IEEE P802.11
Wireless LANs

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| 802.11 bn PHY ad-hoc minutes November 2024-January 2025 |
| Date: 2024-12-09 |
| Author(s): |
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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 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:

* TBD

**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.