IEEE P802.11
Wireless LANs

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| IEEE 802.11bf – Teleconference Minutes September-November 2021  |
| Date: 2021-11-02 |
| Author(s): |
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Abstract

This document contains minutes for the TG 802.11bf teleconferences in September-November 2021.

Rev 0: Minutes for TG 802.11bf teleconference on the 28th of September 2021.

Rev 1: Minutes for TG 802.11bf teleconference on the 12th of October 2021 added.

Rev 2: Minutes for TG 802.11bf teleconference on the 19th of October 2021 added.

Rev 3: Minutes for TG 802.11bf teleconference on the 25th of October 2021 added and some typos corrected.

Rev 4: Minutes for TG 802.11bf teleconference on the 26th of October added.

Rev 5: Minutes for TG 802.11bf teleconference on the 1st and 2nd of November added.

**Tuesday, September 28, 2021, 10:00-12:00 am (ET)**

**Meeting Agenda:**

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

<https://mentor.ieee.org/802.11/dcn/21/11-21-1571-00-00bf-tgbf-meeting-agenda-2021-09-11.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 Xiao Han, calls the meeting to order at 10:00am (about 37 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 (slide 17). The chair also presents a newly added slide, slide 18, “Discussion of TGbf Timeline and Call for Action”. The slide explains the plan for how to move from SFD to Specification D0.1.
2. The Chair presents slide 19, Call for contributions. This slide has also been updated.
3. The Chair presents the teleconference times (slide 20).
4. Presentations:

**11-21/0504r3, “Specification Framework for TGbf”, Claudio da Silva (Facebook):** Claudio goes through the updates that have been made to the SFD. In particular, quite a number of updates have been made based on the motions in the September Interim meeting. Claudio also points out that the figures need to be in black and white and that he needs the Visio file, and that when proposing text for the specification the contributors should keep this in mind.

Q: Is it possible to indicate what different clauses are impacted and perhaps also appoint responsible persons for these?

A: I have tried to indicate what I believe are the relevant clauses in the title of the different sections in the SFD.

Q: Do we need to fill out all the sections or can we leave some of the sections empty for D0.1?

A: It is OK to leave some empty for D0.1.

Q: You said there will be no clause, what is that based on?

A: In the PAR we state we are going to modify clauses. Usually, a new clause is introduced when there is a new PHY.

**11-21/0876r3, “TGbf Evaluation Methodology and Simulation Scenarios”, Rui Du (Huawei):**  The document has been slightly updated since it was presented last time. There was not enough time for comments when presented last time, so some time is now allocated for Q&A.

Q: Related to the SP, why is this information written as a note? I believe it is an integral part of the SP.

A: OK. The SP is updated accordingly.

**Straw Poll:**

Do you agree to adopt the document (21/0876r3) as the Evaluation Methodology and Simulation Scenarios document for IEEE 802.11 bf?

Simulation is not mandatory for any contributions.

**Result:** Y/N/A: 20/0/6

**11-21/1364r1, “Threshold based sensing procedure”, Mengshi Hu (Huawei):**

Based on off-line discussion it is proposed that the calculations of the CSI variations should be implementation specific. However, some rules for the CSI calculations are suggested to be standardized.

Q: I believe you should replace “sensing procedure” with “measurement instance” in the straw polls.

A: I agree. The SPs are updated accordingly.

Q: How would this work if different implementations have different methods, specifically if the threshold are very different?

A: The threshold has to be per user, rather than universal.

Based on the discussion the word “normalized” is changed to “mapped”.

**Straw Poll 1:** Do you agree that in the threshold based measurement instance, the estimation of CSI variation is implementation specific, but the estimation result shall follow the following rules?

* The estimation value of the CSI variation shall be mapped to a closed interval [0, 1].
* A larger estimation value shall indicate a larger CSI variation degree (strictly increasing).
* The CSI variation of 0 indicates a minimum CSI variation.
* The CSI variation of 1 indicates a maximum CSI variation.

**Result:** Y/N/A: 14/5/6

**Straw Poll 2:** Do you agree that in the threshold based measurement instance, the threshold to be compared with the CSI variation value is determined by the initiator?

**Result:** Y/N/A: 16/1/6

**Straw Poll 3:** Do you agree that in the threshold based measurement instance

* The initiator sends the threshold to the responder.
* The responder feeds back the CSI variation to the initiator.
* The initiator shall not send a feedback trigger frame to a responder that reports a CSI variation that is less than the threshold.
* The initiator should send a feedback trigger frame to a responder that reports a CSI variation that is greater than or equal to the threshold.

We run out of time. Some time will be allocated in coming sessions to finalize the presentation.

1. The Chair asks if there is any other business. No response from the group.
2. The meeting is adjourned without objection at 12:02 pm (ET).

**List of Attendees:**

|  |  |  |  |
| --- | --- | --- | --- |
| Breakout | Timestamp | Name | Affiliation |
| TGbf | 28-Sep | Aboulmagd, Osama | Huawei Technologies Co., Ltd |
| TGbf | 28-Sep | Au, Kwok Shum | Huawei Technologies Co., Ltd |
| TGbf | 28-Sep | Au, Oscar | Origin Wireless |
| TGbf | 28-Sep | Aygul, Mehmet | VESTEL; IMU |
| TGbf | 28-Sep | Beg, Chris | Cognitive Systems Corp. |
| TGbf | 28-Sep | Choi, Jinsoo | LG ELECTRONICS |
| TGbf | 28-Sep | Dong, Xiandong | Xiaomi Inc. |
| TGbf | 28-Sep | feng, Shuling | MediaTek Inc. |
| TGbf | 28-Sep | Gao, Ning | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 28-Sep | Jang, Insun | LG ELECTRONICS |
| TGbf | 28-Sep | Kadampot, Ishaque Ashar | Qualcomm Incorporated |
| TGbf | 28-Sep | Kain, Carl | USDOT; Noblis |
| TGbf | 28-Sep | Kamel, Mahmoud | InterDigital, Inc. |
| TGbf | 28-Sep | katla, satyanarayana | InterDigital, Inc. |
| TGbf | 28-Sep | Kim, Sang Gook | LG ELECTRONICS |
| TGbf | 28-Sep | Lin, Zinan | InterDigital, Inc. |
| TGbf | 28-Sep | Lumbatis, Kurt | CommScope, Inc. |
| TGbf | 28-Sep | Ozbakis, Basak | Vestel Electronics Corp. |
| TGbf | 28-Sep | Petrick, Albert | InterDigital |
| TGbf | 28-Sep | Raissinia, Alireza | Qualcomm Incorporated |
| TGbf | 28-Sep | Sarikaya, Behcet | IEEE Member / Self Employed |
| TGbf | 28-Sep | Shellhammer, Stephen | Qualcomm Incorporated |
| TGbf | 28-Sep | Trainin, Solomon | Qualcomm Incorporated |
| TGbf | 28-Sep | Tsai, Tsung-Han | MediaTek Inc. |
| TGbf | 28-Sep | Varshney, Neeraj | National Institute of Standards and Technology |
| TGbf | 28-Sep | Wang, Chao Chun | MediaTek Inc. |
| TGbf | 28-Sep | Wei, Dong | NXP Semiconductors |
| TGbf | 28-Sep | Wilhelmsson, Leif | Ericsson AB |
| TGbf | 28-Sep | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |
| TGbf | 28-Sep | Zhou, Pei | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |

**Tuesday, October 12, 2021, 10:00-12:00 am (ET)**

**Meeting Agenda:**

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

<https://mentor.ieee.org/802.11/dcn/21/11-21-1571-02-00bf-tgbf-meeting-agenda-2021-09-11.pptx>

1. Call the meeting to order
2. Patent policy and logistics
3. TGbf Timeline
4. Call for contribution
5. Teleconference Times
6. Motions (30-33)
7. Presentation of submissions
8. Any other business
9. Adjourn
10. The chair, Tony Xiao Han, calls the meeting to order at 10:00am (about 30 persons are on the call after a few 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. The chair explains that we will first finalize the presentation from last time and then do the motions.

The author of contribution 11-21/1581 suggests to defer this presentation to the next telco since it has not been uploaded in time to give the group members the chance to read it.

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 slide 19, “Discussion of TGbf Timeline and Call for Action”.
2. The chair presents slide 20, Call for contributions. This slide has also been updated.
3. The chair presents the teleconference times (slide 21).

The chair explains that he proposes to add one more call per week (on Thursdays) since we right now have a backlog of presentations.

After some discussion with the group, a SP is run to check whether Monday or Thursday is the preferred day for an extra call.

**Straw Poll:**

Which day do you prefer?

* Monday
* Thursday
* Abstain

**Result:** Monday/Thursday/Abstain: 21/10/8

The chair explains he will think more about this and announce it on the reflector. (It is later announced that the extra call will be on Mondays.)

1. Presentations:

**11-21/1364r4, “Threshold based sensing procedure”, Mengshi Hu (Huawei):** The presentation as well as SP1 and SP2 were presented in the last teleconference. This is a continuation of the contribution.

Q: Why do you need the to feed back the CSI variation?

A:

The SP is slightly updated based on a comment from the group. Specifically, the word “Note” is removed.

Also “threshold to responder(s)” is updated to “threshold(s) to the responder(s)”

**Straw Poll 3:**

* **Do you agree that in the threshold based scheme**
* The initiator sends the thresholds to the responders (Which frame transmits the threshold is TBD).
* The responders feed back the CSI variation to the initiator in the Feedback Response frame.
* The initiator shall not send a Feedback Trigger frame to a responder that reports a CSI variation that is less than the threshold.
* The initiator should send a Feedback Trigger frame to a responder that reports a CSI variation that is greater than or equal to the threshold.
* The above procedure is applicable to TB based sensing measurement instance.
* Incorporate the figure in slide 13 of 11-21/1364r4 into the SFD.
* Note: The “Feedback” frame shown in the figure should be “Measurement report” frame.

**Result:** Y/N/A: 23/7/16

1. Motions:

**Motion 30:**

Move to adopt the document (21/0876r3) as the official Evaluation Methodology and Simulation Scenarios document for IEEE 802.11 bf ?

Simulation is not mandatory for any contributions.

Note：

* Related document 21/0876r3
* SP Result: 20Y/ 0N/ 6A

**Move:** Rui Du

**Second:** Rajat Pushkarna

**Result:** Passed by unanimous consent.

**Motion 31:**

* Move to adopt Truncated Channel Impulse Response(TCIR) described as follows as one optional type of the sensing measurement results for sub-7 GHz sensing
	+ Calculating the CIR (time domain) from CSI/CFR (frequency domain) through IFT(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.

Note：

* \* Amended result accounts for removal of X votes of non-voting members.
* Related document 21/1288r2
* SP Result: 24Y/ 6N/ 16A

**Move:** Rui Du

**Second:** Junghoon Suh

**Preliminary Result:** Y/N/A: 22/16/9, Motion fails

**Motion 32:**

* Move to add the following to 11bf SFD:
* In the threshold based measurement instance, the estimation of CSI variation is implementation specific, but it shall follow the following rules:
	+ The degree of the estimated CSI variation shall be represented by a value in the closed interval [0, 1].
	+ A larger degree shall reflect a larger estimated CSI variation.
	+ The degree of 0 indicates the smallest degree of the estimated CSI variation.
	+ The degree of 1 indicates the largest degree of the estimated CSI variation.
	+ Note: Which CSI variation corresponds to the degree of 0 or 1 is implementation specific.

Note：

* \* Amended result accounts for removal of X votes of non-voting members.
* Related document 21/1364r3
* SP Result: 14Y/ 5N/ 6A

**Move:** Mengshi Hu

**Second:** Rajat Pushkarna

**Preliminary Result:** Y/N/A: 18/7/13, Motion fails

**Motion 33:**

* Move to add the following to 11bf SFD:
* In the threshold based measurement instance, the threshold for each responder to be compared with the CSI variation value is determined by the initiator.

Note：

* Related document 21/1364r3
* SP Result: 16Y/ 1N/ 6A

**Move:** Mengshi Hu

**Second:** Chenchen Liu

**Result:** Passed by unanimous consent.

1. The chair asks if there is any other business. No response from the group.
2. The meeting is adjourned without objection at 12:00 pm (ET).

**List of Attendees:**

|  |  |  |  |
| --- | --- | --- | --- |
| Breakout | Timestamp | Name | Affiliation |
| TGbf | 10/12 | Aboulmagd, Osama | Huawei Technologies Co., Ltd |
| TGbf | 10/12 | Au, Oscar | Origin Wireless |
| TGbf | 10/12 | Aygul, Mehmet | VESTEL; IMU |
| TGbf | 10/12 | B, Hari Ram | NXP Semiconductors |
| TGbf | 10/12 | Berger, Christian | NXP Semiconductors |
| TGbf | 10/12 | Cao, Rui | NXP Semiconductors |
| TGbf | 10/12 | Carney, William | Sony Group Corporation |
| TGbf | 10/12 | Dong, Xiandong | Xiaomi Inc. |
| TGbf | 10/12 | feng, Shuling | MediaTek Inc. |
| TGbf | 10/12 | Gao, Ning | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 10/12 | Handte, Thomas | Sony Group Corporation |
| TGbf | 10/12 | Kadampot, Ishaque Ashar | Qualcomm Incorporated |
| TGbf | 10/12 | katla, satyanarayana | InterDigital, Inc. |
| TGbf | 10/12 | Kim, Sang Gook | LG ELECTRONICS |
| TGbf | 10/12 | Lim, Dong Guk | LG ELECTRONICS |
| TGbf | 10/12 | Liu, Der-Zheng | Realtek Semiconductor Corp. |
| TGbf | 10/12 | Lou, Hanqing | InterDigital |
| TGbf | 10/12 | Luo, Chaoming | Beijing OPPO telecommunications corp., ltd. |
| TGbf | 10/12 | Montemurro, Michael | Huawei Technologies Co., Ltd |
| TGbf | 10/12 | Ozbakis, Basak | Vestel Electronics Corp. |
| TGbf | 10/12 | Pushkarna, Rajat | Panasonic Asia Pacific Pte Ltd. |
| TGbf | 10/12 | Sethi, Ankit | NXP Semiconductors |
| TGbf | 10/12 | Shellhammer, Stephen | Qualcomm Incorporated |
| TGbf | 10/12 | Trainin, Solomon | Qualcomm Incorporated |
| TGbf | 10/12 | Tsai, Tsung-Han | MediaTek Inc. |
| TGbf | 10/12 | Varshney, Neeraj | National Institute of Standards and Technology |
| TGbf | 10/12 | Wei, Dong | NXP Semiconductors |
| TGbf | 10/12 | Wilhelmsson, Leif | Ericsson AB |
| TGbf | 10/12 | Xin, Yan | Huawei Technologies Co., Ltd |
| TGbf | 10/12 | YANG, RUI | InterDigital, Inc. |
| TGbf | 10/12 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |
| TGbf | 10/12 | Zhang, Meihong | Huawei Technologies Co., Ltd |
| TGbf | 10/12 | Zhou, Pei | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |

**Tuesday, October 19, 2021, 10:00-12:00 am (ET)**

**Meeting Agenda:**

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

<https://mentor.ieee.org/802.11/dcn/21/11-21-1571-03-00bf-tgbf-meeting-agenda-2021-09-11.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 Xiao Han, calls the meeting to order at 10:00am (about 40 persons are on the call after a few 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 26) and asks if there are any questions or comments on the agenda. No response 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 27) and slide 28, “Discussion of TGbf Timeline and Call for Action”.
2. The chair presents slide 29, Call for contributions. This slide has also been updated.
3. The chair presents the teleconference times (slide 30). The chair points out that starting next week we will have two teleconferences per week.
4. Presentations:

**11-21/1573r1, “Low-Complexity Scaling and Quantization for CSI Report”, Steve Shellhammer (Qualcomm):**

A low-complexity scaling and quantization design is proposed with the following benefits

* + Converting from linear to dB has been eliminated
	+ Converting from dB to linear has been eliminated
	+ Division has been replaced by a shift operation

Q: The only difference is how you find the scaling factor if I understand it correct?

A: Yes, that is correct.

Q: 11bf is not supposed to include any PHY changes, would this not actually be a PHY change?

A: I see your point, but I believe the 11n approach has not been implemented and we basically propose that his simplified quantization should be implemented instead.

The SPs are deferred to give people a chance to digest the ideas.

**11-21/1433r0, “Non-TB sensing measurement”, Cheng Chen (Intel):** The contribution proposes a non-TB sensing instance flow which works in scenarios where a non-AP STA is the initiator, and the AP is the responder. Three different scenarios are discussed, namely bidirectional sensing, unidirectional UL sensing, and unidirectional DL sensing.

Cheng explains that he intends to collect feedback before running any SPs.

**11-21/1581r1, “Opportunistic Sensing Measurements”, Chris Beg (Cognitive Systems):** This contribution discusses benefits with opportunistic sensing, where opportunistic sensing is defined as the use of any frame from a Sensing Transmitter to a Sensing Receiver to make a sensing measurement. The frames do not need to be triggered and need not be NDPs.

Q: How do you deal with that a transmitter e.g. may change the transmit power, considering you want to detect variations in the channel estimates?

A: We may either signal any changes in the packet or not allow for changes.

Q: I believe it is a very hard problem to make this work. Maybe it would be good to go through one specific example just so we can discuss the different steps in more detail.

We are out of time.

1. The chair asks if there is any other business. No response from the group.
2. The meeting is adjourned without objection at 12:05 pm (ET).

**List of Attendees:**

|  |  |  |  |
| --- | --- | --- | --- |
| Breakout | Timestamp | Name | Affiliation |
| TGbf | 10/19/2021 | Aboulmagd, Osama | Huawei Technologies Co., Ltd |
| TGbf | 10/19/2021 | Aygul, Mehmet | VESTEL; IMU |
| TGbf | 10/19/2021 | Beg, Chris | Cognitive Systems Corp. |
| TGbf | 10/19/2021 | Bredewoud, Albert | Broadcom Corporation |
| TGbf | 10/19/2021 | Carney, William | Sony Group Corporation |
| TGbf | 10/19/2021 | Chayat, Naftali | Vayyar Imaging |
| TGbf | 10/19/2021 | Choi, Jinsoo | LG ELECTRONICS |
| TGbf | 10/19/2021 | Dong, Xiandong | Xiaomi Inc. |
| TGbf | 10/19/2021 | Du, Rui | Huawei Technologies Co., Ltd |
| TGbf | 10/19/2021 | feng, Shuling | MediaTek Inc. |
| TGbf | 10/19/2021 | Jang, Insun | LG ELECTRONICS |
| TGbf | 10/19/2021 | Kadampot, Ishaque Ashar | Qualcomm Incorporated |
| TGbf | 10/19/2021 | katla, satyanarayana | InterDigital, Inc. |
| TGbf | 10/19/2021 | Kim, Sang Gook | LG ELECTRONICS |
| TGbf | 10/19/2021 | Lim, Dong Guk | LG ELECTRONICS |
| TGbf | 10/19/2021 | Liu, Der-Zheng | Realtek Semiconductor Corp. |
| TGbf | 10/19/2021 | Lumbatis, Kurt | CommScope, Inc. |
| TGbf | 10/19/2021 | Luo, Chaoming | Beijing OPPO telecommunications corp., ltd. |
| TGbf | 10/19/2021 | Mirfakhraei, Khashayar | Zeku |
| TGbf | 10/19/2021 | Ozbakis, Basak | Vestel Electronics Corp. |
| TGbf | 10/19/2021 | Pushkarna, Rajat | Panasonic Asia Pacific Pte Ltd. |
| TGbf | 10/19/2021 | Sahoo, Anirudha | National Institute of Standards and Technology |
| TGbf | 10/19/2021 | Sand, Stephan | German Aerospace Center (DLR) |
| TGbf | 10/19/2021 | Shellhammer, Stephen | Qualcomm Incorporated |
| TGbf | 10/19/2021 | Trainin, Solomon | Qualcomm Incorporated |
| TGbf | 10/19/2021 | Tsai, Tsung-Han | MediaTek Inc. |
| TGbf | 10/19/2021 | Wang, Chao Chun | MediaTek Inc. |
| TGbf | 10/19/2021 | Wei, Dong | NXP Semiconductors |
| TGbf | 10/19/2021 | Wilhelmsson, Leif | Ericsson AB |
| TGbf | 10/19/2021 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |

**Monday, October 25, 2021, 10:00-12:00 am (ET)**

**Meeting Agenda:**

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

<https://mentor.ieee.org/802.11/dcn/21/11-21-1571-04-00bf-tgbf-meeting-agenda-2021-09-11.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 Xiao Han, calls the meeting to order at 10:01am (about 30 persons are on the call after a few 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 27) and asks if there are any questions or comments on the agenda. No response 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 28) and slide 29, “Discussion of TGbf Timeline and Call for Action”.
2. The chair presents slide 30, Call for contributions.
3. The chair presents the teleconference times (slide 31).
4. Presentations:

**11-21/1581r1, “Opportunistic Sensing Measurements”, Chris Beg (Cognitive Systems):**

The contribution was presented last time, but there was no time for the SP.

**Straw Poll 1:**

Do you agree that:

* Opportunistic Sensing can be used as a measurement instance in the WLAN Sensing (SENS) Procedure?

**Result:** Y/N/A: 14/8/7

**11-21/1595r0, “Quantization Error Analysis for CSI Rapport”, Steve Shellhammer (Qualcomm):**

Simulation results are shown for the quantization of the CSI report presented in 11-21/1573r0.

**11-21/1596r1, “Discussion on one-to-one sensing measurement instance”, Chaoming Luo (OPPO):** This contribution is concerned with the procedure when only two STAs are involved, and especially the case when the AP is the initiator.

Q: In case B1, you need a TF

A: Correct, I will update the figure.

Based on the discussion, the SP is updated as indicated below.

**Straw Poll:**

Do you agree to add the following into 11bf SFD ?

* + If Initiator is an AP, the ~~one-to-one~~ measurement instance shall be initiated as a TB measurement instance.
		- ~~Note: one-to-one means there are only two sensing participant STAs in the measurement instance.~~

**The SP is deferred.**

**11-21/1675r0, “NIST mmWave Phased-Array Channel Sounder for Human Sensing”, Camillo Gentile (NIST):**  The contribution presents a 28 GHz phased-array channel sounder for human tracking. The sounder extracts the (co-polarized and cross-polarized) complex power, delay, and AZ/EL AoA of resolvable paths scattered from the human body, in real time and with high precision. Preliminary results that detect the periodic behavior of hand waving are presented. Also, preliminary results that discriminate slow breathing from fast breathing, from the chest and from the abdomen, are shown. Measurements have also been collected in bistatic scenarios and will be presented in a future contribution.

Q: Are these 5G waveforms?

A: No, the waveforms are PN-sequences.

We are out of time, and the chair asks if we can extend to cover the two last questions.

Q: What do you want to achieve with this presentation?

A: For calibration and validation purposes.

1. The chair asks if there is any other business. No response from the group.
2. The meeting is adjourned without objection at 12:08 pm (ET).

**List of Attendees:**

|  |  |  |  |
| --- | --- | --- | --- |
| Breakout | Timestamp | Name | Affiliation |
| TGbf | 10/25 | Aboulmagd, Osama | Huawei Technologies Co., Ltd |
| TGbf | 10/25 | Aygul, Mehmet | VESTEL; IMU |
| TGbf | 10/25 | Beg, Chris | Cognitive Systems Corp. |
| TGbf | 10/25 | Dash, Debashis | Apple Inc. |
| TGbf | 10/25 | Dong, Xiandong | Xiaomi Inc. |
| TGbf | 10/25 | feng, Shuling | MediaTek Inc. |
| TGbf | 10/25 | Kain, Carl | USDOT; Noblis |
| TGbf | 10/25 | Kamel, Mahmoud | InterDigital, Inc. |
| TGbf | 10/25 | Kim, Sang Gook | LG ELECTRONICS |
| TGbf | 10/25 | Lim, Dong Guk | LG ELECTRONICS |
| TGbf | 10/25 | Luo, Chaoming | Beijing OPPO telecommunications corp., ltd. |
| TGbf | 10/25 | Ozbakis, Basak | Vestel Electronics Corp. |
| TGbf | 10/25 | Pushkarna, Rajat | Panasonic Asia Pacific Pte Ltd. |
| TGbf | 10/25 | Raissinia, Alireza | Qualcomm Incorporated |
| TGbf | 10/25 | Sahoo, Anirudha | National Institute of Standards and Technology |
| TGbf | 10/25 | Shellhammer, Stephen | Qualcomm Incorporated |
| TGbf | 10/25 | SUH, JUNG HOON | Huawei Technologies Co., Ltd |
| TGbf | 10/25 | Trainin, Solomon | Qualcomm Incorporated |
| TGbf | 10/25 | Tsai, Tsung-Han | MediaTek Inc. |
| TGbf | 10/25 | Wei, Dong | NXP Semiconductors |
| TGbf | 10/25 | Xin, Yan | Huawei Technologies Co., Ltd |
| TGbf | 10/25 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |
| TGbf | 10/25 | Zhou, Pei | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |

**Tuesday, October 26, 2021, 10:00-12:00 am (ET)**

**Meeting Agenda:**

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

<https://mentor.ieee.org/802.11/dcn/21/11-21-1571-05-00bf-tgbf-meeting-agenda-2021-09-11.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 Xiao Han, calls the meeting to order at 10:01am (about 50 persons are on the call after a few 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 28) and asks if there are any questions or comments on the agenda. No response 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 29) and slide 30, “Discussion of TGbf Timeline and Call for Action”.
2. The chair presents slide 31, Call for contributions.
3. The chair presents the teleconference times (slide 32).
4. Presentations:

**11-21/1676r1, “Simplified Scaling Factor Feedback for CSI Matrices Quantization” Junghoon Suh (Huawei):** A simplified scaling factor computation procedure is proposed, and its performance checked.

Q: I would still prefer the reduction in complexity, rather than the number of FB bits.

Q: I thought there should be no PHY changes according to the PAR, has that changed?

A: The PAR has not changed, but it is fine to discuss ideas I believe.

Q: I am a bit worried about all the different options that are discussed. I think this may prevent adoption of the standard.

Q: My view is that software changes would be allowed by the PAR.

**SP deferred.**

**11-21/1684r0, “Proxy for non-AP Initiator”, Chaoming Luo (OPPO):** This contribution is concerned with the measurement set-up when a non-AP is the Initiator.

Q: I think we need a corresponding session set-up phase.

A: No, my view is that this is only for the measurement set-up.

Q: I like the idea, but I believe it is important to make sure the procedure is made as simple as possible.

**Straw Poll 1:**

Do you agree to add the following into 11bf SFD?

* If the Initiator is a non-AP STA, and Responders include other non-AP STAs and AP, the AP may work as Proxy Initiator for the Initiator in measurement setup and reporting phases.

**Result:** Y/N/A: 14/8/7

**Straw Poll 2:**

Do you agree to add the following into 11bf SFD?

* The Proxy may forwad measurement reports to the Initiator, and/or, the Proxy may process the measurement reports and report the sensing result to the Initiator.
	+ The Initiator may send sensing requirement information for data processing to the Proxy in measurement setup. Detailed information is TBD.

**SP deferred** as there are related presentations in the queue.

**11-21/1692r0, “Enhancing Client-based Sensing: Sensing by Proxy” Claudio da Silva (Facebook):**

The presentation presents a possible approach to enable a client to obtain sensing measurements using multiple radio links. The main idea is to allow for a client to request an AP to obtain sensing measurements for itself. The AP obtains the measurements and reports them to the requesting client.

Run out of time.

1. The chair asks if there is any other business. No response from the group.
2. The meeting is adjourned without objection at 12:01 pm (ET).

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| --- | --- | --- | --- |
| **List of Attendees:**Breakout | Timestamp | Name | Affiliation |
| TGbf | 10/26 | Au, Kwok Shum | Huawei Technologies Co., Ltd |
| TGbf | 10/26 | Aygul, Mehmet | VESTEL; IMU |
| TGbf | 10/26 | Beg, Chris | Cognitive Systems Corp. |
| TGbf | 10/26 | Chayat, Naftali | Vayyar Imaging |
| TGbf | 10/26 | Choi, Jinsoo | LG ELECTRONICS |
| TGbf | 10/26 | Dash, Debashis | Apple Inc. |
| TGbf | 10/26 | da Silva, Claudio | Facebook |
| TGbf | 10/26 | Dong, Xiandong | Xiaomi Inc. |
| TGbf | 10/26 | Du, Rui | Huawei Technologies Co., Ltd |
| TGbf | 10/26 | feng, Shuling | MediaTek Inc. |
| TGbf | 10/26 | Gao, Ning | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 10/26 | Jang, Insun | LG ELECTRONICS |
| TGbf | 10/26 | Kadampot, Ishaque Ashar | Qualcomm Incorporated |
| TGbf | 10/26 | Kasher, Assaf | Qualcomm Incorporated |
| TGbf | 10/26 | Kim, Sang Gook | LG ELECTRONICS |
| TGbf | 10/26 | Luo, Chaoming | Beijing OPPO telecommunications corp., ltd. |
| TGbf | 10/26 | Mirfakhraei, Khashayar | Zeku |
| TGbf | 10/26 | Ozbakis, Basak | Vestel Electronics Corp. |
| TGbf | 10/26 | Pare, Thomas | MediaTek Inc. |
| TGbf | 10/26 | Rafique, Saira | Istanbul Medipol University; Vestel |
| TGbf | 10/26 | Raissinia, Alireza | Qualcomm Incorporated |
| TGbf | 10/26 | Sahoo, Anirudha | National Institute of Standards and Technology |
| TGbf | 10/26 | Satrasala, Rajeshwari | NXP Semiconductors |
| TGbf | 10/26 | Shellhammer, Stephen | Qualcomm Incorporated |
| TGbf | 10/26 | Trainin, Solomon | Qualcomm Incorporated |
| TGbf | 10/26 | Turkmen, Halise | IMU; Vestel |
| TGbf | 10/26 | Wei, Dong | NXP Semiconductors |
| TGbf | 10/26 | Xin, Yan | Huawei Technologies Co., Ltd |
| TGbf | 10/26 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |
| TGbf | 10/26 | Zhou, Pei | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |

**Monday, November 1, 2021, 10:00-12:00 am (ET)**

**Meeting Agenda:**

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

<https://mentor.ieee.org/802.11/dcn/21/11-21-1571-06-00bf-tgbf-meeting-agenda-2021-09-11.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 Xiao Han, calls the meeting to order at 10:01am (about 40 persons are on the call after a few 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 29) and asks if there are any questions or comments on the agenda. No response 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 30 and slide 31), “Discussion of TGbf Timeline and Call for Action”.
2. The chair presents slide 32, Call for contributions.
3. The chair presents the teleconference times (slide 33).
4. Presentations:

**11-21/1692r0, “Enhancing Client-based Sensing: Sensing by Proxy” Claudio da Silva (Facebook):**

The presentation started in the last teleconference but was not finalized.

**11-21/1602r0, “Sensing Transmission in Partial Bandwidth”, Chris Beg (Cognitive Systems):**  Note: The title in mentor is “OFDMA Measurement Discussion”. By using OFDMA in the UL, it is suggested that one may be able to obtain a more flexible Wi-Fi sensing system. One may e.g., obtain fine resolution in one direction by using a larger BW for a sensing transmitter in that particular direction, or one may obtain coarse resolution in several directions by using OFDMA and smaller BW to multiple sensing transmitters.

Q: What’s your view on DL

A: I believe it is less interesting in DL as one may just broadcast and all STAs can use this without OFDMA.

Q: In your example with changing the BW between initial scanning and a refined scanning, I believe this will mean that a new sensing session is needed to be set up.

Q: I believe that the sensing resolution in sub 7 GHz is already quite coarse, and I believe using lower BW may not be the desired way to go.

The chair asks about future plans. Chris explains that the plan is to collect feedback and come back with the SP.

**11-21/1635r0, “Fidelity of CSI time domain representations”, Mohammad Omer (Cognitive Systems):**  CSI representation has an intrinsic dimensionality to it, dictated by the physical process of its formation and computation. The dimensionality can be exploited for compression and de-noising by looking at the time-domain converted version. It is show what the intrinsic dimensionality of CSI waveform looks like, and what is the statistical behaviour over some sampled indoor channels.

Q: An alternative is to have a sparser frequency resolution, have you considered this?

A: No, but that is an interesting idea.

Q: In general, I don’t believe it is a good idea to remove information. It really depends on the application.

A: The idea is to essentially be able to represent the information with sufficient accuracy.

1. The chair asks if there is any other business. No response from the group.
2. The meeting is adjourned without objection at 12:11 pm (ET).

**List of Attendees**

|  |  |  |  |
| --- | --- | --- | --- |
| Breakout | Timestamp | Name | Affiliation |
| TGbf | 11/1 | Aboulmagd, Osama | Huawei Technologies Co., Ltd |
| TGbf | 11/1 | Aygul, Mehmet | VESTEL; IMU |
| TGbf | 11/1 | Beg, Chris | Cognitive Systems Corp. |
| TGbf | 11/1 | Chitrakar, Rojan | Panasonic Asia Pacific Pte Ltd. |
| TGbf | 11/1 | Dash, Debashis | Apple Inc. |
| TGbf | 11/1 | Dong, Xiandong | Xiaomi Inc. |
| TGbf | 11/1 | feng, Shuling | MediaTek Inc. |
| TGbf | 11/1 | Kain, Carl | USDOT; Noblis |
| TGbf | 11/1 | Kamel, Mahmoud | InterDigital, Inc. |
| TGbf | 11/1 | katla, satyanarayana | InterDigital, Inc. |
| TGbf | 11/1 | Kim, Sang Gook | LG ELECTRONICS |
| TGbf | 11/1 | Lim, Dong Guk | LG ELECTRONICS |
| TGbf | 11/1 | Luo, Chaoming | Beijing OPPO telecommunications corp., ltd. |
| TGbf | 11/1 | Ozbakis, Basak | Vestel Electronics Corp. |
| TGbf | 11/1 | Pushkarna, Rajat | Panasonic Asia Pacific Pte Ltd. |
| TGbf | 11/1 | Raissinia, Alireza | Qualcomm Incorporated |
| TGbf | 11/1 | Sahoo, Anirudha | National Institute of Standards and Technology |
| TGbf | 11/1 | Shellhammer, Stephen | Qualcomm Incorporated |
| TGbf | 11/1 | Stanley, Dorothy | Hewlett Packard Enterprise |
| TGbf | 11/1 | Trainin, Solomon | Qualcomm Incorporated |
| TGbf | 11/1 | Tsai, Tsung-Han | MediaTek Inc. |
| TGbf | 11/1 | Varshney, Neeraj | National Institute of Standards and Technology |
| TGbf | 11/1 | Wang, Chao Chun | MediaTek Inc. |
| TGbf | 11/1 | Wei, Dong | NXP Semiconductors |
| TGbf | 11/1 | Wilhelmsson, Leif | Ericsson AB |
| TGbf | 11/1 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |
| TGbf | 11/1 | Zhou, Pei | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |

**Tuesday, November 2, 2021, 10:00-12:00 am (ET)**

**Meeting Agenda:**

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

<https://mentor.ieee.org/802.11/dcn/21/11-21-1571-07-00bf-tgbf-meeting-agenda-2021-09-11.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 Xiao Han, calls the meeting to order at 10:00am (about 45 persons are on the call after a few 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 30) and asks if there are any questions or comments on the agenda. No response 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 31) and slide 32, “Discussion of TGbf Timeline and Call for Action”.
2. The chair presents slide 33, Call for contributions.
3. The chair presents the teleconference times (slide 34).
4. Presentations:

**11-21/1438r1, “Discussion on reporting procedure” Chaoming Luo (OPPO):** The presentation has been updated based on feedback obtained offline.

Q: What do you mean by invalid result

A: Similar as in 11az

Q: Do you handshake on this beforehand in the measurement set-up or is it per reporting event?

A: The capabilities should be shared during the set-up.

**Straw Poll:**

**Do you agree to add the following into 11bf SFD?**

In reporting phase, the measurement results from multiple measurement setups of a sensing responder may be included in a single measurement report frame for delayed reporting.

* + Support for obtaining more than one measurement results in a single measurement report frame sent by the responder is optional for the initiator.
	+ Support for buffering more than one measurement result and sending it in a single measurement report frame to the initiator is optional for the responder.

**Result:** Y/N/A: 16/5/13

**11-21/1705r0, “Calculation of the Scaling Factor in the Sensing CSI Report”, Steve Shellhammer (Qualcomm):** An earlier presentation described the selection of the scaling factor but did not provide a specific equation for the scaling factor. Here two methods of calculating the scaling factor are presented.

**11-21/1445r1, “Requirements for Sensing Transmitters” Dong Wei (NXP):** In the r0 version of this document, the following was suggested:

* + If transmit beamforming is used by the sensing transmitter, then its steering matrix shall be kept unchanged during the process of transmitting consecutive sounding PPDUs to the sensing receiver.
* Based on online comments and offline discussion, it is now proposed that, for a sounding NDP, no beamforming steering matrix is applied to the waveform.
	+ This is similar to the 11az requirement for ranging NDPs.

Run out of time. The chair encourages the group to continue the discussions off-line.

1. The chair asks if there is any other business. No response from the group.
2. The meeting is adjourned without objection at 12:01 pm (ET).

**List of Attendees**

|  |  |  |  |
| --- | --- | --- | --- |
| Breakout | Timestamp | Name | Affiliation |
| TGbf | 11/2 | Au, Kwok Shum | Huawei Technologies Co., Ltd |
| TGbf | 11/2 | Aygul, Mehmet | VESTEL; IMU |
| TGbf | 11/2 | Beg, Chris | Cognitive Systems Corp. |
| TGbf | 11/2 | Bredewoud, Albert | Broadcom Corporation |
| TGbf | 11/2 | Carney, William | Sony Group Corporation |
| TGbf | 11/2 | Chayat, Naftali | Vayyar Imaging |
| TGbf | 11/2 | Dash, Debashis | Apple Inc. |
| TGbf | 11/2 | Dong, Xiandong | Xiaomi Inc. |
| TGbf | 11/2 | feng, Shuling | MediaTek Inc. |
| TGbf | 11/2 | Jang, Insun | LG ELECTRONICS |
| TGbf | 11/2 | Kadampot, Ishaque Ashar | Qualcomm Incorporated |
| TGbf | 11/2 | Kamel, Mahmoud | InterDigital, Inc. |
| TGbf | 11/2 | Kancherla, Sundeep | Infineon Technologies |
| TGbf | 11/2 | katla, satyanarayana | InterDigital, Inc. |
| TGbf | 11/2 | Lim, Dong Guk | LG ELECTRONICS |
| TGbf | 11/2 | Raissinia, Alireza | Qualcomm Incorporated |
| TGbf | 11/2 | Sahoo, Anirudha | National Institute of Standards and Technology |
| TGbf | 11/2 | Shellhammer, Stephen | Qualcomm Incorporated |
| TGbf | 11/2 | Stavridis, Athanasios | Ericsson AB |
| TGbf | 11/2 | SUH, JUNG HOON | Huawei Technologies Co., Ltd |
| TGbf | 11/2 | Trainin, Solomon | Qualcomm Incorporated |
| TGbf | 11/2 | Varshney, Neeraj | National Institute of Standards and Technology |
| TGbf | 11/2 | Wang, Chao Chun | MediaTek Inc. |
| TGbf | 11/2 | Wei, Dong | NXP Semiconductors |
| TGbf | 11/2 | Wilhelmsson, Leif | Ericsson AB |
| TGbf | 11/2 | Xin, Yan | Huawei Technologies Co., Ltd |
| TGbf | 11/2 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |