voter status] First Name Last Name (Affiliation)"

1. The Chair goes through the agenda. Agenda approved with unanimous consent.
2. Announcements:
3. Technical Submissions**-Sounding**
   1. [**1643r1**](https://mentor.ieee.org/802.11/dcn/20/11-20-1643-01-00be-implicit-sounding-performance.pptx)**, “Implicit Sounding Performance” – Oren Kedem [Q&A+SP]**

Oren recaps the presentation.

**Discussion:**

C: I think your results look very optimistic.

A: We have chosen values which we believe are realistic or even pessimistic.

C: In the simulations, did you assume near or far movement?

A: For the simulations we only put results here for near movement.

C: Would be very nice to see real world evaluations before we can commit on it.

A: We would still like to run the SP since

SP:

Do you support to add implicit sounding in R2 as an optional mode in TGbe?

Result: Yes/No/Abstain/No-answer: 79/47/40/80.

1. Technical Submissions**-Trigger** (one or more submissions could move after motions)
   1. [**1669r2**](https://mentor.ieee.org/802.11/dcn/20/11-20-1669-02-00be-spatial-stream-allocation-in-trigger-frames.pptx)**, “Spatial-stream-allocation-in-trigger-frames” – Mengshi Hu**

**Summary:** Due to increased number of antennas in .11be, more spatial streams are possible compared to .11ax. The authors show 3 options on how to signal this.

**Discussion:**

Yes. Discussion regarding pros and cons for the different options.

**SP1:**

Do you agree that a 4-bit Number of Spatial Streams is used fo SS Allocation of a non-MU-MIMO user in the User Info field of a trigger frame?

Discussion:

Short discussion regarding maybe running strawpolls in different order.

**Result:** Yes/No/Abstain/No-answer: 49/51/58/98.

**SP2:**

Do you agree that a 4-bit Starting Spatial Stream and a 2-bit Number Of Spatial Streams are used for SS Allocation of an MU-MIMO user in the User Info field of a trigger frame?

**Discussion:**

C: Can you defer this straw poll?

A: Yes.

*The Chair asks if it is OK to amend the agenda and run motions now. No objections, agenda amended.*

1. [841r36](https://mentor.ieee.org/802.11/dcn/20/11-20-0841-36-00be-tgbe-motions-list-for-teleconferences.pptx) Motions list for teleconferences
   1. **Motion 142**

**Move to add to the 11be SFD, candidate specification text in** [**11-20/566r90**](https://mentor.ieee.org/802.11/dcn/20/11-20-0566-90-00be-compendium-of-straw-polls-and-potential-changes-to-the-specification-framework-document.docx) **that is identified with the following tags:**

SP296, SP297, SP298, SP299, SP300, SP301, SP302, SP303, SP304, SP305,

SP306, SP307, SP308, SP309, SP310.

**Move: Bin Tian Second: Laurent Cariou**

**Discussion: No discussion.**

**Result: Approved with unanimous consent.**

**Note: These are all candidate SFD texts highlighted in yellow that have NOT received a request for further discussion**

* 1. **Motion 143**

**Move to accept changes to the TGbe draft as specified in the following documents:**

* + - [1726r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1726-00-00be-pdt-phy-ppdu-formats-for-clause-36-1-4.docx)

**Move: Jinsoo Choi Second: Edward Au**

**Discussion: No discussion.**

**Result: Approved with unanimous consent.**

**Note: These are all proposed draft texts (PDTs) that obtained ≥ 75% support during the straw poll phase and that have NOT received a request for further discussion**

1. Technical Submissions**-Trigger** (one or more submissions could move after motions)

1. [**1685r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-1685-00-00be-ul-length-indication-in-trigger-frame.pptx)**, “UL length indication in trigger frame” – Ross Jian Yu**

**Summary:** The authors propose how an EHT AP shall set the length field in L\_SIG for EHT TB PPDU.

**Discussion:**

C: It is always tricky with these ceils, floors +-1 etc. Have you double-checked that the +2 in SP2 keeps the duration correct?

A: Yes.

C: The point here is that EHT TB PPDU always use m = 2?

A: Yes.

C: The L\_SIG length for both HE and TB PPDU will have the same value, right?

A: Yes.

Some discussion regarding autodetection in HE and EHT.

**SP1**

Do you agree that an EHT AP shall set the UL Length subfield of a trigger frame to the value given by the following equation with m = 2 if the trigger frame is to solicit EHT TB PPDU?

* + 1. This is for R1



**Discussion:**

C: I believe we are straw polling the future.

A: This is needed now already now.

C: Why not set m = 0?

A: By setting it to m = 2, the AP does not need to make any change compared to .11ax.

**Result:** Yes/No/Abstain/No-answer: 52/23/88/95

*The Chair asks if there is any objection to amend the agenda by adding 1429r2 to the agenda. No objection. Amended agenda approved.*

1. Deferred SPs on Trigger
   1. [**1429r2**](https://mentor.ieee.org/802.11/dcn/20/11-20-1429-02-00be-enhanced-trigger-frame-for-eht-support.pptx)**, “Enhanced Trigger Frame for EHT Support” – Steve Shellhammer**

**SP7:**

* Do you agree to use four bits of the Trigger Frame User Info Field Spatial Stream Allocation subfield to indicate the starting spatial stream, and two bits to indicate the number of per-user spatial streams?
  + Note: This supports up to a total of 16 spatial streams with up to four spatial streams per-user

**Discussion:**

C: Do you have a unified SU/MU case?

A: Yes, we would use this 4+2 bits.

C: How do you indicate that some bits are used for SU or MU MIMO.

A: We don’t distinguish it.

C: We still prefer to have SU/MU MIMO indication. If you can defer the SP I would appreciate it.

A: Ok, I defer it.

**SP9:**

* Do you agree to include a Lower/Upper 160 MHz Segment bit in the Trigger Frame User Info Field?
  + Note: Combining this bit with the 8-bit RU Allocation subfield provides an effective 9-bit field, which is sufficient for supporting all RUs and MRUs. (See Backup)

**Discussion:**

C: I am not sure this is good notation compared to MAC, where we typically have primary/secondary rather than upper/lower etc.

Result: Yes/No/Abstain/No-answer: 56/33/58/109.

1. AoB.
   1. C: Do we need the next call?  
      A: Mainly presentations on the sounding.
2. Adjourn at 11:00 ET, final call of the plenary.

# Wednesday 11 November 10:00 – 12:00 ET

**Introduction**

1. The Chair, Alfred Asterjadhi (Qualcomm), calls the meeting to order at 9:01 ET. The Chair notifies that the agenda is in 1615r11.
2. IEEE 802 and 802.11 IPR policy and procedure. 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 please speak up now. Nobody speaks/writes up.
3. The Chair goes through **Patent, Participation and policy related subclause,** which is located at the bottom of the agenda document.
4. Attendance reminder.

* Participation slide: <https://mentor.ieee.org/802-ec/dcn/16/ec-16-0180-05-00EC-ieee-802-participation-slide.pptx>
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* If you are unable to record the attendance via [IMAT](https://imat.ieee.org/attendance) then please send an e-mail to Dennis Sundman ([dennis.sundman@ericsson.com](mailto:dennis.sundman@ericsson.com)) and Alfred Asterjadhi ([aasterja@qti.qualcomm.com](mailto:aasterja@qti.qualcomm.com))
* Please ensure that the following information is listed correctly when joining the call:
  + "[voter status] First Name Last Name (Affiliation)"

1. Announcements:
   * We are planning to deliver draft 0.2 in December. To make it into 0.2 it needs to be added to motion list before November 19.

The Chair asks if there is any suggestions for modifications to the **agenda**. Nobody speaks up. The agenda is approved with unanimous consent.

1. Technical Submissions**-Sounding**
   1. [**1747r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-1747-00-00be-eht-ndpa-partial-bw-info-design.pptx)**, “EHT NDPA Partial BW Info Design” – Rui Cao**

Summary: The authors propose a design for signalling the partial BW info. They propose a bitmap, which requires 9 bits.

Discussion:

C: I think NDPA must support feedback of 20 MHz for 320 MHz.

A: As I understand it, that will not be needed.

C: I prefer the table based method since we can signal in 20 MHz resolution even for 320 MHz.

*Some more discussion on the restriction of only allowing 40 MHz resolution for 320 MHz.*

* 1. [**1469r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-1469-00-00be-eht-sounding-discussion.pptx)**, “EHT sounding discussion” – Liwen Chu**

Summary: The authors present ideas and suggestions for simplifications of the 802.11ax sounding, to better support the larger number of spatial streams and wider bandwidth.

Discussion:

C: The beamforming report, will it exceed the maximal length of MPDU?

A: It can happen.

C: I would like to check with our implementation team, it would be good if you can wait with the straw poll.

* 1. [**1814r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-1814-00-00be-partial-bw-info-field-design-in-ndpa.pptx)**, “Partial BW Info Field Design in NDPA” – Eunsung Park**

Summary: The authors propose 3 different options for the Partial BW Info Field design. The first 2 options are based on bitmaps, and the 3rd option based on table.

Discussion:

C: So, with memory in option 3 you refer to the new table?

A: Yes.

* 1. [**1015r5**](https://mentor.ieee.org/802.11/dcn/20/11-20-1015-05-00be-eht-ndpa-frame-design-discussion.pptx)**, “EHT NDPA Frame Design Discussion” – Ross Jian Yu**

Summary: This is an updated presentation.

Discussion:

Some discussion whether bitmap or table is a better design principle.

C: You are actually not really proposing a clear table design since you use 8 bits plus some additional information.

A: True.

1. Deferred SPs **on Trigger**
   * *Pending Requests*
2. AoB: No other business.
3. Adjourn at 11:41 ET.