IEEE P802.11
Wireless LANs

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| 802.11 bn PHY ad-hoc minutes November 2024-January 2025 |
| Date: 2024-12-16 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Sigurd Schelstraete | MaxLinear |  |  | sschelstraete@maxlinear.com |

Abstract

This document contains the meeting minutes for the TGbn PHY ad hoc calls held on:

* Thursday December 5, 2024
* Monday December 9, 2024
* Thursday December 12, 2024
* Monday December 16, 2024

## Thursday December 5th, 2024 10:00 – 12:00 ET

**Introduction**

1. The Chair (Dongguk Lim, LGE) calls the meeting to order at 10:00am ET.
2. The Chair follows the agenda in 11-24/**1988r3**.
3. The Chair reminds everyone to report their attendance by using IMAT system and by sending an e-mail to the Co-chair, Tianyu Wu (Apple), Sigurd Schelstraete (MaxLinear) or the Chair himself if unable to record attendance via IMAT system.
4. The Chair goes through the IPR policy and asks if anyone is aware of any potentially essential patents. **Nobody speaks up.**
5. The Chair goes through the Copyright policy.
6. Agenda
* PDT presentations
* Straw Polls
* Technical Submissions–Preamble Part 2 + DRU Misc.:
	+ [24/1831](https://mentor.ieee.org/802.11/dcn/24/11-24-1831-00-00bn-uhr-u-sig-and-uhr-sig-common-field-general-design.pptx) UHR U-SIG and UHR-SIG common field general design Juan Fang
	+ [24/1834](https://mentor.ieee.org/802.11/dcn/24/11-24-1834-00-00bn-11bn-non-elr-signaling-design-for-new-features.pptx) 11bn Non-ELR Signaling Design for New Features Alice Chen
	+ [24/1840](https://mentor.ieee.org/802.11/dcn/24/11-24-1840-00-00bn-uhr-mu-ppdu-user-info-field-signaling.pptx) UHR MU PPDU user info field signaling Rui Cao
	+ [24/1864](https://mentor.ieee.org/802.11/dcn/24/11-24-1864-00-00bn-map-ppdu-consideration-and-harmonized-u-sig-signaling.pptx) MAP PPDU Consideration and Harmonized U-SIG Signaling You-Wei Chen
	+ [24/1753](https://mentor.ieee.org/802.11/dcn/24/11-24-1753-00-00bn-signaling-for-dru-in-trigger-frame-follow-up.pptx) Signaling-for-dru-in-trigger-frame-follow-up Eunsung Park
	+ [24/1778](https://mentor.ieee.org/802.11/dcn/24/11-24-1778-00-00bn-distributed-ru-distortion-beamforming-power-control.pptx) Distributed RU Distortion, Beamforming, Power Control Rainer Strobel

**Attendance**

The following people registered their attendance for the call:

* Yusuke Asai (NTT)
* Jiyang Bai (TCL)
* Yeon Geun Lim (Newracom Inc.)
* You-Wei Chen (MediaTek Inc.)
* Rainer Strobel (Maxlinear)
* Jung Hoon Suh (Huawei Technologies Canada)
* Bo Sun (Sanechips Technology Co., Ltd.)
* Genadiy Tsodik (Huawei Technologies Co., Ltd)
* Ying Wang (InterDigital, Inc.)
* Dong Wei (Guangdong OPPO Mobile Telecommunications Corp.)
* Leif Wilhelmsson (Ericsson AB)
* Kanke Wu (Apple Inc.)
* Tianyu Wu (Apple Inc.)
* Salim Yahya (VESTEL,IMU)
* Ryota Yamada (SHARP CORPORATION)
* Xuwen Zhao (TCL)
* Ke Zhong (Ruijie Networks Co.,Ltd.)
* Lei Zhou (H3C Technologies Co., Limited)
* Sigurd Schelstraete (MaxLinear)
* Walaa Sahyoun (Canon Research Centre France)
* Alphan Sahin (Self)
* Bilal Sadiq (Samsung Research America)
* Jinsoo Choi (LG ELECTRONICS)
* Rocco Di Taranto (Ericsson AB)
* Juan Fang (Intel Corporation)
* Anand Jee (SAMSUNG ELECTRONICS)
* Mahmoud Kamel (Interdigital Inc.)
* Haozheng Li (TP-Link System Inc.)
* Jialing Li (Qualcomm Technologies, Inc)
* Rui Cao (NXP Semiconductors)
* Yapu Li (Guangdong OPPO Mobile Telecommunications Corp.)
* Qinglai Liu (Panasonic Holdings Corporation)
* Ezer Melzer (Toga Networks, a Huawei company)
* Toshizo Nogami (SHARP CORPORATION)
* Sara Norouzi (Huawei Technologies Canada)
* Ju Yan Pan (Huawei Technologies Co., Ltd)
* Eunsung Park (LG ELECTRONICS)
* Dong Guk Lim (LG ELECTRONICS)

**PDT Submissions**

**24/1981r2 PDT ELR (Lin Yang)**

Presenter reviews the proposed text. The proposal is mostly complete, with the following exceptions:

* PE has TBD
* Precorrection req. has TBD and no supporting motion

Discussion

Q: don’t include text that is not agreed – specifically on precompensation

A: Will remove

Q: can you define equation for ELR-STF and ELR-LTF?

A: This PDT describes ELR. If description is common with other formats, it’s not included in this PDT. Can add the equations.

Q: for pilots, can we list the tones explicitly? There are 4 repetitions.

A: we usually use references if things are already defined elsewhere. It’s the same as DL OFDMA with four RUs.

Q: I see comments for the editor. It should be a group’s decision, e.g. by SP.

Q: please use Visio for figures.

Q: don’t see much benefit of including the figures for ELR-MARK.

Q: agree we shouldn’t include not-agreed text, even when indicated in square brackets. There are multiple instances.

PoC will make the requested edits and there will be further offline discussion.

**Straw Polls**

SP1

Do you agree to include the following into the 11bn SFD?

* The UEQM patterns indication for NSS=2, 3 and 4 are as follows:
* NSS=2

|  |  |  |
| --- | --- | --- |
| Index | 1st ss | 2nd SS |
| 0 | M | M-1 |
| 1 | M | M-2 |
| 2-3 | Reserved |

* NSS=3

|  |  |  |  |
| --- | --- | --- | --- |
| Index | 1st ss | 2nd SS | 3rd SS |
| 0 | M | M | M-1 |
| 1 | M | M | M-2 |
| 2 | M | M-1 | M-2 |
| 3 | Reserved |

* NSS=4

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Index | 1st ss | 2nd SS | 3rd SS | 4th SS |
| 0 | M | M | M | M-1 |
| 1 | M | M | M | M-2 |
| 2 | M | M | M-1 | M-2 |
| 3 | M | M-1 | M-1 | M-2 |

* Note: reserved entries will be further categorized as Validate or Disregard, following principles in 11be

*Supporting documents: [24/1772]*

Discussion

Q: we already have motion on patterns. This is about indexing?

A: yes

Result

No objection

SP2

Do you support the following signaling design for MU MIMO ~~u~~User ~~info~~ field in UHR-SIG as shown in the below figure?



* ~~When~~ Also, when Coding field indicates LDPC, then 2XLDPC indication:
	+ Bit22 set to 1: TX encode LDPC using code size as 2x1944
	+ Bit22 set to 0: TX encode LDPC using code size of 648, 1296, or 1944.

*Supporting documents: [24/1695r1]*

Discussion

Q: this is only about bit 22?

A: SP includes all the fields.

Q: should we delete figure?

A: intent is to agree on the full User field.

Q: maybe SP text can be changed

A: SP text change to reference figure (see highlight in SP2)

Q: 2x LDPC bit was motivated by e.g. Broadcast. This does not apply to MU-MIMO. What is the benefit?

A: we discussed the benefits in the supporting contribution

Q: please add “UHR-SIG” in the text

Q: User info field should be “User field”

Q: believe 23 bits have drawbacks and proposal is inefficient. No need for a poll count if there are no other objections.

Result

No objection

SP3

Do you support the following signaling design for non-MU MIMO ~~u~~User ~~info~~ field as shown in the below figure?

* UEQM indication
	+ Bit19 set to 1: UEQM is applied, B20-21 are redefined to indicate UEQM patterns.
	+ Bit19 set to 0: EQM is applied. (B20 and B21 are Bfed and Coding bits)
* Also, w~~W~~hen Coding field indicates LDPC, then 2XLDPC indication:
	+ Bit22 set to 1: TX encode LDPC using code size as 2x1944
	+ Bit22 set to 0: TX encode LDPC using code size of 648, 1296, or 194



 *Supporting documents: [24/1695r1]*

Discussion

Q: not an efficient design. Just expressing opinion, not asking for a count.

Result

No objection

**Technical submission**

**24/1831 UHR U-SIG and UHR-SIG common field general design (Juan Fang)**

Shows how newly agreed features impact the U-SIG and UHR-SIG design.

COBF and CSR U-SIG design is proposed.

Interference mitigation (IM) is also discussed. IM should only be considered for SU.

Common field is reduced by 1 bit.

Discussion

Q: need further discussion on some SPs

Q: why reduce by 1 bit? Also for OFDMA?

A: for SU, common field is combined with first User field. Try to keep it within one OFDM symbol.

Q: Remove text on single user in SP1.

A: maybe run SP2 instead.

Q: OK with SP1 &2, need further discussion on U-SIG

SP4

Do you agree to include the following to the 11bn SFD?

* Keep other fields except the disregard bits in Common field for non-OFDMA transmission in UHR-SIG to be the same as that in common field for non-OFDMA transmission in EHT-SIG as following.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **B0-B3** | **B4-B5** | **B6-B8** | **B9** | **B10-B11** | **B12** | **B13-B15** | **B16-B18** |
| Spatial Reuse | GI+LTF Size | Number of UHR-LTF Symbols | LDPC Extra Symbol Segment | Pre-FEC padding Factor | PE Disambiguity | Disregard | Number of non-OFDMA Users |

Discussion

Q: result of increasing User field to 23 bits. Would have been better to keep sizes aligned with EHT.

Result

No objection

SP5

* Do you agree to Keep the Common field format of UHR-SIG for OFDMA transmission adheres to the Table 36-33 of 11be D7.0

Note: The entries defined for OFDMA + MU-MIMO in RU Allocation table may be updated

Result

No objection

**24/1834 11bn Non-ELR Signaling Design for New Features (Alice Chen)**

No new NDP defined. Reuse EHT NDP instead.

TB-PPDU U-SIG proposal and Preamble changes in MU PPDU are discussed.

Not finalized due to lack of time – Q&A to be continued on the next call.

**Recess**

The meeting is Recessed at 12:01 pm ET.

## Monday December 9th, 2024 19:00 – 21:00 ET

**Introduction**

1. The Chair (Dongguk Lim, LGE) calls the meeting to order at 7:00pm ET.
2. The Chair follows the agenda in 11-24/**1988r6**.
3. The Chair reminds everyone to report their attendance by using IMAT system and by sending an e-mail to the Co-chair, Tianyu Wu (Apple), Sigurd Schelstraete (MaxLinear) or the Chair himself if unable to record attendance via IMAT system.
4. The Chair goes through the IPR policy and asks if anyone is aware of any potentially essential patents. **Nobody speaks up.**
5. The Chair goes through the Copyright policy.
6. Agenda
	* PDT Submissions
		1. [~~24/1992r1~~](https://mentor.ieee.org/802.11/dcn/24/11-24-1992-01-00bn-pdt-phy-longer-ldpc-coding.docx) ~~PDT PHY Longer LDPC Coding Rethna Pulikkoonattu~~
		2. [24/1985r0](https://mentor.ieee.org/802.11/dcn/24/11-24-1985-00-00bn-pdt-phy-unequal-modulation-ueqm-and-new-mcs.docx) PDT PHY UEQM and New MCS Rui Cao
		3. [24/1977r0](https://mentor.ieee.org/802.11/dcn/24/11-24-1977-00-00bn-pdt-phy-u-sig.docx) PDT PHY U-SIG Alice Chen
	* Pending SPs
	* Technical Submissions–Preamble Part 3 + DRU Misc.:
		1. [24/1834](https://mentor.ieee.org/802.11/dcn/24/11-24-1834-03-00bn-11bn-non-elr-signaling-design-for-new-features.pptx) 11bn Non-ELR Signaling Design for New Features Alice Chen
		2. [24/1840](https://mentor.ieee.org/802.11/dcn/24/11-24-1840-00-00bn-uhr-mu-ppdu-user-info-field-signaling.pptx) UHR MU PPDU user info field signaling Rui Cao
		3. [24/1864](https://mentor.ieee.org/802.11/dcn/24/11-24-1864-00-00bn-map-ppdu-consideration-and-harmonized-u-sig-signaling.pptx) MAP PPDU Consideration and Harmonized U-SIG Signaling You-Wei Chen
		4. [~~24/1753~~](https://mentor.ieee.org/802.11/dcn/24/11-24-1753-00-00bn-signaling-for-dru-in-trigger-frame-follow-up.pptx) ~~Signaling-for-dru-in-trigger-frame-follow-up Eunsung Park~~
		5. [24/1778](https://mentor.ieee.org/802.11/dcn/24/11-24-1778-00-00bn-distributed-ru-distortion-beamforming-power-control.pptx) Distributed RU Distortion, Beamforming, Power Control Rainer Strobel
	* Technical Submissions–UEQM + IM:
		1. [24/1745](https://mentor.ieee.org/802.11/dcn/24/11-24-1745-00-00bn-discussion-on-frequency-domain-ueqm.pptx) Discussion on Frequency Domain UEQM Mengshi Hu
		2. [24/1807](https://mentor.ieee.org/802.11/dcn/24/11-24-1807-00-00bn-follow-up-on-ueqm-stream-parser.pptx) Follow Up on UEQM Stream Parser Ying Wang
		3. [24/1832](https://mentor.ieee.org/802.11/dcn/24/11-24-1832-01-00bn-stream-parser-for-unequal-modulation.pptx) Stream Parser for Unequal Modulation Qinghua Li
		4. [24/1747](https://mentor.ieee.org/802.11/dcn/24/11-24-1747-00-00bn-discussion-on-signalling-of-additional-pilots-for-interference-mitigation.pptx) Discussion on Signalling of Additional Pilots for IM Ke Zhong
		5. [24/1785](https://mentor.ieee.org/802.11/dcn/24/11-24-1785-00-00bn-interference-mitigation-pilots-definitions.pptx) Interference Mitigation Pilots – Definitions Shimi Shilo

**Attendance**

The following people registered their attendance for the call:

* + Ying Wang (Interdigital)
	+ Lei Zhou (H3C)
	+ Alireza Ghaderipoor (Mediatek)
	+ Juan Fang (Intel)
	+ Kanke Wu (Apple)
	+ Sixian Luo (Sharp)
	+ Jung Hoon Suh (Huawei)
	+ Yeon Geun Lim (Newracom)
	+ Ju Yan Pan (Huawei)
	+ Boqi Jia (Huawei)
	+ Bilal Sadiq (Samsung)
	+ Genadiy Tsodik (Huawei)
	+ Qinglai Liu (Panasonic)
	+ Anand Jee (Samsung)
	+ Dong Guk Lim (Lg)
	+ Ke Zhong (Ruijie)
	+ Jun Minotani (Panasonic)
	+ Jialing Li (Qualcomm)
	+ Yapu Li (Guangdong)
	+ Shuling Feng (Mediatek)
	+ Xuwen Zhao (Tcl)
	+ Dong Wei (Oppo)
	+ Gary Anwyl (Mediatek)
	+ Sigurd Schelstraete (Maxlinear)
	+ Sara Norouzi (Huawei)
	+ You-Wei Chen (Mediatek)
	+ Yusuke Asai (Ntt)
	+ Wookbong Lee (Apple)
	+ Walaa Sahyoun (Canon)

**PDT Submissions**

**24/1992r1 PDT PHY Longer LDPC Coding (Rethna Pulikkoonattu)**

Deferred

**24/1985r0 PDT PHY UEQM and New MCS (Rui Cao)**

Proposed draft text to incorporate UEQM.

Will be further updated after Dec 19 Motion results.

Discussion

Q: PDT for UHR-SIG has been uploaded. Should be aligned with the UHR-SIG section in this PDT.

Q: is there still UHR-DUP?

A: That’s the baseline assumption. Up to group discussion.

Q: Don’t see further optimization for DUP mode relative to EHT

Q: existing MCS are same as EHT?

A: Yes

Q: For ELR case, will we merge the 4x52RU or will there be a separate table?

A: there is a separate MCS table for ELR in ELR PDT

Q: stream parser for EQM refers to 11ax. UEQM refers to 11n. However ,11n only supports up to 64QAM. Better to rewrite the equation.

Q: is UEQM supported in TB PPDU? TB PPDU is mentioned at end of section 38.3.11.

A: currently not motioned. Mention is for MCS only.

Q: is stream parser already agreed?

Q: we should consider merging the block diagrams for UEQM and EQM when incorporating into the draft.

Q: Do we need to mention the number of encoders since BCC is not used here?

A: Can take a look

Q: “Modulation level” should be changed to “Modulation order”

A: OK

**24/1977r0 PDT PHY U-SIG (Alice Chen)**

Proposes a U-SIG design for UHR.

Discussion

Q: equation used for ELR modulation is identical to the more generic one, but limited to 20 MHz. This can create confusion.

A: we can add clarifying sentence.

Q: equation can be further customized by removing CSD.

A: this is legacy portion, the CSD is per chain

**Pending SPs**

SP1 – Dongguk Lim

Do you agree to change the assigned bits for NSS field and Spatial configuration field by considering the maximum NSS is 8 in 11bn?

• For non-MU-MIMO allocation of the UHR SIG field

• NSS field consists of 3 bits in the user field

• For MU-MIMO allocation of the UHR SIG field

• Spatial configuration field consists of 4 bits in the user field.

Supporting documents: [24/1427r2]

Discussion

Q: applies to both DL and UL?

A: this is for MU PPDU. UHR-SIG is only included for MU PPDU.

Q: is it similar to what we passed last week for the User field design?

A: yes

Result:

No objection

SP2 – Dongguk Lim

Do you agree to include the following text to the 11bn SFD?

• The MCS field in the user field of UHR-SIG field consists of 5 bits.

• The B11 ~ B15 of the UHR-SIG field is assigned for the MCS field

• The configuration of MCS field is TBD.

 Supporting documents: [24/1427r2]

Discussion

Q: didn’t this pass yet?

A: not this SP

Q: it’s consistent with the agreement passed last week?

A: we previously had no agreements on location of the bits

Result:

No objection

SP3 – Ron Porat

Do you agree to add to the 11bn SFD?

• The first 16 entries of the 5 bit MCS table (MCS0 to MCS15) are identical to 11be

Supporting documents: [24/1826r1]

Result:

No objection

SP4 – Ron Porat

Do you agree to add to the 11bn SFD?

• In the 5bit MCS table

• MCS17 signals QPSK rate 2/3

• MCS19 signals 16QAM rate 2/3

• MCS20 signals 16QAM rate 5/6

• MCS23 signals 256QAM rate 2/3

 Supporting documents: [24/1826r1]

Discussion

Q: would be good to defer for further discussion. There may be easier ways.

A: there are many different ways. How long do you want to postpone?

A: hopefully next week.

Q: How does this help?

A: helps implementation

A: provides intuitive understanding of the approximate data rate of the MCS.

Q: applicability may be limited.

Result:

Deferred till next call

**Technical Submissions**

**24/1834r4 11bn Non-ELR Signaling Design for New Features (Alice Chen)**

Presented last week – brief recap given.

Discussion

Q: I don’t see any detailed contribution on the signaling of IM.

Q: will you run SP6 today?

A: only SP1-4

Q: COBF or SR can not be used at the same time?

A: COBF could also change the power. SR is only power control.

Straw Polls

SP5:

Do you agree to include the following to the 11bn SFD?

* Add a 1-bit 2x LDPC subfield in the UHR variant user info field in Trigger Frame, MU-MIMO and non-MU-MIMO user field formats in UHR-SIG
* The 2x LDPC subfield is set to 1 to indicate 2x LDPC (nominal codeword size of 3888) is used, or set to 0 to indicate it’s not used, if the coding scheme is LDPC
* In the MU-MIMO or non-MU-MIMO user field formats, the 2x LDPC subfield is set to 1 and treat as Validate if Coding is BCC (0)
* In the UHR variant user info field in Trigger Frame, the 2x LDPC subfield is set to 1 and reserved if UL FEC Coding Type is BCC (0)
* *Supporting doc: 11-24/1833r3, 11-24/1834r4*

Result:

No objection

SP6:

Do you agree to include the following to the 11bn SFD?

* The UHR TB PPDU, and UHR MU PPDU with DL OFDMA transmission, SU transmission, and DL non-OFDMA MU-MIMO use same combinations of the UL/DL subfield and PPDU Type And Compression Mode subfield values for indication as in EHT

Result:

No objection

SP7:

Do you agree to include the following to the 11bn SFD?

* Reuse the U-SIG field structure in EHT TB PPDUs for the U-SIG in UHR TB PPDUs
	+ PHY Version Identifier is set to 0 or 1 to differentiate EHT & UHR
	+ How to set Disregard and Validate bits is TBD

Result:

No objection

SP8:

Do you agree to include the following to the 11bn SFD?

* Use B13 in the common field of UHR-SIG in non-OFDMA to indicate Interference Mitigation (IM) ON/OFF
	+ Value 0 indicates IM enabled
	+ Value 1 indicates IM disabled (because B13 was originally 'set to 1 and Disregard at RX’)

Discussion

Q: Still open for other PPDU types?

A: up to submissions

Result:

No objection

SP9:

Do you agree to include the following to the 11bn SFD?

* Keep all the fields in U-SIG for UHR MU PPDU to be the same as that in U-SIG for EHT MU PPDU as following, and PHY version is set to 1 for UHR, UHR-SIG MCS and Number of UHR-SIG Symbols subfields replace the EHT-SIG MCS and Number of EHT-SIG Symbols subfields
* Note- The disregard and validate bits may be updated for new features.
* *Supporting doc: 11-24/1834r4, 11-24/1831r3*



Result:

No objection

**24/1840 UHR MU PPDU user info field signaling (Rui Cao)**

Proposes a UHR-SIG User info field design to indicate the new PHY features.

Most SPs are already covered by other submissions. Only one SP requested to be run.

SP10:

**Do you support to include the following in the 11bn SFD**

* **the four new MCSs are defined for both BCC and LDPC for UHR**
* Note: QPSK-2/3, 16QAM-2/3, 16QAM-5/6, 256QAM-2/3

Result:

No objection

**Adjourn**

Meeting is adjourned at 9 pm ET.

## Thursday December 12th, 2024 10:00 – 12:00 ET

**Introduction**

1. The Chair (Dongguk Lim, LGE) calls the meeting to order at 10:00am ET.
2. The Chair follows the agenda in 11-24/**1988r7**.
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	* Technical Submissions
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		+ [24/1753](https://mentor.ieee.org/802.11/dcn/24/11-24-1753-00-00bn-signaling-for-dru-in-trigger-frame-follow-up.pptx) Signaling-for-dru-in-trigger-frame-follow-up Eunsung Park
		+ [24/1778](https://mentor.ieee.org/802.11/dcn/24/11-24-1778-00-00bn-distributed-ru-distortion-beamforming-power-control.pptx) Distributed RU Distortion, Beamforming, Power Control Rainer Strobel
		+ [24/1745](https://mentor.ieee.org/802.11/dcn/24/11-24-1745-00-00bn-discussion-on-frequency-domain-ueqm.pptx) Discussion on Frequency Domain UEQM Mengshi Hu
		+ [24/1807](https://mentor.ieee.org/802.11/dcn/24/11-24-1807-00-00bn-follow-up-on-ueqm-stream-parser.pptx) Follow Up on UEQM Stream Parser Ying Wang
		+ [24/1832](https://mentor.ieee.org/802.11/dcn/24/11-24-1832-01-00bn-stream-parser-for-unequal-modulation.pptx) Stream Parser for Unequal Modulation Qinghua Li
		+ [24/1747](https://mentor.ieee.org/802.11/dcn/24/11-24-1747-00-00bn-discussion-on-signalling-of-additional-pilots-for-interference-mitigation.pptx) Discussion on Signalling of Additional Pilots for IM Ke Zhong
		+ [24/1785](https://mentor.ieee.org/802.11/dcn/24/11-24-1785-00-00bn-interference-mitigation-pilots-definitions.pptx) Interference Mitigation Pilots – Definitions Shimi Shilo

**Attendance**

The following people registered their attendance for the call:

* + Rainer Strobel (Maxlinear)
	+ Shuling Feng (Mediatek Inc.)
	+ Ying  Wang (Interdigital, Inc.)
	+ Alireza Ghaderipoor (Mediatek Inc.)
	+ Xuwen Zhao (Tcl)
	+ Hirohiko Inohiza (Canon)
	+ Lei Zhou ( H3C Technologies Co., Limited)
	+ Anand Jee (Samsung Electronics)
	+ Jiayi Zhang (Ofinno)
	+ Youhan Kim (Qualcomm Technologies, Inc.)
	+ Qinglai Liu (Panasonic Holdings Corporation)
	+ Mahmoud Kamel (Interdigital Inc.)
	+ Juan Fang (Intel Corporation)
	+ Azin Neishaboori (General Motors Company)
	+ Sixian Luo (Sharp Corporation)
	+ Jialing Li (Qualcomm Technologies, Inc)
	+ Kanke Wu (Apple Inc.)
	+ Dong Wei (Oppo)
	+ Ke Zhong (Ruijie Networks Co.,Ltd.)
	+ Bo Sun (Sanechips Technology Co., Ltd.)
	+ Eunsung Park (Lg Electronics)
	+ Walaa Sahyoun ( Canon Research Centre France)
	+ Yapu Li (Oppo)
	+ Rocco Di Taranto (Ericsson Ab)
	+ You-Wei Chen (Mediatek Inc.)
	+ Sara Norouzi (Huawei Technologies)
	+ Genadiy Tsodik (Huawei Technologies Co., Ltd)

**PDT presentations**

**24/2025r0 PDT PHY RU and MRU restrictions for 20 MHz operation (Eunsung Park)**

Discussion

Q: RRU rules are the same as for MU EHT PPDU? Only DRU is new?

A: yes

Q: there are two type of 20 MHz only operating STAs. We don’t differentiate?

A: Both are included

Q: No restriction in 80 MHz subblock when 20 MHz is punctured out? 20 MHz only should not be allowed in such a channel.

A: 20+40 is allowed. DRU for 20 MHz can be used. 20 MHz only can participate.

Q: Disagree. 20 MHz only should not participate. Some issue with DC tone. Need to look at it further.

Q: performance for 20 MHz operation in 80 MHz shows performance degradation for higher MCS

A: can be discussed further. Should have a motion for this issue. We can not add text without agreement on this.

Q: capability indication of 20 MHz in wide BW needs to be looked at further.

Q: in UHR we don’t need two types of 20 MHz only STAs in UHR

**24/2032r0 PDT-PHY-UHR PPDU Format (Dongguk Lim)**

Discussion

Q: we don’t have motion support for MU and TB PPDU. Should we remove the description here?

A: we already have motions about the SIG fields. OK to wait with the motion.

Q: I think nobody expects that UHR will not support MU or TB PPDU. Don’ think there are concerns.

Q: is ELR-SIG pre-UHR modulated? Should be UHR modulated.

Q: Do we have motion related to COBF?

A: needs further discussion. COBF uses exactly same sequence as MU PPDU. Only contents of the fields are changing. Shouldn’t be listed as new PPDU type.

**24/2033r0 PDT-PHY-Legacy preamble (Dongguk Lim)**

Discussion

Q: Why duplicate the whole text? We could just call out the difference for ELR.

Q: PDT will combine all related changes.

Q: what did we do for EHT, …?

Q: Agree we don’t need to duplicate, but need to make sure the equations are correct and we can optimize later.

**Pending SPs**

**SP1 – Lin Yang**

Do you support to include the spec text of 11-24/1981r3 PDT PHY ELR to the TGbn D0.1?

*Supporting documents: [24/1981r3]*

Presentation

Updated based on comments that were received. Figures were changed to Visio. Removed text that wasn’t agreed yet.

Discussion

Q: two things are missing: TPE and CFO requirement. Those would have to be motioned directly into D0.1?

A: can probably be included into PDT if motions pass in time.

A: Text changes can be proposed outside of PDT as well.

Q: equation for data field turned out to be OK. It can be added back.

Result

No objection

**SP2 – Brian Hart**

Do you agree to add the following text to the 11bn SFD:

* Define a mechanism in 11bn to enable PHY-level vendor specific extensions that are safe:
	+ Not ambiguous to an intended recipient
	+ Use of any PHY signaling resources by the mechanism does not introduce interoperability issues if the resources were to be unreserved / redefined in 11bn or a future amendment

*Supporting documents: [24/1122]*

Discussion

Q: Presenter is not on the call. Does he want to run the SP?

A: SP was requested

Result:

Slido raw data: 52 total votes, Y: 17%, N: 35%, A: 48%

Y/N/A: 9/18/25

**SP3 – Sameer Vermani**

Do you agree to include the following to the 11bn SFD?

* There is no UHR sounding sequence for SU TxBF or DL MU-MIMO.  UHR SU TxBF and UHR DL MU-MIMO uses EHT sounding sequence.

*Supporting doc: [11-24/1822r4]*

Discussion

Q: could this be deferred? We need offline discussion. Would like to unify the UHR variants.

A: would like to understand the concerns. Was intended to be non-controversial.

Q: this SP is not related to NDPA variant. This is the baseline for MU-MIMO

Q: there are already two EHT sounding sequences. Should use plural “sequences”.

Q: support SP. Not relate to VHT/EHT NDPA discussion.

A: prefer unified NDPA

Q: support SP3. SP4 is also OK if SP3 passes.

Result:

No objection

**SP4 – Sameer Vermani, Qinghua Li, You Wei Chen**

Do you agree to include the following to the 11bn SFD?

* UHR sounding sequence uses EHT NDP.  I.e., there is no UHR NDP.
	+ UHR COBF sounding sequence is the only UHR sounding sequence

*Supporting doc: [11-24/1822r4, 11-24/1835r3, 11-24/1865r3]*

Result:

No objection

**SP5 – Sameer Vermani, Qinghua Li, You Wei Chen**

Do you agree to include the following to the 11bn SFD?

* NDPA Announcement Variant subfield shall be set to 3 for COBF NDPA in UHR.

*Supporting doc: 11-24/1822r4, 11-24/1835r3, 11-24/1865r3*

Result:

Deferred

**SP6 – Sameer Vermani, Qinghua Li, You Wei Chen - Sounding**

Do you agree to include the following to the 11bn SFD?

* When the initiating AP requests the responding AP to join the CoBF sounding, the red subfields in the first and second User Info fields of the NDPA shall be set as follows.
	+ NDPA Version Identifier is set to 0 for CoBF sounding in UHR
	+ Number of LTF symbols is set to 0 and 1 for 4 and 8 symbols, respectively
	+ Starting Spatial Stream is set to 0 and 1 for the 1 st and 5 th streams, respectively
	+ Number of spatial streams is set to 0 and 1 for the 4 and 8 streams, respectively
	+ LTF+GI is set to 0 and 1 for 2x LTF+0.8us GI and 2x LTF+1.6us GI, respectively



*Supporting doc: 11-24/1822r4, 11-24/1835r3, 11-24/1865r3*

Result:

Deferred

**Technical Submissions**

**24/1864r1 COBF/COSR PPDU Consideration and U-SIG Signaling (You-Wei Chen)**

Proposal for U-SIG signaling to accommodate COBF and C-SR.

Discussion

Q: Why do we need to explicitly indicate COBF vs. COSR? How will this information be used?

A: need it for processing UHR-SIG

Q: Why do we need the second color?

A: was explained in other submissions. Needed to resolve some MAC issues. Two BSS could have the same STAID for their respective STAs.

SP deferred

**24/1753 Signaling-for-dru-in-trigger-frame-follow-up (Eunsung Park)**

Most proposals have been discussed on other submissions. One SP is still relevant.

SP7

**Do you agree to add the following text to the TGbn SFD?**

* 4-bit bitmap indexed by the 80 MHz frequency subblocks in ascending order with the LSB indicating the lowest 80 MHz frequency subblock is defined in the Common Info field (B56-B59) of the Trigger frame to indicate RU types in a TB PPDU as follows
	+ For a 320 MHz TB PPDU, B56-B59 indicate whether DRU or RRU is used in the corresponding 80 MHz frequency subblocks
	+ For a 160 MHz TB PPDU, B56 and B57 indicate whether DRU or RRU is used in the corresponding 80 MHz frequency subblocks and B58 and B59 are reserved
	+ For a 20 / 40 / 80 MHz TB PPDU, B56 indicates whether DRU or RRU is used in the whole bandwidth and B57-B59 are reserved
	+ 0 and 1 indicate DRU and RRU, respectively
	+ Reserved bits are set to all 1s

Discussion

Q: is this not already on SFD?

A: Partially, no details related to the 4-bit bitmap

Q: previous SP includes B56, B59

Q: text on signaling is already in PDT

SP Deferred

**Adjourn**

Meeting is adjourned at 11:58 am ET.

## Monday December 16th, 2024 19:00 – 21:00 ET

**Introduction**

1. The Chair (Dongguk Lim, LGE) calls the meeting to order at 7:00pm ET.
2. The Chair follows the agenda in 11-24/**1988r9**.
3. The Chair reminds everyone to report their attendance by using IMAT system and by sending an e-mail to the Co-chair, Tianyu Wu (Apple), Sigurd Schelstraete (MaxLinear) or the Chair himself if unable to record attendance via IMAT system.
4. The Chair goes through the IPR policy and asks if anyone is aware of any potentially essential patents. **Nobody speaks up.**
5. The Chair goes through the Copyright policy.
6. Agenda
	* PDT Submissions
		1. 24/2046r1 Draft Text on DRU (Jianhan Liu)
		2. 24/1992r3 PDT LDPC
	* Pending SPs
	* Technical Submissions
		1. 24/1807 Follow Up on UEQM Stream Parser Ying Wang
		2. 24/1832 Stream Parser for Unequal Modulation Qinghua Li
		3. 24/1745 Discussion on Frequency Domain UEQM Mengshi Hu
		4. 24/1747 Discussion on Signalling of Additional Pilots for IM Ke Zhong
		5. 24/1785 Interference Mitigation Pilots – Definitions Shimi Shilo

**Attendance**

The following people registered their attendance:

* LIU, QINGLAI Panasonic Holdings Corporation
* Luo, Sixian SHARP CORPORATION
* Dumdei, Alan Cisco
* Cho, Hangyu LG ELECTRONICS
* Norouzi, Sara Huawei Technologies Canada; Huawei Technologie...
* feng, Shuling MediaTek Inc.
* SUH, JUNG HOON Huawei Technologies Canada; Huawei Technologie...
* Batra, Anuj Apple Inc.
* Li, Yanchun Huawei Technologies Co., Ltd
* Jee, Anand SAMSUNG ELECTRONICS
* Montreuil, Leo Broadcom Corporation
* Xin, Yan Huawei Technologies Canada; Huawei Technologie...
* Pan, Ju Yan Huawei Technologies Co., Ltd
* Jia, Boqi Huawei Technologies Co., Ltd
* Kim, Youhan Qualcomm Technologies, Inc.
* Lim, Dong Guk LG ELECTRONICS
* Minotani, Jun Panasonic Holdings Corporation
* Sahyoun, Walaa Canon Research Centre France
* Li, Jialing Qualcomm Technologies, Inc
* Zhong, Ke Ruijie Networks Co.,Ltd.
* Chen, You-Wei MediaTek Inc.
* Anwyl, Gary Mediatek Inc
* Park, Eunsung LG ELECTRONICS
* Wei, Dong Guangdong OPPO Mobile Telecommunications Corp....
* Zhao, Xuwen TCL
* Li, Yapu Guangdong OPPO

**PDT Submissions**

**24/2046r1 Draft Text on DRU (Jianhan Liu)**

Reviewed.

SP to be run on next call.

**24/1992r3 PDT LDPC (Rethna)**

Deferred to next call

**Pending SPs**

**SP1 (Sameer Vermani)**

Do you agree to add the following to the 11bn SFD:

* + For the COBF case, the information in the NDPA for the responding AP has a unified design for joint-NDP based sounding as well as cross-BSS section of sequential sounding.

*Supporting documents: [24/1822r4]*

Discussion

Q: “responding AP” is also used in M-AP.

A: roles can switch. This is only for the purposes of sounding.

Q: requesting to discuss NDPA in joint session. Better to discuss it there. Contribution is being prepared.

A: Not sure this requires further delay. This was already discussed in PHY and is mostly PHY-centric. Not sure why there is a need to go to the joint session.

Q: Would like MAC people to understand the background. Trigger frame is discussed in joint, so surprised NDPA is not.

A: a sequence already exists in the SFD. Based on that, this SP is an obvious consequence.

Q: NDPA is a MAC frame. Better to have discussion with MAC people.

A: only talks about general direction. Paves the way for MAC people to give further inputs.

Q: frame and sequence are relevant to MAC design. Prefer to move to joint session.

Result

Y/N/A: 28/17/8

**SP2 (Sameer Vermani)**

Do you agree to add the following to the 11bn SFD:

* + The spatial config field in the user field of UHR-SIG field in PPDUs for COBF transmission will re-use the same design as in UHR DL MU-MIMO.
		- Encoding table will be same as 11ax

*Supporting documents: [24/1822r4]*

Discussion

Q: some correction needed in the wording

A: SP text updated

Q: we still support 8 antennas for MU-MIMO, but COBF only uses up to 2 SS. Will all the bits be used?

A: design is the same, limits on the fields have been discussed.

Q: we haven’t defined COBF PPDU type.

A: will change PPDU to COBF transmissions

Result:

No objection

**SP3 (Sameer Vermani)**

Do you agree to add the following to the 11bn SFD:

* + In a PPDU for COBF transmission, all the user-fields in UHR-SIG belonging to an AP and the corresponding spatial streams are contiguous.
		- The user fields of one AP are together followed by the ones of the other AP and the same holds for spatial streams

*Supporting documents: [24/1822r4]*

Discussion

No discussion

Result:

No objection

**SP4 (Shengquan Hu)**

Do you agree to include the following text to the 11bn SFD?

* LDPC is the only coding mode for COBF.

*Supporting doc: [11-24/1829r1]*

Discussion

No discussion

Result:

No objection

**SP5 – Shengquan Hu – CBF**

Do you agree to include the following text to the 11bn SFD?

* 1-bit indication in the per-user SIG field to resolve the BSS color for COBF transmissions.
	+ The coding bit is re-purposed for this indication

*Supporting doc: [11-24/1829r1, 11-24/1822r4]*

Result:

Deferred

Modified to SP5-1

**SP5-1 (Shengquan Hu)**

Do you agree to include the following text to the 11bn SFD?

* 11bn defines an indication to identify the BSS color for COBF transmissions.

*Supporting doc: [11-24/1829r1, 11-24/1822r4]*

Discussion

Q: need more time for further discussion. Asking to defer.

A: regardless of whether BSS color is done in MAC or PHY, we still need to resolve which BSS it comes from.

Q: need to decide in the overall context. Not PHY-only. Same for subsequent SPs.

Q: would you agree to generic mention of “indication” rather than 1-bit indication?

A: that could be OK. SP text changed accordingly.

Result:

No objection

**~~SP6 (Alice Chen, Juan Fang, You-Wei Chen)~~**

~~Do you agree to include the following to the 11bn SFD?~~

* ~~When the initiating AP requests the responding AP to join the CoBF sounding, the red subfields in the first and second User Info fields of the NDPA shall be set as follows.~~
	+ ~~NDPA Version Identifier is set to 0 for CoBF sounding in UHR~~
	+ ~~Number of LTF symbols is set to 0 and 1 for 4 and 8 symbols, respectively~~
	+ ~~Starting Spatial Stream is set to 0 and 1 for the 1 st and 5 th streams, respectively~~
	+ ~~Number of spatial streams is set to 0 and 1 for the 4 and 8 streams, respectively~~
	+ ~~LTF+GI is set to 0 and 1 for 2x LTF+0.8us GI and 2x LTF+1.6us GI, respectively~~

~~~~

*~~Supporting doc: 11-24/1822r4, 11-24/1835r3, 11-24/1865r3~~*

Result:

Superseded by SP9

**SP7 (Ron Porat)**

Do you agree to add to the 11bn SFD?

* In the 5bit MCS table
	+ MCS17 signals QPSK rate 2/3
	+ MCS19 signals 16QAM rate 2/3
	+ MCS20 signals 16QAM rate 5/6
	+ MCS23 signals 256QAM rate 2/3

*Supporting documents: [24/1826r1]*

Discussion

Q: would like to leave more time for discussion all subsequent SPs. Also, some of these could be moved to Joint session.

Result:

Deferred

**SP8 – Sameer Vermani, Qinghua Li, You Wei Chen - Sounding**

Do you agree to include the following to the 11bn SFD?

* NDPA Announcement Variant subfield shall be set to 3 for COBF NDPA in UHR.

 *Supporting doc: 11-24/1822r4, 11-24/1835r3, 11-24/1865r3*

Result:

Deferred

**SP9 – Sameer Vermani, Qinghua Li, You Wei Chen - Sounding**

Do you agree to include the following to the 11bn SFD?

* When the initiating AP requests the responding AP to join the CoBF sounding, the red subfields in the first and second User Info fields of the NDPA shall be set as follows.
	+ NDPA Version Identifier is set to 0 for CoBF sounding in UHR
	+ Number of LTF symbols is set to 0 and 1 for 4 and 8 symbols, respectively
	+ Starting Spatial Stream is set to 0 and 1 for the 1 st and 5 th streams, respectively
	+ Number of spatial streams is set to 0 and 1 for the 4 and 8 streams, respectively
	+ LTF+GI is set to 0 and 1 for 2x LTF+0.8us GI and 2x LTF+1.6us GI, respectively



*Supporting doc: 11-24/1822r4, 11-24/1835r3, 11-24/1865r3*

Result:

Deferred

**SP10 – Alice Chen, Juan Fang, You-Wei Chen – U-SIG**

Do you agree to include the following to the 11bn SFD?

* CoBF is only applied in DL non-OFDMA MU MIMO transmission
* C-SR is only applied in UHR DL SU transmission in each BSS
* The entire U-SIG format in a UHR MU PPDU is as in the following figure



*Supporting doc: 11-24/1834r4, 11-24/1831r3, 11-24/1864r1*

Result:

Deferred

**Technical Submissions**

**24/1807 Follow Up on UEQM Stream Parser (Ying Wang)**

802.11n stream Parser may not be able to handle BPSK in UEQM. Operation of the 802.11n stream parser is reviewed. Three proposals are given of stream parsers that can handle BPSK in UEQM.

Q&A deferred till next meeting

**Adjourn**

Meeting is adjourned at 9 pm ET.