IEEE P802.11
Wireless LANs

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| Minutes 802.11 bn PHY ad hoc – March to May Conference calls  |
| Date: 2024-04-22 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Dongguk Lim | LG Electronics |  |  | Dongguk.lim@lge.com |

Abstract

This document contains the PHY ad hoc meeting minutes for TGbn teleconferences held between March and May 2024:

* March 28, 2024
* April 8, 2024
* April 11, 2024
* April 22, 2024
* May 6, 2024

# Thursday March 28th, 2024 10:00 – 12:00 ET

**Introduction**

1. The Chair (Tianyu, Apple) calls the meeting to order at 10:00am ET.
2. The Chair follows the agenda in 11-24/0633r0.
3. The Chair goes through the IPR policy and asks if anyone is aware of any potentially essential patents. **Nobody speaks up.**
4. The Chair goes through the Copyright policy.
5. The Chair reminds everyone to report their attendance by using IMAT system and by sending an e-mail to the Co-chair, Dongguk Lim (LGE), Sigurd Schelstraete (MaxLinear) or the Chair himself if unable to record attendance via IMAT system.
6. Discussions on the agenda.
	* 24/0433 Analysis on UEQM and UEQ MCS Ross Jian Yu
	* 24/0438 UEQM Benefit Analysis Rainer Strobel
	* 24/0439 UEQM evaluation and simulation results Rainer Strobel
	* 24/0474 UHR unequal modulation pattern and new MCS Rui Cao
	* 24/0498 Unequal Modulation in MIMO TxBF and New MCS for 11bn Alice Chen

**Attendance**

The following people registered their attendance through IMAT:

|  |  |  |  |
| --- | --- | --- | --- |
| TGbn (PHY) | 3/28 | Asai, Yusuke | Nippon Telegraph and Telephone Corporation (NTT) |
| TGbn (PHY) | 3/28 | Batra, Anuj | Apple Inc. |
| TGbn (PHY) | 3/28 | Chen, You-Wei | MediaTek Inc. |
| TGbn (PHY) | 3/28 | Choi, Jinsoo | LG ELECTRONICS |
| TGbn (PHY) | 3/28 | Choo, Seungho | Senscomm Semiconductor Co., LTD |
| TGbn (PHY) | 3/28 | CHUN, JINYOUNG | LG ELECTRONICS |
| TGbn (PHY) | 3/28 | Coffey, John | Realtek Semiconductor Corp. |
| TGbn (PHY) | 3/28 | Di Taranto, Rocco | Ericsson AB |
| TGbn (PHY) | 3/28 | Fang, Juan | Intel Corporation |
| TGbn (PHY) | 3/28 | Gao, Ning | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbn (PHY) | 3/28 | Hu, Shengquan | MediaTek Inc. |
| TGbn (PHY) | 3/28 | Jee, Anand | SAMSUNG ELECTRONICS |
| TGbn (PHY) | 3/28 | Jeon, Eunsung | SAMSUNG ELECTRONICS |
| TGbn (PHY) | 3/28 | Jung, Insik | LG ELECTRONICS |
| TGbn (PHY) | 3/28 | Kabbinale, Aniruddh | Samsung Electronics |
| TGbn (PHY) | 3/28 | Kamel, Mahmoud | Interdigital Inc. |
| TGbn (PHY) | 3/28 | Lanante, Leonardo | Ofinno |
| TGbn (PHY) | 3/28 | Li, Haozheng | TP-Link Corporation Limited |
| TGbn (PHY) | 3/28 | Li, Jialing | Qualcomm Technologies Inc. |
| TGbn (PHY) | 3/28 | Li, Yapu | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbn (PHY) | 3/28 | Lim, Dong Guk | LG ELECTRONICS |
| TGbn (PHY) | 3/28 | LIU, QINGLAI | Panasonic |
| TGbn (PHY) | 3/28 | Minotani, Jun | Panasonic Holdings Corporation |
| TGbn (PHY) | 3/28 | Motozuka, Hiroyuki | Panasonic Holdings Corporation |
| TGbn (PHY) | 3/28 | Ng, Boon Loong | Samsung Research America |
| TGbn (PHY) | 3/28 | Norouzi, Sara | Huawei Technologies Canada; Huawei Technologies Co., Ltd |
| TGbn (PHY) | 3/28 | Ratnam, Vishnu | Samsung Research America |
| TGbn (PHY) | 3/28 | Shilo, Shimi | Huawei Technologies Co., Ltd |
| TGbn (PHY) | 3/28 | Singh, Aditi | Charter Communications |
| TGbn (PHY) | 3/28 | Strobel, Rainer | Maxlinear |
| TGbn (PHY) | 3/28 | SUH, JUNG HOON | Huawei Technologies Canada; Huawei Technologies Co., Ltd |
| TGbn (PHY) | 3/28 | Sun, Bo | Sanechips Technology Co., Ltd. |
| TGbn (PHY) | 3/28 | Wang, Ying | InterDigital, Inc. |
| TGbn (PHY) | 3/28 | Wei, Dong | NXP Semiconductors |
| TGbn (PHY) | 3/28 | Wilhelmsson, Leif | Ericsson AB |
| TGbn (PHY) | 3/28 | Wu, Kanke | Apple Inc. |
| TGbn (PHY) | 3/28 | Wu, Tianyu | Apple Inc. |
| TGbn (PHY) | 3/28 | Yamada, Ryota | SHARP CORPORATION |
| TGbn (PHY) | 3/28 | YANG, RUI | InterDigital, Inc. |
| TGbn (PHY) | 3/28 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |
| TGbn (PHY) | 3/28 | Zhang, Jiayi | Ofinno |
| TGbn (PHY) | 3/28 | Zhang, Yan | Apple Inc. |
| TGbn (PHY) | 3/28 | Zhong, Ke | Ruijie Networks Co.,Ltd. |
| TGbn (PHY) | 3/28 | Zhou, Lei | H3C Technologies Co., Limited |

**Technical contributions**

1. **24/0433 Analysis on UEQM and UEQ MCS Ross Jian Yu (Huawei)**

Discussions:

C: How do you define the condition number in a simulation?

A: The largest or the smallest difference

C: It is difficult to compare the performance only using one channel condition, you need to consider more channel conditions.

C: Do you have a plan to compare the performance when 2 SS is considered

A: Now I don’t have a plan

C: UEQ MCS needs a different PSDU and it means that you need to have a new interface that all PSUDs are coming from the same TX queue. It is very challenging

A: Yes, it could be.

C: Do you allocate equal power to other cases except the unequal power cases?

A: The difference MCS case does not need it because the MCS is determined by using SNR

C: If a different MCS is applied to each RU, it requires more complexity.

A: I agree

C: The analysis in the spatial domain for UEQM and Unequal MCS may be different from the frequency domain because of interference on the frequency domain

Q: Slide 19, do you also compare the UEQM using the joint encoding?

A: No

Q: From the STA perspective, it requires more complexity(i.e. LDPC complexity). If the STA doesn’t implement it, what’s the reason for the AP to implement it?

A: we can get the 15 ~20% bps tput gains.

1. **24/0438 UEQM Benefit Analysis Rainer Strobel (MaxLinear)**

Discussions:

C: How do you define the SNR margin?

A: It is the value for the certain target bit error rate and it is the dB value.

C: In op2, what are you going to feedback?

A: The SNR feedback per spatial stream.

C: What do you mean by the decoder effects?

A: Special steams with different qualities can average out those differences by the decoder.

C: In current LA, it only includes the preferred MCS, not the SNR difference. Aspect of LA, it requires the new parameters.

A: The sounding feedback information can be used.

C: Regarding SNR margin, is it a single average value for every spatial stream?

A: Yes

1. **24/0439 UEQM evaluation and simulation results Rainer Strobel (MaxLinear)**

Discussions:

C: Have you looked into the performance of 2x2 without BF? I am not sure how much we are going to optimize for 2x2.

A: SVD provides the gain.

C: How much RvR difference can we observe when a difference is three? The Difference two can provide enough gain.

A: We don’t consider the limitation for the selection of MCS.

C: slide 17, do you expect those RVR gains to meet at the high SNR scenario?

**Adjourn**

The meeting is Adjourned at 12:00am ET.

# Monday April 8th, 2024 19:00 – 21:00 ET

**Introduction**

1. The Chair (Tianyu, Apple) calls the meeting to order at 19:00pm ET.
2. The Chair follows the agenda in 11-24/0633r2.
3. The Chair goes through the IPR policy and asks if anyone is aware of any potentially essential patents. **Nobody speaks up.**
4. The Chair goes through the Copyright policy.
5. The Chair reminds everyone to report their attendance by using IMAT system and by sending an e-mail to the Co-chair, Dongguk Lim (LGE), Sigurd Schelstraete (MaxLinear) or the Chair himself if unable to record attendance via IMAT system.
6. Discussions on the agenda.
	* [24/0474](https://mentor.ieee.org/802.11/dcn/24/11-24-0474-00-00bn-uhr-unequal-modulation-pattern-and-new-mcs.pptx) UHR unequal modulation pattern and new MCS Rui Cao
	* [24/0498](https://mentor.ieee.org/802.11/dcn/24/11-24-0498-00-00bn-unequal-modulation-in-mimo-txbf-and-new-mcs-for-11bn.pptx) Unequal Modulation in MIMO TxBF and New MCS for 11bn Alice Chen
	* [24/0507](https://mentor.ieee.org/802.11/dcn/24/11-24-0507-00-00bn-ueqm-further-details.pptx) UEQM – Further details Ron Porat
	* [24/0469](https://mentor.ieee.org/802.11/dcn/24/11-24-0469-00-00bn-new-mcss-for-11bn.pptx) New MCSs for 11bn Shengquan Hu
	* [24/0437](https://mentor.ieee.org/802.11/dcn/24/11-24-0437-00-00bn-interference-mitigation-for-improved-reliability-more-insights.pptx) Interference Mitig. for Impr. Reliability – More Insights Shimi Shilo
	* 24/0440 DPWiFi for IEEE802.11bn WMAN Carlos Rios
	* 24/0460 Low Power and Long Range Preamble Follow Up Brian Hart

**Attendance**

The following people registered their attendance through IMAT:

|  |  |  |  |
| --- | --- | --- | --- |
| TGbn (PHY) | 4/8 | Choo, Seungho | Senscomm Semiconductor Co., LTD |
| TGbn (PHY) | 4/8 | CHUN, JINYOUNG | LG ELECTRONICS |
| TGbn (PHY) | 4/8 | Fang, Juan | Intel Corporation |
| TGbn (PHY) | 4/8 | feng, Shuling | MediaTek Inc. |
| TGbn (PHY) | 4/8 | Gao, Ning | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbn (PHY) | 4/8 | Hart, Brian | Cisco Systems, Inc. |
| TGbn (PHY) | 4/8 | Hu, Shengquan | MediaTek Inc. |
| TGbn (PHY) | 4/8 | Jee, Anand | SAMSUNG ELECTRONICS |
| TGbn (PHY) | 4/8 | Kamel, Mahmoud | Interdigital Inc. |
| TGbn (PHY) | 4/8 | Kim, Youhan | Qualcomm Technologies, Inc. |
| TGbn (PHY) | 4/8 | Lanante, Leonardo | Ofinno |
| TGbn (PHY) | 4/8 | Lee, Wookbong | Apple Inc. |
| TGbn (PHY) | 4/8 | Li, Jialing | Qualcomm Technologies Inc. |
| TGbn (PHY) | 4/8 | Li, Yapu | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbn (PHY) | 4/8 | Lim, Dong Guk | LG ELECTRONICS |
| TGbn (PHY) | 4/8 | Lim, Yeon Geun | Newracom Inc. |
| TGbn (PHY) | 4/8 | MAO, ZHI | Huawei Technologies Co., Ltd |
| TGbn (PHY) | 4/8 | Minotani, Jun | Panasonic Holdings Corporation |
| TGbn (PHY) | 4/8 | Norouzi, Sara | Huawei Technologies Canada; Huawei Technologies Co., Ltd |
| TGbn (PHY) | 4/8 | Ratnam, Vishnu | Samsung Research America |
| TGbn (PHY) | 4/8 | Rios, Carlos | Terabit Wireless Internet LLC |
| TGbn (PHY) | 4/8 | Sadiq, Bilal | Samsung Research America |
| TGbn (PHY) | 4/8 | Shilo, Shimi | Huawei Technologies Co., Ltd |
| TGbn (PHY) | 4/8 | Song, Hao | Intel Corporation |
| TGbn (PHY) | 4/8 | SUH, JUNG HOON | Huawei Technologies Canada; Huawei Technologies Co., Ltd |
| TGbn (PHY) | 4/8 | Sun, Bo | Sanechips Technology Co., Ltd. |
| TGbn (PHY) | 4/8 | Tian, Bin | Qualcomm Incorporated; Qualcomm Technologies, Inc |
| TGbn (PHY) | 4/8 | Tsodik, Genadiy | Huawei Technologies Co., Ltd |
| TGbn (PHY) | 4/8 | Wang, Ying | InterDigital, Inc. |
| TGbn (PHY) | 4/8 | Wei, Dong | NXP Semiconductors |
| TGbn (PHY) | 4/8 | Wu, Kanke | Apple Inc. |
| TGbn (PHY) | 4/8 | Wu, Tianyu | Apple Inc. |
| TGbn (PHY) | 4/8 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |
| TGbn (PHY) | 4/8 | Zhang, Jiayi | Ofinno |
| TGbn (PHY) | 4/8 | Zhang, Yan | Apple Inc. |
| TGbn (PHY) | 4/8 | Zhong, Ke | Ruijie Networks Co.,Ltd. |
| TGbn (PHY) | 4/8 | Zhou, Lei | H3C Technologies Co., Limited |

**Technical contributions**

1. **24/0474 UHR unequal modulation pattern and new MCS Rui Cao (NXP)**

Discussions:

C: Regarding the new MCSs, its gain is very limited. Adding the new MCSs is not friendly for practical systems because it requires additional link adaptation and increases the complexity.

A: In one SS, we don’t expect it as a UEQM in multi-stream. and, advanced fast link adaptation mechanisms may help that.

C: Slide 6, what coding rate is assumed?

A: At the SNR point, we chose the corresponding optimal coding rate for all spatial streams.

C: Slide 4, it is not clear what are two differences. Is it up to 2 differences or exactly two differences?

A: It is up to 2 differences.

C: It is useful to evaluate for every value of M how much it contributes and how useful it is

A: I agree but I think that it is very difficult to make a final selection because there’s a finer resolution of the choice at SNR point and each coding rate.

C: Do you consider the multiple Nosie realization averaging or is it per specific realization?

A: We averaged noise.

C: Slide 7, what is the reason you select green even though black is the same?

A: I chose the most common one among the two channels.

C: What is the mean of percentage?

A: First, the choice of each rate is based on the 4%, at least 4% higher group will get. The last column shows the percentage of the occurrence for all these scenarios.

C: What do you think about the use of the different channel decomposition methods such as GMD on the receiver side?

A: I assume in the next-generation receiver implementation they may choose the beamforming implementation based on the TX’s capability.

1. **24/0498 Unequal Modulation in MIMO TxBF and New MCS for 11bn Alice Chen (Qualcomm)**

Discussions:

C: Slide 13, if you consider the practical channel estimation and practical CSI feedback, can you get the gain?

A: That could be like one dB gain somewhere there.

C: If we agree that UFEQM is defined for 2 to 4 SS and obviously makes no sense for one SS, it seems like we don’t consider it applied to 5 to 8 SS.

A: As the first generation, we think that it’s better to focus on the most useful cases.

C: The results show three thousand or four thousand gain per symbol, if you compare the percentage of the improvement it almost doesn’t exist.

A: The percentage wise, it may be that the improvement may be small in certain SNR

C: For the lower MCS side, we don’t have many choices for the same QAM, right? Is that the reason, why you see some degradation in the lower SNR region?

A: Yes,

C: How many new MCSs do you consider?

A: 4 new MCSs are introduced.

C: In one special stream case, the gain was minimal in the previous presentation and this presentation as well.

A: No

1. **24/0507 UEQM – Further details Ron Porat (Broadcom)**

Discussions:

C: Slide 10, do you have checked why this kind of dropping and sorting out in terms of gain

A: Sometimes MCSs have big gaps such as 4dB which is why we would like to add a couple of MCSs to close the gap

**Adjourn**

The meeting is Adjourned at 21:00pm ET.

# Thursday April 11th, 2024 10:00 – 12:00 ET

**Introduction**

1. The Chair (Tianyu, Apple) calls the meeting to order at 10:00am ET.
2. The Chair follows the agenda in 11-24/0633r6.
3. The Chair goes through the IPR policy and asks if anyone is aware of any potentially essential patents. **Nobody speaks up.**
4. The Chair goes through the Copyright policy.
5. The Chair reminds everyone to report their attendance by using IMAT system and by sending an e-mail to the Co-chair, Dongguk Lim (LGE), Sigurd Schelstraete (MaxLinear) or the Chair himself if unable to record attendance via IMAT system.
6. Discussions on the agenda.
	* [24/0460](https://mentor.ieee.org/802.11/dcn/24/11-24-0460-00-00bn-long-range-low-power-preamble-follow-up.pptx) Low Power and Long Range Preamble Follow Up Brian Hart
	* [24/0469](https://mentor.ieee.org/802.11/dcn/24/11-24-0469-00-00bn-new-mcss-for-11bn.pptx) New MCSs for 11bn Shengquan Hu
	* [24/0437](https://mentor.ieee.org/802.11/dcn/24/11-24-0437-00-00bn-interference-mitigation-for-improved-reliability-more-insights.pptx) Interference Mitig. for Impr. Reliability–More Insights Shimi Shilo
	* [24/0440](https://mentor.ieee.org/802.11/dcn/24/11-24-0440-01-00bn-dpwifi-for-802-11bn-wman.pptx) DPWiFi for IEEE802.11bn WMAN Carlos Rios
	* [24/0435](https://mentor.ieee.org/802.11/dcn/24/11-24-0435-00-00bn-ideas-related-to-achieving-ultra-high-reliability.pptx) Ideas related to achieving (Ultra) High Reliability Leif Wilhelmsson

**Attendance**

The following people registered their attendance through IMAT:

|  |  |  |  |
| --- | --- | --- | --- |
| TGbn (PHY) | 4/11 | Anwyl, Gary | Mediatek Inc |
| TGbn (PHY) | 4/11 | Cao, Rui | NXP Semiconductors |
| TGbn (PHY) | 4/11 | Chen, You-Wei | MediaTek Inc. |
| TGbn (PHY) | 4/11 | Choo, Seungho | Senscomm Semiconductor Co., LTD |
| TGbn (PHY) | 4/11 | CHUN, JINYOUNG | LG ELECTRONICS |
| TGbn (PHY) | 4/11 | Coffey, John | Realtek Semiconductor Corp. |
| TGbn (PHY) | 4/11 | Di Taranto, Rocco | Ericsson AB |
| TGbn (PHY) | 4/11 | feng, Shuling | MediaTek Inc. |
| TGbn (PHY) | 4/11 | Gao, Ning | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbn (PHY) | 4/11 | Hart, Brian | Cisco Systems, Inc. |
| TGbn (PHY) | 4/11 | Hosseinianfar, Hamid | Ofinno |
| TGbn (PHY) | 4/11 | Jee, Anand | SAMSUNG ELECTRONICS |
| TGbn (PHY) | 4/11 | Jeon, Eunsung | SAMSUNG ELECTRONICS |
| TGbn (PHY) | 4/11 | Kamel, Mahmoud | Interdigital Inc. |
| TGbn (PHY) | 4/11 | Lanante, Leonardo | Ofinno |
| TGbn (PHY) | 4/11 | Lee, Wookbong | Apple Inc. |
| TGbn (PHY) | 4/11 | Li, Haozheng | TP-Link Corporation Limited |
| TGbn (PHY) | 4/11 | Li, Jialing | Qualcomm Technologies Inc. |
| TGbn (PHY) | 4/11 | Li, Yapu | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbn (PHY) | 4/11 | Lim, Dong Guk | LG ELECTRONICS |
| TGbn (PHY) | 4/11 | Lim, Yeon Geun | Newracom Inc. |
| TGbn (PHY) | 4/11 | Motozuka, Hiroyuki | Panasonic Holdings Corporation |
| TGbn (PHY) | 4/11 | Norouzi, Sara | Huawei Technologies Canada; Huawei Technologies Co., Ltd |
| TGbn (PHY) | 4/11 | Schelstraete, Sigurd | MaxLinear |
| TGbn (PHY) | 4/11 | Singh, Aditi | Charter Communications |
| TGbn (PHY) | 4/11 | Strobel, Rainer | Maxlinear |
| TGbn (PHY) | 4/11 | SUH, JUNG HOON | Huawei Technologies Canada; Huawei Technologies Co., Ltd |
| TGbn (PHY) | 4/11 | Wang, Ying | InterDigital, Inc. |
| TGbn (PHY) | 4/11 | Wei, Dong | NXP Semiconductors |
| TGbn (PHY) | 4/11 | Wilhelmsson, Leif | Ericsson AB |
| TGbn (PHY) | 4/11 | Wu, Kanke | Apple Inc. |
| TGbn (PHY) | 4/11 | Wu, Tianyu | Apple Inc. |
| TGbn (PHY) | 4/11 | Yamada, Ryota | SHARP CORPORATION |
| TGbn (PHY) | 4/11 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |
| TGbn (PHY) | 4/11 | Yu, Jian | Huawei Technologies Co., Ltd |
| TGbn (PHY) | 4/11 | Zhang, Yan | Apple Inc. |
| TGbn (PHY) | 4/11 | Zhong, Ke | Ruijie Networks Co.,Ltd. |
| TGbn (PHY) | 4/11 | Zhou, Lei | H3C Technologies Co., Limited |

**Technical contributions**

1. **24/0460 Low Power and Long Range Preamble Follow Up Brian Hart (Cisco Systems)**

Discussions:

C: For the long-range extension, the bottleneck could be the preamble portion. How to enable the packet detection?

A: I am not claiming the perfect idea in terms of packet detection. I agree it is an open issue.

C: how do you wake up some low power STA after sending the PPDU to regular power STA?

A: You mentioned the trigger information embedded in another PPDU ready to go for the next PPDU. This seems a little bit like cascading.

C: What’s the purpose of this extended UHR-STF

A: You can use it for the CFO

C: Does the preamble extension provide the full delay that 128us would provide for this part?

A: 128 us is one of the best values for that, and it is probably not enough to justify the effect. we are thinking about the various transition delays.

1. **24/0469 New MCSs for 11bn Shengquan Hu (Mediatek)**

Discussions:

C: The throughput is very limited in terms of SNR gain and it requires a very sensitive link adaptation algorithm. We need more discussion and consideration on adding a new MCS. So can you defer the running of the SP?

A: I can defer, but we showed the throughput gain by adding this new MCS. The new MCS can improve the 20~30% throughput gain.

C: In your simulation, you choose the ten number of symbols as a specific payload size and choose the nominal coding rate, right?

A: Yes,

C: For the new four candidate MCSs, we cannot find the interpreter number of NDPS or CBPS.

A: I don’t think there’s a kind of concern but I will take your comment to double check.

C: Slide 9, for single stream, do you only use the MMSE?

A: For a single stream, linear detection is used.

C: Even though you showed 20% or over in the narrow range, the entire SNR range is not a huge gain.

C: What is the throughput gain with the percentage you showed?

A: The percentage of gain is between the existing MCS and another with a new MCS.

1. **24/0437 Interference Mitig. for Impr. Reliability – More Insights Shimi Shilo (Huawei)**

Discussions:

C: The interference comes at a random time during the PPDU reception.

A: Yes, interference is typically not controlled.

C: How we can predict it at the receiver or transmitter? How do you choose this new PPDU rather than the regular PPDU?

A: I wouldn’t call it a PPDU. It should be depending on the scenario and implementation.

C: Slide 4, we need to accommodate a new Nsd,im in value?

A: Yes,

C: For the IM pilot, do you base on some accurate frequency feedback from the receiver to decide it

A: There are several different options. one option is not to do it every time by to do it when both the transmitter and receiver decide

C: Do you intend to apply for all cases or limited to certain BW or RU sites?

A: I don’t want to limit anything at this stage.

C: by considering the interference, we can use MRU.

A: It cannot cover both the narrow bandwidth and wide bandwidth interference in the entire BW.

**Adjourn**

The meeting is Adjourned at 12:00am ET.

# Monday April 22th, 2024 19:00 – 21:00 ET

**Introduction**

1. The Chair (Tianyu, Apple) calls the meeting to order at 19:00pm ET.
2. The Chair follows the agenda in 11-24/0633r9.
3. The Chair goes through the IPR policy and asks if anyone is aware of any potentially essential patents. **Nobody speaks up.**
4. The Chair goes through the Copyright policy.
5. The Chair reminds everyone to report their attendance by using IMAT system and by sending an e-mail to the Co-chair, Dongguk Lim (LGE), Sigurd Schelstraete (MaxLinear) or the Chair himself if unable to record attendance via IMAT system.
6. Discussions on the agenda.
	* [24/0534](https://mentor.ieee.org/802.11/dcn/24/11-24-0534-00-00bn-lpi-static-preamble-puncturing.pptx) LPI Static Preamble Puncturing Pelin Salem\*
	* [24/0440](https://mentor.ieee.org/802.11/dcn/24/11-24-0440-01-00bn-dpwifi-for-802-11bn-wman.pptx) DPWiFi for IEEE802.11bn WMAN Carlos Rios
	* [24/0461](https://mentor.ieee.org/802.11/dcn/24/11-24-0461-00-00bn-vendor-specific-ppdu-options.pptx) Vendor specific PHY Options Brian Hart
	* [24/0508](https://mentor.ieee.org/802.11/dcn/24/11-24-0508-00-00bn-extended-6-ghz-channelization.pptx) Extended 6 GHz channelization Thomas Derham
	* [24/0524](https://mentor.ieee.org/802.11/dcn/24/11-24-0524-00-00bn-multiple-ap-transmissions-using-dru.pptx) Multiple AP transmissions Using DRU Leonardo Lanante

**Attendance**

The following people registered their attendance through IMAT:

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| --- | --- | --- | --- |
| TGbn (PHY) | 4/22 | Asai, Yusuke | Nippon Telegraph and Telephone Corporation (NTT) |
| TGbn (PHY) | 4/22 | Cho, Hangyu | LG ELECTRONICS |
| TGbn (PHY) | 4/22 | Choi, Jinsoo | LG ELECTRONICS |
| TGbn (PHY) | 4/22 | Choo, Seungho | Senscomm Semiconductor Co., LTD |
| TGbn (PHY) | 4/22 | Chou, Tzu-Hsuan | Qualcomm Incorporated; Qualcomm Technologies, Inc |
| TGbn (PHY) | 4/22 | feng, Shuling | MediaTek Inc. |
| TGbn (PHY) | 4/22 | Hansen, Christopher | Covariant Corporation |
| TGbn (PHY) | 4/22 | Hart, Brian | Cisco Systems, Inc. |
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| TGbn (PHY) | 4/22 | Jee, Anand | SAMSUNG ELECTRONICS |
| TGbn (PHY) | 4/22 | Jeon, Eunsung | SAMSUNG ELECTRONICS |
| TGbn (PHY) | 4/22 | Kamel, Mahmoud | Interdigital Inc. |
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| TGbn (PHY) | 4/22 | Li, Haozheng | TP-Link Corporation Limited |
| TGbn (PHY) | 4/22 | Li, Jialing | Qualcomm Technologies Inc. |
| TGbn (PHY) | 4/22 | Li, Yapu | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbn (PHY) | 4/22 | Lim, Dong Guk | LG ELECTRONICS |
| TGbn (PHY) | 4/22 | Lim, Yeon Geun | Newracom Inc. |
| TGbn (PHY) | 4/22 | Liu, Jianhan | MediaTek Inc. |
| TGbn (PHY) | 4/22 | LIU, QINGLAI | Panasonic |
| TGbn (PHY) | 4/22 | MAO, ZHI | Huawei Technologies Co., Ltd |
| TGbn (PHY) | 4/22 | Minotani, Jun | Panasonic Holdings Corporation |
| TGbn (PHY) | 4/22 | Mohamed Hassan Salem, Nedime Pelin | Cisco Systems, Inc. |
| TGbn (PHY) | 4/22 | Motozuka, Hiroyuki | Panasonic Holdings Corporation |
| TGbn (PHY) | 4/22 | Norouzi, Sara | Huawei Technologies Canada; Huawei Technologies Co., Ltd |
| TGbn (PHY) | 4/22 | Ratnam, Vishnu | Samsung Research America |
| TGbn (PHY) | 4/22 | Rios, Carlos | Terabit Wireless Internet LLC |
| TGbn (PHY) | 4/22 | Schelstraete, Sigurd | MaxLinear |
| TGbn (PHY) | 4/22 | Singh, Aditi | Charter Communications |
| TGbn (PHY) | 4/22 | Song, Hao | Intel Corporation |
| TGbn (PHY) | 4/22 | Tian, Bin | Qualcomm Incorporated; Qualcomm Technologies, Inc |
| TGbn (PHY) | 4/22 | Wang, Ying | InterDigital, Inc. |
| TGbn (PHY) | 4/22 | Wei, Dong | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbn (PHY) | 4/22 | Wu, Kanke | Apple Inc. |
| TGbn (PHY) | 4/22 | Wu, Tianyu | Apple Inc. |
| TGbn (PHY) | 4/22 | Yamada, Ryota | SHARP CORPORATION |
| TGbn (PHY) | 4/22 | Yan, Aiguo | Ubilinx |
| TGbn (PHY) | 4/22 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |
| TGbn (PHY) | 4/22 | Yu, Jian | Huawei Technologies Co., Ltd |

**Technical contributions**

1. **24/0534 LPI Static Preamble Puncturing Pelin Salem (Cisco Systems)**

Discussions:

C: Preamble puncturing cannot be used to avoid interference from the incumbent.

C: Why -42dbm is used for preamble puncturing?

A: Because noise is going to be captured, that’s why we raise it slightly by 20 dBm seems like a reasonable level.

C: Slide 7, you proposed the 42 dBm. May I know where this number comes from?

A: 20dB was selected because this is the 20dB notch required for the IEEE mask.

C: How does AP know that interference is a static interference or incumbent user?

A: It is not dynamic behavior. it is announced.

C: For LPI we don’t need to be concerned with puncturing, why are we doing this?

A: Because we are not allowed to do it, for example, when the incumbent user is located closely there’s an opportunity instead of vacating the entire.

C: Is it a Wi-Fi interference or non Wi-fi interference?

A: They are interference from the incumbent.

1. **24/0461 Vendor specific PHY Options Brian Hart (Cisco Systems)**

Discussions:

C: The device overhearing it would not be able to distinguish between the version-specific use or a later standardized use.

A: I agree with it and the vendor-specific behavior must not affect information for third-party STA

C: I agree that defining some VS is useful. We need to check to prevent confusion about BSS or AID

A: I agree with that in general.

1. **24/0524 Multiple AP transmissions Using DRU Leonardo Lanante (Ofinno)**

Discussions:

C: This is like a coordinated DL FDMA and it is a similar direction. And it requires some new requirements for AP2 because does not transmit the TB PPDU

A: We can design it such that AP can transmit the MU PPDU instead of a TB PPDU although we’ll have some alignment problems.

1. **24/0440 DPWiFi for IEEE802.11bn WMAN Carlos Rios (Terabit Wireless Internet LLC )**

Discussions:

C: It is better to convert the price or dollar amount you showed to a certain relative complexity or something.

C: What is required for the Standardization?

A: The Polarization MIMO is not a standard anywhere. So for this, we can add the capability to use MIMO on it.

**Adjourn**

The meeting is Adjourned at 21:00pm ET.

# Monday May 6th, 2024 19:00 – 21:00 ET

**Introduction**

1. The Chair (Tianyu, Apple) calls the meeting to order at 19:00pm ET.
2. The Chair follows the agenda in 11-24/0633r13.
3. The Chair goes through the IPR policy and asks if anyone is aware of any potentially essential patents. **Nobody speaks up.**
4. The Chair goes through the Copyright policy.
5. The Chair reminds everyone to report their attendance by using IMAT system and by sending an e-mail to the Co-chair, Dongguk Lim (LGE), Sigurd Schelstraete (MaxLinear) or the Chair himself if unable to record attendance via IMAT system.
6. Discussions on the agenda.
	* [24/0488](https://mentor.ieee.org/802.11/dcn/24/11-24-0488-00-00bn-sta-assisted-calibration-for-multi-ap-coordination.pptx) STA-assisted Calibration for Multi-AP Coordination Ke Zhong
	* [24/0508](https://mentor.ieee.org/802.11/dcn/24/11-24-0508-00-00bn-extended-6-ghz-channelization.pptx) Extended 6 GHz channelization Thomas Derham
	* 24/0734 On UEQM and UEQ-MCS Ron Porat
	* [24/0753](https://mentor.ieee.org/802.11/dcn/24/11-24-0753-00-00bn-new-mcs-simulation-results.pptx) New MCS - Simulation Results Ron Porat

**Attendance**

The following people registered their attendance through IMAT:

|  |  |  |  |
| --- | --- | --- | --- |
| TGbn (PHY) | 5/6 | Anwyl, Gary | Mediatek Inc |
| TGbn (PHY) | 5/6 | Asai, Yusuke | Nippon Telegraph and Telephone Corporation (NTT) |
| TGbn (PHY) | 5/6 | Chen, You-Wei | MediaTek Inc. |
| TGbn (PHY) | 5/6 | Cho, Hangyu | LG ELECTRONICS |
| TGbn (PHY) | 5/6 | Choi, Jinsoo | LG ELECTRONICS |
| TGbn (PHY) | 5/6 | Choo, Seungho | Senscomm Semiconductor Co., LTD |
| TGbn (PHY) | 5/6 | Coffey, John | Realtek Semiconductor Corp. |
| TGbn (PHY) | 5/6 | Cui, Yaoshen | TP-Link Corporation Limited |
| TGbn (PHY) | 5/6 | Fang, Juan | Intel Corporation |
| TGbn (PHY) | 5/6 | feng, Shuling | MediaTek Inc. |
| TGbn (PHY) | 5/6 | Gao, Ning | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbn (PHY) | 5/6 | Hart, Brian | Cisco Systems, Inc. |
| TGbn (PHY) | 5/6 | Jia, Boqi | Huawei Technologies Co., Ltd |
| TGbn (PHY) | 5/6 | Kamel, Mahmoud | Interdigital Inc. |
| TGbn (PHY) | 5/6 | Kim, Youhan | Qualcomm Technologies, Inc. |
| TGbn (PHY) | 5/6 | Lanante, Leonardo | Ofinno |
| TGbn (PHY) | 5/6 | Li, Haozheng | TP-Link Corporation Limited |
| TGbn (PHY) | 5/6 | Li, Jialing | Qualcomm Technologies Inc. |
| TGbn (PHY) | 5/6 | Li, Yapu | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbn (PHY) | 5/6 | Lim, Dong Guk | LG ELECTRONICS |
| TGbn (PHY) | 5/6 | Lim, Yeon Geun | Newracom Inc. |
| TGbn (PHY) | 5/6 | Liu, Jianhan | MediaTek Inc. |
| TGbn (PHY) | 5/6 | LIU, QINGLAI | Panasonic |
| TGbn (PHY) | 5/6 | Minotani, Jun | Panasonic Holdings Corporation |
| TGbn (PHY) | 5/6 | Motozuka, Hiroyuki | Panasonic Holdings Corporation |
| TGbn (PHY) | 5/6 | Norouzi, Sara | Huawei Technologies Canada; Huawei Technologies Co., Ltd |
| TGbn (PHY) | 5/6 | Pare, Thomas | MediaTek Inc. |
| TGbn (PHY) | 5/6 | Ratnam, Vishnu | Samsung Research America |
| TGbn (PHY) | 5/6 | Schelstraete, Sigurd | MaxLinear |
| TGbn (PHY) | 5/6 | Shilo, Shimi | Huawei Technologies Co., Ltd |
| TGbn (PHY) | 5/6 | SUH, JUNG HOON | Huawei Technologies Canada; Huawei Technologies Co., Ltd |
| TGbn (PHY) | 5/6 | Sun, Bo | Sanechips Technology Co., Ltd. |
| TGbn (PHY) | 5/6 | Tsodik, Genadiy | Huawei Technologies Co., Ltd |
| TGbn (PHY) | 5/6 | Wang, Ying | InterDigital, Inc. |
| TGbn (PHY) | 5/6 | Ward, Lisa | Rohde & Schwarz |
| TGbn (PHY) | 5/6 | Wei, Dong | Guangdong OPPO Mobile Telecommunications Corp.,Ltd |
| TGbn (PHY) | 5/6 | Wu, Chao-Yi | Samsung Electronics Co., Ltd. |
| TGbn (PHY) | 5/6 | Wu, Kanke | Apple Inc. |
| TGbn (PHY) | 5/6 | Wu, Tianyu | Apple Inc. |
| TGbn (PHY) | 5/6 | Yamada, Ryota | SHARP CORPORATION |
| TGbn (PHY) | 5/6 | Yano, Kazuto | Advanced Telecommunications Research Institute International (ATR) |
| TGbn (PHY) | 5/6 | Zhang, Yan | Apple Inc. |
| TGbn (PHY) | 5/6 | Zhong, Ke | Ruijie Networks Co.,Ltd. |
| TGbn (PHY) | 5/6 | Zhou, Lei | H3C Technologies Co., Limited |

**Technical contributions**

1. **24/0488 STA-assisted Calibration for Multi-AP Coordination Ke Zhong (Ruijie Networks Co., Ltd.)**

Discussions:

C: Why wouldn’t APs calibrate directly with each other?

A: Each AP cannot share the each other because backhaul is not ideal.

C: I have concerns about overheads and air time

A: The feedback from multiple APs can be overhead. We need further study for that.

C: In the status such as each AP cannot hear the other and backhaul is poor, why AP does not synchronize with STA?

A: The multi-AP transmission is a joint transmission. So, each AP should be synchronized.

C: In poor status, why joint-transmission can be considered?

A: It can improve the performance.

C: Do you assume that all shared APs can communicate with sharing APs?

A: Yes, it can be shared in non-ideal backhaul.

1. **24/0734 On UEQM and UEQ-MCS Ron Porat(Broadcom)**

Discussions:

C: In 4x4 MIMO, the weakest stream is very terrible. So, we normally do not schedule in normal transmission. It also needs equal power allocation.

A: If the 4th stream is so weak, maybe we go to 3 stream. But, we figured that’s equivalent to having 4 streams.

C: In case we may allocate some power to the weakest stream, the lowest stream may apply higher MCS

A: I don’t think so.

C: In slide 3, could you clarify the one steam of the LDPC codeword?

A: Each stream is encoded by using an LDPC encoder

C: If UEQ-MCS is considered, each PSDU individually encodes and all PSDUs do not match with the same duration. But in the case of joint coding, we don’t need to consider padding and don’t need to align for different PSDUs.

A: Yes.

C: Do you consider that applying multiple codewords requires a more intelligent decoder?

A: We assume not

C: We need to think more about taking care of the last symbol in the LDPC

1. **24/0753 New MCS - Simulation Results Ron Porat(Broadcom)**

Discussions:

C: Why do you suggest the new MCS be applied to all transmission modes?

A: The new MCS helps all other cases regardless of UEQM

C: Adding new MCS brings a very limited gain. And, I have concerns about imperfect link adaptation

A: Regarding link adaptation, companies will figure out how to do it. It’s outside the spec.

C: Why your simulation results are different from QC’s results?

A: We consider the same simulation parameters. We showed similar gains for different new MCSs.

**Adjourn**

The meeting is Adjourned at 20:27pm ET.