IEEE P802.11  
Wireless LANs

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| IEEE 802.11bf – Teleconference Minutes November 2021-January 2022 | | | | |
| Date: 2021-12-20 | | | | |
| Author(s): | | | | |
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Abstract

This document contains minutes for the TG 802.11bf teleconferences in November 2021 – January 2022.

Rev 0: Minutes for TG 802.11bf teleconference on the 22nd of November 2021.

Rev1: Minutes for TG 802.11bf teleconference on the 23rd of November 2021 added.

Rev2: Minutes for TG 802.11bf teleconference on the 29th of November 2021 added.

Rev3: Minutes for TG 802.11bf teleconference on the 30th of November 2021 added.

Rev4: Minutes for TG 802.11bf teleconference on the 6th of December 2021 added.

Rev5: Minutes for TG 802.11bf teleconference on the 7th of December 2021 added.

Rev6: Minutes for TG 802.11bf teleconference on the 13th of December 2021 added.

Rev7: Minutes for TG 802.11bf teleconference on the 14th of December 2021 added.

Rev8: Minutes for TG 802.11bf teleconference on the 20th of December 2021 added.

**Monday, November 22, 2021, 9:00-11:00 am (ET)**

**Meeting Agenda:**

The meeting agenda is shown below, and published in the agenda document:

<https://mentor.ieee.org/802.11/dcn/21/11-21-1883-00-00bf-tgbf-meeting-agenda-2021-11-12.pptx>

1. Call the meeting to order
2. Patent policy and logistics
3. TGbf Timeline
4. Call for contribution
5. Teleconference Times
6. Presentation of submissions
7. Any other business
8. Adjourn
9. The vice chair, Assaf Kasher, calls the meeting to order at 9:06am (about 40 persons are on the call after a few minutes of the meeting).
10. The vice chair goes through “Meeting Protocol, Attendance, Voting & Documentation Status” (slide 4), “Participants have a duty to inform the IEEE” (slide 6), and “Ways to inform IEEE” (slide 7).

The vice chair makes a Call for Potentially Essential Patents. No potentially essential patents reported, and no questions asked.

The vice chair goes through “Other Guideline for IEEE WG meetings” (slide 8), “Patent related information” (slide 9), “ IEEE SA Copyright Policy” (slides 10 and 11), “Participant behavior in IEEE-SA activities is guided by the IEEE Codes of Ethics & Conduct” (slide 12), “Participants in the IEEE-SA “individual process” shall act independently of others, including employers”(slide 13), and “IEEE-SA standards activities shall allow the fair & equitable consideration of all viewpoints” (slide 14), and “Required notices” (slide 15).

The vice chair goes through the agenda (slide 16) and asks if there are any questions or comments on the agenda.

The vice chair asks if there is any objection to approve the modified agenda. No objection from the group so the agenda is approved.

The chair, Tony Han, announces that he has joined the call.

1. The Chair presents the TGbf timeline (slides 17 and 18). D0.1 is moved to March, but the remaining milestones have not been changed.

Q: Claudio points out that even if D0.1 is delayed until March, we still must work hard to meet this milestone.

Q: I believe four months will not be sufficient for moving from D0.1 to D1.0, so I expect we will need to also delay the milestone for D1.0.

Q: I believe it would be appropriate to add Comment Collection to the timeline.

1. The Chair presents slide 19, Call for contributions.
2. The Chair presents the teleconference times (slide 20).
3. Presentations:

**11-21/1754r2, “Legacy Support in 11bf – Next Steps”, Rojan Chitrakar (Panasonic):** The topic was brought up in the July meeting, proposing that 11bf should be supported by devices with legacy PHY (11n and 11ac).

Q: Why as a user would I be interested in upgrading e.g., 11ac with 11bf instead of just buying a new AP supporting 11ax?

A: I am thinking that there are huge legacy installations where 11bf may be useful, but an upgrade to 11ax would not be needed. You can also view it like “why don’t make use of all the devices out there”.

Q: I see a problem in that available implementations do not support features that are not certified by WFA and some of the features you need are not certified.

A: I believe it is implemented in many devices. Maybe not tested.

**11-21/1745r2, “Opportunistic WLAN Sensing”, Rajat Pushkarma (Panasonic):**  In this contribution, the usage of regular PPDU (A ‘regular PPDU’ is defined as any PPDU which is not an NDP for sensing) exchange which can be utilized to perform sensing measurement and obtain CSI for sub-7GHz.

Measurement results are also shown, where a 90 % accuracy for detection is reported.

Q: I am not convinced that it is sufficient to include information about TX parameters to allow for the sensing receiver to be able to compensate for variations.

A: TX power and beamforming matrix.

Q: On slide 3, are you thinking of using the Data PPDU or the ACK for opportunistic sensing?

A: In principle both could be used.

The chair asks about future plans. Rajat explains that he will discuss more off-line and based on the outcome have a SP in a future session.

**11-21/1799r0, “(E)DMG multi/bistatic radar”, Assaf Kasher (Qualcomm):** The contribution discusses a general proposal for the PHY and lower MAC of a bistatic/multi-static radar/sensing in DMG and EDMG. It assumes a single Tx/Rx chain per STA.

Q: Do you think we need any new field in the packets?

A: Yes, I expect so.

**Straw Poll 1:** Do you agree to add to the SFD the following text:

* EDMG transmitter initiator bi-static sensing is based on a BRP request in a BRP-RX/TX, BRP-TX, BRP-RX PPDU and the BRP response
* Feedback for the measurement is carried in the BRP response
  + Feedback may be delayed
  + Feedback may be aggregated (single feedback for some measurements, to facilitate doppler measurement)

**Result:** Y/N/A: 12/1/22

1. The chair asks if there is AoB. No response from the group.
2. The meeting is adjourned without objection at 11:02am.

**List of Attendees:**

|  |  |  |  |
| --- | --- | --- | --- |
| Breakout | Timestamp | Name | Affiliation |
| TGbf | 11/22 | Aboulmagd, Osama | Huawei Technologies Co., Ltd |
| TGbf | 11/22 | Au, Oscar | Origin Wireless |
| TGbf | 11/22 | Aygul, Mehmet | VESTEL; IMU |
| TGbf | 11/22 | B, Hari Ram | NXP Semiconductors |
| TGbf | 11/22 | Beg, Chris | Cognitive Systems Corp. |
| TGbf | 11/22 | Chitrakar, Rojan | Panasonic Asia Pacific Pte Ltd. |
| TGbf | 11/22 | da Silva, Claudio | Meta Platforms, Inc. |
| TGbf | 11/22 | Dong, Xiandong | Xiaomi Inc. |
| TGbf | 11/22 | feng, Shuling | MediaTek Inc. |
| TGbf | 11/22 | Gao, Ning | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 11/22 | Hsu, Ostrovsky | Xiaomi Inc. |
| TGbf | 11/22 | Huang, Lei | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 11/22 | Kamel, Mahmoud | InterDigital, Inc. |
| TGbf | 11/22 | Kim, Sang Gook | LG ELECTRONICS |
| TGbf | 11/22 | Lanante, Leonardo | Ofinno |
| TGbf | 11/22 | Lim, Dong Guk | LG ELECTRONICS |
| TGbf | 11/22 | Luo, Chaoming | Beijing OPPO telecommunications corp., ltd. |
| TGbf | 11/22 | NANDAGOPALAN, SAI SHANKAR | Synaptics |
| TGbf | 11/22 | Ozbakis, Basak | Vestel Electronics Corp. |
| TGbf | 11/22 | Pushkarna, Rajat | Panasonic Asia Pacific Pte Ltd. |
| TGbf | 11/22 | Raissinia, Alireza | Qualcomm Incorporated |
| TGbf | 11/22 | Rantala, Enrico-Henrik | Zeku |
| TGbf | 11/22 | Sahoo, Anirudha | National Institute of Standards and Technology |
| TGbf | 11/22 | Shellhammer, Stephen | Qualcomm Incorporated |
| TGbf | 11/22 | Trainin, Solomon | Qualcomm Incorporated |
| TGbf | 11/22 | Tsai, Tsung-Han | MediaTek Inc. |
| TGbf | 11/22 | Wei, Dong | NXP Semiconductors |
| TGbf | 11/22 | Wilhelmsson, Leif | Ericsson AB |
| TGbf | 11/22 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |
| TGbf | 11/22 | Zhou, Pei | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |

**Tuesday, November 23, 2021, 9:00-11:00 am (ET)**

**Meeting Agenda:**

The meeting agenda is shown below, and published in the agenda document:

<https://mentor.ieee.org/802.11/dcn/21/11-21-1883-01-00bf-tgbf-meeting-agenda-2021-11-12.pptx>

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4. Call for contribution
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7. Any other business
8. Adjourn
9. The chair, Tony Xiao Han, calls the meeting to order at 9:06am (about 40 persons are on the call after a few minutes of the meeting).
10. The chair goes through “Meeting Protocol, Attendance, Voting & Documentation Status” (slide 4), “Participants have a duty to inform the IEEE” (slide 6), and “Ways to inform IEEE” (slide 7).

The chair makes a Call for Potentially Essential Patents. No potentially essential patents reported, and no questions asked.

The chair goes through “Other Guideline for IEEE WG meetings” (slide 8), “Patent related information” (slide 9), “ IEEE SA Copyright Policy” (slides 10 and 11), “Participant behavior in IEEE-SA activities is guided by the IEEE Codes of Ethics & Conduct” (slide 12), “Participants in the IEEE-SA “individual process” shall act independently of others, including employers”(slide 13), and “IEEE-SA standards activities shall allow the fair & equitable consideration of all viewpoints” (slide 14), and “Required notices” (slide 15).

The chair goes through the agenda (slide 17) and asks if there are any questions or comments on the agenda.

The chair asks if there is any objection to approve the modified agenda. No objection from the group so the agenda is approved.

1. The Chair presents the TGbf timeline (slide 18). D0.1 is moved to March and it has also been suggested by group members to also move D1.0 from July to September.

Q: What is the process to move from where we are today with the SFD to D0.1?

A: The procedure is that we will ask people in the group to be responsible for different parts of the D0.1 and take the corresponding parts in the SFD write the corresponding specification text.

Q: The SFD is viewed as basically a draft of a draft?

A: The SFD contains the scope, but the text needs to be expanded.

The chair asks if there is any concern to update the timeline as proposed on slide 18. There is not comments from the group so the change is approved with unanimous consent.

1. The Chair presents slide 20, Call for contributions.
2. The Chair presents the teleconference times (slide 21).
3. Presentations:

**11-21/1799r0, “(E)DMG multi/bistatic radar”, Assaf Kasher (Qualcomm):**

The contribution was presented in the latest teleconference, but there was not enough time to run all the SPs.

The SPs are slightly updated during the presentation and these can be found in r1 of the document once uploaded.

Q: Would it make sense to write sensing receiver instead of receiver?

A: OK. The SP is updated accordingly.

Q: Is it possible to make the SP applicable for DMG as well?

A: Yes. The SP is updated accordingly.

**Straw poll 2:** Do you agree to add to the SFD the following text:

* EDMG/DMG sensing receiver initiator bi-static sensing is based on a BRP request frame that includes a request for the responder to transmit a BRP-RX/TX, BRP-TX, BRP-RX PPDU.

**Result:** Y/N/A: 11/0/18

**Straw poll 3:** Do you agree to add to the SFD the following text:

* EDMG/DMG Bi/multi-static sensing capability set may include (at least):
  + TRN field Golay sequence lengths supported
  + number of directions in Tx and Rx (Number of Tx/RX AWV sets used for sensing)
  + Feedback capabilities
  + Beam sets in which every beam has direction, gain, and beam width.

**Result:** Y/N/A: 12/0/18

**Straw poll 4:** Do you agree to add to the SFD the following text:

* In an EDMG/DMG Bi/Multi-static measurement setup exchange (at last) the following parameters exchanged:
  + set of beam directions in TX (sets of TX AWV settings to be used in the measurements)
  + set of beam directions in RX (sets of RX AWV settings to be used in the measurements)
  + beamforming TRN field information such as TRN-P, TRN-M, TRN-N
  + location and orientation of each of the STAs
    - coordinates can be local or earth coordinates
    - relative locations orientation may be estimated using TGaz based exchanges or available from management layer
  + Scheduling

**Result:** Y/N/A: 10/1/21

**Straw poll 5:** Do you agree to add to the SFD the following text:

* A multi-static EDMG sensing measurement instance has the following parts:
  + A measurement setup/trigger part in which STA index is assigned to each responding STA. The responding STA responds with an ACK
  + A multi-static EDMG sensing PPDU addressed directed to responding STA to which index 1 was assigned, in which there are sync fields per each of the other STAs. Each sync field is transmitted in the direction of the other STAs. A TRN field is part of the PPDU
  + A feedback part in which the initiator polls each responding STA for feedback.

**Result:** Y/N/A: 8/3/19

**11-21/1801r0, “Imaging Radar data report”, Alecsander Eitan (Qualcomm):** This presentation introduces the Imaging Radar, including typical processing of an Imaging Radar. The presentation also discussesthe report options and evaluate them.

Q: Do you believe the device has the capability to perform this filtering?

A: At least doing this filtering to reduce the amount of data to be sent should be an option.

Q: I assume it is not the signal processing algorithms that is defined?

A: Correct, it is only the interface.

Q: Is this only for 60 GHz?

A: I am OK to add this. As a result of this comment the SP is updated accordingly.

**Straw poll 1:** Do you agree to add the following to 11bf SFD:

* The 11bf amendment shall define one or more report methods for 2D, 3D and 4D filtered maps for DMG/EDMG.

**Result:** Y/N/A: 8/4/21

**Straw poll 2:** Do you agree to add the following to 11bf SFD:

* The 11bf amendment shall define one or more report methods for targets for DMG/EDMG.  
  (“Target” is a detected object. e.g. with a 3D size and specific doppler)

**Result:** Y/N/A: 8/10/16

**11-21/1828r1, “Measurement setup frame formats”, Chaoming Luo (OPPO):** This contribution is concerned about details of the measurement setup frame formats.

Out of time. The chair explains that some time will be allocated for questions in the next teleconference call.

1. The chair asks if there is AoB. No response from the group.
2. The meeting is adjourned without objection at 11:00am.

**List of Attendees:**

|  |  |  |  |
| --- | --- | --- | --- |
| Breakout | Timestamp | Name | Affiliation |
| TGbf | 11/23 | Au, Oscar | Origin Wireless |
| TGbf | 11/23 | Aygul, Mehmet | VESTEL; IMU |
| TGbf | 11/23 | Beg, Chris | Cognitive Systems Corp. |
| TGbf | 11/23 | Chayat, Naftali | Vayyar Imaging |
| TGbf | 11/23 | da Silva, Claudio | Meta Platforms, Inc. |
| TGbf | 11/23 | Dong, Xiandong | Xiaomi Inc. |
| TGbf | 11/23 | feng, Shuling | MediaTek Inc. |
| TGbf | 11/23 | Gao, Ning | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 11/23 | Hsu, Ostrovsky | Xiaomi Inc. |
| TGbf | 11/23 | Huang, Lei | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 11/23 | Jang, Insun | LG ELECTRONICS |
| TGbf | 11/23 | Kadampot, Ishaque Ashar | Qualcomm Technologies, Inc. |
| TGbf | 11/23 | Kamel, Mahmoud | InterDigital, Inc. |
| TGbf | 11/23 | Kim, Sang Gook | LG ELECTRONICS |
| TGbf | 11/23 | Lim, Dong Guk | LG ELECTRONICS |
| TGbf | 11/23 | Luo, Chaoming | Beijing OPPO telecommunications corp., ltd. |
| TGbf | 11/23 | Ozbakis, Basak | Vestel Electronics Corp. |
| TGbf | 11/23 | Pushkarna, Rajat | Panasonic Asia Pacific Pte Ltd. |
| TGbf | 11/23 | Rantala, Enrico-Henrik | Zeku |
| TGbf | 11/23 | Ryu, Kiseon | Ofinno |
| TGbf | 11/23 | Sahoo, Anirudha | National Institute of Standards and Technology |
| TGbf | 11/23 | Shellhammer, Stephen | Qualcomm Incorporated |
| TGbf | 11/23 | Trainin, Solomon | Qualcomm Incorporated |
| TGbf | 11/23 | Wang, Chao Chun | MediaTek Inc. |
| TGbf | 11/23 | Wei, Dong | NXP Semiconductors |
| TGbf | 11/23 | YANG, RUI | InterDigital, Inc. |
| TGbf | 11/23 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |
| TGbf | 11/23 | Zhou, Pei | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |

**Monday, November 29, 2021, 9:00-11:00 am (ET)**

**Meeting Agenda:**

The meeting agenda is shown below, and published in the agenda document:

<https://mentor.ieee.org/802.11/dcn/21/11-21-1883-02-00bf-tgbf-meeting-agenda-2021-11-12.pptx>

1. Call the meeting to order
2. Patent policy and logistics
3. TGbf Timeline
4. Call for contribution
5. Teleconference Times
6. Presentation of submissions
7. Any other business
8. Adjourn
9. The chair, Tony Han, calls the meeting to order at 9:00am (about 50 persons are on the call after a few minutes of the meeting).
10. The chair goes through “Meeting Protocol, Attendance, Voting & Documentation Status” (slide 4), “Participants have a duty to inform the IEEE” (slide 6), and “Ways to inform IEEE” (slide 7).

The chair makes a Call for Potentially Essential Patents. No potentially essential patents reported, and no questions asked.

The chair goes through “Other Guideline for IEEE WG meetings” (slide 8), “Patent related information” (slide 9), “ IEEE SA Copyright Policy” (slides 10 and 11), “Participant behavior in IEEE-SA activities is guided by the IEEE Codes of Ethics & Conduct” (slide 12), “Participants in the IEEE-SA “individual process” shall act independently of others, including employers”(slide 13), and “IEEE-SA standards activities shall allow the fair & equitable consideration of all viewpoints” (slide 14), and “Required notices” (slide 15).

The chair goes through the agenda (slide 18) and asks if there are any questions or comments on the agenda.

There is a comment from one member that one presentation is missing. The chair agrees and explains he will add this.

The chair asks if there is any objection to approve agenda. No objection from the group so the agenda is approved.

1. The Chair presents the TGbf timeline (slide 19).
2. The Chair presents slide 21, Call for contributions.
3. The Chair presents the teleconference times (slide 22).
4. Presentations:

**11-21/1828r2, “Measurement setup frame formats”, Chaoming Luo (OPPO):**

The contribution has been slightly updated compared to rev1 presented in the last teleconference.

**Straw Poll 1:** Which option do you prefer to design the sensing measurement setup procedure?

* + Option 1 (unified sequence): A sequence of a request and a response frame.
  + Option 2 (mixed sequence): Either a sequence including a request and a response frame, or a sequence including a request and a response and a confirmation frame.
  + Abs

The SPs are deferred based on the comments from the group.

**11-21/1792r0, “Non-TB Measurements for Sensing”, Christian Berger (NXP):** The presentation is concerned primarily with Non-TB sensing.

The chair asks about next steps. Christian explains that it is to incorporate feedback and come back with a SP.

**11-21/1602r0, “Sensing Transmission in Partial Bandwidths”, Chris Beg (Cognitive Systems):**

The focus is on the TB procedure and that there may be cases where it is not needed to use the full BW. May be beneficial to multiplex measurements from different devices.

Q: How would this compare if one instead multiplexed in the spatial domain using different streams?

A: Both are good options, I think. I basically want to provide the tools to the application to use the most efficient approach.

**Straw Poll 1:**

Do you agree that the Sensing TB procedure shall provide the ability to allocate OFDMA RUs for the NDP transmission for the measurement phase to one or more STAs that are not Full-Bandwidth?

**Result:** Y/N/A: 17/17/5

**11-21/1692r3, “Enhancing Client-based Sensing: Sensing by Proxy”, Claudio da Silva (Meta):**

Q: Will the AP use the existing sensing procedure or include some extra information, like who is requesting the sensing?

A: We have not really thought so much about this.

Q: I think it may be useful to have some additional information.

Based on some feedback from the group, the SP is slightly updated. A new revision is uploaded to Mentor.

**Straw Poll:** Do you agree to add the following text to the SFD:

A sensing by proxy (SBP) procedure is defined in which:

* An “SBP request” consists of a non-AP STA sending an SBP Request frame to an SBP-capable AP STA.
  + An STA that sends an SBP Request frame to invoke SBP (and, as a result, WLAN sensing) is denoted by “SBP requesting STA”.
  + The format and contents of the SBP Request frame are TBD.
* An AP STA that receives an SBP request shall send to the SBP requesting STA an SBP Response frame to accept or reject the request.
  + The format and contents of the SBP Response frame are TBD.
* An AP STA that accepts an SBP request shall initiate WLAN sensing procedure(s) with one or more non-AP STA(s) using operational parameters derived from those indicated within the SBP Request frame.
* Measurement results obtained in WLAN sensing procedure(s) resultant from an SBP request shall be reported to the SBP requesting STA.

**Result:** Y/N/A: 30/2/8

**11-21/1896r1, “NDPA for Sensing”, Junghoon Suh (Huawei):** Three different proposals to accommodate the new NDPA frame needs are proposed.

Q: What is the benefit of such a complicated approach as modifying the NDPA?

A: What is complicated? I don’t think it is complicated.

Q: I prefer the second options.

Q: Do you have some straw poll?

A: Not right now.

1. The chair asks if there is AoB. No response from the group.
2. The meeting is adjourned without objection at 11:02am.

**List of Attendees:**

|  |  |  |  |
| --- | --- | --- | --- |
| Breakout | Timestamp | Name | Affiliation |
| TGbf | 11/29 | Aygul, Mehmet | VESTEL; IMU |
| TGbf | 11/29 | B, Hari Ram | NXP Semiconductors |
| TGbf | 11/29 | Beg, Chris | Cognitive Systems Corp. |
| TGbf | 11/29 | Berger, Christian | NXP Semiconductors |
| TGbf | 11/29 | Bredewoud, Albert | Broadcom Corporation |
| TGbf | 11/29 | Chayat, Naftali | Vayyar Imaging |
| TGbf | 11/29 | Chung, Chulho | SAMSUNG |
| TGbf | 11/29 | Dash, Debashis | Apple Inc. |
| TGbf | 11/29 | da Silva, Claudio | Meta Platforms, Inc. |
| TGbf | 11/29 | Dong, Xiandong | Xiaomi Inc. |
| TGbf | 11/29 | feng, Shuling | MediaTek Inc. |
| TGbf | 11/29 | Gao, Ning | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 11/29 | HAN, Xiao | Huawei Technologies Co., Ltd |
| TGbf | 11/29 | Hsu, Ostrovsky | Xiaomi Inc. |
| TGbf | 11/29 | Huang, Lei | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 11/29 | Jang, Insun | LG ELECTRONICS |
| TGbf | 11/29 | Kadampot, Ishaque Ashar | Qualcomm Technologies, Inc. |
| TGbf | 11/29 | Kim, Sang Gook | LG ELECTRONICS |
| TGbf | 11/29 | Lim, Dong Guk | LG ELECTRONICS |
| TGbf | 11/29 | Luo, Chaoming | Beijing OPPO telecommunications corp., ltd. |
| TGbf | 11/29 | NANDAGOPALAN, SAI SHANKAR | Synaptics |
| TGbf | 11/29 | Ozbakis, Basak | Vestel Electronics Corp. |
| TGbf | 11/29 | Pare, Thomas | MediaTek Inc. |
| TGbf | 11/29 | Pushkarna, Rajat | Panasonic Asia Pacific Pte Ltd. |
| TGbf | 11/29 | Raissinia, Alireza | Qualcomm Incorporated |
| TGbf | 11/29 | Rantala, Enrico-Henrik | Zeku |
| TGbf | 11/29 | Sahoo, Anirudha | National Institute of Standards and Technology |
| TGbf | 11/29 | Shellhammer, Stephen | Qualcomm Incorporated |
| TGbf | 11/29 | Trainin, Solomon | Qualcomm Incorporated |
| TGbf | 11/29 | Tsai, Tsung-Han | MediaTek Inc. |
| TGbf | 11/29 | Wang, Chao Chun | MediaTek Inc. |
| TGbf | 11/29 | Wei, Dong | NXP Semiconductors |
| TGbf | 11/29 | Wilhelmsson, Leif | Ericsson AB |
| TGbf | 11/29 | Xin, Yan | Huawei Technologies Co., Ltd |
| TGbf | 11/29 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |

**Tuesday, November 30, 2021, 9:00-11:00 am (ET)**

**Meeting Agenda:**

The meeting agenda is shown below, and published in the agenda document:

<https://mentor.ieee.org/802.11/dcn/21/11-21-1883-03-00bf-tgbf-meeting-agenda-2021-11-12.pptx>

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9. The chair, Tony Xiao Han, calls the meeting to order at 9:00am (about 50 persons are on the call after a few minutes of the meeting).
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The chair makes a Call for Potentially Essential Patents. No potentially essential patents reported, and no questions asked.

The chair goes through “Other Guideline for IEEE WG meetings” (slide 8), “Patent related information” (slide 9), “ IEEE SA Copyright Policy” (slides 10 and 11), “Participant behavior in IEEE-SA activities is guided by the IEEE Codes of Ethics & Conduct” (slide 12), “Participants in the IEEE-SA “individual process” shall act independently of others, including employers”(slide 13), and “IEEE-SA standards activities shall allow the fair & equitable consideration of all viewpoints” (slide 14), and “Required notices” (slide 15).

