IEEE P802.11
Wireless LANs

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| IEEE 802.11bf – Teleconference Minutes November 2021-January 2022  |
| Date: 2021-11-29 |
| Author(s): |
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Abstract

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

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

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

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

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

**Meeting Agenda:**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

A: TX power and beamforming matrix.

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

A: In principle both could be used.

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

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

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

A: Yes, I expect so.

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

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

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

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

**List of Attendees:**

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

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

**Meeting Agenda:**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

A: OK. The SP is updated accordingly.

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

A: Yes. The SP is updated accordingly.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

A: Correct, it is only the interface.

Q: Is this only for 60 GHz?

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

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

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

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

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

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

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

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

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

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

**List of Attendees:**

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

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

**Meeting Agenda:**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

**Straw Poll 1:**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

 Q: I prefer the second options.

Q: Do you have some straw poll?

A: Not right now.

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

**List of Attendees:**

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