IEEE P802.11  
Wireless LANs

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| Minutes for Task Group (TG) 802.11 be Extremely High Throughput Telephone Conferences in April 2020 | | | | |
| Date: 2020-04-03 | | | | |
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|  |  |  |  |  |

Abstract

This document contains the meeting minutes from TGbe telcos in April, 2020.

* Rev0: Minutes for conference call Thursday April 2, 2020.
* Rev1: Minutes for conference call Thursday April 16, 2020.
* Rev2: Minutes for conference call Thursday April 30, 2020.

# Contents

[Contents 2](#_Toc39228076)

[Thursday 2 April 2020, 10:00 – 13:00 ET 3](#_Toc39228077)

[Monday 6 April 2020, 10:00 – 13:00 ET 8](#_Toc39228078)

[Thursday 9 April 2020, 19:00 – 22:00 ET 8](#_Toc39228079)

[Monday 13 April 2020, 19:00 – 22:00 ET 8](#_Toc39228080)

[Thursday 16 April 2020, 10:00 – 13:00 ET 9](#_Toc39228081)

[Friday 17 April 2020, 10:00 – 13:00 ET 14](#_Toc39228082)

[Monday 20 April 2020, 10:00 – 13:00 ET 14](#_Toc39228083)

[Thursday 23 April 2020, 19:00 – 22:00 ET 14](#_Toc39228084)

[Friday 24 April 2020, 10:00 – 13:00 ET 14](#_Toc39228085)

[Tuesday 28 April 2020, 19:00 – 22:00 ET 14](#_Toc39228086)

[Thursday 30 April 2020, 10:00 – 13:00 ET 15](#_Toc39228087)

# Thursday 2 April 2020, 10:00 – 13:00 ET

**Introduction**

1. The Chair, Alfred Asterjadhi (Qualcomm) calls the meeting to order at 10:02. The agenda document was prior to meeting [11-20/0425r15](https://mentor.ieee.org/802.11/dcn/20/11-20-0425-15-00be-2020-mar-may-tgbe-teleconference-agendas.docx) but will be [11-20/0425r16.](https://mentor.ieee.org/802.11/dcn/20/11-20-0425-16-00be-2020-mar-may-tgbe-teleconference-agendas.docx)
2. The Chair goes through the IEEE 802 and 802.11 IPR policy and procedure. The Chair asks if anybody willing to speak up. Nobody speaks up.
3. Attendance reminder. Please record your attendance during the conference call by using the IMAT system:
   1. 1) login to [imat](https://imat.ieee.org/attendance), 2) select “802.11 Telecons (<Month>)” entry, 3) select “C/LM/WG802.11 Attendance” entry, 4) click “TGbe <MAC/PHY/Joint> conference call that you are attending.
   2. If you are unable to record the attendance via [IMAT](https://imat.ieee.org/attendance) then please send an e-mail to Dennis Sundman ([dennis.sundman@ericsson.com](mailto:dennis.sundman@ericsson.com)) and Alfred Asterjadhi ([aasterja@qti.qualcomm.com](mailto:aasterja@qti.qualcomm.com))

There is some discussion regarding how imat works.

**List of attendees:**

* Abdelaal, Rana Broadcom Corporation
* Aboulmagd, Osama Huawei Technologies Co.,  Ltd
* Adhikari, Shubhodeep Broadcom Corporation
* Akhmetov, Dmitry Intel Corporation
* An, Song-Haur INDEPENDENT
* Asterjadhi, Alfred Qualcomm Incorporated
* Au, Kwok Shum Huawei Technologies Co., Ltd
* baron, stephane Canon Research Centre France
* Bei, Jianwei NXP Semiconductors
* Bredewoud, Albert Broadcom Corporation
* Cao, Rui NXP Semiconductors
* Cariou, Laurent Intel Corporation
* Carney, William Sony Corporation
* Chen, Xiaogang Intel
* Cheng, Paul MediaTek Inc.
* CHERIAN, GEORGE Qualcomm Incorporated
* Chitrakar, Rojan Panasonic Asia Pacific Pte Ltd.
* Choi, Jinsoo LG ELECTRONICS
* Chu, Liwen NXP Semiconductors
* CHUN, JINYOUNG LG ELECTRONICS
* Ciochina, Dana Sony Corporation
* Das, Dibakar Intel Corporation
* Das, Subir Applied Communication Sciences
* Derham, Thomas Broadcom Corporation
* Doostnejad, Roya Intel Corporation
* Duan, Ruchen SAMSUNG
* ElSherif, Ahmed Qualcomm Incorporated
* Erceg, Vinko Broadcom Corporation
* Fang, Yonggang ZTE TX Inc
* Fischer, Matthew Broadcom Corporation
* Gan, Ming Huawei Technologies Co., Ltd
* Garcia Rodriguez, Adrian Jose Nokia
* Guo, Qiang Futurewei Technologies
* Guo, Yuchen Huawei Technologies Co., Ltd
* Gwak, Yongsu Korea National University of Transportation
* Han, Jonghun SAMSUNG
* Handte, Thomas Sony Corporation
* Hervieu, Lili Cable Television Laboratories Inc. (CableLabs)
* Ho, Duncan Qualcomm Incorporated
* Hong, Hanseul Yonsei University
* Hu, Chunyu Facebook
* Hu, Mengshi HUAWEI
* Huang, Guogang  Huawei
* Huang, Po-Kai Intel Corporation
* Jang, Insun LG ELECTRONICS
* Ji, Chenhe Huawei Technologies Co. Ltd
* jiang, feng Intel Corporation
* Kain, Carl USDoT
* Kandala, Srinivas SAMSUNG
* Kedem, Oren 101 Consulting Corporation
* Kim, Jeongki LG ELECTRONICS
* Kim, Myeong-Jin SAMSUNG
* kim, namyeong LG ELECTRONICS
* Kim, Sang Gook LG ELECTRONICS
* Kim, Yongho Korea National University of Transportation
* Klein, Arik Intel Corporation
* Kneckt, Jarkko Apple, Inc.
* Ko, Geonjung WILUS Inc.
* Kwon, Young Hoon NXP Semiconductors
* Lalam, Massinissa SAGEMCOM BROADBAND SAS
* Lan, Zhou Broadcom Corporation
* Lee, Wookbong SAMSUNG
* Levy, Joseph InterDigital, Inc.
* Li, Guoqing Apple, Inc.
* Li, Yiqing Huawei Technologies Co. Ltd
* Li, Yunbo Huawei Technologies Co., Ltd
* Liang, dandan Huawei Technologies Co., Ltd
* Lim, Dong Guk LG ELECTRONICS
* Lin, Wei Huawei Technologies Co. Ltd
* Liu, Jianhan MediaTek Inc.
* Liu, Yong Apple, Inc.
* Lopez, Miguel Ericsson AB
* Lou, Hanqing InterDigital, Inc.
* Lv, kaiying MediaTek Inc.
* Lv, Lily Huawei Technologies Co. Ltd
* Madpuwar, Girish Broadcom Corporation
* Max, Sebastian Ericsson AB
* Monajemi, Pooya Cisco Systems, Inc.
* NANDAGOPALAN, SAI SHANKAR Cypress Semiconductor Corporation
* Naribole, Sharan SAMSUNG
* Nezou, Patrice Canon Research Centre France
* noh, yujin Newracom Inc.
* Omar, Hassan Huawei Technologies Co.,  Ltd
* Pare, Thomas MediaTek Inc.
* Park, Eunsung LG ELECTRONICS
* Park, Minyoung Intel Corporation
* Park, Sung-jin LG ELECTRONICS
* Patil, Abhishek Qualcomm Incorporated
* Patwardhan, Gaurav Hewlett Packard Enterprise
* PESIN, ANTHONY InterDigital, Inc.
* Petrick, Albert InterDigital, Inc.
* porat, ron Broadcom Corporation
* Puducheri, Srinath Broadcom Corporation
* Pulikkoonattu, Rethnakaran Broadcom Corporation
* Redlich, Oded Huawei
* RISON, Mark Samsung Cambridge Solution Centre
* Rosdahl, Jon Qualcomm Technologies, Inc.
* Schelstraete, Sigurd Quantenna Communications, Inc.
* Seok, Yongho MediaTek Inc.
* Sharma, Prashant NXP Semiconductors
* Shellhammer, Stephen Qualcomm Incorporated
* Shilo, Shimi HUAWEI
* Song, Taewon LG ELECTRONICS
* SUH, JUNG HOON Huawei Technologies Co. Ltd
* Sun, Bo ZTE Corporation
* Sun, Li-Hsiang InterDigital, Inc.
* Sun, Yanjun Qualcomm Incorporated
* Sundman, Dennis Ericsson AB
* Tian, Bin Qualcomm Incorporated
* Tsodik, Genadiy Huawei Technologies Co. Ltd
* Van Zelst, Allert Qualcomm Incorporated
* Varshney, Prabodh Nokia
* Verma, Sindhu Broadcom Corporation
* Vermani, Sameer Qualcomm Incorporated
* VIGER, Pascal Canon Research Centre France
* Wang, Hao Self
* Wang, Huizhao Quantenna Communications, Inc.
* Wang, Lei Huawei R&D USA
* Wang, Xiaofei InterDigital, Inc.
* Wentink, Menzo Qualcomm
* Xin, Yan Huawei Technologies Co., Ltd
* Yang, Bo Huawei Technologies Co. Ltd
* YANG, RUI InterDigital, Inc.
* Yano, Kazuto Advanced Telecommunications Research Institute International (ATR)
* Yee, James MediaTek Inc.
* yi, yongjiang Futurewei Technologies
* Young, Christopher Broadcom Corporation
* Yu, Jian Huawei Technologies Co., Ltd
* Yu, Mao NXP Semiconductors
* Yuan, Fangchao HUAWEI
* Yukawa, Mitsuyoshi Canon, Inc.
* ZHANG, JIAYIN HUAWEI
* Zhang, Yan NXP Semiconductors
* Zhou, Yifan Huawei Technologies Co., Ltd

1. The meeting is full, we move from Webex to Zoom. Recess for 5 minutes.
2. Announcements:
   1. Members are encouraged to read the SP guidelines at the end of the doc [11-20/0425r16](https://mentor.ieee.org/802.11/dcn/20/11-20-0425-16-00be-2020-mar-may-tgbe-teleconference-agendas.docx).
   2. Any feedback/suggestions on the ways of working? Further notes in [11-20/0425r16](https://mentor.ieee.org/802.11/dcn/20/11-20-0425-16-00be-2020-mar-may-tgbe-teleconference-agendas.docx).
      1. I would like to have a document where we summarize the SPs that pass the 75%.
      2. We may want to think about a temporary change in process of SFD updates since we don’t have motions.
      3. It would be nice to have the strawpoll results within 24 hours after the meeting, so we have a feeling for what we have accomplished.
      4. AI: Sync up with ad-hoc chairs to have documents timely available so that information is available asap. ETA of 48 hours.
      5. It would be good with arranging somehow motions.
      6. I agree having some document clearly showing straw polls is useful.
      7. Electronic voting for motions would be good. Ensure that SPs are run in such a way that members from anywhere can express their opinion (indepentendly of location).
      8. Rules prohibit rules to be updated. The WG is working on a solution how to address this.
      9. It makes me nervous that we have SPs that have some sort of higher priority than other SPs. This is directly against the current rules. We can run motions electronically, it requires 50% members of the WG to be voting.
      10. How can members obtain voting right if there are no F2F meetings?
          1. New participant orientation: <https://mentor.ieee.org/802.11/dcn/20/11-20-0007-01-0000-802-11-new-participant-introduction.pptx>
          2. It is being looked at on how to attend plenary meetings. Nothing is decided yet.
      11. It’s good if the SP has a reference to the document it comes from.
   3. Some discussion on the SP document.
3. The agenda is to continue with technical contributions. The Chair asks if there is any objection to proceed with the agenda. No objection.

**Contributions**

* + - 1. **SP:** [**11-20/0056r2**](https://mentor.ieee.org/802.11/dcn/20/11-20-0056-02-00be-preparations-for-coordinated-ofdma.pptx)**, “Peparations for Coordinated OFDMA” – Rojan Chitrakar (Panasonic)**  
         Do you support to add the following to the 11be SFD:  
         The sharing AP may solicit feedback from one or more APs from the aP candidate set to learn the frequency resources preferred for Coordinated OFDMA transmissions.  
           
         **Comments:**C: What do you mean with one or more APs? Are these shared APs?  
         A: Yes.  
         C: We don’t have a definition of AP candidate set?  
         A: I believe we have it.   
         C: What is the intention with this frequency resource?  
         A: This is more like a recommendation.  
         C: Does the SP assume that the sharing have a link with the shared AP in the AP candidate set?  
         C: Is this like the CQI?  
         A: No.  
         C: This is really vague. I understand the idea here. But I can just say I prefer all of the RUs.  
         C: How often is this done?  
         A: This has to be done some time to time.  
         C: I believe the preferred frequency resources need to be shared often. It’s unclear to me if it’s worth the overhead.  
         C: The definition of the AP candidate set is not given in the SFD, but there is a place where that term is used. I suggest that we have a separate SP to define that term, or add a separate note defining it.  
         A: The term itself is there in the SFD, so I believe it can be used.  
         C: I also agree, there is no clear definition on the AP candidate set. I suggest you edit the SP and add that AP candidate set is TBD, since this has been done in other SPs and motions.  
         A: Ok.  
         C: Can we have unsolicited feedback?  
         A: I don’t want to have a separate protocol for this. But yes I believe it can be there, but I don’t have it in this SP.  
           
         **New text:**  
         Do you support to add the following to the 11be SFD:  
         The sharing AP may solicit feedback from one or more APs from the aP candidate set to learn the frequency resources preferred for Coordinated OFDMA transmissions.  
         Note: AP Candidate set is TBD.  
           
         **Result:**  
         Y/N/A: 38/28/53
      2. **SP:** [**11-20/0071r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-0071-01-00be-joint-transmission-for-11be.pptx)**, “joint Transmission for 11be” – Ron Porat (Broadcom)**  
         Do you support adding to 11be SFD Joint Transmission for single and multi user under the multi-AP topic?  
           
         **Discussion:**  
         C: Can you add that PPDU for JT is the same as PPDU for single AP.  
         A: I add something.  
         C: Can you add that this is a feature for rel. 2.  
         A: I have a concern regarding the note added earlier. It should be removed.  
           
         **New text:**  
         Do you support adding to 11be SFD Joint Transmission for single and multi user under the multi-AP topic?  
         - Note: this feature is for rel. 2  
           
         **Result:**  
         Y/N/A: 89/10/28
      3. **Q&A + SPs:** [**11-20/0277r1**](https://mentor.ieee.org/802.11/dcn/20/11-20-0277-01-00be-coordinated-ofdma-protocol.pptx)**, “Coordinated OFDMA protocol” – Sharan Naribole (Samsung)  
           
         Discussion:**C: I have two questions: Is the first and fourth bullet sensing necessary?  
         A: The first bullet is more to set the terminology. But the bullet itself does not specify clearly any behaviour.  
         C: You can already today allocate an RU that is not in my primary for OFDMA today. What is different with this contribution?  
         A: The intention is before the TXOP for the shared AP to hear the sharing APs announcement.  
         C: Slide 9, UL sharing, is it for Data or only ACKs?  
         A: It could be trigger based access.  
         C: Is this intention that the Sharing AP should allocate the resource within the BSS operating BW of the Shared AP? The Candidate set is a bit throwing me off.  
         C: More comments regarding AP candidate set.  
         C: The chair steps in and suggests that a SP is prepared defining canditade APs before running more SPs containing this undefined term.  
         C: Can an AP candidate set have multiple sharing APs?  
         A: No.
      4. [**11-20/0475r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-0475-00-00be-coordinated-txop-sharing-in-ul.pptx)**, “Coordinated TXOP sharing in UL” – Miguel Lopez (Ericsson)**  
         **Discussion:**  
         C: What is the scope of the SP?  
         A: I am explicitly referring to the given reference.  
         C: Maybe we should then first decide the coordinated OFDMA/TDMA?  
         A: You are correct that at this point, the SP is a bit high level. I am not proposing this for the SFD either.  
         C: If you can be more specific it would be better.  
         A: I understand your concern.  
         C: When you say UL transmisisons. What kind of STAs are you thinking about? If it is TGbe STAs we can change the rules.  
         A: I was aiming at .11be STAs.  
         C: My key concern here is what is the expected gain, why would one want to do UL CAP-TDMA/OFDMA?  
         A: Thanks.  
         C: Can you remove the time/frequency resources? It could also be for example spatial?

**Adjourned at 12:59.**

# Monday 6 April 2020, 10:00 – 13:00 ET

Split PHY and MAC.

* MAC: <https://mentor.ieee.org/802.11/dcn/20/11-20-0511-05-00be-minutes-for-tgbe-mac-ad-hoc-teleconferences-march-and-may-2020.docx>
* PHY: <https://mentor.ieee.org/802.11/dcn/20/11-20-0587-03-00be-minutes-april-phy-cc.docx>

# Thursday 9 April 2020, 19:00 – 22:00 ET

Split PHY and MAC.

* MAC: <https://mentor.ieee.org/802.11/dcn/20/11-20-0511-05-00be-minutes-for-tgbe-mac-ad-hoc-teleconferences-march-and-may-2020.docx>
* PHY: <https://mentor.ieee.org/802.11/dcn/20/11-20-0587-03-00be-minutes-april-phy-cc.docx>

# Monday 13 April 2020, 19:00 – 22:00 ET

Split PHY and MAC.

* MAC: <https://mentor.ieee.org/802.11/dcn/20/11-20-0511-05-00be-minutes-for-tgbe-mac-ad-hoc-teleconferences-march-and-may-2020.docx>
* PHY: <https://mentor.ieee.org/802.11/dcn/20/11-20-0587-03-00be-minutes-april-phy-cc.docx>

# Thursday 16 April 2020, 10:00 – 13:00 ET

**Introduction**

1. The Chair calls the meeting to order at 10:00.
2. IEEE 802 and 802.11 IPR policy and procedure. The Chair asks if anyone is willing to speak up on the call for potentially essential patents. Nobody speaks up.
3. Attendance reminder.
4. Participation slide: <https://mentor.ieee.org/802-ec/dcn/16/ec-16-0180-05-00EC-ieee-802-participation-slide.pptx>
5. Please record your attendance during the conference call by using the IMAT system:
   * 1) login to [imat](https://imat.ieee.org/attendance), 2) select “802.11 Telecons (<Month>)” entry, 3) select “C/LM/WG802.11 Attendance” entry, 4) click “TGbe <MAC/PHY/Joint> conference call that you are attending.
6. If you are unable to record the attendance via [IMAT](https://imat.ieee.org/attendance) then please send an e-mail to Dennis Sundman ([dennis.sundman@ericsson.com](mailto:dennis.sundman@ericsson.com)) and Alfred Asterjadhi ([aasterja@qti.qualcomm.com](mailto:aasterja@qti.qualcomm.com))

**Attendees:**

* Abouelseoud, Mohamed Sony Corporation
* Aboulmagd, Osama Huawei Technologies Co.,  Ltd
* Adhikari, Shubhodeep Broadcom Corporation
* Akhmetov, Dmitry Intel Corporation
* An, Song-Haur INDEPENDENT
* Ansley, Carol CommScope
* Asterjadhi, Alfred Qualcomm Incorporated
* Au, Kwok Shum Huawei Technologies Co., Ltd
* baron, stephane Canon Research Centre France
* Bei, Jianwei NXP Semiconductors
* Bredewoud, Albert Broadcom Corporation
* Cao, Rui NXP Semiconductors
* Cariou, Laurent Intel Corporation
* Carney, William Sony Corporation
* Cheng, Paul MediaTek Inc.
* CHERIAN, GEORGE Qualcomm Incorporated
* Chitrakar, Rojan Panasonic Asia Pacific Pte Ltd.
* Choi, Jinsoo LG ELECTRONICS
* Chu, Liwen NXP Semiconductors
* CHUN, JINYOUNG LG ELECTRONICS
* Ciochina, Dana Sony Corporation
* Das, Dibakar Intel Corporation
* Das, Subir Perspecta Labs Inc.
* Doostnejad, Roya Intel Corporation
* Duan, Ruchen SAMSUNG
* ElSherif, Ahmed Qualcomm Incorporated
* Fang, Yonggang ZTE TX Inc
* Fischer, Matthew Broadcom Corporation
* Gan, Ming Huawei Technologies Co., Ltd
* Guo, Qiang Futurewei Technologies
* Guo, Yuchen Huawei Technologies Co., Ltd
* Gwak, Yongsu Korea National University of Transportation
* Han, Jonghun SAMSUNG
* Han, Zhiqiang ZTE Corporation
* Handte, Thomas Sony Corporation
* Ho, Duncan Qualcomm Incorporated
* Hong, Hanseul Yonsei University
* Hsieh, Hung-Tao MediaTek Inc.
* Hsu, Chien-Fang MediaTek Inc.
* Hu, Chunyu Facebook
* Hu, Mengshi HUAWEI
* Huang, Guogang  Huawei
* Huang, Lei Panasonic Asia Pacific Pte Ltd.
* Huang, Po-Kai Intel Corporation
* Jang, Insun LG ELECTRONICS
* Ji, Chenhe Huawei Technologies Co. Ltd
* jiang, feng Intel Corporation
* Kain, Carl USDoT
* Kandala, Srinivas SAMSUNG
* Kedem, Oren Huawei Technologies Co. Ltd
* Kim, Jeongki LG ELECTRONICS
* Kim, Myeong-Jin SAMSUNG
* kim, namyeong LG ELECTRONICS
* Kim, Sang Gook LG ELECTRONICS
* Kim, Sanghyun WILUS Inc
* Kim, Youhan Qualcomm Incorporated
* Kishida, Akira Nippon Telegraph and Telephone Corporation (NTT)
* Ko, Geonjung WILUS Inc.
* Kwon, Young Hoon NXP Semiconductors
* Lalam, Massinissa SAGEMCOM BROADBAND SAS
* Lan, Zhou Broadcom Corporation
* Lansford, James Qualcomm Incorporated
* Lee, Wookbong SAMSUNG
* Levy, Joseph InterDigital, Inc.
* Li, Yiqing Huawei Technologies Co. Ltd
* Li, Yunbo Huawei Technologies Co., Ltd
* Liang, dandan Huawei Technologies Co., Ltd
* Lim, Dong Guk LG ELECTRONICS
* LIU, CHENCHEN Huawei Technologies Co., Ltd
* Lopez, Miguel Ericsson AB
* Lou, Hanqing InterDigital, Inc.
* Lv, kaiying MediaTek Inc.
* Lv, Lily Huawei Technologies Co. Ltd
* Max, Sebastian Ericsson AB
* Nezou, Patrice Canon Research Centre France
* noh, yujin Newracom Inc.
* Ouchi, Masatomo Canon
* Park, Sung-jin LG ELECTRONICS
* Patil, Abhishek Qualcomm Incorporated
* PESIN, ANTHONY InterDigital, Inc.
* Petrick, Albert InterDigital, Inc.
* Puducheri, Srinath Broadcom Corporation
* Pulikkoonattu, Rethnakaran Broadcom Corporation
* Redlich, Oded Huawei
* RISON, Mark Samsung Cambridge Solution Centre
* Rosdahl, Jon Qualcomm Technologies, Inc.
* Schelstraete, Sigurd Quantenna Communications, Inc.
* Sedin, Jonas Ericsson AB
* Seok, Yongho MediaTek Inc.
* Sharma, Prashant NXP Semiconductors
* Shellhammer, Stephen Qualcomm Incorporated
* Shilo, Shimi HUAWEI
* Son, Ju-Hyung WILUS Inc.
* Stanley, Dorothy Hewlett Packard Enterprise
* SUH, JUNG HOON Huawei Technologies Co. Ltd
* Sun, Bo ZTE Corporation
* Sun, Li-Hsiang InterDigital, Inc.
* Sun, Yanjun Qualcomm Incorporated
* Sundman, Dennis Ericsson AB
* Tian, Bin Qualcomm Incorporated
* Tsodik, Genadiy Huawei Technologies Co. Ltd
* Uln, Kiran Cypress Semiconductor Corporation
* Van Zelst, Allert Qualcomm Incorporated
* Varshney, Prabodh Nokia
* Verma, Sindhu Broadcom Corporation
* Vermani, Sameer Qualcomm Incorporated
* Wang, Lei Huawei R&D USA
* Wang, Xiaofei InterDigital, Inc.
* Wentink, Menzo Qualcomm
* Wilhelmsson, Leif Ericsson AB
* Wu, Tianyu Apple, Inc.
* Xin, Yan Huawei Technologies Co., Ltd
* Yang, Bo Huawei Technologies Co. Ltd
* YANG, RUI InterDigital, Inc.
* Yang, Steve TS MediaTek Inc.
* Yano, Kazuto Advanced Telecommunications Research Institute International (ATR)
* Yee, James MediaTek Inc.
* yi, yongjiang Futurewei Technologies
* Young, Christopher Broadcom Corporation
* Yu, Jian Huawei Technologies Co., Ltd
* Yu, Mao NXP Semiconductors
* Zeleznikar, Alan CommScope
* Zhang, Yan NXP Semiconductors
* Zhou, Yifan Huawei Technologies Co., Ltd

1. Due to technical issues we have an interruption. Back again at 10:18.
2. **Announcements:** Need to go over the action items and guidline below. No other announcements.
3. Agenda approved.
4. Robert Stacey is not on the call. The Chair asks if it is OK with everyone to take up the tutorial when he comes. Nobody objects.

**Follow up on e-motions and guidelines**

1. TGbe editor prepared and maintains an SFD-like document containing passed straw polls. Latest version [11-20/566r3](https://mentor.ieee.org/802.11/dcn/20/11-20-0566-03-00be-compendium-of-straw-polls-and-potential-changes-to-the-specification-framework-document.docx).
2. Added a new subclause “Order Of Topics”, which contains the order of topics for Joint, MAC, and PHY.
   1. Comment that some presentations have been on the server much longer than others and how to take care of the prioritization in those cases. The Chair responds that some flexibility is needed.
   2. Comment that if the agenda is to be changed, that it does not change too soon prior to the meeting.
3. Added 75% rule for SPs in the “Guideline-Running StrawPolls” subclause. This is added for clarity although we already follow this practice.
4. There are no ongoing discussions to amend the way we run motions during this period that we have no F2F meetings.
   1. The Chair presents some updated guidelines for voting on strawpolls on page 41, in 425r25.
   2. Several comments:

C: I believe the guidline is good. Regarding voting members only voting in SP, this does not follow the normal guidelines. How can you make sure that only voting members vote?

A: This is not easy, but by filling your name and affiliation we can keep track of it.  
C: Can we extend the voting pool, for example including aspirants?  
A: No answer.  
C: Can we use imat for voting?

A: It’s hard for each SP.

C: I have a question on d). A poll is not enough to populate the SFD. We should use the precise language to use a motion.

A: Yes.

C: I am not convinced it is permissible to restrict the voting of SP to voting members only.

A: We are basing all this based on honours.

C: Are you allowed to disregard votes of voters who are not members?

A: Strawpolls are informative, so there are no strict rules that would forbid the task group to enforce such guidelines if the group wants to.

C: The operations manual explicitly states that everyone can vote.

A: We can present the results of separate subgroups.

1. More work in progress.

**WebEx: A Brief Tutorial (Robert Stacey)**

Robert explains how to change name in WebEx and Zoom. Discussion arise to add [V] in front of the name if you are a voter. [P] for potential voter, [A] for aspirant, [N] for non-voter.

**Technical presentations**

1. [**410r4**](https://mentor.ieee.org/802.11/dcn/20/11-20-0410-04-00be-coordinated-spatial-reuse-procedure.pptx)**, “Coordinated Spatial Reuse Procedure” – Sungjin Park (LGE)**

**Summary:** The authors propose an unsolicited method for performing coordinated spatial reuse (CSR). They provide a full protocol on how to do this.

**Discussion:**

C: Slide 13. I agree we need to have a measurement phase. What is the purpose of the setup phase?  
A: There are multiple manners of obtaining the pathloss. We can do the NDP or an ongoing packet. Can you go to slide 8. CSR setup phase is the start of the coordination phase, i.e. the start of the TXOP.

C: Have you considered power control for CSR?

A: Yes, maximum TX power should be decided in this procedure.

C: On slide 8, what exactly does the Sharing AP tell the Shared AP?

A: STA a has reported the power of the Shared AP, so the power is conveyed from Sharing AP to Shared AP what power to use.

C: This seems very similar to beacon request/response. Have you looked at that?

A: I am not sure.

C: Slide 8. Signaling the TX power is a waste of information. Why do you believe the Sharing AP should share this information?

A: The candidate AP does not know this.

C: Slide 6. You mention that the STA measures the RSSI on the ongoing packet. You assume the STA measures the whole packet with the same TX power.

C: I believe these messages are needed. I believe your SPs 1 and 2 are good. I believe the decision of the TX power should be decided elsewhere.

A: Ok.

C: Have you considered how this would work in the context of multi-users?

A: We can extend the per STA case.

C: How does the Sharing AP know which STAs the Shared AP are going to schedule in a TXOP.

A: The Sharing AP does not need to know this.

C: I believe before we go into depths of spatial reuse, we should consider potential gains.  
C: Do you think your approach will work with APs that have beamforming capability? The measured RSSI is dependent on beamforming weights.

A: There is no beamforming capability.

1. [**424r3**](https://mentor.ieee.org/802.11/dcn/20/11-20-0424-03-00be-coordinated-ap-spatial-sharing-in-a-txop.pptx)**, Coordinated AP Spatial Sharing in a TXOP (Dennis Sundman)**

**Summary:** The authors propose to use the CAP-OFDMA/TDMA protocol for doing spatial multiplexing, which they refer to as CAP-SDMA. Under the assumption that APs have more antennas than ongoing spatial streams, the remaining degrees of freedom can be used for nulling. When this is the case, significant gain compared to CAP-OFDMA/TDMA is claimed.

**Comment:**

C: Is this the same as the CBF?

A: Yes.

C: I believe the channel sounding phase may not be needed in each TXOP.

A: I think you are right.

C: Where does the 4X come from?

A: The 4X comes from the comparison with CAP-OFDMA / CAP-TDMA. In the latter, time/frequency is split among the participating APs. In CBF, the full time/frequency plane may be utilized. Since there are 4 APs in this example, the maximum gain is thus 4X.

C: Regarding the number of spatial stream. We should call it CBF. I don’t think we need the SP1. Is this only for DL transmission? This is similar to what we already have in the SFD.

A: Yes, this is only DL transmission. Can you update me on the section in SFD?

C: Section 9.3 in the SFD.

C: I am uncertain that 2 ms is enough for the sounding phase.

A: Get back to me offline and I can show you the precise assumptions there.

C: Multi-AP feedback how does it work with the IDs?

A: I am envisioning that the Multi-AP feedback are multicast frames. I am unsure if it is already supported in the spec or not, since there are receivers (APs) both in the BSS and OBSS.

C: Regarding the SP. I believe you can wait with it.

A: I will not run the strawpoll now.

1. [**457r1**](https://mentor.ieee.org/802.11/dcn/20/11-20-0457-01-00be-discussion-on-coordinated-spatial-reuse-operation.pptx)**, “Discussion on Coordinated Spatial Reuse Operation” – Kosuke Aio (Sony)**

**Summary:** The authors evaluate a C-SR protocol in a home mesh simulation scenario. They propose a new optimizition constraint where instead of maximizing the sum throughput, the Sharing AP satisfies target SINR of at least a target STA.

**Discussion:**

C: Slide 6. I am not sure when shared APs are decided. In here there are potential Shared APs. When and how are the Shared APs decided from the potential Shared APs?

A: This is decided as described on slide 7, i.e. to satisfy the target SINR.

C: I agree that the Sharing AP first need to guarantee its own performance. I am a bit confused in the second step in (B) in slide 7. I believe it’s better to let the Shared AP to do this job.  
C: How is the sounding performed?

A: I think joint sounding is not needed.

C: Slide 11, what is your intuition that option 2 does not have a poor tail? It seems to me it should have that.

A: Option 2 doesn’t mean sharing AP doesn’t care about shared AP.

C: In the deployment scenario on slide 10, which STAs contribute to the tail?

A: Not sure.

**Ajourned at 12:59.**

# Friday 17 April 2020, 10:00 – 13:00 ET

Only MAC.

* MAC: <https://mentor.ieee.org/802.11/dcn/20/11-20-0511-05-00be-minutes-for-tgbe-mac-ad-hoc-teleconferences-march-and-may-2020.docx>

# Monday 20 April 2020, 10:00 – 13:00 ET

Split PHY and MAC.

* MAC: <https://mentor.ieee.org/802.11/dcn/20/11-20-0511-05-00be-minutes-for-tgbe-mac-ad-hoc-teleconferences-march-and-may-2020.docx>
* PHY: <https://mentor.ieee.org/802.11/dcn/20/11-20-0587-03-00be-minutes-april-phy-cc.docx>

# Thursday 23 April 2020, 19:00 – 22:00 ET

Split PHY and MAC.

* MAC: <https://mentor.ieee.org/802.11/dcn/20/11-20-0511-05-00be-minutes-for-tgbe-mac-ad-hoc-teleconferences-march-and-may-2020.docx>
* PHY: <https://mentor.ieee.org/802.11/dcn/20/11-20-0587-03-00be-minutes-april-phy-cc.docx>

# Friday 24 April 2020, 10:00 – 13:00 ET

Only MAC.

* MAC: <https://mentor.ieee.org/802.11/dcn/20/11-20-0511-05-00be-minutes-for-tgbe-mac-ad-hoc-teleconferences-march-and-may-2020.docx>

# Tuesday 28 April 2020, 19:00 – 22:00 ET

Split PHY and MAC.

* MAC: <https://mentor.ieee.org/802.11/dcn/20/11-20-0511-05-00be-minutes-for-tgbe-mac-ad-hoc-teleconferences-march-and-may-2020.docx>
* PHY: <https://mentor.ieee.org/802.11/dcn/20/11-20-0587-03-00be-minutes-april-phy-cc.docx>

# ­­­­Thursday 30 April 2020, 10:00 – 13:00 ET

**Introduction**

1. The Chair calls the meeting to order at 10:00.
2. IEEE 802 and 802.11 IPR policy and procedure. The Chair asks if anyone is willing to speak up on the call for potentially essential patents. Nobody speaks up.
3. Attendance reminder.
4. Participation slide: <https://mentor.ieee.org/802-ec/dcn/16/ec-16-0180-05-00EC-ieee-802-participation-slide.pptx>
5. Please record your attendance during the conference call by using the IMAT system:
   * 1) login to [imat](https://imat.ieee.org/attendance), 2) select “802.11 Telecons (<Month>)” entry, 3) select “C/LM/WG802.11 Attendance” entry, 4) click “TGbe <MAC/PHY/Joint> conference call that you are attending.
6. If you are unable to record the attendance via [IMAT](https://imat.ieee.org/attendance) then please send an e-mail to Dennis Sundman ([dennis.sundman@ericsson.com](mailto:dennis.sundman@ericsson.com)) and Alfred Asterjadhi ([aasterja@qti.qualcomm.com](mailto:aasterja@qti.qualcomm.com))

**Attendees:**

* + Abouelseoud, Mohamed Sony Corporation
  + Aboulmagd, Osama Huawei Technologies Co.,  Ltd
  + Adhikari, Shubhodeep Broadcom Corporation
  + Aio, Kosuke Sony Corporation
  + Akhmetov, Dmitry Intel Corporation
  + Ansley, Carol CommScope
  + Au, Kwok Shum Huawei Technologies Co., Ltd
  + Baik, Eugene Qualcomm Incorporated
  + baron, stephane Canon Research Centre France
  + Bei, Jianwei NXP Semiconductors
  + Bredewoud, Albert Broadcom Corporation
  + Cao, Rui NXP Semiconductors
  + Cariou, Laurent Intel Corporation
  + Carney, William Sony Corporation
  + Chen, Cheng Intel Corporation
  + Chen, Xiaogang Intel
  + Cheng, Paul MediaTek Inc.
  + CHERIAN, GEORGE Qualcomm Incorporated
  + Chitrakar, Rojan Panasonic Asia Pacific Pte Ltd.
  + Choi, Jinsoo LG ELECTRONICS
  + CHUN, JINYOUNG LG ELECTRONICS
  + Coffey, John Realtek Semiconductor Corp.
  + Das, Subir Perspecta Labs Inc.
  + de Vegt, Rolf Qualcomm Incorporated
  + Doostnejad, Roya Intel Corporation
  + Duan, Ruchen SAMSUNG
  + ElSherif, Ahmed Qualcomm Incorporated
  + Erceg, Vinko Broadcom Corporation
  + Fang, Yonggang ZTE TX Inc
  + Fischer, Matthew Broadcom Corporation
  + Ghosh, Chittabrata Intel Corporation
  + Guo, Yuchen Huawei Technologies Co., Ltd
  + Gwak, Yongsu Korea National University of Transportation
  + HAN, Xiao Huawei Technologies Co., Ltd
  + Han, Zhiqiang ZTE Corporation
  + Handte, Thomas Sony Corporation
  + Hedayat, Ahmadreza Charter Communications
  + Hervieu, Lili Cable Television Laboratories Inc. (CableLabs)
  + Ho, Duncan Qualcomm Incorporated
  + Hong, Hanseul Yonsei University
  + Hsieh, Hung-Tao MediaTek Inc.
  + Hsu, Chien-Fang MediaTek Inc.
  + Hu, Chunyu Facebook
  + Hu, Mengshi HUAWEI
  + Huang, Guogang  Huawei
  + Jang, Insun LG ELECTRONICS
  + jiang, feng Intel Corporation
  + Jiang, Jinjing Apple, Inc.
  + Jones, Vincent Knowles IV Qualcomm Incorporated
  + Kain, Carl USDoT
  + Kandala, Srinivas SAMSUNG
  + Kedem, Oren Huawei Technologies Co. Ltd
  + Kim, Jeongki LG ELECTRONICS
  + kim, namyeong LG ELECTRONICS
  + Kim, Sang Gook LG ELECTRONICS
  + Kim, Sanghyun WILUS Inc
  + Kim, Yongho Korea National University of Transportation
  + Kim, Youhan Qualcomm Incorporated
  + Kishida, Akira Nippon Telegraph and Telephone Corporation (NTT)
  + Ko, Geonjung WILUS Inc.
  + Kumar, Manish Marvell Semiconductor, Inc.
  + Kwon, Young Hoon NXP Semiconductors
  + Lalam, Massinissa SAGEMCOM BROADBAND SAS
  + Lansford, James Qualcomm Incorporated
  + Lee, Wookbong SAMSUNG
  + Levitsky, Ilya IITP RAS
  + Levy, Joseph InterDigital, Inc.
  + Li, Qinghua Intel Corporation
  + Li, Yiqing Huawei Technologies Co. Ltd
  + Li, Yunbo Huawei Technologies Co., Ltd
  + Lim, Dong Guk LG ELECTRONICS
  + LIU, CHENCHEN Huawei Technologies Co., Ltd
  + Liu, Jianhan MediaTek Inc.
  + Liu, Yong Apple, Inc.
  + Lopez, Miguel Ericsson AB
  + Lou, Hanqing InterDigital, Inc.
  + Lv, kaiying MediaTek Inc.
  + Lv, Lily Huawei Technologies Co. Ltd
  + Max, Sebastian Ericsson AB
  + Mirfakhraei, Khashayar Cisco Systems, Inc.
  + Monajemi, Pooya Cisco Systems, Inc.
  + Montreuil, Leo Broadcom Corporation
  + NANDAGOPALAN, SAI SHANKAR Cypress Semiconductor Corporation
  + Naribole, Sharan SAMSUNG
  + Nezou, Patrice Canon Research Centre France
  + noh, yujin Newracom Inc.
  + Park, Eunsung LG ELECTRONICS
  + Park, Sung-jin LG ELECTRONICS
  + Patil, Abhishek Qualcomm Incorporated
  + Patwardhan, Gaurav Hewlett Packard Enterprise
  + PESIN, ANTHONY InterDigital, Inc.
  + Petrick, Albert InterDigital, Inc.
  + porat, ron Broadcom Corporation
  + Puducheri, Srinath Broadcom Corporation
  + Redlich, Oded Huawei
  + RISON, Mark Samsung Cambridge Solution Centre
  + Rosdahl, Jon Qualcomm Technologies, Inc.
  + Schelstraete, Sigurd Quantenna Communications, Inc.
  + Sedin, Jonas Ericsson AB
  + Sharma, Prashant NXP Semiconductors
  + Shellhammer, Stephen Qualcomm Incorporated
  + Shilo, Shimi HUAWEI
  + Song, Taewon LG ELECTRONICS
  + Stacey, Robert Intel Corporation
  + Strauch, Paul Qualcomm Incorporated
  + SUH, JUNG HOON Huawei Technologies Co. Ltd
  + Sun, Bo ZTE Corporation
  + Sun, Li-Hsiang InterDigital, Inc.
  + Sun, Yanjun Qualcomm Incorporated
  + Sundman, Dennis Ericsson AB
  + Tanaka, Yusuke Sony Corporation
  + Tian, Bin Qualcomm Incorporated
  + Torab Jahromi, Payam Facebook
  + Tsodik, Genadiy Huawei Technologies Co. Ltd
  + Van Zelst, Allert Qualcomm Incorporated
  + Varshney, Prabodh Nokia
  + Verma, Sindhu Broadcom Corporation
  + Vermani, Sameer Qualcomm Incorporated
  + VIGER, Pascal Canon Research Centre France
  + Wang, Hao Tencent
  + Wang, Huizhao Quantenna Communications, Inc.
  + Wang, Lei Huawei R&D USA
  + Wang, Xiaofei InterDigital, Inc.
  + Wentink, Menzo Qualcomm
  + Xin, Liangxiao Sony Corporation
  + Xin, Yan Huawei Technologies Co., Ltd
  + Yan, Aiguo Oppo
  + Yang, Bo Huawei Technologies Co. Ltd
  + YANG, RUI InterDigital, Inc.
  + Yang, Steve TS MediaTek Inc.
  + Yano, Kazuto Advanced Telecommunications Research Institute International (ATR)
  + Yee, James MediaTek Inc.
  + yi, yongjiang Futurewei Technologies
  + Young, Christopher Broadcom Corporation
  + Yu, Jian Huawei Technologies Co., Ltd
  + Yu, Mao NXP Semiconductors
  + Zeleznikar, Alan CommScope
  + Zhang, Yan NXP Semiconductors
  + Zhou, Yifan Huawei Technologies Co., Ltd

1. **Announcements:**
   1. The July meeting is cancelled.
   2. Schedule a call with MAC ad-hoc chairs to find ways to accelerate coverage of presentations and making progress.
2. **Straw polls on Requests for Candidate SFD texts:**
   1. 566r11 – Page 11 Line 28 (SP1 of 394r1))
   2. 566r11 – Section 13.13, line 25-33
   3. 566r12 – SP1 of 394r1
   4. 566r12 – Page 15 line 26

Discusion:

C: Will this be a TG motion?

A: This will be WG motion.

1. **Agenda approved.**

**Straw polls**

1. **566r11 – Page 11 Line 28 (SP1 of 394r1))**

Do you support joint interleaving for RU and aggregated RU size <= 80 MHz?

[20/0394r1 (Thoughts on RU Aggregation and Interleaving, Bin Tian, Qualcomm), SP#1, Y/N/A: 38/9/11]  
  
**Discussion:**C: Joint interleaving doesn’t mean BCC term.  
C: We never used interleaving for constellation map symbols.  
C: Why do you want to include BCC here?

C: I thought this was only for LDPC. If this is also for BCC I will revoke my support.

C: Let’s update the text.

**New text:**

Do you support joint interleaving for BCC and joint tone mapper for LDPC for RU and aggregated RU size <= 80 MHz?  
  
**SP passed to replace previous text with new text, with unanimous consent.**

**Discussion:**

C: I would like this SP to be deferred.

C: It is not needed to have a joint tone mapper.

C: For RU 242 and RU 484 we already have a tone mapper in .11ax.

C: I don’t think the above is a good argument to change the SP.

C: What is going on?

C: We have got a request to defer the strawpoll.  
C: What does defer mean?

C: I want to re-run the straw poll with the new text.

**New voting on the new SP text.**

**Result:** Y/N/A/No-answer: 64/6/62/23

1. **566r11 – Section 13.13, line 25-33**

**Discussion:**C: Please go to section 3.1 line 1-3.  
  
Do you agree to add the following to SFD?

Do you support that 11be defines a procedure for an AP to share time resource obtained in a TXOP for peer to peer (STA-TO-STA) frame exchanges?

[19/1604r1 (EHT Direct Link Transmission, Dibakar Das, Intel), SP, Y/N/A/No answer: 33/11/18/30  
  
**Discussion:**C: I believe we need more discussion whether it should be release 1 or 2.  
C: Nothing here mentions if it is R1 or R2. I believe that maybe we can add a note that says whether it is for R1 or R2 can be TBD.  
C: I believe to really have this for R1 we need to have a solution, so I am not sure I agree. But sure we can always do as you suggest.

C: Do you believe we should also vote if Multi-AP should also be in R2?  
C: Yes.

--- More discussion regarding how to think about R1 and R2, nothing particular is decided ---

**New text:**  
Do you support that 11be defines a procedure for an AP to share time resource obtained in a TXOP for peer to peer (STA-TO-STA) frame exchanges?

- Whether it is in R1 or R2 is TBD

**No objection to change the text in the straw poll. New text amended with unanimous consent.**

1. **566r12 – Page 15 line 26**

Do you agree that a STA only needs to process up to one 80 MHz segment of the pre EHT preamble (up-to and including EHT-SIG) to get all the assignment information for itself?

No 80 MHz segment change is needed while processing L-SIG, U-SIG, and EHT-SIG.

[20/0380r0 (U-SIG structure and Preamble Processing, Sameer Vermani, Qualcomm), SP, Y/N/A: 31/8/14]  
  
**Discussion:**C: Can we remove the word “only”.  
C: We want the “only” to remain there. I don’t agree with deleting “only”.

Any objection to pass the straw poll with keeping the text? Nobody speaks up. **Straw poll text passed with unanimous consent.**

**Technical submissions**

[**099r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-0099-00-00be-coordinated-beamforming-for-802-11be.pptx) **Multi-AP Coordinated BF in IEEE 802.11be (Roya Doostnejad) [1 SP]**

**Summary:** The authors propose to add Mult-AP coordinated beamforming to the SFD.

**Straw poll:**

Do you support adding “Multi-AP Coordinated BF” to 802.11be SFD as one of the multi-AP coordination schemes?

Note: This feature is for rel. 2

**No discussion.**

**Result:** Y/N/A/No-answer: 88/1/41/26

1. [**123r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-0123-00-00be-channel-sounding-for-multi-ap-cbf.pptx) **Channel Sounding for Multi-AP CBF (Feng Jiang) [3 SPs]**

**Summary:** The authors discuss sequential channel sounding based on HE sounding.

**No discussion.**

**Straw poll1:**

* Do you support that multiple APs can sequentially use an 11ax-like sounding sequence to collect CSI from the in-BSS STAs and OBSS STAs?
  + Each AP’s sounding sequence is similar to the 11ax sounding protocol with multiple STAs (NDPA + NDP + BFRP TF + CSI report).

**No discussion.**

**Result:** Y/N/A/No-answer: 81/4/43/30

**Straw poll2:**

* In sequential channel sounding sequence for multi-AP, do you support that the NDPA frame and BFRP TF frame will include ID info for OBSS STA?
  + The details of the NDPA, BFRP TF and the ID info are TBD.

**Discussion:**C: Does NDPA include the same information?  
C: I think it could be different.

**Result: Y/N/A/No-answer: 75/9/45/26**

**Straw poll 3:**

* In sequential channel sounding sequence for multi-AP, do you support that STA will process the NDPA frame and respond to the BFRP Trigger frame received from OBSS AP and report channel state information (CSI) to OBSS AP?
  + The details of CSI report are TBD.

**Discussion:**

C: Is the STA required to process any trigger frame from OBSS?

C: No we need some setup for this.

C: I believe the SP3 is out of the place. We need some more protocol.

**New text:**

* In sequential channel sounding sequence for multi-AP, do you support that STA will process the NDPA frame and respond to the BFRP Trigger frame received from OBSS AP and report channel state information (CSI) to OBSS AP?
  + The details of CSI report are TBD.
  + Note: The OBSS AP belongs to the Multi-AP set.

Straw poll deferred.

1. [**502r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-0502-00-00be-multi-ap-sounding-discussion-follow-up.pptx) **Multi-ap-sounding-discussion-follow-up (Qichen Jia, ZTE)**

**Summary:** Additional simulation results on code based multi-Ap sounding.

**Discussion:**

C: Can you show some gain with your proposal comaperd to 1x LTF

C: In the previous presentation we showed some gains.

1. [**466r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-0466-00-00be-harq-feedback.pptx) **HARQ feedback (Li-Hsiang Sun)**

**Summary:** Discussion about the required feedback for enabling HARQ.

**No discussion.**

**Adjourned at 13:00.**