The chair goes through the agenda (slide 19) and asks if there are any questions or comments on the agenda.

The chair asks if there is any objection to approve the modified agenda. No objection from the group so the agenda is approved.

1. The Chair presents the TGbf timeline (slide 20 and 21).
2. The Chair presents slide 22, Call for contributions.
3. The Chair presents the teleconference times (slide 23).
4. Presentations:

**11-21/1896r2, “NDPA for Sensing”, Junghoon Suh (Huawei):** Junghoon continues the presentation from the last teleconference.

After some discussion, Junghoon decides to defer the straw poll.

**11-21/1865r1, “DMG Multi-Static PPDU structure”, Assaf Kasher (Qualcomm):** This presentation proposes a PPDU format and synchronization sequences for Multi-Static sensing in DMG.

Q: The 8x8 matrix on page is orthogonal?

A: Yes.

Straw Poll 1 is slightly updated based on comments from the group.

**Straw Poll 1:** Do you agree to add to the SFD the following text:

* A multi-static EDMG sensing measurement instance has the following parts:
  + A triggering frame sent to each STA, each STA acknowledges to it.
  + A multi-static EDMG sensing PPDU
  + A feedback part in which the initiator polls each responding STA for feedback.

**Result:** Y/N/A: 10/8/19

**Straw Poll 2:** Do you agree to add to the SFD the following text:

* A multi-static EDMG sensing PPDU is an EDMG BRP-RX, BRP-TX, BRP-RX/TX PPDU with an addition of sync fields between the data and the TRN field

**Result:** Y/N/A: 8/4/25

**11-21/1596r2, “Discussion on one-to-one sensing measurement instance”, Chaoming Luo (OPPO):**

R1 has been presented

Q: I believe your SP is quite restrictive. There may be situations where non-TB sensing is suitable.

Straw Poll 1 is modified based on feedback from the group.

**Straw Poll 1:** Do you agree to add the following into 11bf SFD?

* + Option 1: The measurement instance shall be initiated by an AP as a TB measurement instance if the AP is the Initiator.
  + Option 2: More discussion is needed.
  + Option 3: Abstain

**Result:** Option 1/Option 2/Option 3: 9/23/7

**11-21/1934r0, “Discussion on Session Setup”, Chaoming Luo (OPPO):** This contribution discusses more about the detail of session setup procedure and frame formats.

The presentation is not finalized but will get more time in the next teleconference.

**11-21/1904r0, “Local Reporting of Sensing Measurement”, Oscar Au (Origin Wireless Inc.):** The contribution is about that the sensing receiver may use the measurement itself, even if also reported to the sensing transmitter.

Q: This seems more like a proprietary proposal, rather than something that needs to be standardized.

Q: I believe it would be helpful if the presentation could be extended. There is a lot of information in there.

Run out of time.

1. The chair asks if there is AoB. No response from the group.
2. The meeting is adjourned without objection at 11:01am.

**List of Attendees:**

|  |  |  |  |
| --- | --- | --- | --- |
| Breakout | Timestamp | Name | Affiliation |
| TGbf | 11/30 | Au, Oscar | Origin Wireless |
| TGbf | 11/30 | Aygul, Mehmet | VESTEL; IMU |
| TGbf | 11/30 | Chung, Chulho | SAMSUNG |
| TGbf | 11/30 | Dash, Debashis | Apple Inc. |
| TGbf | 11/30 | da Silva, Claudio | Meta Platforms, Inc. |
| TGbf | 11/30 | Dong, Xiandong | Xiaomi Inc. |
| TGbf | 11/30 | Gao, Ning | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 11/30 | Hsu, Ostrovsky | Xiaomi Inc. |
| TGbf | 11/30 | Kadampot, Ishaque Ashar | Qualcomm Technologies, Inc. |
| TGbf | 11/30 | katla, satyanarayana | InterDigital, Inc. |
| TGbf | 11/30 | Kim, Sang Gook | LG ELECTRONICS |
| TGbf | 11/30 | Lim, Dong Guk | LG ELECTRONICS |
| TGbf | 11/30 | lim, taesung | LG ELECTRONICS |
| TGbf | 11/30 | Luo, Chaoming | Beijing OPPO telecommunications corp., ltd. |
| TGbf | 11/30 | Ozbakis, Basak | Vestel Electronics Corp. |
| TGbf | 11/30 | Pushkarna, Rajat | Panasonic Asia Pacific Pte Ltd. |
| TGbf | 11/30 | Raissinia, Alireza | Qualcomm Incorporated |
| TGbf | 11/30 | Rantala, Enrico-Henrik | Zeku |
| TGbf | 11/30 | Sahoo, Anirudha | National Institute of Standards and Technology |
| TGbf | 11/30 | Stavridis, Athanasios | Ericsson AB |
| TGbf | 11/30 | SUH, JUNG HOON | Huawei Technologies Co., Ltd |
| TGbf | 11/30 | Sun, Bo | ZTE Corporation |
| TGbf | 11/30 | Trainin, Solomon | Qualcomm Incorporated |
| TGbf | 11/30 | Wang, Pu | Mitsubishi Electric Research Labs (MERL) |
| TGbf | 11/30 | Wang, Qi | Apple, Inc. |
| TGbf | 11/30 | Wei, Dong | NXP Semiconductors |
| TGbf | 11/30 | Wilhelmsson, Leif | Ericsson AB |
| TGbf | 11/30 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |

**Monday, December 6, 2021, 9:00-11:00 am (ET)**

**Meeting Agenda:**

The meeting agenda is shown below, and published in the agenda document:

<https://mentor.ieee.org/802.11/dcn/21/11-21-1883-06-00bf-tgbf-meeting-agenda-2021-11-12.pptx>

1. Call the meeting to order
2. Patent policy and logistics
3. TGbf Timeline
4. Call for contribution
5. Teleconference Times
6. Presentation of submissions
7. Any other business
8. Adjourn
9. The chair, Tony Han, calls the meeting to order at 9:00am (about 35 persons are on the call after a few minutes of the meeting).
10. The chair goes through “Meeting Protocol, Attendance, Voting & Documentation Status” (slide 4), “Participants have a duty to inform the IEEE” (slide 6), and “Ways to inform IEEE” (slide 7).

The chair makes a Call for Potentially Essential Patents. No potentially essential patents reported, and no questions asked.

The chair goes through “Other Guideline for IEEE WG meetings” (slide 8), “Patent related information” (slide 9), “ IEEE SA Copyright Policy” (slides 10 and 11), “Participant behavior in IEEE-SA activities is guided by the IEEE Codes of Ethics & Conduct” (slide 12), “Participants in the IEEE-SA “individual process” shall act independently of others, including employers”(slide 13), and “IEEE-SA standards activities shall allow the fair & equitable consideration of all viewpoints” (slide 14), and “Required notices” (slide 15).

The chair goes through the agenda (slide 20) and asks if there are any questions or comments on the agenda.

The chair asks if there is any objection to approve agenda. No objection from the group so the agenda is approved.

1. The Chair presents the TGbf timeline (slide 21).
2. The Chair presents slide 23, Call for contributions.
3. The Chair presents the teleconference times (slide 24).
4. Presentations:

**11-21/1904r0, “Local Reporting of Sensing Measurement”, Oscar Au (Origin Wireless Inc.):**

The SP is updated slightly (“may” is replaced by “shall”) based on a comment from the group.

**Straw Poll 1:** Do you agree with the following statement?

* + Sensing measurement results shall be reported locally in the sensing receiver via a MLME primitive.

**Result:** Y/N/A: 6/9/20

**11-21/1905r0, “Threshold-based Local Reporting of Sensing Measurement”, Oscar Au (Origin Wireless Inc.):**

Q: Can the threshold be different for local reporting and non-local reporting?

A: Yes, I think so.

Q: For non-local the threshold-based reporting was to reduce the over the air transmissions, but here this does not really seem to be a problem.

A: Actually, I believe it is very important here as it essentially filters the data in the PHY such that the MAC is not activated if not needed.

SP 1 is updated slightly based on comments from the group.

**Straw Poll 1:** Do you agree with the following statement?

* *Assuming sensing measurement results can be reported locally in sensing receiver,*
* *“Threshold-based local reporting” shall be applied to local reporting in the sensing receiver,*
* *Threshold-based local reporting means a sensing measurement will be reported locally via an MLME when “sensing measurement variation” is larger than a threshold.*

**Straw Poll2:** Assuming threshold-based local reporting can be applied in the sensing receiver, which manner should it be applied?

1. Optional
2. Mandatory
3. Abstain

**Straw Poll 3:** Do you agree with the following statement?

* + *The threshold used in “threshold-based local reporting” shall be set via an MLME in the sensing receiver.*

**Straw poll 4:** Do you agree with the following statement?

* + *At least one “sensing measurement variation” (SMV) shall be available to “threshold-based local reporting”.*
  + *One of the at least one SMV shall be selected via an MLME in the sensing receiver.*

**All SPs are deferred.**

**11-21/1909r0, “Selection of Nonlocal Reporting and Local Reporting”, Oscar Au (Origin Wireless Inc.):**

**Straw Poll 1:** Which reporting should a sensing receiving support?

*(i) nonlocal reporting only, no local reporting,*

*(ii) local reporting only, no nonlocal reporting,*

*(iii) both local reporting and nonlocal reporting.*

* + *Wherein Nonlocal reporting means transmission of sensing measurement results to sensing initiator using sensing measurement reporting frame*
  + *Wherein Local reporting means reporting of sensing measurement results locally in sensing receiver via an MLME*

1. Only (i), but not (ii) and (iii)
2. One of (i) and (ii), but not (iii)
3. One of (i), (ii) and (iii)
4. None of the above
5. Abstain

**Result:**

**All SPs deferred.**

**11-21/1910r0, “Measurement Instance Sharing”, Oscar Au (Origin Wireless Inc.):**

**Straw Poll1:** Do you agree with the following statement?

* *“Measurement instance sharing” shall be allowed in a sensing session,*
* *“Measurement instance sharing” allows an instantaneous (individual) measurement instance to be associated with N sensing measurement setup ID, and to perform the associated sensing measurement with an instantaneous “common” setup which enables the sensing measurement to satisfy all requirement/specification of the N sensing measurement setup ID.*
* *N>1. N is TBD.*

**Result:**

Run out of time.

1. The chair asks if there is AoB. No response from the group.
2. The meeting is adjourned without objection at 11:01am.

**List of Attendees:**

|  |  |  |  |
| --- | --- | --- | --- |
| Breakout | Timestamp | Name | Affiliation |
| TGbf | 12/6 | Au, Oscar | Origin Wireless |
| TGbf | 12/6 | Aygul, Mehmet | VESTEL; IMU |
| TGbf | 12/6 | Beg, Chris | Cognitive Systems Corp. |
| TGbf | 12/6 | Dash, Debashis | Apple Inc. |
| TGbf | 12/6 | da Silva, Claudio | Meta Platforms, Inc. |
| TGbf | 12/6 | Dong, Xiandong | Xiaomi Inc. |
| TGbf | 12/6 | Du, Rui | Huawei Technologies Co., Ltd |
| TGbf | 12/6 | Hsu, Ostrovsky | Xiaomi Inc. |
| TGbf | 12/6 | Jang, Insun | LG ELECTRONICS |
| TGbf | 12/6 | Kadampot, Ishaque Ashar | Qualcomm Technologies, Inc. |
| TGbf | 12/6 | Kamel, Mahmoud | InterDigital, Inc. |
| TGbf | 12/6 | Kim, Sang Gook | LG ELECTRONICS |
| TGbf | 12/6 | Lim, Dong Guk | LG ELECTRONICS |
| TGbf | 12/6 | Luo, Chaoming | Beijing OPPO telecommunications corp., ltd. |
| TGbf | 12/6 | Ozbakis, Basak | Vestel Electronics Corp. |
| TGbf | 12/6 | Pushkarna, Rajat | Panasonic Asia Pacific Pte Ltd. |
| TGbf | 12/6 | Raissinia, Alireza | Qualcomm Incorporated |
| TGbf | 12/6 | Sahoo, Anirudha | National Institute of Standards and Technology |
| TGbf | 12/6 | Shellhammer, Stephen | Qualcomm Incorporated |
| TGbf | 12/6 | Stavridis, Athanasios | Ericsson AB |
| TGbf | 12/6 | Trainin, Solomon | Qualcomm Incorporated |
| TGbf | 12/6 | Tsai, Tsung-Han | MediaTek Inc. |
| TGbf | 12/6 | Wang, Pu | Mitsubishi Electric Research Labs (MERL) |
| TGbf | 12/6 | Wei, Dong | NXP Semiconductors |
| TGbf | 12/6 | Wilhelmsson, Leif | Ericsson AB |
| TGbf | 12/6 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |
| TGbf | 12/6 | Zhou, Pei | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |

**Tuesday, December 7, 2021, 9:00-11:00 am (ET)**

**Meeting Agenda:**

The meeting agenda is shown below, and published in the agenda document:

<https://mentor.ieee.org/802.11/dcn/21/11-21-1883-07-00bf-tgbf-meeting-agenda-2021-11-12.pptx>

1. Call the meeting to order
2. Patent policy and logistics
3. TGbf Timeline
4. Call for contribution
5. Teleconference Times
6. Presentation of submissions
7. Any other business
8. Adjourn
9. The chair, Tony Han, calls the meeting to order at 9:00am (about 30 persons are on the call after a few minutes of the meeting).
10. The chair goes through “Meeting Protocol, Attendance, Voting & Documentation Status” (slide 4), “Participants have a duty to inform the IEEE” (slide 6), and “Ways to inform IEEE” (slide 7).

The chair makes a Call for Potentially Essential Patents. No potentially essential patents reported, and no questions asked.

The chair goes through “Other Guideline for IEEE WG meetings” (slide 8), “Patent related information” (slide 9), “ IEEE SA Copyright Policy” (slides 10 and 11), “Participant behavior in IEEE-SA activities is guided by the IEEE Codes of Ethics & Conduct” (slide 12), “Participants in the IEEE-SA “individual process” shall act independently of others, including employers”(slide 13), and “IEEE-SA standards activities shall allow the fair & equitable consideration of all viewpoints” (slide 14), and “Required notices” (slide 15).

The chair goes through the agenda (slide 21) and asks if there are any questions or comments on the agenda.

The chair asks if there is any objection to approve agenda. No objection from the group so the agenda is approved.

1. The Chair presents the TGbf timeline (slide 22).
2. The Chair presents slide 24, Call for contributions.
3. The Chair presents the teleconference times (slide 25).
4. Presentations:

**11-21/1914r0, “Coordination among multiple monostatic radar”, Rui Du (Huawei):**

This contribution discusses the advantages and the feasibility of using multiple monostatic radars at 60 GHz.

Q: Regarding UL, do you assume that the STAs uses orthogonal waveforms.

A: Yes, that is one possibility.

Q: I believe it would be helpful to discuss interference between the different signals a bit more.

Q: You talk only about 60 GHz, but the SP does not mention 60 GHz.

A: I can add 60 GHz to the SP.

**Straw Poll:**

* Do you support monostatic radar and multiple monostatic radars with coordination at 60 GHz in a WLAN sensing procedure?
* The details of the monostatic/multiple monostatic radar coordination are TBD.

**Result:** Y/N/A: 23/0/14

**11-21/1433r2, “Non-TB sensing measurement”, Cheng Chen (Intel):**

A unified non-TB sensing measurement instance flow is proposed for the scenarios where a non-AP STA is the initiator and an AP is the responder.

The contribution has been presented before. The SP has been slightly updated based on off-line discussions.

**Straw Poll:** Do you agree with the following?

* 11bf shall define a non-Trigger based (non-TB) sensing measurement instance as follows:
  + One non-AP STA is the sensing initiator and one AP is the sensing responder.
  + Once the non-AP STA obtains a TXOP, it shall initiate a non-TB sensing measurement instance by transmitting an NDPA frame to the AP followed by an Initiator-to-Responder (I2R) NDP SIFS after. SIFS after the I2R NDP, the AP shall transmit a Responder-to-Initiator (R2I) NDP to the non-AP STA.
  + If the non-AP STA is only the sensing transmitter, then the NDPA frame should configure the R2I NDP to be transmitted with minimum possible length with one LTF symbol.
  + If the non-AP STA is only the sensing receiver, then the NDPA frame should configure the I2R NDP to be transmitted with minimum possible length with one LTF symbol.
  + The details of the NDPA frame are TBD.

**Result:** Y/N/A: 19/4/13

**11-21/1926r0, “Collaborative WLAN Sensing - Definition and Operational Scenarios”, Sang Kim (LGE):** This contribution proposes definitions and operational scenarios for collaborative WLAN sensing.

**Straw Poll:** Do you support to adopt the following definition of collaborative WLAN sensing into SFD:

* WLAN sensing in which a sensing procedure may be comprised of multiple sensing measurement setups over which the same set of more than one sensing responder STAs is maintained, but their participation and/or roles as a transmitter and a receiver for a measurement instance may be configured by multiple measurement setup IDs in coordinated way.
* The same set of AID and/or UID is maintained in collaborative sensing.
* Multiple measurement setup IDs may be maintained until explicitly or implicitly terminated.

**Result:** Y/N/A: 11/11/11

**11-21/1735r2, “Procedure of Sensing Measurement Setup”, Insun Jang (LGE):**

This contribution is concerned with the mechanism for the sensing measurement setup.

The SP is slightly updated based on comments from the group.

**Straw Poll 1:** Do you support to add to the 11bf SFD that sensing measurement setup request and response frames, which allow to perform a sensing measurement setup, are defined, and the following mechanism is enabled?

* A sensing initiator transmits a sensing measurement setup request frame to a sensing responder with which it intends to perform a sensing measurement setup
* The sensing responder, which receives the sensing measurement setup request frame, shall transmit a sensing measurement setup response frame to the sensing initiator which transmitted the sensing measurement setup request frame to accept or reject the sensing measurement setup
* The subtype of sensing measurement setup request and response frames are Action and those are individually addressed
* Formats of the sensing measurement setup request and response frames are TBD

**Result:** Y/N/A: 25/0/9

1. The chair asks if there is AoB. No response from the group.
2. The meeting is adjourned without objection at 10:58am.

**List of Attendees:**

|  |  |  |  |
| --- | --- | --- | --- |
| Breakout | Timestamp | Name | Affiliation |
| TGbf | 12/7 | Aboulmagd, Osama | Huawei Technologies Co., Ltd |
| TGbf | 12/7 | Beg, Chris | Cognitive Systems Corp. |
| TGbf | 12/7 | Chayat, Naftali | Vayyar Imaging |
| TGbf | 12/7 | Dash, Debashis | Apple Inc. |
| TGbf | 12/7 | da Silva, Claudio | Meta Platforms, Inc. |
| TGbf | 12/7 | Dong, Xiandong | Xiaomi Inc. |
| TGbf | 12/7 | Du, Rui | Huawei Technologies Co., Ltd |
| TGbf | 12/7 | Eitan, Alecsander | Qualcomm Incorporated |
| TGbf | 12/7 | feng, Shuling | MediaTek Inc. |
| TGbf | 12/7 | Gao, Ning | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 12/7 | Kamel, Mahmoud | InterDigital, Inc. |
| TGbf | 12/7 | Kim, Sang Gook | LG ELECTRONICS |
| TGbf | 12/7 | Luo, Chaoming | Beijing OPPO telecommunications corp., ltd. |
| TGbf | 12/7 | OZDEN ZENGIN, OZLEM | VESTEL |
| TGbf | 12/7 | Pushkarna, Rajat | Panasonic Asia Pacific Pte Ltd. |
| TGbf | 12/7 | Raissinia, Alireza | Qualcomm Incorporated |
| TGbf | 12/7 | Rantala, Enrico-Henrik | Zeku |
| TGbf | 12/7 | Ryu, Kiseon | Ofinno |
| TGbf | 12/7 | Sahoo, Anirudha | National Institute of Standards and Technology |
| TGbf | 12/7 | Shellhammer, Stephen | Qualcomm Incorporated |
| TGbf | 12/7 | Sun, Bo | ZTE Corporation |
| TGbf | 12/7 | Trainin, Solomon | Qualcomm Incorporated |
| TGbf | 12/7 | Wang, Chao Chun | MediaTek Inc. |
| TGbf | 12/7 | Wang, Pu | Mitsubishi Electric Research Labs (MERL) |
| TGbf | 12/7 | Wei, Dong | NXP Semiconductors |
| TGbf | 12/7 | Wilhelmsson, Leif | Ericsson AB |
| TGbf | 12/7 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |
| TGbf | 12/7 | Zhou, Pei | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |

**Monday, December 13, 2021, 9:00-11:00 am (ET)**

**Meeting Agenda:**

The meeting agenda is shown below, and published in the agenda document:

<https://mentor.ieee.org/802.11/dcn/21/11-21-1883-08-00bf-tgbf-meeting-agenda-2021-11-12.pptx>

1. Call the meeting to order
2. Patent policy and logistics
3. TGbf Timeline
4. Call for contribution
5. Teleconference Times
6. Presentation of submissions
7. Any other business
8. Adjourn
9. The chair, Tony Han, calls the meeting to order at 9:00am (about 35 persons are on the call after a few minutes of the meeting).
10. The chair goes through “Meeting Protocol, Attendance, Voting & Documentation Status” (slide 4), “Participants have a duty to inform the IEEE” (slide 6), and “Ways to inform IEEE” (slide 7).

The chair makes a Call for Potentially Essential Patents. No potentially essential patents reported, and no questions asked.

The chair goes through “Other Guideline for IEEE WG meetings” (slide 8), “Patent related information” (slide 9), “ IEEE SA Copyright Policy” (slides 10 and 11), “Participant behavior in IEEE-SA activities is guided by the IEEE Codes of Ethics & Conduct” (slide 12), “Participants in the IEEE-SA “individual process” shall act independently of others, including employers”(slide 13), and “IEEE-SA standards activities shall allow the fair & equitable consideration of all viewpoints” (slide 14), and “Required notices” (slide 15).

The chair goes through the agenda (slide 22) and asks if there are any questions or comments on the agenda. A note that Rojan is not present today, but he will be ready to present tomorrow.

The chair asks if there is any objection to approve agenda. No objection from the group so the agenda is approved.

1. The Chair presents the TGbf timeline (slide 23).
2. The Chair presents slide 24, Call for contributions.
3. The Chair presents the teleconference times (slide 26).
4. Presentations:

**11-21/1932r1, “Aggregation in Sensing Measurement Instance”, Mengshi Hu (Huawei):**

This contribution it is proposed to support aggregated measurement instances. The aggregation means that measurements corresponding to different measurement setup IDs can be aggregated.

Q: I believe you want to have another report that is the sum of reports. I think we already have what we need.

Q: I also think we have what we need, and maybe we just need to clarify things a bit better in the SFD.

The SP is deferred.

**11-21/2004r0, “TWT for WLAN Sensing”, Dong Wei (NXP):** This is a follow-up presentation of 11-21/1532 where additional details are provided.

Q: You have not excluded to do both communication and sensing at once?

A: It is not included here, but communication and sensing would not be simultaneous but rather sequential within the same wake-up time.

Q: I am concerned with the first bullet in the SP, i.e., that TWT setup must be included in the setup.

Q: I think we may have to clarify a bit further what the additions to the TWT.

**Straw Poll:** Do you agree with the following?

* + 11bf shall add the following to the WLAN sensing procedure to facilitate the use of the Target Wake Time (TWT) mechanism specified in 11ax/11be:
    - TWT setup is included in the sensing measurement setup.
    - At least one sensing measurement instance is scheduled in each TWT service period.
    - The termination of a sensing measurement setup shall result in the teardown of all the TWT agreement(s) associated with the sensing measurement setup. (The details of this teardown is specified in the handshake protocol for sensing measurement termination, which is TBD.)
    - The teardown of any TWT agreement does not result in termination of the associated sensing measurement setup.
    - Support of types of TWT are TBD.

**Result:** The Straw Poll is deferred.

**11-21/1924r0, “Time Stamping Measurement Results”, Chris Beg (Cognitive Systems):** This contribution proposes to add a timestamp to the measurement results.

Q: What is your proposal for STAs not associated with the AP?

A: I think it is not a problem if the STA is the transmitter, because then the AP can set the time stamp. The other direction is a problem.

Q: How often do you want to make measurements?

A: Somewhere in the range 30-100 ms.

Q: I agree that it makes sense to add some kind of timestamp.

Q: I believe that even if the client is not associated it will be able to synchronize. We need to add that.

**Straw Poll 1:** Do you agree that:

* A timestamp reflecting a time-of-measurement shall be included as part of a Measurement Result.

The chair announces that some time will be allocate for the SP tomorrow.

1. The chair asks if there is AoB. No response from the group.
2. The meeting is adjourned without objection at 10:58am.

**List of Attendees:**

|  |  |  |  |
| --- | --- | --- | --- |
| Breakout | Timestamp | Name | Affiliation |
| TGbf | 12/13 | Aboulmagd, Osama | Huawei Technologies Co., Ltd |
| TGbf | 12/13 | Beg, Chris | Cognitive Systems Corp. |
| TGbf | 12/13 | Berger, Christian | NXP Semiconductors |
| TGbf | 12/13 | da Silva, Claudio | Meta Platforms, Inc. |
| TGbf | 12/13 | Dong, Xiandong | Xiaomi Inc. |
| TGbf | 12/13 | Du, Rui | Huawei Technologies Co., Ltd |
| TGbf | 12/13 | Eitan, Alecsander | Qualcomm Incorporated |
| TGbf | 12/13 | feng, Shuling | MediaTek Inc. |
| TGbf | 12/13 | Gao, Ning | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 12/13 | HAN, Xiao | Huawei Technologies Co., Ltd |
| TGbf | 12/13 | Hsu, Ostrovsky | Xiaomi Inc. |
| TGbf | 12/13 | Kadampot, Ishaque Ashar | Qualcomm Technologies, Inc. |
| TGbf | 12/13 | kim, namyeong | LG ELECTRONICS |
| TGbf | 12/13 | Kim, Sang Gook | LG ELECTRONICS |
| TGbf | 12/13 | Lim, Dong Guk | LG ELECTRONICS |
| TGbf | 12/13 | lim, taesung | LG ELECTRONICS |
| TGbf | 12/13 | Luo, Chaoming | Beijing OPPO telecommunications corp., ltd. |
| TGbf | 12/13 | Ozbakis, Basak | Vestel Electronics Corp. |
| TGbf | 12/13 | Raissinia, Alireza | Qualcomm Incorporated |
| TGbf | 12/13 | Sahoo, Anirudha | National Institute of Standards and Technology |
| TGbf | 12/13 | Shellhammer, Stephen | Qualcomm Incorporated |
| TGbf | 12/13 | SUH, JUNG HOON | Huawei Technologies Co., Ltd |
| TGbf | 12/13 | Trainin, Solomon | Qualcomm Incorporated |
| TGbf | 12/13 | Tsai, Tsung-Han | MediaTek Inc. |
| TGbf | 12/13 | Wang, Chao Chun | MediaTek Inc. |
| TGbf | 12/13 | Wei, Dong | NXP Semiconductors |
| TGbf | 12/13 | Wilhelmsson, Leif | Ericsson AB |
| TGbf | 12/13 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |
| TGbf | 12/13 | Zhou, Pei | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |

**Tuesday, December 14, 2021, 9:00-11:00 am (ET)**

**Meeting Agenda:**

The meeting agenda is shown below, and published in the agenda document:

<https://mentor.ieee.org/802.11/dcn/21/11-21-1883-09-00bf-tgbf-meeting-agenda-2021-11-12.pptx>

1. Call the meeting to order
2. Patent policy and logistics
3. TGbf Timeline
4. Call for contribution
5. Teleconference Times
6. Presentation of submissions
7. Any other business
8. Adjourn
9. The chair, Tony Han, calls the meeting to order at 9:00am (about 50 persons are on the call after a few minutes of the meeting).
10. The chair goes through “Meeting Protocol, Attendance, Voting & Documentation Status” (slide 4), “Participants have a duty to inform the IEEE” (slide 6), and “Ways to inform IEEE” (slide 7).

The chair makes a Call for Potentially Essential Patents. No potentially essential patents reported, and no questions asked.

The chair goes through “Other Guideline for IEEE WG meetings” (slide 8), “Patent related information” (slide 9), “ IEEE SA Copyright Policy” (slides 10 and 11), “Participant behavior in IEEE-SA activities is guided by the IEEE Codes of Ethics & Conduct” (slide 12), “Participants in the IEEE-SA “individual process” shall act independently of others, including employers”(slide 13), and “IEEE-SA standards activities shall allow the fair & equitable consideration of all viewpoints” (slide 14), and “Required notices” (slide 15).

The chair goes through the agenda (slide 23) and asks if there are any questions or comments on the agenda.

The chair asks if there is any objection to approve agenda. No objection from the group so the agenda is approved.

1. The Chair presents the TGbf timeline (slide 24).
2. The Chair presents slide 26, Call for contributions.
3. The Chair presents the teleconference times (slide 27).
4. Presentations:

**11-21/2007r0, “Guidelines for Draft (D0.1) Text Writing”, Claudio Da Silva (Meta Platforms):** Claudio presents how the work on D0.1 will be organized.

Q: Some of the topics are empty in the SFD. Therefore, I think it will be hard to complete the baseline on January 21. Is it still possible to prepare in parallel after January 21?

A: We don’t expect the SFD to be complete on January 21. Even D0.1 will most likely have gaps.

Q: We don’t have anything on 60 GHz. How do you plan to proceed there?

A: Basically, we need people to bring contributions. We can also have additional ad-hoc meetings, but we need contributions to start with.

Q: When do you plan to stop updating the SFD?

A: The SFD will be updated at least until March. Then I believe we will have a discussion.

Based on the discussion some additions are made and a revision 1 of this document will be uploaded.

**11-21/1924r0, “Time Stamping Measurement Results”, Chris Beg (Cognitive Systems):**

Presented in the last teleconference, but there was enough time to run the SPs.

Q: Do we really need a time stamp. Is not the measurement ID sufficient?

A: In case of delayed reporting or sensing by proxy.

Q: I believe you can always use the measurement ID to get the timing information.

Q: Maybe the “shall” in the SP can be replaced?

Q: Does the time refer on over the air or when the result is at the interface between PHY and MAC?

A: Both, I believe.

As a result of this last question SP1 is updated accordingly.

**Straw Poll 1:** Do you agree that:

* A timestamp reflecting a time-of-measurement shall be included as part of a Measurement Result for both MLME and Sensing Measurement Report.

**Result:** Y/N/A: 18/7/17

**11-21/1921r0, “Partial CSI Feedback”, Rojan Chitrakar (Panasonic):**

In many sensing applications, it is sufficient to only feedback the amplitude or the phase. This contribution proposes to have this opportunity to reduce that amount of feedback data.

Q: There are some relatively more complex operations needed for calculating the amplitude and phase. Would it be possible to estimate how much additional complexity this means?

A: We can try. I would still like to stress that the there is a 50% reduction in the amount of data needed to be sent over the air.

1. The chair asks if there is AoB. No response from the group.
2. The meeting is adjourned without objection at 11:01am.

**List of Attendees:**

|  |  |  |  |
| --- | --- | --- | --- |
| Breakout | Timestamp | Name | Affiliation |
| TGbf | 12/14 | Aboulmagd, Osama | Huawei Technologies Co., Ltd |
| TGbf | 12/14 | Au, Oscar | Origin Wireless |
| TGbf | 12/14 | Aygul, Mehmet | VESTEL; IMU |
| TGbf | 12/14 | Beg, Chris | Cognitive Systems Corp. |
| TGbf | 12/14 | Bredewoud, Albert | Broadcom Corporation |
| TGbf | 12/14 | Chayat, Naftali | Vayyar Imaging |
| TGbf | 12/14 | Chitrakar, Rojan | Panasonic Asia Pacific Pte Ltd. |
| TGbf | 12/14 | Dash, Debashis | Apple Inc. |
| TGbf | 12/14 | Dong, Xiandong | Xiaomi Inc. |
| TGbf | 12/14 | Du, Rui | Huawei Technologies Co., Ltd |
| TGbf | 12/14 | feng, Shuling | MediaTek Inc. |
| TGbf | 12/14 | Hsu, Ostrovsky | Xiaomi Inc. |
| TGbf | 12/14 | Huang, Lei | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 12/14 | Jang, Insun | LG ELECTRONICS |
| TGbf | 12/14 | Kamel, Mahmoud | InterDigital, Inc. |
| TGbf | 12/14 | kim, namyeong | LG ELECTRONICS |
| TGbf | 12/14 | Kim, Sang Gook | LG ELECTRONICS |
| TGbf | 12/14 | Lanante, Leonardo | Ofinno |
| TGbf | 12/14 | Lim, Dong Guk | LG ELECTRONICS |
| TGbf | 12/14 | lim, taesung | LG ELECTRONICS |
| TGbf | 12/14 | Luo, Chaoming | Beijing OPPO telecommunications corp., ltd. |
| TGbf | 12/14 | Ozbakis, Basak | Vestel Electronics Corp. |
| TGbf | 12/14 | OZDEN ZENGIN, OZLEM | VESTEL |
| TGbf | 12/14 | Pushkarna, Rajat | Panasonic Asia Pacific Pte Ltd. |
| TGbf | 12/14 | Raissinia, Alireza | Qualcomm Incorporated |
| TGbf | 12/14 | Sahoo, Anirudha | National Institute of Standards and Technology |
| TGbf | 12/14 | Shellhammer, Stephen | Qualcomm Incorporated |
| TGbf | 12/14 | Srivatsa, Veena | Synaptics |
| TGbf | 12/14 | Sun, Bo | ZTE Corporation |
| TGbf | 12/14 | Trainin, Solomon | Qualcomm Incorporated |
| TGbf | 12/14 | Turkmen, Halise | IMU; Vestel |
| TGbf | 12/14 | Wang, Chao Chun | MediaTek Inc. |
| TGbf | 12/14 | Wei, Dong | NXP Semiconductors |
| TGbf | 12/14 | Wilhelmsson, Leif | Ericsson AB |
| TGbf | 12/14 | Xin, Yan | Huawei Technologies Co., Ltd |
| TGbf | 12/14 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |
| TGbf | 12/14 | Zhou, Pei | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |

**Monday, December 20, 2021, 9:00-11:00 am (ET)**

**Meeting Agenda:**

The meeting agenda is shown below, and published in the agenda document:

<https://mentor.ieee.org/802.11/dcn/21/11-21-1883-10-00bf-tgbf-meeting-agenda-2021-11-12.pptx>

1. Call the meeting to order
2. Patent policy and logistics
3. TGbf Timeline
4. Call for contribution
5. Teleconference Times
6. Presentation of submissions
7. Any other business
8. Adjourn
9. The chair, Tony Han, calls the meeting to order at 9:00am (about 50 persons are on the call after 30 minutes of the meeting).
10. The chair goes through “Meeting Protocol, Attendance, Voting & Documentation Status” (slide 4), “Participants have a duty to inform the IEEE” (slide 6), and “Ways to inform IEEE” (slide 7).

The chair makes a Call for Potentially Essential Patents. No potentially essential patents reported, and no questions asked.

The chair goes through “Other Guideline for IEEE WG meetings” (slide 8), “Patent related information” (slide 9), “ IEEE SA Copyright Policy” (slides 10 and 11), “Participant behavior in IEEE-SA activities is guided by the IEEE Codes of Ethics & Conduct” (slide 12), “Participants in the IEEE-SA “individual process” shall act independently of others, including employers”(slide 13), and “IEEE-SA standards activities shall allow the fair & equitable consideration of all viewpoints” (slide 14), and “Required notices” (slide 15).

The chair goes through the agenda (slide 24) and asks if there are any questions or comments on the agenda.

The chair asks if there is any objection to approve agenda. No objection from the group so the agenda is approved.

1. The Chair presents the TGbf timeline (slide 25).
2. The Chair presents slide 27, Call for contributions.
3. The Chair presents the teleconference times (slide 28).
4. Presentations:

**11-21/1941r0, “Discussion on Measurement Setup ID Setting”, Pei Zhou (OPPO):**

This contribution proposes an optional negotiation process in the measurement setup phase.

Q: On slide 5, what does P2P sensing refer to?

A: STA-STA sensing.

Q: With respect to the SP, I believe we want the initiator to set the Measurement Setup ID, so I prefer Option 1.

Q: I believe the analysis is not complete in that sensing by proxy is not considered.

A: I will add also this until next time and defer the SP for the moment.

**Straw Poll:**

* Which option do you prefer to solve the potential conflict of Measurement Setup IDs:
* Option 1: Measurement Setup ID is set by Sensing Initiator, the tuple <Sensing Initiator’s ID, Measurement Setup ID> is used to identify a specific Measurement Setup.
  + Whether the Sensing Initiator’s ID is MAC Address or AID/UID is TBD.
* Option 2: The Measurement Setup ID is always set by AP, the Measurement Setup ID is used to identify a specific Measurement Setup.
  + If STA is Sensing Initiator, it can request the AP (Sensing Responder) to set the Measurement Setup ID through Sensing Measurement Setup Response frame.

**Result:** TheSP deferred.

**11-21/1890r2, “DMG Sensing taxonomy”, Solomon Trainin (Qualcomm):**

This contribution elaborates on DMG sensing and describe the different types of sensing that can take place.

Q: For the bistatic case, there is no AP in the figures. Can you elaborate on this?

A: In these figures the TX is the AP.

The SP deferred to let the people get a chance to digest.

**11-21/1949r0, “Need for an MLME SAP Interface for WLAN Sensing”, Claudio da Silva (Meta Platforms):** This contribution aims at justifying the need for defining MLME primitives for WLAN sensing.

**Straw Poll:**

Do you agree that the 11bf amendment shall define a new subclause under 6.3 (MLME SAP interface) that specifies request, confirm, indication, and response primitives for WLAN sensing?

**Result:** The SP deferred.

**11-21/1288r4, “Truncated Power Delay Profile – follow up”, Rui Du (Huawei):** This is a follow up presentation related to using TPDP for reporting, illustrating the performance.

**Straw Poll:** Do you support to add the following to the TGbf SFD:

* Truncated Channel Impulse Response(TCIR) described as follows should be considered as one optional type of the sensing measurement results for sub-7GHz sensing.
  + Calculating the CIR (time domain) from frequency domain CSI through IDFT (usually, IFFT).
  + Reporting the subset of complex samples corresponding to the range of interest of the entire CIR.
  + Note: the size of the subset is TBD.

**Result:** Y/N/A: 12/2/20

**11-21/1828r3, “Measurement setup frame formats”, Chaoming Luo (OPPO):**

This contribution is concerned with the details of measurement setup procedure and frame formats.

**Straw Poll 1:** Do you agree to add the following into 11bf SFD?

* + A sensing measurement setup procedure consists of a request frame exchange initiated by the initiator followed by a response frame exchange initiated by the responder.

**Result:** Y/N/A: 20/1/15

**Strawn Poll 2:** Do you agree to add the following into 11bf SFD?

* In a sensing measurement setup procedure, if the sensing responder intends to reject the assigned operational parameters included in the sensing measurement setup request frame, it may provide its preferred operational parameters in the sensing measurement setup response frame.
* For the accept case, whether the responder may provide its preferred operational parameters or not is TBD.

**Result:** Y/N/A: 14/6/14

**Strawn Poll 3:** Do you agree to add the following into 11bf SFD?

11bf shall define both public and protected sensing management frames, which include sensing measurement setup request/response, sensing measurement report, sensing measurement setup termination, and SBP request/response frames.

Note: Other public and protected sensing management frames are TBD.

Run out of time. The chair explains that some time will be allocated for this SP in the next teleconference.

1. The chair asks if there is AoB. No response from the group.
2. The meeting is adjourned without objection at 11:00am.

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| TGbf | 12/20 | Chayat, Naftali | Vayyar Imaging |
| TGbf | 12/20 | Dash, Debashis | Apple Inc. |
| TGbf | 12/20 | da Silva, Claudio | Meta Platforms, Inc. |
| TGbf | 12/20 | Dong, Xiandong | Xiaomi Inc. |
| TGbf | 12/20 | Du, Rui | Huawei Technologies Co., Ltd |
| TGbf | 12/20 | Eitan, Alecsander | Qualcomm Incorporated |
| TGbf | 12/20 | feng, Shuling | MediaTek Inc. |
| TGbf | 12/20 | Gao, Ning | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 12/20 | Hsu, Ostrovsky | Xiaomi Inc. |
| TGbf | 12/20 | Kasher, Assaf | Qualcomm Incorporated |
| TGbf | 12/20 | Lim, Dong Guk | LG ELECTRONICS |
| TGbf | 12/20 | lim, taesung | LG ELECTRONICS |
| TGbf | 12/20 | Luo, Chaoming | Beijing OPPO telecommunications corp., ltd. |
| TGbf | 12/20 | Ozbakis, Basak | Vestel Electronics Corp. |
| TGbf | 12/20 | Pushkarna, Rajat | Panasonic Asia Pacific Pte Ltd. |
| TGbf | 12/20 | Raissinia, Alireza | Qualcomm Incorporated |
| TGbf | 12/20 | Sahoo, Anirudha | National Institute of Standards and Technology |
| TGbf | 12/20 | Shellhammer, Stephen | Qualcomm Incorporated |
| TGbf | 12/20 | Srivatsa, Veena | Synaptics |
| TGbf | 12/20 | Trainin, Solomon | Qualcomm Incorporated |
| TGbf | 12/20 | Tsai, Tsung-Han | MediaTek Inc. |
| TGbf | 12/20 | Wang, Chao Chun | MediaTek Inc. |
| TGbf | 12/20 | Wang, Pu | Mitsubishi Electric Research Labs (MERL) |
| TGbf | 12/20 | Wei, Dong | NXP Semiconductors |
| TGbf | 12/20 | Wilhelmsson, Leif | Ericsson AB |
| TGbf | 12/20 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |
| TGbf | 12/20 | Zhou, Pei | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |