IEEE P802.11
Wireless LANs

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| IEEE 802.11bf – Teleconference Minutes March-May 2022  |
| Date: 2022-04-24 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
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| Sang Kim | LGE |  |  |  |

Abstract

This document contains minutes for the TG 802.11bf teleconferences in March - May 2022.

Rev 0: Minutes for TG 802.11bf teleconference on the17th of March 2022.

Rev 1: Minutes for TG 802.11bf teleconference on the 21st of March 2022 added.

Rev 2: Minutes for TG 802.11bf teleconference on the 22nd of March 2022 added + list of attendance for 17th and 21st of March added + some typos corrected.

Rev 3: Minutes for TG 802.11bf teleconference on the 24th of March 2022 added + typo corrected.

Rev 4: Minutes for TG 802.11bf teleconference on the 28th of March 2022 added.

Rev 5: Minutes for TG 802.11bf teleconference on the 29th of March 2022 added.

Rev 6: Minutes for TG 802.11bf teleconference on the 31st of March 2022 added.

Rev 7: Attendance for 22nd, 24th, 28th, 29th, and 31st of March 2022 added.

Rev 8: Minutes for TG 802.11bf teleconference on the 7th of April 2022 added.

Rev 9: Attendance for the 7th of April 2022 added.

Rev 10: Minutes for TG 802.11bf teleconference on the 12th of April 2022 added.

Rev 11: Minutes for TG 802.11bf teleconference on the 14th of April 2022 added.

Rev 12: Minutes for TG 802.11bf teleconference on the 18th of April 2022 added + typo for the minutes of the 14th of April corrected.

Rev 13: Minutes for TG 802.11bf teleconference on the 19th of April 2022 added.

Rev 14: Attendance for the 12th and 14th of April 2022 added.

Rev 15: Attendance for the 18th and 19th of April 2022 added.

**Thursday, March 17, 2022, 11:00 pm-01:00 am (ET)**

**Meeting Agenda:**

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

<https://mentor.ieee.org/802.11/dcn/22/11-22-0502-00-00bf-tgbf-meeting-agenda-2022-03-teleconference.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 11:00 pm ET (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 16) 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 (slides 17 and 18) and highlights the update that was done during the March Plenary. Claudio announces that he will release D0.01 so the group can help reviewing what currently has been included in the draft. We are not asking for formal comments, but instead save the comments for the formal review of D0.1. Claudio explains that D0.01 has been sent to Robert Stacey this Monday and that we currently wait for this to be uploaded. If someone wants to have the document for review already now, he or she may send an email to Claudio to request this.

Q: Is there a Word version of the draft?

A: Not at the moment. We are using Framemaker, but I will look into generating a Word version.

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

**11-22/0327r1, “DMG Bi Static Sounding and BRP Frame”, Assaf Kasher (Qualcomm):**

Revision 0 of the paper has been reviewed and Assaf goes through the changes that have been made.

Q: What is the meaning of the instance number?

A: For example, if a device reports several measurements at a time, this is to distinguish these.

**PDT Straw Poll:**

**Straw Poll:** Do you support including the text proposed in the following document into the IEEE802.11bf draft amendment?

* 22/0327r1: PDT for Bi-Static Sounding and BRP Frame

**Result:** Supported by unanimous consent.

**11-22/0401r1, “Sensing Security”, Michael Montemurro (Huawei):**

Mike has prepared a table to collect feedback from the group on various aspects related to security and privacy.

Q: How is the privacy achieved?

A: I am not an expert, change of MAC address is one approach. There is also related work in other TGs.

Q: Related to SBP authentication, I believe the initiator and the responder also need to know of one another.

Q: Related to PHY security, are there similar attacks for sensing as there are for secure ranging? I believe we need to have a discussing about if there are similar attacks that we expect.

Q: I believe it may be better if it covered in the TGs that are working on security related things.

A: I agree, the purpose is not to redo what is done elsewhere but to identify whether there may be things we need that is not covered in the other groups.

Q: I think it would be very valuable to have some kind of brainstorm and get input from sensing customers.

Tony suggests having a dedicated off-line discussion on this subject.

**11-22/0370r0, “PDT-DMG-Multi-Static-Instance”, Assaf Kasher (Qualcomm):**

The document presents the PDT draft text for DMG Multi-Statis Sensing Instance. The first part of the paper has already been presented. The focus today is on multi-static sensing.

Q: Do you suggest that multi-static sensing is closely related to TDD?

A: No, I am just reusing the frames.

Q: You mention the response field, but I can’t find it in the figure

A: It is an error. The sentence will be removed.

**11-22/0414r1, “Fraction Scaling Factor for Sensing Measurement Report”, Steve Shellhammer (Qualcomm):** Two methods for scaling the CSI report have been presented, namely real-value scaling and power-of-two scaling. The present contribution shows a scaling that is in between these two both in terms of complexity and performance.

Tony asks about future plans. Steve proposes that off-line discussion will be arranged. Steve also explains that he is working on a more comprehensive presentation that also will include a straw poll.

1. The chair asks if there is AoB. No response from the group.
2. The meeting is adjourned without objection at 01:04am ET.

**List of Attendees:**

|  |  |  |  |
| --- | --- | --- | --- |
| Breakout | Timestamp | Name | Affiliation |
| TGbf | 3/17 | Beg, Chris | Cognitive Systems Corp. |
| TGbf | 3/17 | Berger, Christian | NXP Semiconductors |
| TGbf | 3/17 | Chitrakar, Rojan | Panasonic Asia Pacific Pte Ltd. |
| TGbf | 3/17 | da Silva, Claudio | Meta Platforms, Inc. |
| TGbf | 3/17 | feng, Shuling | MediaTek Inc. |
| TGbf | 3/17 | Huq, Kazi Mohammed Saidul | Ofinno |
| TGbf | 3/17 | Kamel, Mahmoud | InterDigital, Inc. |
| TGbf | 3/17 | Kasher, Assaf | Qualcomm Incorporated |
| TGbf | 3/17 | Kim, Sang Gook | LG ELECTRONICS |
| TGbf | 3/17 | Luo, Chaoming | Beijing OPPO telecommunications corp., ltd. |
| TGbf | 3/17 | Montemurro, Michael | Huawei Technologies Co., Ltd |
| TGbf | 3/17 | Motozuka, Hiroyuki | Panasonic Corporation |
| TGbf | 3/17 | Pushkarna, Rajat | Panasonic Asia Pacific Pte Ltd. |
| TGbf | 3/17 | Raissinia, Alireza | Qualcomm Incorporated |
| TGbf | 3/17 | Rantala, Enrico-Henrik | Zeku |
| TGbf | 3/17 | Shellhammer, Stephen | Qualcomm Incorporated |
| TGbf | 3/17 | SUH, JUNG HOON | Huawei Technologies Co., Ltd |
| TGbf | 3/17 | Trainin, Solomon | Qualcomm Incorporated |
| TGbf | 3/17 | Wei, Dong | NXP Semiconductors |
| TGbf | 3/17 | Wilhelmsson, Leif | Ericsson AB |
| TGbf | 3/17 | Xin, Yan | Huawei Technologies Co., Ltd |
| TGbf | 3/17 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |
| TGbf | 3/17 | Zhang, Jiayi | Ofinno |
| TGbf | 3/17 | Zhou, Pei | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |

**Monday, March 21, 2022, 10:00 am-12:00 pm (ET)**

**Meeting Agenda:**

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

<https://mentor.ieee.org/802.11/dcn/22/11-22-0502-00-00bf-tgbf-meeting-agenda-2022-03-teleconference.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 10:00 am ET (about 55 persons are on the call after 15 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. It is pointed out that the agenda is currently not on Mentor.

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

1. The Chair presents the TGbf timeline (slide 18) and reminds about the deadline for motion request.
2. The Chair presents slide 19, Call for contributions.
3. The Chair presents the teleconference times (slide 20 and 21).
4. Presentations:

**11-22/0415r2, “NDP Selection for 802.11bf”, Steve Shellhammer (Qualcomm):**

The TG needs to decide which NDP will be supported in 802.11bf. In this contribution a comparison between HE Ranging NDP and the EHT NDP.

Q: Is it correct that 11az does not support puncturing.

A: Yes, I believe so and the reason is that this makes it harder to determine the line-of-sight component in the time domain.

Q: I also believe the LTF repetition is an advantage.

Q: I am a bit reluctant to rely on what may be specified in a future TG like 11az+

**11-22/0421r0, “Discussion on the NDP format for sensing”, Yan Xin (Huawei):**

The NDP format for sensing in the sub-7 GHz systems should be chosen from the NDP formats specified in other amendments. This contribution discusses the different available options.

It is believed that the EHT sounding NDP format is the best one.

Q: I believe we need to address security first, before running this SP.

**11-22/0423r0, “DMG passive sensing based on A-BFT”, Narengerile (Huawei):**

Passive sensing based on beacons have been discussed already. In this contribution it is proposed to enable passive sensing based on A-BFT, i.e., in the UL.

Q: I believe the packet is subject to collisions, so I am not sure how useful this would be.

A: If there is a collision, it will compete for a new transmission. So I believe it can still be useful.

Q: I believe there are some issues with this contribution, so if you decide to run the SP, I will not be able to support you.

Q: I don’t agree that the changes are minor.

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

**DMG passive sensing based on A-BFT is enabled by**

* + Capability bit in the Association Request, Reassociation Request, Probe Request
	+ Indication bit using one reserved bit in the SSW/Short SSW
	+ Sensing information request and response that will provide information about the SSW/Short SSW
		- Sensing information include:
			* + Azimuth and elevation for each sector ID of SSW/Short SSW
				+ Location information of the STA (Sensing transmitter)

**Result:** Y/N/A: 12/8/25

**11-22/0339r1, “STA-STA sub 7GHz WLAN sensing support by leveraging SBP”, Enrico Rantala (Zeku):** Revision 0 has already been presented, but without the SP.

Q: I am not sure if the initiating STA knows the location of the other STAs.

A: There are ways this can be achieved, but this is not really discussed here.

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

SBP initiator (non-AP STA) may request SBP responder capable AP to include ‘responder to responder NDP measurement’ as part of the sensing procedure

**Result:** Y/N/A: 21/5/17

1. The chair asks if there is AoB. No response from the group.
2. The meeting is adjourned without objection at 11:58 am ET.

**List of Attendees:**

|  |  |  |  |
| --- | --- | --- | --- |
| Breakout | Timestamp | Name | Affiliation |
| TGbf | 3/21 | Au, Oscar | Origin Wireless |
| TGbf | 3/21 | Aygul, Mehmet | VESTEL; IMU |
| TGbf | 3/21 | Beg, Chris | Cognitive Systems Corp. |
| TGbf | 3/21 | Bredewoud, Albert | Broadcom Corporation |
| TGbf | 3/21 | Carney, William | Sony Group Corporation |
| TGbf | 3/21 | Chayat, Naftali | Vayyar Imaging |
| TGbf | 3/21 | Dash, Debashis | Apple Inc. |
| TGbf | 3/21 | da Silva, Claudio | Meta Platforms, Inc. |
| TGbf | 3/21 | Dong, Xiandong | Xiaomi Inc. |
| TGbf | 3/21 | Du, Rui | Huawei Technologies Co., Ltd |
| TGbf | 3/21 | Eitan, Alecsander | Qualcomm Incorporated |
| TGbf | 3/21 | Erkucuk, Serhat | Ofinno |
| TGbf | 3/21 | feng, Shuling | MediaTek Inc. |
| TGbf | 3/21 | Gao, Ning | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 3/21 | Hu, Shengquan | MediaTek Inc. |
| TGbf | 3/21 | Huang, Lei | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 3/21 | Huq, Kazi Mohammed Saidul | Ofinno |
| TGbf | 3/21 | Kadampot, Ishaque Ashar | Qualcomm Technologies, Inc. |
| TGbf | 3/21 | katla, satyanarayana | InterDigital, Inc. |
| TGbf | 3/21 | Kim, Sang Gook | LG ELECTRONICS |
| TGbf | 3/21 | Lanante, Leonardo | Ofinno |
| TGbf | 3/21 | Lim, Dong Guk | LG ELECTRONICS |
| TGbf | 3/21 | McCann, Stephen | Huawei Technologies Co., Ltd |
| TGbf | 3/21 | Mirfakhraei, Khashayar | Zeku |
| TGbf | 3/21 | Pushkarna, Rajat | Panasonic Asia Pacific Pte Ltd. |
| TGbf | 3/21 | Qi, Liu | Huawei Technologies Co., Ltd |
| TGbf | 3/21 | Raissinia, Alireza | Qualcomm Incorporated |
| TGbf | 3/21 | Rantala, Enrico-Henrik | Zeku |
| TGbf | 3/21 | Sahoo, Anirudha | National Institute of Standards and Technology |
| TGbf | 3/21 | Sand, Stephan | German Aerospace Center (DLR) |
| TGbf | 3/21 | Shellhammer, Stephen | Qualcomm Incorporated |
| TGbf | 3/21 | Sosack, Robert | Molex Incorporated |
| TGbf | 3/21 | Sun, Bo | ZTE Corporation |
| TGbf | 3/21 | Trainin, Solomon | Qualcomm Incorporated |
| TGbf | 3/21 | Tsai, Tsung-Han | MediaTek Inc. |
| TGbf | 3/21 | Unterhuber, Paul | German Aerospace Center (DLR) |
| TGbf | 3/21 | Wei, Dong | NXP Semiconductors |
| TGbf | 3/21 | Wilhelmsson, Leif | Ericsson AB |
| TGbf | 3/21 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |
| TGbf | 3/21 | Zhang, Jiayi | Ofinno |

**Tuesday, March 22, 2022, 10:00 am-12:00 pm (ET)**

**Meeting Agenda:**

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

<https://mentor.ieee.org/802.11/dcn/22/11-22-0502-02-00bf-tgbf-meeting-agenda-2022-03-teleconference.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 10:00 am ET (about 45 persons are on the call after 15 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. No comments from the group.

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

1. The Chair presents the TGbf timeline (slides 19) and reminds about the deadline for motion request.
2. The Chair presents slide 20, Call for contributions.
3. The Chair presents the teleconference times (slide 21 and 22).

Claudio points out that it is possible to receive D0.01 by sending Claudio an email. Unfortunately, it has still not be uploaded to the members area.

1. Presentations:

**PDT Straw Poll:**

**Straw Poll:** Do you support including the text proposed in the following document into the IEEE802.11bf draft amendment?

* 22/0370r2: PDT-DMG-Multi-Static-Instance

**Result:** Y/N/A: 17/6/17

**11-22/0132r3, “PDT DMG sensing: monostatic configurations”, Rui Du (Huawei):**

Rui explains that the change compared to the previous revision is that he has added some example.

Q: Do we have agreement on the waveform for monostatic sensing? I don’t recall this.

A: I believe you are correct.

Q: To make sure we have agreement on what should be added, I suggest you propose the addition to D0.01. This would make it clear.

Q: The TRN-N, TRN-P and so on are not needed because in Monostatic we do not specify the waveform used by the responder.

**11-22/0506r1, “Differential Quantization for CSI Report”, Qinghua Li (Intel):**

This contribution discusses difference in performance on basing the CSI report on TCIR or on the channel estimated in the frequency domain. In addition, it discussed how differential quantization of the report in the frequency domain can be sent in a differential way. Basically, the statement is that frequency domain is preferred.

Q: On slide 24, what is the SNR setting in your simulations?

A: No noise, only quantization noise.

Q: Actually, when it comes to using TCIR it is possible to apply windowing to improve things, but we believe this is implementation dependents to we did not go into this. So I don’t think your conclusions are correct.

Q: On page 29, the conclusions, you argue for differential coding. We have to select one method to be mandatory, are you suggesting that your approach with differential decoding is what should be selected?

A: I would support Steve’s proposal as the base line. The important thing is that it is in the frequency domain.

Q: On page 26, it looks like TCIR and differential quantization are similar.

Q: On page 28, you only show Ng = 4. However, we have seen that the performance can be very poor for large values of Ng.

A: We believe Ng= 4 is the most interesting case.

1. The chair asks if there is AoB. No response from the group.
2. The meeting is adjourned without objection at 12:03 pm ET.

**List of Attendees:**

|  |  |  |  |
| --- | --- | --- | --- |
| Breakout | Timestamp | Name | Affiliation |
| TGbf | 3/22 | Aboulmagd, Osama | Huawei Technologies Co., Ltd |
| TGbf | 3/22 | Aygul, Mehmet | VESTEL; IMU |
| TGbf | 3/22 | Beg, Chris | Cognitive Systems Corp. |
| TGbf | 3/22 | Berger, Christian | NXP Semiconductors |
| TGbf | 3/22 | Bredewoud, Albert | Broadcom Corporation |
| TGbf | 3/22 | Dash, Debashis | Apple Inc. |
| TGbf | 3/22 | da Silva, Claudio | Meta Platforms, Inc. |
| TGbf | 3/22 | Dong, Xiandong | Xiaomi Inc. |
| TGbf | 3/22 | Eitan, Alecsander | Qualcomm Incorporated |
| TGbf | 3/22 | Erkucuk, Serhat | Ofinno |
| TGbf | 3/22 | feng, Shuling | MediaTek Inc. |
| TGbf | 3/22 | Gao, Ning | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 3/22 | Huq, Kazi Mohammed Saidul | Ofinno |
| TGbf | 3/22 | Kadampot, Ishaque Ashar | Qualcomm Technologies, Inc. |
| TGbf | 3/22 | Kain, Carl | USDOT; Noblis |
| TGbf | 3/22 | Kamel, Mahmoud | InterDigital, Inc. |
| TGbf | 3/22 | Kasher, Assaf | Qualcomm Incorporated |
| TGbf | 3/22 | Kim, Sang Gook | LG ELECTRONICS |
| TGbf | 3/22 | Lim, Dong Guk | LG ELECTRONICS |
| TGbf | 3/22 | Luo, Chaoming | Beijing OPPO telecommunications corp., ltd. |
| TGbf | 3/22 | McCann, Stephen | Huawei Technologies Co., Ltd |
| TGbf | 3/22 | Pushkarna, Rajat | Panasonic Asia Pacific Pte Ltd. |
| TGbf | 3/22 | Raissinia, Alireza | Qualcomm Incorporated |
| TGbf | 3/22 | Sahoo, Anirudha | National Institute of Standards and Technology |
| TGbf | 3/22 | Shellhammer, Stephen | Qualcomm Incorporated |
| TGbf | 3/22 | Sun, Bo | ZTE Corporation |
| TGbf | 3/22 | Trainin, Solomon | Qualcomm Incorporated |
| TGbf | 3/22 | Wei, Dong | NXP Semiconductors |
| TGbf | 3/22 | Wilhelmsson, Leif | Ericsson AB |
| TGbf | 3/22 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |
| TGbf | 3/22 | Zhang, Jiayi | Ofinno |
| TGbf | 3/22 | Zhou, Pei | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |

**Thursday, March 24, 2022, 11:00 pm-1:00 am (ET)**

**Meeting Agenda:**

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

<https://mentor.ieee.org/802.11/dcn/22/11-22-0502-03-00bf-tgbf-meeting-agenda-2022-03-teleconference.pptx>

1. Call the meeting to order
2. Patent policy and logistics
3. TGbf Timeline
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6. Presentation of submissions
7. Any other business
8. Adjourn
9. The chair, Tony Han, calls the meeting to order at 11:00 pm ET (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 19) and states that the order of the presentations are changed such that the PDT presentation has a priority. He also reminded that the deadline for motion request is April 1st and that the Editor has uploaded D0.01 in the member’s area. The Editor asked to go over D0.01 to catch implementation problem. He said he already received 6 or 7 comments on this. He also mentioned that a couple of PDTs are still missing and if anyone needs help, then let Chair and Editor know.

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 20).
2. The Chair presents slide 21, Call for contributions.
3. The Chair presents the teleconference times (slide 22). The Chair presents the teleconference times for May Interim meeting (slide 23). He mentioned that the May Interim meeting will be electronic only, so the teleconference times will be adjusted and the number of time slots requested may be changed based on our progress.
4. Presentations:

**11-22/0521r0, “Proposed Draft Text for Responder-to-Responder (R2R) Sensing Procedure”, Sang Kim (LGE):** This document contains proposed draft text for responder-to-responder (R2R) sensing procedure that will be included in TGbf D0.1.

Q: Sentence is not clearly written.

A: Based on the discussion on the fly, the sentence is modified as “The WLAN sensing procedure initiated by an AP optionally allows a sensing responder to measure an NDP transmitted by another sensing responder.”

Q: Since this assumes TB sensing, specify exact Clause regarding TB sensing.

A: Clause 11 is changed to Clause 11.21.18.6 (TB Sensing Measurement Instance).

Q: Configuration is between an initiator and a responder or between an initiator and responders? It is not clear.

A: Since this text only reflects what was agreed, that will be addressed during comment collection.

Q: It is not clear whether NDP transmission from a responder is received by another responder or responders.

A: Since this text only reflects what was agreed, that will be addressed during comment collection.

The document was updated to 11-22/0521r1 and uploaded.

**11-22/0513r0, “Proposed Draft Text for MLME – Part II”, Narengerile (Huawei):** This document includes proposed draft text part II that covers the broad MLME topic as defined in TGbf’s SFD by the following:

“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.”

Q: In the Figure 6-28b, the 2nd NDP is not used. Why do you show the 2nd NDP?

A: Agreed to remove the 2nd NDP.

Q: Sensing measurement report is optional. Why is it shown in Figure 6-28b?

A: Claudio mentioned that it will be addressed in the next contribution in the queue.

The figures will be fixed and a straw poll will then be requested.

**11-22/0524r1, “Proposed Draft Text for SBP and Motion 60”, Claudio da Silva (Meta Platforms Inc):** This document proposes draft text that addresses the following two topics brought up during the discussion of the SBP PDT (11-22/0234r6):

* How existing D0.01 text (“Editor’s Note: Measurement results obtained in a WLAN sensing procedure resultant from an SBP request shall be reported to the SBP initiator”) relates to text introduced in the SFD by motion 60 (“For the case when the sensing initiator is the sensing transmitter, the reporting of sensing measurement results to the sensing initiator is optional”).
* Lack of normative text in D0.01 that implements motion 60.

Q: Editorial question is raised on the underline.

A: Spec text will not contain underline and this is for reference only.

C: Detail on SBP procedure reporting is not agreed.

A: It is noted as “TBD”.

C: If this is agreed, then SBP Request frame is also needed to be updated.

A: Claudio will work with commenter (Chaoming).

**11-22/0457r0, “Trigger frame for 11bf”, Dongguk Lim (LGE):** This contribution investigates the Trigger frames for purpose of the sensing measurement. Two options are considered:

* Option 1: newly define the Sensing Trigger frame variant.
* Option 2: reuse the Ranging Trigger frame variant.

Q: I support Option 2. Reusing the existing Trigger frame variant is good. However, reusing does not mean changes due to backward compatibility. In S12, B8 to B15 are added, but legacy devices will not understand these bits.

A: Agree with commenter. Legacy devices may be impacted. Contributor will think more.

C: I support Option 1. In S12, B4 is changed from reserved to sensing. Trigger frame will be broadcasted and legacy devices will read it, but will ignore it. It doesn’t seem to work. Option 1 is more robust.

C: I support Option 2. We need to discuss NDP measurement. When the measurement result is for completely local purpose, the Measurement Setup ID and Measurement Instance ID are not needed.

C: Same concern on supporting legacy devices.

C: Why do you consider Trigger frame format defined in 11ax? It does not support 320 MHz.

C: Support Option 2. Concern on Measurement Setup ID and etc.

Q: If we choose Option 2, then is Ranging NDP used?

A: Further discussion is needed.

Offline discussion will follow and then straw polls will be requested.

**11-22/0533r0, “Updated Proposal on CSI Formatting for the Sensing Measurement Report”, Steve Shellhammer (Qualcomm):** There have been several presentations on CSI formatting for the Sensing Measurement Report. The ideas from these presentations are brought together into an updated CSI formatting proposal. They are considered with respect to:

* Per-TX/RF Antenna Pair (per-Link) Scaling
* Fractional Scaling Values
* Proposals on supported values of Ng
* Proposal on supported values of Nb
* Channel Smoothing rule

Q: Some sensing applications may be sensitive to actual subcarrier values. In such cases, Ng = 2 may be needed. In addition 320 MHz should be supported.

A: More discussion is needed for Ng = 2. For the 320 MHz case, one row will be added if we agree to support this.

Q: We have open sensing applications. Do we need to indicate channel smoothing?

A: Channel smoothing is probably good in general and already implemented.

Q: Per-TX/RF Antenna Pair should be Per-TX/RX Antenna Pair. Since NDP is not aligned with TX antenna, but with TX stream, it is better to use Per-TX SS/RX Antenna Pair

A: In 11n, CSI report is antenna-to antenna.

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

**List of Attendees:**

|  |  |  |  |
| --- | --- | --- | --- |
| Breakout | Timestamp | Name | Affiliation |
| TGbf | 3/24 | Beg, Chris | Cognitive Systems Corp. |
| TGbf | 3/24 | Chitrakar, Rojan | Panasonic Asia Pacific Pte Ltd. |
| TGbf | 3/24 | Choi, Jinsoo | LG ELECTRONICS |
| TGbf | 3/24 | Dash, Debashis | Apple Inc. |
| TGbf | 3/24 | da Silva, Claudio | Meta Platforms, Inc. |
| TGbf | 3/24 | Dong, Xiandong | Xiaomi Inc. |
| TGbf | 3/24 | feng, Shuling | MediaTek Inc. |
| TGbf | 3/24 | Gao, Ning | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 3/24 | HAN, Xiao | Huawei Technologies Co., Ltd |
| TGbf | 3/24 | Hsu, Ostrovsky | Xiaomi Inc. |
| TGbf | 3/24 | Huang, Lei | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 3/24 | Huq, Kazi Mohammed Saidul | Ofinno |
| TGbf | 3/24 | Kamel, Mahmoud | InterDigital, Inc. |
| TGbf | 3/24 | Kim, Sang Gook | LG ELECTRONICS |
| TGbf | 3/24 | Lim, Dong Guk | LG ELECTRONICS |
| TGbf | 3/24 | Luo, Chaoming | Beijing OPPO telecommunications corp., ltd. |
| TGbf | 3/24 | Mirfakhraei, Khashayar | Zeku |
| TGbf | 3/24 | Pushkarna, Rajat | Panasonic Asia Pacific Pte Ltd. |
| TGbf | 3/24 | Raissinia, Alireza | Qualcomm Incorporated |
| TGbf | 3/24 | Sahoo, Anirudha | National Institute of Standards and Technology |
| TGbf | 3/24 | Shellhammer, Stephen | Qualcomm Incorporated |
| TGbf | 3/24 | SUH, JUNG HOON | Huawei Technologies Co., Ltd |
| TGbf | 3/24 | Trainin, Solomon | Qualcomm Incorporated |
| TGbf | 3/24 | Wang, Chao Chun | MediaTek Inc. |
| TGbf | 3/24 | Wei, Dong | NXP Semiconductors |
| TGbf | 3/24 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |
| TGbf | 3/24 | Zhang, Jiayi | Ofinno |

**Monday, March 28, 2022, 10:00 am-12:00 pm (ET)**

**Meeting Agenda:**

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

<https://mentor.ieee.org/802.11/dcn/22/11-22-0502-05-00bf-tgbf-meeting-agenda-2022-03-teleconference.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 10:00 am ET (about 50 persons are on the call after 10 minutes of the meeting).
10. The Chair goes through “Meeting Protocol, Attendance, Voting & Document 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 the agenda. No objection from the group so the agenda is approved.

1. The Chair presents the TGbf timeline (slide 21) and reminds about the deadline for motion request.
2. The Chair presents slide 22, Call for contributions.
3. The Chair presents the teleconference times (slide 23 and 24). With respect to the teleconference times for the May interim two options are proposed by the chair. Tony asks the group to digest these options and be prepared to discuss these in a future meeting.

Q: I would prefer Option 2.

1. Presentations:

**PDT Straw Poll:**

**Straw Poll:** Do you support including the text proposed in the following document into the IEEE802.11bf draft amendment?

* 22/0524r1: PDT for SBP and Motion 60

**Result:** Supported by unanimous consent.

**Straw Poll:** Do you support including the text proposed in the following document into the IEEE802.11bf draft amendment?

* 22/0521r1: PDT Sta to STA Sensing

**Result:** Supported by unanimous consent.

**Straw Poll:** Do you support including the text proposed in the following document into the IEEE802.11bf draft amendment?

* 22/0513r1: PDT for MLME – Part II

**Result:** Supported by unanimous consent.

**11-22/0533r1, “Updated Proposal on CSI Formatting for the Sensing Measurement Report”, Steve Shellhammer (Qualcomm):** The purpose is to discuss the SPs with the group and then run them at a later time.

Q: About the smoothing, you are proposing the same rules should apply as previously.

A: Correct.

Q: In SP1, perhaps change will to shall.

A: Agree.

Q: in SP2, would it be OK to also include alpha = 7 and also adding more values for beta?

A: I believe I would be OK with that.

Q: In SP4, perhaps change will to shall?

A: Agree.

Q: In SP3, you are not considering 320 MHz?

A: Not right now, we may do that at a later stage and then come back with a new SP.

**11-22/0543r0, “DMG Passive Sensing based on A-BFT”, Narengerile (Huawei):** The document has been updated based on off-line feedback. Narengerile goes through these updates.

Q: Is the passive sensing limited to PCP/AP?

A: Yes, in this contribution it is.

**Straw Poll:** Do you support including the text proposed in the following document into the IEEE802.11bf draft amendment?

* 22/0543r0: PDT for DMG Passive Sensing based on A-BFT

**Result:** Y/N/A: 10/7/25

**11-22/0544r0, “Encrypted measurement in WLAN sensing at 60 GHz”, Rui Du (Huawei):**

Security is a problem that needs to be considered in the daily application of WLAN Sensing. From the perspective of security, in some applications, it is better to keep the sensing results only can be understood by the sensing initiator, but not the unintended STAs and/or the sensing responder. In this contribution, an approach is proposed to realize the encrypted measurement and feedback at 60GHz.

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 12:02 pm EST.

**List of Attendees:**

|  |  |  |  |
| --- | --- | --- | --- |
| Breakout | Timestamp | Name | Affiliation |
| TGbf | 3/28 | Aygul, Mehmet | VESTEL; IMU |
| TGbf | 3/28 | Beg, Chris | Cognitive Systems Corp. |
| TGbf | 3/28 | Carney, William | Sony Group Corporation |
| TGbf | 3/28 | Dash, Debashis | Apple Inc. |
| TGbf | 3/28 | da Silva, Claudio | Meta Platforms, Inc. |
| TGbf | 3/28 | Dong, Xiandong | Xiaomi Inc. |
| TGbf | 3/28 | Erkucuk, Serhat | Ofinno |
| TGbf | 3/28 | feng, Shuling | MediaTek Inc. |
| TGbf | 3/28 | Gao, Ning | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 3/28 | Hsu, Ostrovsky | Xiaomi Inc. |
| TGbf | 3/28 | Huang, Lei | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 3/28 | Huq, Kazi Mohammed Saidul | Ofinno |
| TGbf | 3/28 | Jang, Insun | LG ELECTRONICS |
| TGbf | 3/28 | Kain, Carl | USDOT; Noblis |
| TGbf | 3/28 | Kamel, Mahmoud | InterDigital, Inc. |
| TGbf | 3/28 | katla, satyanarayana | InterDigital, Inc. |
| TGbf | 3/28 | Kim, Sang Gook | LG ELECTRONICS |
| TGbf | 3/28 | Lanante, Leonardo | Ofinno |
| TGbf | 3/28 | Lim, Dong Guk | LG ELECTRONICS |
| TGbf | 3/28 | Liu, Der-Zheng | Realtek Semiconductor Corp. |
| TGbf | 3/28 | Luo, Chaoming | Beijing OPPO telecommunications corp., ltd. |
| TGbf | 3/28 | Mirfakhraei, Khashayar | Zeku |
| TGbf | 3/28 | Ozbakis, Basak | Vestel Electronics Corp. |
| TGbf | 3/28 | Pushkarna, Rajat | Panasonic Asia Pacific Pte Ltd. |
| TGbf | 3/28 | Raissinia, Alireza | Qualcomm Incorporated |
| TGbf | 3/28 | Sahoo, Anirudha | National Institute of Standards and Technology |
| TGbf | 3/28 | Shellhammer, Stephen | Qualcomm Incorporated |
| TGbf | 3/28 | Sosack, Robert | Molex Incorporated |
| TGbf | 3/28 | Stavridis, Athanasios | Ericsson AB |
| TGbf | 3/28 | SUH, JUNG HOON | Huawei Technologies Co., Ltd |
| TGbf | 3/28 | Trainin, Solomon | Qualcomm Incorporated |
| TGbf | 3/28 | Tsai, Tsung-Han | MediaTek Inc. |
| TGbf | 3/28 | Wang, Chao Chun | MediaTek Inc. |
| TGbf | 3/28 | Wei, Dong | NXP Semiconductors |
| TGbf | 3/28 | Wilhelmsson, Leif | Ericsson AB |
| TGbf | 3/28 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |
| TGbf | 3/28 | Zhou, Pei | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |

**Tuesday, March 29, 2022, 10:00 am-12:00 pm (ET)**

**Meeting Agenda:**

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

<https://mentor.ieee.org/802.11/dcn/22/11-22-0502-07-00bf-tgbf-meeting-agenda-2022-03-teleconference.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 10:00 am ET (about 55 persons are on the call after 15 minutes of the meeting).
10. The Chair goes through “Meeting Protocol, Attendance, Voting & Document 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), “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 the agenda. No objection from the group so the agenda is approved.

1. The Chair presents the TGbf timeline (slide 22) and reminds about the deadline for motion request.
2. The Chair presents slide 23, Call for contributions.
3. The Chair presents the teleconference times (slide 24 and 25). With respect to the teleconference times for the May interim two options are proposed by the chair. Tony asks if the groups is OK with option 2.

Q: I would prefer Option 1 as it easier to cancel than to add a slot.

As a result of this Option 1 is kept.

Q: I believe we should consider cancel a call when there is, say, not more than two presentations. This should then be announced 24 hours in advance.

A: Agree in principle, since presentations may be of varying size, I suggest not to have a fixed number of contributions for cancelling but make it a bit flexible.

Tony shows the SP on slide 30 and asks for comments.

Q: Is it a WG level or TG level?

A: WG level.

Q: Don’t we need another SP for releasing D0.1 before running this SP?

A: No, we can run this SP before the draft is ready.

Q: Note that this is an informal CC.

Q: I believe we should not run this SP before we have seen the draft.

A: We have discussed this with Dorothy and this approach is OK. It should be noted that this is just a CC and not a Letter Ballot.

Tony explains that he intends to run the SP on Thursday.

1. Presentations:

**PDT Straw Poll:**

Based on comments from the group the document 22/0134 is slightly updated.

**Straw Poll:** Do you support including the text proposed in the following document into the IEEE802.11bf draft amendment?

* 22/0132r5: PDT for DMG sensing monostatic configurations

**Result:** Supported by unanimous consent.

**11-22/0544r0, “Encrypted measurement in WLAN sensing at 60 GHz”, Rui Du (Huawei):** This is a continuation of the presentation yesterday.

Q: Basically, I believe it is not enough to scramble with a binary sequence, but a larger alphabet is needed.

Q: I believe there are other means to use the sensing signal, e.g. based on autocorrelation, that cannot be avoided with the proposed method.

Q: I am kind of questioning the assumption that the responder not being trusted.

Q: TRN is used for beam training and beam tracking. It is not clear to me if this still can be achieved with your method.

The chair asks about future plans. Rui explains that he intends to have off-line discussions.

Tony explains that he has updated the SP for the comment collection and asks the group for comments.

1. The chair asks if there is AoB. No response from the group.
2. The meeting is adjourned without objection at 12:07 pm EST.

**List of Attendees:**

|  |  |  |  |
| --- | --- | --- | --- |
| Breakout | Timestamp | Name | Affiliation |
| TGbf | 3/29 | Aygul, Mehmet | VESTEL; IMU |
| TGbf | 3/29 | Beg, Chris | Cognitive Systems Corp. |
| TGbf | 3/29 | Dash, Debashis | Apple Inc. |
| TGbf | 3/29 | Dong, Xiandong | Xiaomi Inc. |
| TGbf | 3/29 | feng, Shuling | MediaTek Inc. |
| TGbf | 3/29 | Kadampot, Ishaque Ashar | Qualcomm Technologies, Inc. |
| TGbf | 3/29 | Kamel, Mahmoud | InterDigital, Inc. |
| TGbf | 3/29 | katla, satyanarayana | InterDigital, Inc. |
| TGbf | 3/29 | Kim, Sang Gook | LG ELECTRONICS |
| TGbf | 3/29 | Lim, Dong Guk | LG ELECTRONICS |
| TGbf | 3/29 | Luo, Chaoming | Beijing OPPO telecommunications corp., ltd. |
| TGbf | 3/29 | Mirfakhraei, Khashayar | Zeku |
| TGbf | 3/29 | Montemurro, Michael | Huawei Technologies Co., Ltd |
| TGbf | 3/29 | Ozbakis, Basak | Vestel Electronics Corp. |
| TGbf | 3/29 | Pushkarna, Rajat | Panasonic Asia Pacific Pte Ltd. |
| TGbf | 3/29 | Raissinia, Alireza | Qualcomm Incorporated |
| TGbf | 3/29 | Sahoo, Anirudha | National Institute of Standards and Technology |
| TGbf | 3/29 | Sand, Stephan | German Aerospace Center (DLR) |
| TGbf | 3/29 | Shellhammer, Stephen | Qualcomm Incorporated |
| TGbf | 3/29 | Sosack, Robert | Molex Incorporated |
| TGbf | 3/29 | Srivatsa, Veena | Synaptics |
| TGbf | 3/29 | Stavridis, Athanasios | Ericsson AB |
| TGbf | 3/29 | SUH, JUNG HOON | Huawei Technologies Co., Ltd |
| TGbf | 3/29 | Trainin, Solomon | Qualcomm Incorporated |
| TGbf | 3/29 | Wei, Dong | NXP Semiconductors |
| TGbf | 3/29 | Wilhelmsson, Leif | Ericsson AB |
| TGbf | 3/29 | Xin, Yan | Huawei Technologies Co., Ltd |
| TGbf | 3/29 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |
| TGbf | 3/29 | Zhang, Jiayi | Ofinno |
| TGbf | 3/29 | Zhou, Pei | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |

**Thursday, March 31, 2022, 11:00 pm-01:00 am (ET)**

**Meeting Agenda:**

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

<https://mentor.ieee.org/802.11/dcn/22/11-22-0502-08-00bf-tgbf-meeting-agenda-2022-03-teleconference.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. Motions (84-87)
8. SP (Comment collection on TGbf( D0.1)
9. Any other business
10. Adjourn
11. The Chair, Tony Han, calls the meeting to order at 11:00 pm ET (about 45 persons are on the call after a few minutes of the meeting).
12. 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.

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 (slides 23) Tony stresses that 1st of April is the last time to request for motions and adds that it seems all expected requests have been received.
2. The Chair presents slide 24, Call for contributions.
3. The Chair presents the teleconference times (slide 25 and 26).
4. Presentations:

**11-22/0513r2, “Proposed Draft Text for MLME – Part II”, Narengerile (Huawei):**

Narengerile goes through the changes made to the previous version before running the PDT SP.

**PDT Straw Poll:**

**Straw Poll:** Do you support including the text proposed in the following document into the IEEE802.11bf draft amendment?

* 22/0513r2: PDT for DMG sensing monostatic configurations

**Result:** Supported by unanimous consent.

**11-22/0555r0, “Proposed Draft Text for SBP Procedure Enhancement”, Enrico Rantala (Zeku):** The contribution proposed to add the following text: “SBP initiator (non-AP STA) may request SBP responder capable AP to initiate a WLAN sensing procedure, which allows a sensing responder to measure an NDP transmitted by another sensing responder.”

Q: Does the initiating STA also want to participate in the STA-STA measurement?

A: Yes.

Q: I believe what we currently have in the spec allows what you are suggesting.

As a result, the text under 11.21.19.1 General is slightly updated.

Q: To me this is a bit premature. For instance, it is not clear that the APs have the capabilities. Also, you are only discussing the request, but I believe we should also discuss to responses before putting it in the specification.

A: Here, if the request is sent to the AP it is assumed that the AP has this capability.

Q: I propose to add the text as an editor’s note, rather than normative text.

As a result the document is updated accordingly.

**PDT Straw Poll:**

**Straw Poll:** Do you support including the text proposed in the following document into the IEEE802.11bf draft amendment?

* 22/0555r1: PDT for DMG sensing monostatic configurations

**Result:** Supported by unanimous consent.

1. Motions:

**Motion 84:** Move to include the text proposed in the following document into the IEEE 802.11bf draft amendment:

* 22/240r5 PDT-DMG-Sensing-Capability

**Move:** Assaf Kasher

**Second:** Solomon Trainin

**Result:** Motion passed by unanimous consent.

**Note：**

* Related document 22/240r5
* SP Result: Unanimous consent

**Motion 85:** Move to include the text proposed in the following document into the IEEE 802.11bf draft amendment:

* 22/241r7 PDT-DMG-Passive-sensing

**Move:** Assaf Kasher

**Second:** Solomon Trainin

**Result:** Motion passed by unanimous consent.

**Note：**

* Related document 22/241r7
* SP Result: Unanimous consent

**Motion 86:** Move to include the text proposed in the following document into the IEEE 802.11bf draft amendment:

* 22/295r5 PDT-DMG-Measurement-Setup-frames

**Move:** Assaf Kasher

**Second:** Solomon Trainin

**Result:** Motion passed by unanimous consent.

Note：

* Related document 22/295r5
* SP Result: Unanimous consent

**Motion 87:** Move to include the text proposed in the following document into the IEEE 802.11bf draft amendment:

* 22/0327r1 PDT-Bi-Static-Sounding-and-BPR-Frame

**Move:** Assaf Kasher

**Second:** Solomon Trainin

**Result:** Motion passed by unanimous consent.

Note：

* Related document 22/0327r1
* SP Result: Unanimous consent
1. **Straw Poll (Comment Collection on TGbf D0.1):** Do you agree to instruct the TGbf editor to prepare TGbf D0.1 and launch a 30-day comment collection on TGbf D0.1?

**Result:** Y/N/A: 33/0/3

**PDT Straw Poll:**

**11-22/0464r0, “PDT EDMG Multi-Static PPDU structure”, Assaf Kasher (Qualcomm):** This document presents draft text for EDMG Multi-Static PPDU structure.

Q:LTF is not the term used in 60 GHz I believe.

Q:For padding is that also Golay sequences?

A: Yes.

Q: About the proposed sequences, it is not clear to me exactly what the design is based on and what the performance is.

A: The rational for the design as well as the performance have been presented in contribution 11-21/1865r1.

Q: So it is the cross-correlation for sync and cross-correlation between the sequences?

A: Yes.

Q: Why is there no sync field for STA1?

A: STA1 can receive the other parts of the packet, which STA2 – STAN may not be able to.

Because of the received feedback on the document, Assaf decides to defer the SP.

**11-22/0549r0, “STA-STA WLAN Sensing: Scenarios and Signaling”, Anirudha Sahoo (NIST):** This contribution is concerned with STA-STA sensing, which is seen as a core feature for collaborative WLAN sensing.

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 12:00 pm EST.

**List of Attendees:**

|  |  |  |  |
| --- | --- | --- | --- |
| Breakout | Timestamp | Name | Affiliation |
| TGbf | 3/31 | Beg, Chris | Cognitive Systems Corp. |
| TGbf | 3/31 | Berger, Christian | NXP Semiconductors |
| TGbf | 3/31 | Chitrakar, Rojan | Panasonic Asia Pacific Pte Ltd. |
| TGbf | 3/31 | Dash, Debashis | Apple Inc. |
| TGbf | 3/31 | da Silva, Claudio | Meta Platforms, Inc. |
| TGbf | 3/31 | Dong, Xiandong | Xiaomi Inc. |
| TGbf | 3/31 | feng, Shuling | MediaTek Inc. |
| TGbf | 3/31 | Gao, Ning | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 3/31 | Huang, Lei | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 3/31 | Kamel, Mahmoud | InterDigital, Inc. |
| TGbf | 3/31 | Kim, Sang Gook | LG ELECTRONICS |
| TGbf | 3/31 | Krebs, Alexander | Apple, Inc. |
| TGbf | 3/31 | Luo, Chaoming | Beijing OPPO telecommunications corp., ltd. |
| TGbf | 3/31 | Mirfakhraei, Khashayar | Zeku |
| TGbf | 3/31 | Pushkarna, Rajat | Panasonic Asia Pacific Pte Ltd. |
| TGbf | 3/31 | Raissinia, Alireza | Qualcomm Incorporated |
| TGbf | 3/31 | Sahoo, Anirudha | National Institute of Standards and Technology |
| TGbf | 3/31 | Shellhammer, Stephen | Qualcomm Incorporated |
| TGbf | 3/31 | Srivatsa, Veena | Synaptics |
| TGbf | 3/31 | SUH, JUNG HOON | Huawei Technologies Co., Ltd |
| TGbf | 3/31 | Trainin, Solomon | Qualcomm Incorporated |
| TGbf | 3/31 | Wei, Dong | NXP Semiconductors |
| TGbf | 3/31 | Wilhelmsson, Leif | Ericsson AB |
| TGbf | 3/31 | Xin, Yan | Huawei Technologies Co., Ltd |
| TGbf | 3/31 | Xu, Yanchao | Zeku |
| TGbf | 3/31 | YANG, RUI | InterDigital, Inc. |
| TGbf | 3/31 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |
| TGbf | 3/31 | Zhang, Jiayi | Ofinno |

**Thursday, April 7, 2022, 10:00 am-12:00 pm (ET)**

**Meeting Agenda:**

The meeting agenda is shown below, and published in the agenda document: <https://mentor.ieee.org/802.11/dcn/22/11-22-0566-01-00bf-tgbf-meeting-agenda-2022-04-teleconference.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 10:00 am ET (about 40 persons are on the call after 10 minutes of the meeting).
10. The Chair goes through “Meeting Protocol, Attendance, Voting & Document 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), “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 16) and asks if there are any questions or comments on the agenda. Assaf announces that he would like to present on next Monday instead.

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

1. Presentations:

**11-22/0549r0, “STA-STA WLAN Sensing: Scenarios and Signaling”, Anirudha Sahoo (NIST):** The contribution was partially presented in the latest call before we run out of time. In essence, AP initiated STA-STA sensing is the main building block to support *collaborative WLAN sensing* and *SBP-based STA-STA WLAN sensing.* Here different scenarios of STA-STA WLAN sensing are presented and high level signaling for the same are provided.

Q: On page 14, is the assumption that a movement cannot be detected on two of the links at the same time?

A: No, but probably one of the links may be much better for the detection.

Q: I believe what is shown on slide 15 actually may exist already today.

Q: I believe one also need to ensure that the included devices have the capabilities, this is not necessarily the case.

**11-22/0377r3, “On Sensing by Proxy”, Dong Wei (NXP):** The change compared to rev2 is an added slide and that the SP has been revised.

Q: SP1 mandates that the same pairs are used, I don’t think that is needed.

A: Different antenna pairs can have very different channels.

Q: In SP1, I suggest changing shall to should.

Based on the feedback, Dong decides to defer the SPs.

**11-22/0556r1, “PN and SN for sensing”, Chaoming Luo( OPPO):** This contribution proposes a new replay counter, a new bit in CCMP/GCMP header for sensing.

Q: I can see why ranging require another PN space, but I believe we need to understand the requirements for sensing a bit better before deciding on this.

Based on the feedback from the group, Chaoming decides to defer the SPs.

**11-22/0557r0, “Sensing Trigger Frame for 11bf”, Narengerile (Huawei):**

The presentation today is mainly to provide information and the SP will not be run.

Q: I believe it would be useful to consider some different kind of devices, like devices that support ranging.

A: I agree, but I don’t think this is a big issue.

Tony explains that he will allocate some time in the next teleconference to finalize the Q&A.

The Chair asks the group is any objection for cancel the next call as there is only one contribution in the queue. The group explicitly supports this idea.

1. The chair asks if there is AoB. No response from the group.
2. The meeting is adjourned without objection at 12:00 pm EST.

**List of Attendees:**

|  |  |  |  |
| --- | --- | --- | --- |
| Breakout | Timestamp | Name | Affiliation |
| TGbf | 4/7 | Aboulmagd, Osama | Huawei Technologies Co., Ltd |
| TGbf | 4/7 | Au, Oscar | Origin Wireless |
| TGbf | 4/7 | Aygul, Mehmet | VESTEL; IMU |
| TGbf | 4/7 | Beg, Chris | Cognitive Systems Corp. |
| TGbf | 4/7 | feng, Shuling | MediaTek Inc. |
| TGbf | 4/7 | Gao, Ning | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 4/7 | Kadampot, Ishaque Ashar | Qualcomm Technologies, Inc. |
| TGbf | 4/7 | Kim, Sang Gook | LG ELECTRONICS |
| TGbf | 4/7 | Krebs, Alexander | Apple, Inc. |
| TGbf | 4/7 | Lim, Dong Guk | LG ELECTRONICS |
| TGbf | 4/7 | LIU, CHENCHEN | Huawei Technologies Co., Ltd |
| TGbf | 4/7 | Luo, Chaoming | Beijing OPPO telecommunications corp., ltd. |
| TGbf | 4/7 | McCann, Stephen | Huawei Technologies Co., Ltd |
| TGbf | 4/7 | Mirfakhraei, Khashayar | Zeku |
| TGbf | 4/7 | Pushkarna, Rajat | Panasonic Asia Pacific Pte Ltd. |
| TGbf | 4/7 | Qi, Liu | Huawei Technologies Co., Ltd |
| TGbf | 4/7 | Raissinia, Alireza | Qualcomm Incorporated |
| TGbf | 4/7 | Sand, Stephan | German Aerospace Center (DLR) |
| TGbf | 4/7 | Shellhammer, Stephen | Qualcomm Incorporated |
| TGbf | 4/7 | Sun, Bo | ZTE Corporation |
| TGbf | 4/7 | Turkmen, Halise | Istanbul Medipol University; Vestel |
| TGbf | 4/7 | Wei, Dong | NXP Semiconductors |
| TGbf | 4/7 | Wilhelmsson, Leif | Ericsson AB |
| TGbf | 4/7 | Zhang, Jiayi | Ofinno |

**Tuesday, April 12, 2022, 10:00 am-12:00 pm (ET)**

**Meeting Agenda:**

The meeting agenda is shown below, and published in the agenda document: <https://mentor.ieee.org/802.11/dcn/22/11-22-0566-03-00bf-tgbf-meeting-agenda-2022-04-teleconference.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. Motion (88-95)
8. Any other business
9. Adjourn
10. The Chair, Tony Han, calls the meeting to order at 10:00 am ET (about 55 persons are on the call after 15 minutes of the meeting).
11. 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. No comments from the group.

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

1. The Chair presents the TGbf timeline (slide 18), which is unchanged.
2. Presentations:

**PDT Straw Poll:**

**Straw Poll:** Do you support including the text proposed in the following document into the IEEE802.11bf draft amendment?

* 22/0464r2: PDT EDMG Multi-Static PPDU Structure

**Result:** Y/N/A: 12/10/23

**11-22/457r1, “Trigger frame for 11bf”, Dongguk Lim (LGE):**

The contribution has been presented at an earlier teleconference, but the SPs were not run.

Q: Without more details for the two options, I don’t understand how one can decide between the options.

**Straw Poll 1:** Which option do you prefer to define the Sensing Trigger frame format?

* + Opt. 1: Newly define the Sensing Trigger frame variant
		- The Trigger type subfield value of 9 is used
	+ Opt. 2: Reuse of Ranging Trigger frame variant
		- The Trigger type subfield value of 8 is used, i.e., same as the Ranging Trigger frame.
	+ Opt. 3: Need further discussion.

**Result:** Opt.1 /Opt. 2/Opt. 3/: 1/22/22

1. Motions:

**Motion 88:** Move to include the text proposed in the following document into the IEEE 802.11bf draft amendment:

* 22/0370r3 PDT-DMG-Multi-Static-Instance

**Move:** Assaf Kasher

**Second:** Solomon Trainin

**Result:** Motion passed by unanimous consent.

**Note :**

* Related document 22/0370rXX
* SP Result: Y/N/A: 17/6/17

**Motion 89:** Move to include the text proposed in the following document into the IEEE 802.11bf draft amendment:

* 22/0524r1 Proposed Draft Text for SBP and Motion 60

**Move:** Claudio da Silva

**Second:** Jinson Choi

**Result:** Motion passed by unanimous consent.

**Note：**

* Related document 22/0524r1
* SP Result: Unanimous consent

**Motion 90:** Move to include the text proposed in the following document into the IEEE 802.11bf draft amendment:

* 22/0521r1 PDT STA to STA Sensing

**Move:** Sang Kim

**Second:** Dongguk Lim

**Result:** Motion passed by unanimous consent.

**Note：**

* Related document 22/0521r1
* SP Result: Unanimous consent

**Motion 91:** Move to include the text proposed in the following document into the IEEE 802.11bf draft amendment:

* 22/0513r2 Proposed Draft Text for MLME - Part II

**Move:** Rui Du

**Second:** Claudio da Silva

**Result:** Motion passed by unanimous consent.

**Note：**

* Related document 22/0513r1
* SP Result: Unanimous consent

**Motion 92:** Move to include the text proposed in the following document into the IEEE 802.11bf draft amendment:

* 22/0132r6 PDT for DMG sensing monostatic configurations

**Move:** Rui Du

**Second:** Yan Xin

**Result:** Motion passed by unanimous consent.

**Note：**

* Related document 22/0132r6
* SP Result: Unanimous consent

**Motion 93:** Move to include the text proposed in the following document into the IEEE 802.11bf draft amendment:

* 22/0555r1 Proposed Draft Text for SBP Procedure Enhancement

**Move:** Enrico Rantala

**Second:** Sang Kim

**Result:** Motion passed by unanimous consent.

**Note：**

* Related document 22/0555r1
* SP Result: Unanimous consent

**Motion 94:** Move to include the text proposed in the following document into the IEEE 802.11bf draft amendment: (Assaf requests the counting to be recorded)

* **22/0464r2 PDT EDMG Multi-Static PPDU structure**

**Move:** Assaf Kasher

**Second:** Solomon Trainin

**Preliminary Result:** Y/N/A:12/7/21

**Result\*:** 12/7/21

**Note：**

* \* Amended result accounts for removal of 0 votes of non-voting members.
* Related document
* SP Result: Y/N/A: 12/10/23

Recorded Vote:



Q: With respect to Motion 95, when does the 30-day period start?

A: First the Draft must be released, then it starts when Dorothy announces so.

**Motion 95 (Comment collection on TGbf D0.1):** Move to instruct the TGbf editor to prepare TGbf D0.1 and launch a 30-day comment collection on TGbf D0.1.

**Move:** Claudio Da Silva

**Second:**

**Preliminary Result: ( Y/ N/ A)**

**Result\*:**

**Note：**

* \* Amended result accounts for removal of X votes of non-voting members.
* SP Result: 33Y/ 0N/ 3A

Motion 95 is deferred as we 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 11:59 am EST.

**List of Attendees:**

|  |  |  |  |
| --- | --- | --- | --- |
| Breakout | Timestamp | Name | Affiliation |
| TGbf | 4/12 | Aboulmagd, Osama | Huawei Technologies Co., Ltd |
| TGbf | 4/12 | Au, Oscar | Origin Wireless |
| TGbf | 4/12 | Aygul, Mehmet | VESTEL; IMU |
| TGbf | 4/12 | Beg, Chris | Cognitive Systems Corp. |
| TGbf | 4/12 | Berger, Christian | NXP Semiconductors |
| TGbf | 4/12 | Chitrakar, Rojan | Panasonic Asia Pacific Pte Ltd. |
| TGbf | 4/12 | Dash, Debashis | Apple Inc. |
| TGbf | 4/12 | da Silva, Claudio | Meta Platforms, Inc. |
| TGbf | 4/12 | Dong, Xiandong | Xiaomi Inc. |
| TGbf | 4/12 | Du, Rui | Huawei Technologies Co., Ltd |
| TGbf | 4/12 | Erkucuk, Serhat | Ofinno |
| TGbf | 4/12 | feng, Shuling | MediaTek Inc. |
| TGbf | 4/12 | Gao, Ning | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 4/12 | Jia, Jia | Huawei Technologies Co., Ltd; Huawei Technologies Co., Ltd |
| TGbf | 4/12 | katla, satyanarayana | InterDigital, Inc. |
| TGbf | 4/12 | Kim, Sang Gook | LG ELECTRONICS |
| TGbf | 4/12 | Krebs, Alexander | Apple, Inc. |
| TGbf | 4/12 | Lim, Dong Guk | LG ELECTRONICS |
| TGbf | 4/12 | Luo, Chaoming | Beijing OPPO telecommunications corp., ltd. |
| TGbf | 4/12 | Montemurro, Michael | Huawei Technologies Co., Ltd |
| TGbf | 4/12 | narengerile, narengerile | Huawei Technologies Co., Ltd |
| TGbf | 4/12 | Omar, Hassan | Huawei Technologies Co., Ltd |
| TGbf | 4/12 | Raissinia, Alireza | Qualcomm Incorporated |
| TGbf | 4/12 | Rantala, Enrico-Henrik | Zeku |
| TGbf | 4/12 | Ryu, Kiseon | Ofinno |
| TGbf | 4/12 | Sahoo, Anirudha | National Institute of Standards and Technology |
| TGbf | 4/12 | Sand, Stephan | German Aerospace Center (DLR) |
| TGbf | 4/12 | Shellhammer, Stephen | Qualcomm Incorporated |
| TGbf | 4/12 | Sosack, Robert | Molex Incorporated |
| TGbf | 4/12 | Stavridis, Athanasios | Ericsson AB |
| TGbf | 4/12 | Strauch, Paul | Qualcomm Incorporated |
| TGbf | 4/12 | SUH, JUNG HOON | Huawei Technologies Co., Ltd |
| TGbf | 4/12 | Sun, Yanjun | Qualcomm Incorporated |
| TGbf | 4/12 | Trainin, Solomon | Qualcomm Incorporated |
| TGbf | 4/12 | Tsai, Tsung-Han | MediaTek Inc. |
| TGbf | 4/12 | Wang, Chao Chun | MediaTek Inc. |
| TGbf | 4/12 | Wei, Dong | NXP Semiconductors |
| TGbf | 4/12 | Wilhelmsson, Leif | Ericsson AB |
| TGbf | 4/12 | Xin, Yan | Huawei Technologies Co., Ltd |
| TGbf | 4/12 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |
| TGbf | 4/12 | Yu, Jian | Huawei Technologies Co., Ltd |
| TGbf | 4/12 | Zhang, Jiayi | Ofinno |

**Thursday, April 14, 2022, 11:00 pm-01:00 am (ET)**

**Meeting Agenda:**

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

<https://mentor.ieee.org/802.11/dcn/22/11-22-0566-06-00bf-tgbf-meeting-agenda-2022-04-teleconference.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. Motion (95)
8. Any other business
9. Adjourn
10. The Chair, Tony Han, calls the meeting to order at 11:00 pm ET (about 70 persons are on the call after one hour of the meeting).
11. 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.

The Chair asks if there is any objection to approve the 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 20, Call for contributions.
3. The Chair presents the teleconference times (slide 21).
4. Presentations:

**11-22/0636r2, “EDMG Multi-Static Sensing Sounding PPDU Structure”, Yan Xin (Huawei):**

The contribution proposes to change the packet structure slightly in order to reduce the number of beam switches needed.

Q: We have a structure denoted TRN field that has a certain structure, which is what we have proposed. Switching is also not an issue for sensing. If you break the structure of the TRN unit, it makes it hard to do frequency and phase tracking. I also believe it is good to keep the CEF

A: I don’t think there is such a big difference in ability for tracking.

Q: I would also prefer to keep the structure as far as possible. Also, there is a huge number of beam switches so reducing the number of switches with one or two does not really matter in my opinion.

Tony asks about next plans. Yan explains that they will discuss more off-line.

**11-22/0626r1, “Updates on Sensing Measurement Setup Termination frame”, Pei Zhou (OPPO):**

This contribution discusses what is believed to be things currently missing from the Sensing Measurement Setup Termination frame.

Q: I basically agree with the idea, but I believe we need to have some offline discussions to clarify some of the details.

A: OK.

Tony asks about next plans. Pei explains that the idea is to have off-line discussions.

As a result the SP is deferred.

**11-22/0556r2, “PN and SN for sensing”, Chaoming Luo (OPPO):**

This contribution was presented last week, and has just been slightly updated based on the feedback.

Q: Why are you discussing three bits, you only need to discuss two.

A: I am fine with that.

As a result of the discussion, the SP is deferred and will be modified.

1. Motion:

**Motion 95 (Comment collection on TGbf D0.1):** Move to instruct the TGbf editor to prepare TGbf D0.1 and launch a 30-day comment collection on TGbf D0.1.

**Move:** Claudio Da Silva

**Second:** Cheng Chen

**Preliminary Result:** Y/N/A: 42/0/7

**Result\*:**

**Note：**

* \* Amended result accounts for removal of X votes of non-voting members.
* SP Result: 33Y/ 0N/ 3A

**11-22/0533r3, “Updated Proposal on CSI Formatting
for the Sensing Measurement Report”, Steve Shellhammer (Qualcomm):**

This contribution has been presented already, and the idea is to just run the SPs.

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

* In the formatting of the Sensing Measurement report all the in-phase and quadrature components of each of the tones of the CSI from a given measurement instance for a given TX/RX antenna pair, shall be scaled with the same value.

**Result:** The SP is supported by unanimous consent.

Q: I don’t believe there is an actual saving in complexity.

A: We believe it is and we have also discussed this with other implementers, and they agree.

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

* In the formatting of the Sensing Measurement report the scaling and quantizing of the in-phase and quadrature CSI components will be according to the following two equations

$$\hat{H}\_{Q}\left(k\right)=round\left(\left(\frac{α}{β}\right) H\_{Q}(k)\right)$$

$$\hat{H}\_{I}\left(k\right)=round\left(\left(\frac{α}{β}\right) H\_{I}(k)\right)$$

The values of $α$ and $β$ are selected from the following sets

* $α\in \left\{1, 3, 5\right\}$
* $β\in \left\{2^{0}, 2^{1}, 2^{2}, …2^{11}\right\}$

The selection of $α$ and $β$ values are implementation specific

**Result:** Y/N/A: 54/20/11

1. The chair asks if there is AoB. No response from the group.
2. The meeting is adjourned without objection at 12:03 pm.

**List of Attendees:**

|  |  |  |  |
| --- | --- | --- | --- |
| Breakout | Timestamp | Name | Affiliation |
| TGbf | 4/14 | Beg, Chris | Cognitive Systems Corp. |
|  TGbf | 4/14 | Chitrakar, Rojan | Panasonic Asia Pacific Pte Ltd. |
| TGbf | 4/14 | Dash, Debashis | Apple Inc. |
| TGbf | 4/14 | Dong, Xiandong | Xiaomi Inc. |
| TGbf | 4/14 | Eitan, Alecsander | Qualcomm Incorporated |
| TGbf | 4/14 | feng, Shuling | MediaTek Inc. |
| TGbf | 4/14 | Gao, Ning | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 4/14 | Huang, Lei | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 4/14 | Kadampot, Ishaque Ashar | Qualcomm Technologies, Inc. |
| TGbf | 4/14 | Kamel, Mahmoud | InterDigital, Inc. |
| TGbf | 4/14 | Kasher, Assaf | Qualcomm Incorporated |
| TGbf | 4/14 | Kim, Sang Gook | LG ELECTRONICS |
| TGbf | 4/14 | Kim, Youhan | Qualcomm Incorporated |
| TGbf | 4/14 | Li, Jialing | Qualcomm Incorporated |
| TGbf | 4/14 | Lim, Dong Guk | LG ELECTRONICS |
| TGbf | 4/14 | Lou, Hui-Ling | NXP Semiconductors |
| TGbf | 4/14 | Ma, Li | MediaTek Inc. |
| TGbf | 4/14 | Raissinia, Alireza | Qualcomm Incorporated |
| TGbf | 4/14 | Rosdahl, Jon | Qualcomm Technologies, Inc. |
| TGbf | 4/14 | Sahoo, Anirudha | National Institute of Standards and Technology |
| TGbf | 4/14 | Shellhammer, Stephen | Qualcomm Incorporated |
| TGbf | 4/14 | Strauch, Paul | Qualcomm Incorporated |
| TGbf | 4/14 | SUH, JUNG HOON | Huawei Technologies Co., Ltd |
| TGbf | 4/14 | Sun, Yanjun | Qualcomm Incorporated |
| TGbf | 4/14 | Trainin, Solomon | Qualcomm Incorporated |
| TGbf | 4/14 | Wang, Chao Chun | MediaTek Inc. |
| TGbf | 4/14 | Wei, Dong | NXP Semiconductors |
| TGbf | 4/14 | Wilhelmsson, Leif | Ericsson AB |
| TGbf | 4/14 | Wu, Kanke | Qualcomm Incorporated |
| TGbf | 4/14 | Xin, Yan | Huawei Technologies Co., Ltd |
| TGbf | 4/14 | YANG, RUI | InterDigital, Inc. |
| TGbf | 4/14 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |
| TGbf | 4/14 | Zhang, Jiayi | Ofinno |
| TGbf | 4/14 | Zhang, Yan | NXP Semiconductors |

Christian Berger, NXP

Ankit Sethi, NXP

**Monday, April 18, 2022, 10:00 am-12:00 pm (ET)**

**Meeting Agenda:**

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

<https://mentor.ieee.org/802.11/dcn/22/11-22-0566-08-00bf-tgbf-meeting-agenda-2022-04-teleconference.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 10:00 am ET (about 80 persons are on the call after 20 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 19) and asks if there are any questions or comments on the agenda.

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

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

**11-22/0533r3, “Updated Proposal on CSI Formatting for the Sensing Measurement Report”, Steve Shellhammer (Qualcomm):**

This contribution has been presented already, and the first two SPs were run in the previous teleconference.

Q: Is the intention to address 320 MHz at a later time?

A: Yes.

Q: This relates to the transmitter side, not the receiver side?

A: Correct.

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

* If a STA supports the Sensing Measurement report, then the conditionally mandatory and optional supported values of Ng in the Sensing Measurement report shall depend on the number of transmit antennas and the NDP bandwidth according to the following table:
* Note, this is relative to a 4xLTF



* The indices for the Ng = 8 for a 160 MHz NDP are specified in the following table:

|  |  |  |
| --- | --- | --- |
| **Channel Width** | **Ng** | **Indices** |
| 160 MHz | 8 | -1012, -1004, … -20, -12, 12, 20, … 1004, 1012 |

**Result:** Y/N/A: 45/13/12

**Straw Poll 4:** Do you agree to add the following to the 11bf SFD?

* The Sensing Measurement report shall support word size values for the in-phase and quadrature components of the scaled CSI of both Nb = 8 and Nb = 10 bits.

**Result:** SP supported unanimously.

**Straw Poll 5:** Do you agree to add the following to the 11bf SFD?

* Smoothing should not be applied prior to scaling and quantization in the CSI formatting for the Sensing Measurement Report, when the beamforming bit in the NDP is set to 1.

Based on the feedback from the group, Steve decides to defer the SP.

**11-22/0642r1, “SP for TGbf Freq Domain CSI Feedback”, Junghoon Suh (Huawei):**

Q: On slide 7, you are doing a division and a multiplication that is not a power of two, which is not needed in the other approach.

A: We still think that the gain in performance is more important than the saving in complexity.

**Straw Poll:** Do you agree to have a conditional mandatory CSI Feedback scheme according to the CSI matrices feedback as defined in IEEE Std 802.11-2020 with the additional following implementation updates?

* The bandwidth parameter is extended to support up to 160 MHz/320 MHz depending on Sensing NDP format
* The TX-RX pair parameters are extended to support up to 8 RF chains in each TX and RX
* The maximums of the real and imaginary parts across the entire subcarriers can be found per each link (TX-RX pair) for the Scale Factor
* This is for the freq domain CSI feedback
* “conditional mandatory” means that the CSI Feedback Scheme proposed in this SP is mandatorily supported, when the CSI Feedback is supported in a STA

**Result:** Y/N/A: 24/44/11

**11-21/1934r5, “Discussion on Session Setup”, Chaoming Luo (OPPO):** This is an updated version, updated based on offline comments.

After some discussions, the SPs are deferred.

1. The chair asks if there is AoB. No response from the group.
2. The meeting is adjourned without objection at 12:02 pm.

**List of Attendees:**

|  |  |  |  |
| --- | --- | --- | --- |
| Breakout | Timestamp | Name | Affiliation |
| TGbf | 4/18 | Aboulmagd, Osama | Huawei Technologies Co., Ltd |
| TGbf | 4/18 | Ajami, Abdel Karim | Qualcomm Incorporated |
| TGbf | 4/18 | Aygul, Mehmet | VESTEL; IMU |
| TGbf | 4/18 | Beg, Chris | Cognitive Systems Corp. |
| TGbf | 4/18 | Bei, Jianwei | NXP Semiconductors |
| TGbf | 4/18 | Cheng, Xilin | NXP Semiconductors |
| TGbf | 4/18 | Chitrakar, Rojan | Panasonic Asia Pacific Pte Ltd. |
| TGbf | 4/18 | Chng, Shi Baw | BAWMAN LLC |
| TGbf | 4/18 | Dash, Debashis | Apple Inc. |
| TGbf | 4/18 | da Silva, Claudio | Meta Platforms, Inc. |
| TGbf | 4/18 | de Vegt, Rolf | Qualcomm Technologies Inc |
| TGbf | 4/18 | Dong, Xiandong | Xiaomi Inc. |
| TGbf | 4/18 | Eitan, Alecsander | Qualcomm Incorporated |
| TGbf | 4/18 | Erkucuk, Serhat | Ofinno |
| TGbf | 4/18 | Gao, Ning | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 4/18 | Ho, Duncan | Qualcomm Incorporated |
| TGbf | 4/18 | Huang, Po-Kai | Intel Corporation |
| TGbf | 4/18 | Huq, Kazi Mohammed Saidul | Ofinno |
| TGbf | 4/18 | Kadampot, Ishaque Ashar | Qualcomm Technologies, Inc. |
| TGbf | 4/18 | Kakani, Naveen | Qualcomm Incorporated |
| TGbf | 4/18 | Kamel, Mahmoud | InterDigital, Inc. |
| TGbf | 4/18 | Kim, Sang Gook | LG ELECTRONICS |
| TGbf | 4/18 | Kim, Youhan | Qualcomm Incorporated |
| TGbf | 4/18 | Li, Jialing | Qualcomm Incorporated |
| TGbf | 4/18 | Li, Qinghua | Intel |
| TGbf | 4/18 | Lim, Dong Guk | LG ELECTRONICS |
| TGbf | 4/18 | Liu, Der-Zheng | Realtek Semiconductor Corp. |
| TGbf | 4/18 | Luo, Chaoming | Beijing OPPO telecommunications corp., ltd. |
| TGbf | 4/18 | Montreuil, Leo | Broadcom Corporation |
| TGbf | 4/18 | Muth, Karlheinz | Broadcom Corporation |
| TGbf | 4/18 | Naik, Gaurang | Qualcomm Incorporated |
| TGbf | 4/18 | narengerile, narengerile | Huawei Technologies Co., Ltd |
| TGbf | 4/18 | Qi, Liu | Huawei Technologies Co., Ltd |
| TGbf | 4/18 | Rai, Kapil | Qualcomm Technologies, Inc. |
| TGbf | 4/18 | Raissinia, Alireza | Qualcomm Incorporated |
| TGbf | 4/18 | Rezk, Meriam | Qualcomm Incorporated |
| TGbf | 4/18 | Rosdahl, Jon | Qualcomm Technologies, Inc. |
| TGbf | 4/18 | Ryu, Kiseon | Ofinno |
| TGbf | 4/18 | Sahoo, Anirudha | National Institute of Standards and Technology |
| TGbf | 4/18 | Shellhammer, Stephen | Qualcomm Incorporated |
| TGbf | 4/18 | Strauch, Paul | Qualcomm Incorporated |
| TGbf | 4/18 | Sun, Bo | ZTE Corporation |
| TGbf | 4/18 | Sun, Yanjun | Qualcomm Incorporated |
| TGbf | 4/18 | Tolpin, Alexander | Intel Corporation |
| TGbf | 4/18 | Tsai, Tsung-Han | MediaTek Inc. |
| TGbf | 4/18 | Wei, Dong | NXP Semiconductors |
| TGbf | 4/18 | Wilhelmsson, Leif | Ericsson AB |
| TGbf | 4/18 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |
| TGbf | 4/18 | Yee, James | MediaTek Inc. |
| TGbf | 4/18 | Zhang, Jiayi | Ofinno |

**Tuesday, April 19, 2022, 10:00 am-12:00 pm (ET)**

**Meeting Agenda:**

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

<https://mentor.ieee.org/802.11/dcn/22/11-22-0566-09-00bf-tgbf-meeting-agenda-2022-04-teleconference.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 10:00 am ET (about 55 persons are on the call after 50 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 the agenda. No objection from the group so the agenda is approved.

1. The Chair presents the TGbf timeline (slide 21), which is unchanged. Tony points out that the next step is that Claudio will release D0.1.
2. The Chair presents slide 22, Call for contributions, which is unchanged.
3. The Chair presents the teleconference times (slide 23), which is unchanged. Tony announces that he may cancel some of the upcoming teleconferences since there is not many contributions in the queue.
4. Presentations:

**11-22/0647r0, “Information Exchange of WLAN Sensing Link”, Rui Du (Huawei):**

Q: I don’t see the need to report this. I believe what you describe is how things usually works and that this is included in e.g. the CSI report.

A: We believe it is needed.

Q: You envision that several transmitters are sending at the same time with different powers?

A: Yes, this can happen today in the UL due to different path losses

Q: We have also looked at this, and it is important to understand that an AGC change is not just a change in the power, but there is also a frequency dependent change which may cause problem if one wants to sense very small variation.

Tony asks about next steps. Rui explains that he will continue offline discussions and defer the SPs for the moment.

**11-22/0626r2, “Updates on Sensing Measurement Setup Termination frame”, Pei Zhou (OPPO):** This contribution, r1, was presented last week and this is an updated version addressing some of the concerns from the group.

Tony asks about next steps. Pei explains he will make changes based on the feedback and then may want to run the SP.

Tony explains that if there are no contributions announced, he will cancel the next teleconference.

1. The chair asks if there is AoB. No response from the group.
2. The meeting is adjourned without objection at 11:31am.

**List of Attendees:**

|  |  |  |  |
| --- | --- | --- | --- |
| Breakout | Timestamp | Name | Affiliation |
| TGbf | 4/19 | Aygul, Mehmet | VESTEL; IMU |
| TGbf | 4/19 | Beg, Chris | Cognitive Systems Corp. |
| TGbf | 4/19 | Carney, William | Sony Group Corporation |
| TGbf | 4/19 | Chitrakar, Rojan | Panasonic Asia Pacific Pte Ltd. |
| TGbf | 4/19 | Chng, Shi Baw | BAWMAN LLC |
| TGbf | 4/19 | da Silva, Claudio | Meta Platforms, Inc. |
| TGbf | 4/19 | Dong, Xiandong | Xiaomi Inc. |
| TGbf | 4/19 | Erkucuk, Serhat | Ofinno |
| TGbf | 4/19 | feng, Shuling | MediaTek Inc. |
| TGbf | 4/19 | Gao, Ning | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 4/19 | Kamel, Mahmoud | InterDigital, Inc. |
| TGbf | 4/19 | Kim, Sang Gook | LG ELECTRONICS |
| TGbf | 4/19 | Kim, Youhan | Qualcomm Incorporated |
| TGbf | 4/19 | Kumari, Warren | Google |
| TGbf | 4/19 | Lim, Dong Guk | LG ELECTRONICS |
| TGbf | 4/19 | Montemurro, Michael | Huawei Technologies Co., Ltd |
| TGbf | 4/19 | Ozbakis, Basak | Vestel Electronics Corp. |
| TGbf | 4/19 | Raissinia, Alireza | Qualcomm Incorporated |
| TGbf | 4/19 | Sand, Stephan | German Aerospace Center (DLR) |
| TGbf | 4/19 | Shellhammer, Stephen | Qualcomm Incorporated |
| TGbf | 4/19 | Srivatsa, Veena | Synaptics |
| TGbf | 4/19 | Stavridis, Athanasios | Ericsson AB |
| TGbf | 4/19 | Wei, Dong | NXP Semiconductors |
| TGbf | 4/19 | Wilhelmsson, Leif | Ericsson AB |
| TGbf | 4/19 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |
| TGbf | 4/19 | Yoon, Kangjin | Facebook |
| TGbf | 4/19 | Zhang, Jiayi | Ofinno |

**Monday, April 25, 2022, 10:00 am-12:00 pm (ET)**

**Meeting Agenda:**

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

<https://mentor.ieee.org/802.11/dcn/22/11-22-0566-10-00bf-tgbf-meeting-agenda-2022-04-teleconference.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 10:00 am ET (about 50 persons are on the call after 10 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 points out that the timeline, call for contribution, and teleconference times are unchanged.

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

1. The Chair presents the TGbf timeline (slide 23), which is unchanged.
2. The Chair presents slide 24, Call for contributions, which is unchanged.
3. The Chair presents the teleconference times (slide 25), which is unchanged. Tony announces that he may cancel the teleconference tomorrow, depending on the progress today.
4. Presentations:

**11-22/0556r3, “PN and SN for sensing”, Chaoming Luo (OPPO):**

Has been presented before…

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

* + A new **replay counter** is introduced and applies to the new action category ‘Protected Sensing Frame’. 11bf shall not define any additional replay counter for other sensing management frames.
	+ Protected sensing measurement report frame belongs to the new action category ‘Protected Sensing Frame’, while other protected sensing Action frames belong to the action category ‘Protected Dual of Public Action’.
	+ Use the **B3 and B4** of ‘Key ID Octet’ in the CCMP/GCMP Header to indicate a frame of the new action category ‘Protected Sensing Frame’.
		- 01 indicates protected ranging
		- 10 indicates protected sensing
		- 11 is reserved

**Result:** SP supported unanimously.

**Straw Poll 2:**

Based on a request from the group, the SP is deferred.

**11-22/0654r0, “Discussion on NDP Transmission in TF Sounding Phase”, Mahmoud Kamel (Interdigital):** The topic of this contribution is to propose different means to improve the sensing efficiency by allowing more than one channel to be measured simultaneously.

Q: On slide 5, The first option in Method 2 is not allowed according to the current specification.

Q: I just want to point out that I believe this is not prevented by the current specification, but I believe it can in practice be very difficult and I am not sure it will ever be used.

Q: On slide 9, in practice it will not be possible to send the same x as there will be different time and frequency drift, and maybe other issues as well. So, I am not convinced that this simple model reflects reality.

A: I agree, but this was more to highlight and illustrate the idea.

The chair asks about future plans. Mahmoud explains that he will consider the feedback and think about next steps.

**11-22/0649r1, “WLAN Two-Way Sensing Use Cases”, Oscar Au (Origin Wireless):** Two-way sensing does here mean that the two devices involved in the sensing may both be interested in sensing results.

Q: I believe this is already allowed by the specification.

After some discussion in the group, it seems the group agrees that two-way sensing is important, but that it is already supported.

Tony asks if there is any objection to cancel the teleconference call tomorrow. No objection from the group.

1. The chair asks if there is AoB. No response from the group.
2. The meeting is adjourned without objection at 12:00pm.