IEEE P802.11
Wireless LANs

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| IEEE 802.11bf – Teleconference Minutes April 2021  |
| Date: 2021-04-27 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
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Abstract

This document contains minutes for the TG 802.11bf teleconferences in April 2021.

Rev 0: Minutes for TG 802.11bf teleconference on 6th of April.

Rev 1: Motion 15 corrected.

Rev 2: Minutes for TG 802.11bf teleconference on 20th of April added.

Rev 3: Minutes for TG 802.11bf teleconference on 27th of April added.

**Tuesday, April 6, 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/21/11-21-0502-05-00bf-tgbf-meeting-agenda-2021-03-04.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 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 meeting” (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. Solomon Trainin explains that his contribution is related to Motion 16 and askes to run Motion 16 after his presentation. Chair askes the mover for Motion 16 if this is OK. The mover agrees to this.

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 TGf timeline (slide 22).
2. The Chair presents slide 23, Call for contributions.
3. The Chair presents the teleconference times (slide 24).
4. Presentations:

**Technical motion (Motion 15)**

**Motion:** Move to add the following to 11bf SFD:

A sensing session is composed of one or more of the following phases: setup phase, measurement phase, reporting phase, and termination phase.

* In the setup phase, a sensing session is established, and operational parameters associated with the sensing session are determined and may be exchanged between STAs.
* In the measurement phase, sensing measurements are performed.
* In the reporting phase, sensing measurement results are reported.
* In the termination phase, STAs stop performing measurements and terminate the sensing session.

**Move:** Cheng Chen

**Second:** Rajat Pushkarna

**Result**: Y/N/A: 24/1/5, motion passes

Note: The related document is 20/1851r4.

**11-21/0407r3, “Multi-Band WiFi Fusion for WLAN Sensing”, Pu (Perry) Wang (MERL):**

This contribution was presented in the last teleconference, but was not fully discussed.

**Straw Poll 1:**

* Do you agree that the mid-grained beam measurements (e.g., beam SNRs) at 60 GHz as one type of sensing measurements for WLAN Sensing?

**Y/N/A: 18/4/16**

Q: Is this the same as beam SNR as already available in 11ad?

A: Yes, the purpose is to reuse but for sensing applications.

Q: Just a comment. The text is fine for a SP, but if you plan to motion this, things must be well defined. Right now there is some ambiguity I believe.

**Straw Poll 2:**

* Do you agree that the fused WiFi measurements across multiple operating frequency bands as a valid type of sensing measurements or sensing results?

**The SP is deferred.**

Q: Do you believe that the standard should specify the algorithms for the fusion?

A: The idea is to modify PHY and MAC as little as possible and just standardize what really is needed. Basically, we believe we need to standardize the different steps that are needed, but not the algorithms themselves.

Q: Currently it is not clear to me what you mean by fusion. Is it just to combine measurements in more than one band?

A: I agree, maybe we need to define it a bit better.

**11-21/0391r0 “Minizing Impact as a Design Goal”, Chris Beg (Cognitive Systems):**

The presentation is about enabling full use of the flexibility in 802.11 MAC/PHY to minimize system impact. Features introduced by 11bf should minimize network impact.

Q: Do you think this should be part of 11bf or described/standardized somewhere else where higher layers are discussed?

A: 11bf should allow for the flexibility such that suitable decisions can be made at the application layer.

**Straw Poll 1:**

* Do you agree that the TGbf functional requirements document should include “minimizing the impact of sensing functionality on the 802.11 data network performance” as a design goal?

**Y/N/A: 16/18/12**

Q: I believe this is very interesting, but I also believe we need to be more specific with what is meant by minimizing the impact, etc.

**Motion 16:**

Move to add the following to 11bf SFD:

More than one sensing responder may participate in the measurement phase and reporting phase.

Move: Sang Km

Second: Rajat Pushkarna

Result: Y/N/A: 35/0/5, motion passes

Note: Related document 21/0145r5

**Motion 17:**

Move to add the following to 11bf SFD:

11bf shall define an optional negotiation process in the sensing setup phase for a sensing initiator and sensing responder(s) to exchange and agree on operational parameters associated with a sensing session.

Move: Cheng Chen

Second: Jinsoo Choi

Result: Motion passes by unanimous consent

Note: Related document 21/0370r1

**11-21/0419r0, “Sensing Measurement sequence of 11bf”, Dongguk Lim (LGE):**

The contribution is concerned with the protocol for supporting sensing by multiple STAs.

Before the discussion of the contribution is finalized, the Chair announces that we are out of time. We will contine the discussion in the next conference call.

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 | 4/6 | Aboulmagd, Osama | Huawei Technologies Co., Ltd |
| TGbf | 4/6 | Au, Kwok Shum | Huawei Technologies Co., Ltd |
| TGbf | 4/6 | Aygul, Mehmet | VESTEL; IMU |
| TGbf | 4/6 | Bahn, Christy | IEEE STAFF |
| TGbf | 4/6 | Beg, Chris | Cognitive Systems Corp. |
| TGbf | 4/6 | Bredewoud, Albert | Broadcom Corporation |
| TGbf | 4/6 | Chayat, Naftali | Vayyar Imaging |
| TGbf | 4/6 | Chen, Cheng | Intel Corporation |
| TGbf | 4/6 | Choi, Jinsoo | LG ELECTRONICS |
| TGbf | 4/6 | da Silva, Claudio | Intel Corporation |
| TGbf | 4/6 | Dong, Xiandong | Xiaomi Inc. |
| TGbf | 4/6 | Du, Rui | Huawei Technologies Co., Ltd |
| TGbf | 4/6 | feng, Shuling | MediaTek Inc. |
| TGbf | 4/6 | HAN, Xiao | Huawei Technologies Co., Ltd |
| TGbf | 4/6 | Haskou, Abdullah | InterDigital, Inc. |
| TGbf | 4/6 | Jang, Insun | LG ELECTRONICS |
| TGbf | 4/6 | Kadampot, Ishaque Ashar | Qualcomm Incorporated |
| TGbf | 4/6 | Kain, Carl | USDOT; Noblis |
| TGbf | 4/6 | katla, satyanarayana | InterDigital, Inc. |
| TGbf | 4/6 | Kessler, Thomas | Deutsche Telekom AG |
| TGbf | 4/6 | Kim, Sang Gook | LG ELECTRONICS |
| TGbf | 4/6 | Kwon, Young Hoon | NXP Semiconductors |
| TGbf | 4/6 | Lim, Dong Guk | LG ELECTRONICS |
| TGbf | 4/6 | Lu, Liuming | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 4/6 | Luo, Chaoming | Beijing OPPO telecommunications corp., ltd. |
| TGbf | 4/6 | Mirfakhraei, Khashayar | IEEE member / Self Employed |
| TGbf | 4/6 | NANDAGOPALAN, SAI SHANKAR | Infineon Technologies |
| TGbf | 4/6 | Ozbakis, Basak | Vestel Electronics Corp. |
| TGbf | 4/6 | PESIN, ANTHONY | InterDigital, Inc. |
| TGbf | 4/6 | Pushkarna, Rajat | Panasonic Asia Pacific Pte Ltd. |
| TGbf | 4/6 | Raissinia, Alireza | Qualcomm Incorporated |
| TGbf | 4/6 | Restuccia, Francesco | Northeastern University |
| TGbf | 4/6 | Sahin, Onur | InterDigital, Inc. |
| TGbf | 4/6 | Sosack, Robert | Molex Incorporated |
| TGbf | 4/6 | Stanley, Dorothy | Hewlett Packard Enterprise |
| TGbf | 4/6 | SUH, JUNG HOON | Huawei Technologies Co., Ltd |
| TGbf | 4/6 | Sun, Bo | ZTE Corporation |
| TGbf | 4/6 | Sun, Yingxiang | Huawei Technologies Co., Ltd |
| TGbf | 4/6 | Teran, Jesus Gutierrez | IHP GmbH |
| TGbf | 4/6 | Trainin, Solomon | Qualcomm Incorporated |
| TGbf | 4/6 | Tsai, Tsung-Han | MediaTek Inc. |
| TGbf | 4/6 | Wang, Chao Chun | MediaTek Inc. |
| TGbf | 4/6 | Wilhelmsson, Leif | Ericsson AB |
| TGbf | 4/6 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |
| TGbf | 4/6 | Yee, James | MediaTek Inc. |
| TGbf | 4/6 | Zeng, Ruochen | NXP Semiconductors |
| TGbf | 4/6 | Zhang, Meihong | Huawei Technologies Co., Ltd |

**Tuesday, April 20, 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/21/11-21-0502-07-00bf-tgbf-meeting-agenda-2021-03-04.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 65 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 meeting” (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 27) and asks if there are any questions or comments on the agenda. Solomon comments that there is no need to present 21/0521 as the corresponding motion was approved in the last call.

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 TGf timeline (slide 28).
2. The Chair presents slide 29, Call for contribution.
3. The Chair presents the teleconference times (slide 30). The chair informs the group that the teleconference schedule is increased to every week rather than every other week.

Q: You may not need the telcos on 13th and 20th of July as this overlap with the Plenary.

A: Thanks. I will delete these.

Q: Why is there a gap between April 27 and May 25?

A: Because there is an Interim meeting.

1. Presentations:

**11-21/0419r1, “Sensing Measurement sequence of 11bf”, Dongguk Lim (LGE):**

The contribution was presented in the latest teleconference, but there was not enough time to finalize the discussion.

Q: On slide 7, you don’t have any polling. I believe you need to know that the device is actually there.

Q: On slide 10, I believe it is not so easy to set up measurements where one non-AP STA sends a packet that is used by another non-AP STA for sensing. For instance, I don’t agree that the NDP is broadcasted.

A: OK. I believe we need more discussion about this.

Q: Related to the SP, it is not clear how you define “measurement procedure”.

A: It is just a high-level concept. Essentially that the NDP can be used.

Q: In the figure, what does “NDPA/Trigger” mean?

A: It is just an example, meaning that either type of frame can be used.

**Straw Poll 1:** Do you agree that NDP based measurement procedure is supported for channel measurement in the sub-7GHz band for 11bf?**Y/N/A: 26/7/17**

**Straw Poll 2:**

**Deferred**

Q: Related to SP 3, I believe we already have similar wording in the SFD and don’t really see the need for this.

**Straw Poll 3:** Do you agree that the initiator of sensing operation may request the feedback of channel measurement information to the responders? Details are TBD.

**Y/N/A: 15/16/12**

**11-21/0351r4 “Threshold Based Sensing Measurement” Yingxiang Sun (Huawei)**

The contribution has already been presented. The updated version addresses the questions received during the presentation last time.

**Straw Poll:** Do you agree that 11bf could consider the following threshold based feedback in the proposed threshold based sensing measurement (TBSM)?

* The difference between the current measured CSI and the previous measured CSI is quantified. The difference is referred to as CSI variation.´
* A threshold value to be used by the sensing receiver in the threshold based procedure is defined.
* By comparing the CSI variation with the threshold, the sensing receiver can send a feedback resulting from the large CSI variation to the sensing transmitter
* Whether the threshold is predefined, or defined by the sensing receiver, transmitter, initiator or responder is TBD.

**Y/N/A: 19/7/14**

1. The Chair asks if there is any other business. No response from the group.
2. The meeting is adjourned without objection at 11:59 am (ET).

**List of Attendees:**

|  |  |  |  |
| --- | --- | --- | --- |
| Breakout | Timestamp |  Name | Affiliation |
| TGbf | 4/20 | Aboulmagd, Osama | Huawei Technologies Co., Ltd |
| TGbf | 4/20 | Au, Kwok Shum | Huawei Technologies Co., Ltd |
| TGbf | 4/20 | Au, Oscar | Origin Wireless |
| TGbf | 4/20 | Aygul, Mehmet | VESTEL; IMU |
| TGbf | 4/20 | Beg, Chris | Cognitive Systems Corp. |
| TGbf | 4/20 | Bredewoud, Albert | Broadcom Corporation |
| TGbf | 4/20 | Chayat, Naftali | Vayyar Imaging |
| TGbf | 4/20 | Choi, Jinsoo | LG ELECTRONICS |
| TGbf | 4/20 | da Silva, Claudio | Intel Corporation |
| TGbf | 4/20 | Dong, Xiandong | Xiaomi Inc. |
| TGbf | 4/20 | Du, Rui | Huawei Technologies Co., Ltd |
| TGbf | 4/20 | feng, Shuling | MediaTek Inc. |
| TGbf | 4/20 | Ghaderipoor, Alireza | MediaTek Inc. |
| TGbf | 4/20 | Haskou, Abdullah | InterDigital, Inc. |
| TGbf | 4/20 | Hu, Mengshi | Huawei Technologies Co., Ltd |
| TGbf | 4/20 | Huang, Lei | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 4/20 | Kadampot, Ishaque Ashar | Qualcomm Incorporated |
| TGbf | 4/20 | Kessler, Thomas | Deutsche Telekom AG |
| TGbf | 4/20 | Kim, Jeongki | LG ELECTRONICS |
| TGbf | 4/20 | Kim, Sang Gook | LG ELECTRONICS |
| TGbf | 4/20 | Kwon, Young Hoon | NXP Semiconductors |
| TGbf | 4/20 | Lim, Dong Guk | LG ELECTRONICS |
| TGbf | 4/20 | lim, taesung | LG ELECTRONICS |
| TGbf | 4/20 | Lindskog, Erik | Samsung |
| TGbf | 4/20 | Lu, Liuming | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 4/20 | Luo, Chaoming | Beijing OPPO telecommunications corp., ltd. |
| TGbf | 4/20 | Ma, Li | MediaTek Inc. |
| TGbf | 4/20 | Memisoglu, Ebubekir | Istanbul Medipol University; Vestel |
| TGbf | 4/20 | Mirfakhraei, Khashayar | IEEE member / Self Employed |
| TGbf | 4/20 | Ozbakis, Basak | Vestel Electronics Corp. |
| TGbf | 4/20 | OZDEN ZENGIN, OZLEM | VESTEL |
| TGbf | 4/20 | PESIN, ANTHONY | InterDigital, Inc. |
| TGbf | 4/20 | Pushkarna, Rajat | Panasonic Asia Pacific Pte Ltd. |
| TGbf | 4/20 | Rafique, Saira | Istanbul Medipol University; Vestel |
| TGbf | 4/20 | Raissinia, Alireza | Qualcomm Incorporated |
| TGbf | 4/20 | Rantala, Enrico-Henrik | Nokia |
| TGbf | 4/20 | Restuccia, Francesco | Northeastern University |
| TGbf | 4/20 | Solaija, Muhammad Sohaib | Istanbul Medipol University; Vestel |
| TGbf | 4/20 | Sosack, Robert | Molex Incorporated |
| TGbf | 4/20 | SUH, JUNG HOON | Huawei Technologies Co., Ltd |
| TGbf | 4/20 | Teran, Jesus Gutierrez | IHP GmbH |
| TGbf | 4/20 | Trainin, Solomon | Qualcomm Incorporated |
| TGbf | 4/20 | Tsai, Tsung-Han | MediaTek Inc. |
| TGbf | 4/20 | Tugtekin, Omer | Vestel Electronics Corp. |
| TGbf | 4/20 | Turkmen, Halise | IMU; Vestel |
| TGbf | 4/20 | Wang, Chao Chun | MediaTek Inc. |
| TGbf | 4/20 | Wang, Pu | Mitsubishi Electric Research Labs (MERL) |
| TGbf | 4/20 | Wilhelmsson, Leif | Ericsson AB |
| TGbf | 4/20 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |
| TGbf | 4/20 | ZEGRAR, Salah Eddine | Istanbul Medipol University; Vestel |
| TGbf | 4/20 | Zhang, Meihong | Huawei Technologies Co., Ltd |
| TGbf | 4/20 | Zhou, Pei | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |

**Tuesday, April 27, 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/21/11-21-0502-07-00bf-tgbf-meeting-agenda-2021-03-04.pptx>

1. Call the meeting to order
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7. Any other business?
8. Adjourn
9. The chair, Tony Xiao Han, calls the meeting to order at 10:01am (about 45 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 meeting” (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 31) and asks if there are any questions or comments on the agenda. Solomon comments that there is no need to present 21/0521 as the corresponding motion was approved in the last call.

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 TGf timeline (slide 32).
2. The Chair presents slide 33, Call for contribution.
3. The Chair presents the teleconference times (slide 34).
4. Presentations:

**11-21/0647r1 “WLAN Sensing Discovery”, Pei Zhou (OPPO):**

The contribution is concerned with how to indicate sensing capabilities, both for single AP and multi-AP scenarios.

Q: On slide 4, what is the AP-AP communication using the RNR element?

A: The figure is misleading. We want to illustrate that the RNB element, which is carried in the Beacon, may contain information about AP2.

Q: What roles do the different APs have in case of Multi-AP operation?

A: One may be transmitter and the other may be responder.

Q: Related to SP1, it is not clear to me how the SP relate to the presentation.

Q: I am a bit concerned with SP1. I think there are alternatives and therefore I believe we need to discuss this more.

Q: I think it would be good to be more explicit about what bits should be in the Sensing Capabilities Element and why it is needed.

**Straw Poll 1:** Do you agree that the 802.11bf amendment shall define a Sensing Capabilities element to be used by a STA to advertise its support of sensing capabilities?

**The Straw Poll is deferred.**

Q: Related to SP2, it is not clear to me why the information is different compared to the previous SP.

**Straw Poll 2**: Do you support that (essential) sensing capabilities of neighboring APs may be contained in the RNR element.

Note: Essential sensing capabilities of neighboring APs are TBD.

**The Straw Poll is deferred.**

**11-21/0648r0 “Discussion on Sensing Setup Procedure” Pei Zhou (OPPO):** The contribution proposes to to introduce a “Sensing confirm frame”, to be used in acse of multiple responders.

**Straw Poll 1:** Do you support that 802.11bf amendment shall define sensing confirm frame for sensing setup?

Note: the format of sensing confirm frame is TBD.

**The Straw Poll is deferred.**

**11-21/0669r1 “A Discussion on Measurement Results for Active Radar-Based Applications” A. Haskou (InterDigital):** The contribution is concerned with active sensing and in particular using Range Profile (PR) measurement and Localization Heatmap measurement.

Q: The RP is between any set of antennas, is an antenna array one antenna or each antenna is an individual antenna.

A: If the antennas are used to form beams, it is one RP for each beam.

Q: Would we be able to obtain the RP still reusing the signal waveform we have, or do we need to design new waveforms?

A: I am not really sure. However, if we want to go towards active sensing, I believe we should consider this kind of measurements.

Q: How much data is there in a heatmap?

A: Not so much. The number of points is given by the area, an then with a scale in dB it does not have to be very large.

Q: Can the AP be the receiver instead?

A: Yes, with the proper adjustment of the protocol for who should transmit. That is, the transmission hasto be done in series.

We are out of time and the Chair declares that 20 minutes will be allocated next time for discussion and the SPs.

1. The Chair asks if there is any other business. No response from the group.
2. The meeting is adjourned without objection at 11:59.

**List of Attendees:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Breakout | SA PIN | Timestamp | Name | Affiliation |
| TGbf | 3058 | 4/27 | Aboulmagd, Osama | Huawei Technologies Co., Ltd |
| TGbf | 109440 | 4/27 | Abushattal, Abdelrahman | Istanbul Medipol university ;Vestel |
| TGbf | 12585 | 4/27 | Au, Kwok Shum | Huawei Technologies Co., Ltd |
| TGbf | 109456 | 4/27 | Aygul, Mehmet | VESTEL; IMU |
| TGbf | 104991 | 4/27 | Beg, Chris | Cognitive Systems Corp. |
| TGbf | 58079 | 4/27 | Bluschke, Andreas | Signify |
| TGbf | 4488 | 4/27 | Chayat, Naftali | Vayyar Imaging |
| TGbf | 90586 | 4/27 | Dash, Debashis | Apple, Inc. |
| TGbf | 89108 | 4/27 | da Silva, Claudio | Intel Corporation |
| TGbf | 63690 | 4/27 | Dong, Xiandong | Xiaomi Inc. |
| TGbf | 109618 | 4/27 | feng, Shuling | MediaTek Inc. |
| TGbf | 87389 | 4/27 | HAN, Xiao | Huawei Technologies Co., Ltd |
| TGbf | 107723 | 4/27 | Haskou, Abdullah | InterDigital, Inc. |
| TGbf | 37611 | 4/27 | Huang, Lei | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 109194 | 4/27 | Kadampot, Ishaque Ashar | Qualcomm Incorporated |
| TGbf | 109532 | 4/27 | Kamel, Mahmoud | InterDigital, Inc. |
| TGbf | 9302 | 4/27 | Kasher, Assaf | Qualcomm Incorporated |
| TGbf | 36220 | 4/27 | Kim, Sang Gook | LG ELECTRONICS |
| TGbf | 8390 | 4/27 | Kwon, Young Hoon | NXP Semiconductors |
| TGbf | 72713 | 4/27 | Lim, Dong Guk | LG ELECTRONICS |
| TGbf | 98886 | 4/27 | Lu, Liuming | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbf | 109178 | 4/27 | Luo, Chaoming | Beijing OPPO telecommunications corp., ltd. |
| TGbf | 108372 | 4/27 | Memisoglu, Ebubekir | Istanbul Medipol University; Vestel |
| TGbf | 108566 | 4/27 | Ozbakis, Basak | Vestel Electronics Corp. |
| TGbf | 107992 | 4/27 | PESIN, ANTHONY | InterDigital, Inc. |
| TGbf | 108839 | 4/27 | Pushkarna, Rajat | Panasonic Asia Pacific Pte Ltd. |
| TGbf | 109437 | 4/27 | Rafique, Saira | Istanbul Medipol University; Vestel |
| TGbf | 73048 | 4/27 | Raissinia, Alireza | Qualcomm Incorporated |
| TGbf | 129053 | 4/27 | Restuccia, Francesco | Northeastern University |
| TGbf | 108373 | 4/27 | Solaija, Muhammad Sohaib | Istanbul Medipol University; Vestel |
| TGbf | 109626 | 4/27 | Sosack, Robert | Molex Incorporated |
| TGbf | 66611 | 4/27 | SUH, JUNG HOON | Huawei Technologies Co., Ltd |
| TGbf | 9287 | 4/27 | Trainin, Solomon | Qualcomm Incorporated |
| TGbf | 111868 | 4/27 | Tsai, Tsung-Han | MediaTek Inc. |
| TGbf | 108539 | 4/27 | Turkmen, Halise | IMU; Vestel |
| TGbf | 72083 | 4/27 | Wang, Chao Chun | MediaTek Inc. |
| TGbf | 77110 | 4/27 | Wilhelmsson, Leif | Ericsson AB |
| TGbf | 89721 | 4/27 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |
| TGbf | 8146 | 4/27 | Yee, James | MediaTek Inc. |
| TGbf | 109051 | 4/27 | ZEGRAR, Salah Eddine | Istanbul Medipol University; Vestel |
| TGbf | 108838 | 4/27 | Zhang, Meihong | Huawei Technologies Co., Ltd |
| TGbf | 122872 | 4/27 | Zhou, Pei | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |