IEEE P802.11  
Wireless LANs

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| 802.11 bn PHY ad-hoc minutes for the January 2025 Interim session | | | | |
| Date: 2025-01-15 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Tianyu Wu | Apple |  |  | tianyu@apple.com |

Abstract

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

* Monday PM1, January 13, 2025
* Tuesday AM2, January 14, 2025
* Tuesday PM1, January 14, 2025
* Tuesday PM2, January 14, 2025
* Wednesday AM2, January 15, 2025
* Wednesday PM2, January 15, 2025

## Monday January 13th, 2025 13:30 – 15:30 JST

**Introduction**

1. The Chair (Sigurd Schelstraete, MaxLinear) calls the meeting to order at 13:30 JST.
2. The Chair follows the agenda in 11-24/**2074r4**.
3. Reminder for registration for the Interim meeting.
4. 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), Dongguk Lim (LGE) or the Chair himself if unable to record attendance via IMAT system.
5. The Chair goes through the IPR policy and asks if anyone is aware of any potentially essential patents. **Nobody speaks up.**
6. The Chair goes through the Copyright policy.
7. Discussions on the agenda:

**Straw Polls/Prioritized Submissions (60 mins)**

**PDTs (15 mins)**

* + [24/2046r0](https://mentor.ieee.org/802.11/dcn/24/11-24-2046-00-00bn-draft-text-on-dru.docx) Draft Text on DRU Jianhan Liu [SP]
  + [24/1992r3](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 [SP]
  + [24/2032r1](https://mentor.ieee.org/802.11/dcn/24/11-24-2032-01-00bn-pdt-phy-uhr-ppdu-format.docx) PDT-PHY-UHR PPDU Format Dongguk Lim [SP]

**Submissions – ELR Part 1**

* + [~~24/1748~~](https://mentor.ieee.org/802.11/dcn/24/11-24-1748-01-00bn-discussion-on-transmission-of-elr-sig.pptx) ~~Discussion on Transmission of ELR-SIG Ke Zhong~~
  + [~~24/1764~~](https://mentor.ieee.org/802.11/dcn/24/11-24-1764-00-00bn-elr-ppdu-follow-up.pptx) ~~ELR PPDU follow up Dongguk Lim~~
  + [~~24/1766~~](https://mentor.ieee.org/802.11/dcn/24/11-24-1766-00-00bn-pilot-value-design-for-elr-ppdu.pptx) ~~Pilot Value Design for ELR PPDU Bo Gong~~
  + [~~24/1768~~](https://mentor.ieee.org/802.11/dcn/24/11-24-1768-00-00bn-ul-dl-indication-for-elr-ppdu.pptx) ~~UL/DL Indication for ELR PPDU Bo Gong~~
  + [24/1841](https://mentor.ieee.org/802.11/dcn/24/11-24-1841-00-00bn-uhr-elr-design-open-topics.pptx) UHR ELR design open topics Rui Cao
  + [24/1850](https://mentor.ieee.org/802.11/dcn/24/11-24-1850-00-00bn-mid-range-support-for-elr-ppdu.pptx) Mid-Range Support for ELR PPDU Junghoon Suh

Discussions: 4 submissions withdrawn because the contents are already covered.

**Straw Polls**

**SP1 – *Ron Porat – Preamble***

**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: [11-24/1826r1]***

No Objection

**SP2 –  *Sigurd Schelstraete – LTF***

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

* **UHR-LTF shall define 4xUHR-LTF with GI=1.6 usec for use with TB-PPDU**

***Supporting documents: [11-24/1480r0]***

Deferred

**SP3 *– Alice, Juan, You-Wei – 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**
* **The definition of BSS Color 1/2 are TBD**

A screenshot of a computer

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*Supporting documents: [24/1834r4, 24/1831r3, 24/1864r1]*

Y/N/A: 55/8/22

**SP4 – *Qinghua Li – UHR Stream Parser***

**Do you support to add the following to UHR SFD?**

* **Exclude BPSK from UHR UEQM.**

***Supporting documents: [*24/1832r6, 24/1807r0*]***

No Objection

**SP5 *– Qinghua Li – UHR Stream Parser***

**Do you support to add the following to UHR SFD?**

* **Include 4K QAM in UHR UEQM.**

***Supporting documents: [*24/1832r6*]***

No Objection

**SP6 *– Qinghua Li – UHR Stream Parser***

**Do you support to add the following to UHR SFD?**

* **Reuse HT stream parser for UHR UEQM with the following restrictions and extension**

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*Supporting documents: [*24/1832r6, 24/1451r2*]*

No Objection

***SP7 – Qinghua Li – UHR Stream Parser***

**Do you support to add the following to UHR SFD?**

**For equal modulation, UHR stream parser remains the same as EHT.**

***Supporting documents: [*24/1832r6*]***

No Objection

***SP8 – Qinghua Li – UHR Stream Parser***

***Do you support to add the following to UHR SFD?***

***For bandwidths greater than 80 MHz, the coded bit parsing of UHR is stream parsing first followed by segment parsing.***

***Supporting documents: [24/1832r6]***

No Objection

**Prioritized Submissions**

**24/1827r1 On OFDMA + MU-MIMO (Ron Porat)**

Proposed a limited set of combinations to support MU-MIMO +OFDMA to spur adoption of this feature in light of DSO and mixed BW devices.

Discussion

Q: Are the combinations you proposed mandatory?

A: Not decided on M/O now.

Q: Slide 5: Does that mean you cannot use RU242 in OFDMA anymore as value 65-71 are validate.

A: That was defined as number of users in MU-MIMO RU. For OFDMA case, only need to use value 64 for RU242.

Q: This is for both DL and UL?

A: Yes. Added the clarification in the SP.

**SP9:**

Do you agree to add to the 11bn SFD?

* MU-MIMO+OFDMA in both DL and UL is limited to UHR PPDU of 160 and 320MHz only
  + 160MHz PPDU – 996 and, when the PPDU is punctured, 484+242
  + 320 MHz PPDU: 2x996, 3x996 and, when the PPDU is punctured, 996+484, 2x996+484
* MU-MIMO+OFDMA is further limited to a maximum of 2RUs supporting MU-MIMO and each 80MHz segment is either MU-MIMO or OFDMA
* RU Allocation table in UHR-SIG is the same as that in EHT-SIG except that the rows for RU 242, 484 and 3x996+484 with two or more users are changed to Validate

No Objection

**Straw Polls on PDTs**

**24/2046r4 Draft Text on DRU (Jianhan Liu)**

**SP10:**

Do you agree to include the proposed draft text of 24/2046r4 in D0.1?

No Objection

**24/1992r3 PDT PHY Longer LDPC Coding (Rethna Pulikkoonattu)**

**SP11:**

Do you agree to include the proposed draft text of 24/1992r3 in D0.1?

No Objection

**24/2032r1 PDT-PHY-UHR PPDU Format (Dongguk Lim)**

**SP12:**

Do you agree to include the proposed draft text of 24/2032r1 in D0.1?

No Objection

**Technical contributions**

**24/1841r1 UHR ELR Design Open Topics (Rui Cao)**

ELR Tx CFO pre-compensation accuracy definition to specify for immediate response frame in ELR.

ELR to defined fixed T\_PE of 8us.

Discussion

Q: Some clarification questions

Q: Some comments on SP text. Remove first paragraph in the first SP in this contribution and change SP to be included in a PDT document for both SPs.

**SP1 in 24/1841r1:**

* **Do you agree to add the following text to Section 38.3.19.2 (Pre-correction accuracy requirements) of the PDT 11-24/1981r3?**

For the ELR PPDU carrying immediate response frame in response to a preceding soliciting frame, after compensation, the absolute value of residual CFO error with respect to the preceding PPDU carrying soliciting frame shall not exceed 15 kHz at the 10% point of the complementary cumulative distribution function (CCDF) of CFO error in AWGN at a received power of -82 dBm in the primary 20 MHz channel.

No Objection

**SP2 in 24/1841r1:**

* **Do you agree to replace to TBD to 8us for the PE block in the Figure 38-xx(UHR ELF PPDU format) in Section 38.3.6(UHR PPDU formats) in the PDT 11-24/1981r3, and also reflect the changes in D0.1?**
* Note: the PE value applies for UHR ELR PPDU.

No Objection

Discussion

Q: Request to rerun SP1 and add “and also reflect the changes in D0.1”

**SP to Replace SP1 in 24/1841r1:**

* **Do you agree to add the following text to Section 38.3.19.2 (Pre-correction accuracy requirements) of the PDT 11-24/1981r3, and also reflect the changes in D0.1?**

For the ELR PPDU carrying immediate response frame in response to a preceding soliciting frame, after compensation, the absolute value of residual CFO error with respect to the preceding PPDU carrying soliciting frame shall not exceed 15 kHz at the 10% point of the complementary cumulative distribution function (CCDF) of CFO error in AWGN at a received power of -82 dBm in the primary 20 MHz channel.

No Objection

**24/1850r1 Mid-Range Support for ELR PPDU (Junhoon Suh)**

2x symbol for ELR PPDU, 3 ELR MCSs and remove interleaver/deinterleaver blocks in ELR PPDU.

**Recess**

The meeting is Recessed at 15:25 JST.

## Tuesday January 14th, 2025 10:30 – 12:30 JST

**Introduction**

1. The Chair (Sigurd Schelstraete, MaxLinear) calls the meeting to order at 10:30 JST.
2. The Chair follows the agenda in 11-24/**2074r5**.
3. Reminder for registration for the Interim meeting.
4. 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), Dongguk Lim (LGE) or the Chair himself if unable to record attendance via IMAT system.
5. The Chair goes through the IPR policy and asks if anyone is aware of any potentially essential patents. **Nobody speaks up.**
6. The Chair goes through the Copyright policy.
7. Discussions on the agenda:

**Straw Polls/Prioritized Submissions (45 mins)**

**PDTs (30 mins)**

* + [24/2017r0](https://mentor.ieee.org/802.11/dcn/24/11-24-2017-00-00bn-pdt-phy-transmitter-block-diagram.docx) PDT-PHY-Transmitter-Block-Diagram Yusuke Asai [SP]
  + 24/2033r2 PDT-PHY-Legacy preamble Dongguk Lim [SP]
  + [24/2009r4](https://mentor.ieee.org/802.11/dcn/24/11-24-2009-00-00bn-pdt-phy-uhr-sig.docx) PDT-PHY-UHR-SIG Mengshi Hu [SP]
  + ~~24/2008r0 PDT-PHY-Interference-Mitigation Shimi Shilo~~
  + 24/2027r0 pdt-phy-service-interface Bo Sun

**Submissions – ELR Part 2**

* + 24/1860 Discussion on Aspects of ELR Transmission Leonardo Lanante
  + 24/1861 Discussion on Spatial Reuse and ELR Transmission Leonardo Lanante
  + 25/0009 Discussion on Transmission of PE in ELR PPDU Ke Zhong
  + [25/0059](https://mentor.ieee.org/802.11/dcn/25/11-25-0059-00-00bn-elr-fragmentation-support-and-channel-access.pptx) ELR: Fragmentation support and Channel Access Sigurd Schelstraete

**Straw Polls**

**SP1 – *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 documents: [11-24/1829r2, 11-24/1822r4]***

No Objection

***SP2 – Yin Wang – UEQM***

*Do you agree that the 11bn stream parser should support BPSK in UEQM spatial streams?*

*Withdrawn. Already included in the SP run yesterday.*

**SP3 – *Alice Chen– CBF***

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

* ***2 BSS colors are indicated in the preamble of a COBF PPDU.***
* ***One BSS color for the sharing AP and another BSS color for the shared AP***

***Supporting documents: [11-24/1807r0]***

No Objection

**SP4 – *Juan Fang – CBF***

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

* ***The cyclic shift for pre-UHR modulated fields in UHR MU PPDU used for Co-BF transmission is based on local transmit chain index at each AP?***

***Supporting documents: [None]***

No Objection

**SP5 – *Jianhan Liu – CSR***

***Do you agree that the maximum number of spatial streams transmitted by each AP in CSR is 4?***

***Supporting documents: [None]***

No Objection

**SP6 – *Jianhan Liu – New MCS***

***Do you support that Mandatory support of the following MCSs?***

* ***QPSK with code rate 2/3; 16QAM with code rate 2/3; 16QAM with code rate 5/6; 256QAM with code rate 2/3.***
* ***Support of 256QAM with code rate 2/3 for 20MHz only devices is TBD.***

***Supporting documents: [11-24/0753r1, 11-24/0469r0]***

No Objection

**SP7 – *Alice, Juan, You-Wei – 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 DL SU transmission in each BSS***
* ***The entire U-SIG format in a UHR MU PPDU is as in the following figure***
* ***BSS color 1 and 2  are the BSS color of the two Coordinated BSSs with the order TBD***

A screenshot of a computer

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*Supporting documents: [24/1834r4, 24/1831r3, 24/1864r1]*

No Objection

**PDTs and Straw Polls on PDTs**

**24/2017r0 PDT-PHY-Transmitter-Block-Diagram (Yusuke Asai)**

**SP8:**

Do you agree to accept the proposed draft text in 11-24/2017r0 for inclusion in 802.11bn D0.1?

No Objection

**24/2033r2 PDT-PHY-Legacy preamble (Dongguk Lim)**

**SP9:**

Do you agree to accept the proposed draft text in 11-24/2033r2 for inclusion in 802.11bn D0.1?

No Objection

**24/2009r4 PDT-PHY-UHR-SIG (Mengshi Hu)**

**SP10:**

Do you agree to accept the proposed draft text in 11-24/2009r4 for inclusion in 802.11bn D0.1?

No Objection

**24/2027r0 pdt-phy-service-interface (Bo Sun)**

Discussion

Q: Leave the TXVECTOR/RXVECTOR to after D0.1 for more thoughts on the designs.

A: I can leave 38.2.2 as TBD and update the PDT document.

**Technical contributions**

**24/1861r0 Discussion on Spatial Reuse and ELR Transmission (Leonardo Lanante)**

Discussed the problem of spatial reuse during ELR transmissions and discussed ways to disable it in both EHT and UHR STAs.

Discussion

Q: Slide 4: spatial reuse parameters are in version dependent fields. Legacy devices can’t understand it. Need to clarify that if SR reuse field is not understood, SR is not allowed.

Q: Condition 7 seems already shows that SR is not allowed for ELR PPDU.

A: Need more offline discussion.

**SP1 in 24/1861:**

**Do you support adding to the 11bn SFD,**

**A UHR STA shall not perform spatial reuse (e.g. OBSS PD based SR) for ELR transmissions.**

Discussion

Q: Need more discussion on this topic. ELR has boosted power preamble, there may be some cases OBSS traffic may not affect the ELR traffic.

Q: In outdoor scenario, ELR and SR can be enabled together.

Q: Clarify the purpose is to protect the ELR PPDU.

SP deferred.

**25/0009r0 Discussion on Transmission of PE in ELR PPDU (Ke Zhong)**

Proposed power, duration and BW of PE for ELR PPDU.

Discussion

No discussions.

**25/0059r0 ELR: Fragmentation support and Channel Access (Sigurd Schelstraete)**

Raised some (more MAC-related) issues that need further discussion, e.g. Required support of fragmentation at the transmitter and Clarification of Channel Access behavior

Discussion

Q: Packet detection happens before ELR Mark. Packet detection is similar to legacy PPDU.

A: In my slides, I don’t assume ELR mark is used for packet detection. The focus is the fairness issue for ELR PPDU.

Q: 11ah related question. Will discuss offline.

Q: We have similar problem for ER SU before. We can handle it same way as before.

A: It’s not explicit mentioned.

**Recess**

The meeting is Recessed at 12:30pm JST.

## Tuesday January 14th, 2025 13:30 – 15:30 JST

**Introduction**

1. The Chair (Sigurd Schelstraete, MaxLinear) calls the meeting to order at 13:30 JST.
2. The Chair follows the agenda in 11-24/**2074r6**.
3. Reminder for registration for the Interim meeting.
4. 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), Dongguk Lim (LGE) or the Chair himself if unable to record attendance via IMAT system.
5. The Chair goes through the IPR policy and asks if anyone is aware of any potentially essential patents. **Nobody speaks up.**
6. The Chair goes through the Copyright policy.
7. Discussions on the agenda:

**Straw Polls (15 mins)**

**PDTs (45 mins)**

* + [24/2006r2](https://mentor.ieee.org/802.11/dcn/24/11-24-2006-02-00bn-pdt-phy-capabilities-element.docx) PDT-PHY-Capabilities-Element Eugene Baik [SP]
  + [24/2005r1](https://mentor.ieee.org/802.11/dcn/24/11-24-2005-01-00bn-pdt-phy-introduction.docx) PDT-PHY-Introduction Eugene Baik [SP]
  + [24/2023r0](https://mentor.ieee.org/802.11/dcn/24/11-24-2023-00-00bn-pdt-phy-overview-of-the-ppdu-encoding-process.docx) PDT-PHY Overview of the PPDU encoding process Junghoon Suh [SP]
  + [24/2033r3](https://mentor.ieee.org/802.11/dcn/24/11-24-2033-03-00bn-pdt-phy-legacy-preamble.docx) PDT-PHY-Legacy preamble Dongguk Lim [SP]
  + [24/2027r0](https://mentor.ieee.org/802.11/dcn/24/11-24-2027-00-00bn-pdt-phy-service-interface.docx) pdt-phy-service-interface Bo Sun [SP]
  + [24/2135r0](https://mentor.ieee.org/802.11/dcn/24/11-24-2135-00-00bn-pdt-phy-null-subcarriers.docx) PDT-PHY-Null Subcarriers Bo Gong
  + 24/2034r0 PDT-PHY-Pilot Subcarriers Chenchen Liu
  + 24/2009r5 PDT UHR-SIG Mengshi Hu

1. **Submissions – DRU**
   * [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
   * [25/0060](https://mentor.ieee.org/802.11/dcn/25/11-25-0060-00-00bn-dru-hybrid-mode-for-20-mhz-only-stas.pptx) DRU hybrid mode for 20 MHz-only STAs Sigurd Schelstraete
   * [~~25/0064~~](https://mentor.ieee.org/802.11/dcn/25/11-25-0064-00-00bn-60-mhz-dru-tone-plan.pptx) ~~60 MHz DRU Tone Plan Eunsung Park~~
   * [25/0100](https://mentor.ieee.org/802.11/dcn/25/11-25-0100-00-00bn-some-open-issues-on-dru.pptx) Some Open Issues on DRU Lin Yang
   * [25/0129](https://mentor.ieee.org/802.11/dcn/25/11-25-0129-00-00bn-dru-distribution-bw-indication-in-uhr-trigger-frame.pptx) DRU Distribution BW Indication in UHR Trigger Frame Mahmoud Hasabelnaby

**PDTs and Straw Polls on PDTs**

**24/2006r2 PDT-PHY-Capabilities-Element (Eugene Baik)**

**SP1:**

Do you agree to add the proposed draft text in 11-24/2006r2 to the 802.11bn D0.1 document?

No Objection

**24/2005r1 PDT-PHY-Introduction (Eugene Baik)**

**SP2:**

Do you agree to add the proposed draft text in 11-24/2005r1 to the 802.11bn D0.1 document?

No Objection

**24/2023r3 PDT-PHY Overview of the PPDU encoding process (Junhoon Suh)**

**SP3:**

Do you agree to add the proposed draft text in 11-24/2023r3 to the 802.11bn D0.1 document?

No Objection

**24/2033r3 PDT-PHY-Legacy preamble (Dongguk Lim)**

**SP4:**

Do you agree to add the proposed draft text in 11-24/2033r3 to the 802.11bn D0.1 document?

No Objection

**24/2135r0 PDT-PHY-Null Subcarriers (Bo Gong)**

Discussion

Q: Some editorial comments.

**SP5:**

Do you agree to add the proposed draft text in 11-24/2135r0 to the 802.11bn D0.1 document?

No Objection

**24/2034r1 PDT-PHY-Pilot Subcarriers (Chenchen Liu)**

Discussion

Q: Some clarification questions.

**SP6:**

Do you agree to add the proposed draft text in 11-24/2034r1 to the 802.11bn D0.1 document?

No Objection

**24/2009r5 PDT-UHR-SIG (Mengshi Hu)**

Discussion

Q: Some editorial comments.

**SP7:**

Do you agree to add the proposed draft text in 11-24/2009r6 to the 802.11bn D0.1 document?

No Objection

**24/2027r1 pdt-phy-service-interface (Bo Sun)**

**SP8:**

Do you agree to add the proposed draft text in 11-24/2027r1 to the 802.11bn D0.1 document?

No Objection

**Technical contributions**

**24/1778r1 Distributed RU Distortion, Beamforming, Power Control (Rainer Strobel)**

The contribution discussed the following: Allow beamforming by introducing triggered uplink sounding. Consider nonlinear transmitter distortion, Re-evaluate unused tone error and TX EVM specs. Improve power control accuracy to reduce performance impact of rx distorsion.

Discussion

Q: For beamforming, what is the difference for DRU comparing to RRU? No rule to disallow beamforming for DRU.

A: Triggered sounding for UL is needed.

Q: You want to make the sounding more efficient?

A: That’s correct.

Q: For slide 12 and slide 11, 106 seems has different conclusion.

A: That’s a typo.

Q: You mentioned to tighten the EVM? When AP doing the scheduling, AP should take the EVM into considering, but not tighten the EVM requirement.

Q: Slide 15: For AP to calculate the Tx power for each STA, if there are lots of STAs, it is big burden for AP.

A: It’s already the case currently. AP already does the job for calculation.

Q: This seems to move the burden from STA to AP.

**25/0060r0 DRU hybrid mode for 20 MHz-only STAs (Sigurd Schelstraete)**

Hybrid RRU/DRU mode is not well suited for 20 MHz-only STAs. Allow a hybrid mode that provides better compatibility with 20 MHz-only STAs

Discussion

Q: Slide 6: RU242 is not allowed for 20MHz only device participating wider BW transmission.

Q: This is target for LPI channel, for small RUs, the power will be too low.

A: More offline discussions needed.

**25/0100r0 Some Open Issues on DRU (Lin Yang)**

When a 20 MHz operating STA participates in wide BW UL OFDMA using DRU, some DRUs in that 20MHz DBW may be impacted by the DC leakage from the 20MHz operating device such that performance of high MCS may be significantly degraded.

Discussion

No Discussions.

**SP1 in 25/0100r0:**

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

**For 160 MHz and 320 MHz PPDUs, in only the non-punctured primary 80 MHz subblock, the following distribution bandwidth mode is allowed for DRU**

* + 20 MHz + 20 MHz + 40 MHz (or 40 MHz + 20 MHz + 20 MHz)

No Objection

**SP2 in 25/0100r0:**

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

**For distributed transmission, apply global CSD to UHR-STF only, and UHR-LTF and data still apply local per stream CSD, just like RRU**

No Objection

**SP3 in 25/0100r0:**

* **Do you agree to include the following into the 11bn D0.1, under the section “38.3.2.x RU and MRU restrictions for 20 MHz operation”?**

**Note - When a 20 MHz operating STA participates in an 80 MHz or wider UHR TB PPDU using 20 MHz distribution bandwidth, the TX LO leakage of the STA might interfere with some of the data subcarriers within the 20 MHz distribution bandwidth such that for some DRUs in that 20MHz DBW performance of high MCS may be significantly degraded.**

No Objection

**Recess**

The meeting is Recessed at 15:30pm JST.

## Tuesday January 14th, 2025 16:00 – 18:00 JST

**Introduction**

1. The Chair (Sigurd Schelstraete, MaxLinear) calls the meeting to order at 16:00 JST.
2. The Chair follows the agenda in 11-24/**2074r6**.
3. Reminder for registration for the Interim meeting.
4. 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), Dongguk Lim (LGE) or the Chair himself if unable to record attendance via IMAT system.
5. The Chair goes through the IPR policy and asks if anyone is aware of any potentially essential patents. **Nobody speaks up.**
6. The Chair goes through the Copyright policy.
7. Discussions on the agenda:

**Straw Polls/Prioritized Submissions (45 mins)**

**Submissions from PM1 session**

* + [25/0129](https://mentor.ieee.org/802.11/dcn/25/11-25-0129-00-00bn-dru-distribution-bw-indication-in-uhr-trigger-frame.pptx) DRU Distribution BW Indication in UHR Trigger Frame Mahmoud Hasabelnaby

**PDTs (30 mins)**

* + [24/2011r0](https://mentor.ieee.org/802.11/dcn/24/11-24-2011-00-00bn-pdt-phy-timing-related-parameters.docx) PDT-PHY- Timing-Related Parameters Mengshi Hu [SP]
  + [24/2012r1](https://mentor.ieee.org/802.11/dcn/24/11-24-2012-01-00bn-pdt-phy-packet-extension.docx) PDT-PHY- Packet Extension Mengshi Hu [SP]
  + [24/2042r0](https://mentor.ieee.org/802.11/dcn/23/11-23-2042-02-0amp-further-discussion-on-amp-par.pptx) PDT-PHY- TX requirements for PPDUs sent in response to a triggering frame Juan Fang [SP]
  + [24/2024r0](https://mentor.ieee.org/802.11/dcn/24/11-24-2024-00-00bn-pdt-phy-uhr-stf.docx) PDT PHY UHR-STF Eunsung Park
  + 24/2035r0 PDT-PHY-UHR-LTF  Chenchen Liu

**Submissions – IM + MU MIMO + Sounding + Miscellaneous + UEQM**

* + [24/1785](https://mentor.ieee.org/802.11/dcn/24/11-24-1785-01-00bn-interference-mitigation-pilots-definitions.pptx) Interference Mitigation Pilots – Definitions Shimi Shilo
  + [25/0078](https://mentor.ieee.org/802.11/dcn/25/11-25-0078-00-00bn-special-sta-info-field-in-uhr-ndpa.pptx) Special STA Info Field in UHR NDPA Junghoon Suh
  + 25/0127 Discussion on supported MCS and NSS set Mengshi Hu
  + [25/0128](https://mentor.ieee.org/802.11/dcn/25/11-25-0128-00-00bn-discussion-on-pe-requirement-for-ueqm.pptx) Discussion on PE requirement for UEQM Mengshi Hu
  + 25/0104 Co-SR Preamble Signaling Ross Jian Yu

**Technical contributions**

**25/0129r0 DRU Distribution BW Indication in UHR Trigger Frame (Mahmoud Hasabelnaby)**

Proposed to indicate a 60 MHz DBW using a value of 3 in the 2-bit DBW indication subfield within the UHR variant User Info field of a Trigger Frame in the case of DRU.

Discussion

No discussion

**SP in 25/0129r0:**

**Do you agree to include the following into the 11bn SFD:**

* **11bn supports to indicate a 60 MHz DBW using a value of 3 in the 2-bit DBW indication subfield within the UHR variant User Info field of a Trigger Frame in the case of DRU?**

No Objection

**PDTs and Straw Polls on PDTs**

**24/2011r1 PDT-PHY- Timing-Related Parameters (Mengshi Hu)**

**SP1:**

Do you agree to add the proposed draft text in 11-24/2011r1 to the 802.11bn D0.1 document?

No Objection

**24/2012r3 PDT-PHY- Packet Extension (Mengshi Hu)**

**SP2:**

Do you agree to add the proposed draft text in 11-24/2012r3 to the 802.11bn D0.1 document?

No Objection

**24/2042r1 PDT-PHY- TX requirements for PPDUs sent in response to a triggering frame (Juan Fang)**

**SP3:**

Do you agree to add the proposed draft text in 11-24/2042r1 to the 802.11bn D0.1 document?

No Objection

**24/2024r0 PDT PHY UHR-STF (Eunsung Park)**

**SP4:**

Do you agree to add the proposed draft text in 11-24/2024r0 to the 802.11bn D0.1 document?

No Objection

**24/2035r0 PDT-PHY-UHR-LTF**  **(Chenchen Liu)**

Discussion

Q: We don’t have UHR sounding NDP. Comment to delete that column.

A: Deleted.

Q: Some more comments to make the PDT more precise and clearer.

A: Incorporate the comments and update to r1.

**SP5:**

Do you agree to add the proposed draft text in 11-24/2035r1 to the 802.11bn D0.1 document?

No Objection

**Technical contributions**

**24/1785r1 Interference Mitigation Pilots – Definitions (Shimi Shilo)**

Suggested some constraints and design properties of IM pilots.

**SP1 in 24/1785r1:**

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

**the Interference Mitigation feature is only defined with LDPC.**

No Objection

**SP2 in 24/1785r1:**

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

**the Interference Mitigation feature is not defined for DRUs?**

SP deferred.

**SP3 in 24/1785r1:**

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

**for each bandwidth, there is a fixed number of IM pilots (value TBD).**

No Objection

**SP4 in 24/1785r1:**

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

**within any transmission that uses IM pilots, they are used in every data OFDM symbol and in the same corresponding subcarriers positions, for a given BW.**

No Objection

**25/0078r0 Special STA Info Field in UHR NDPA (Junghoon Suh)**

Proposed the common parameters necessary to be shared among the coordinated APs for the CoBF Sounding. Proposed to set the Recommended CSI MCS level in the Special STA Info field of UHR NDPA for the case of Cross-BSS Sounding in Sequential Sounding and for the Joint Sounding

Discussion

Q: Questions on how to determine the MCS level.

A: It is implementation specific. Get rough RSSI from overheard OBSS PPDUs.

Q: BSRP always indicate max Tx power?

A: Yes, but that can be implementation specific as well.

**SP in 25/0078r0:**

**Do you support to include the following into the 11bn SFD?**

* **11bn defines 5 bit Recommended CSI MCS subfield in the 2nd Special STA Info field of the NDPA targeted for OBSS AP in the UHR CoBF sounding?**
  + **It is set from B20 to B24 in the 2nd Special STA Info field**
  + **The 5-bit MCS level includes “No Recommendation” MCS entry in addition to the UHR MCS entries**
    - **Index 31 indicates “No Recommendation”**
  + **The Recommended CSI MCS is for the OBSS AP to set the MCS in the BFRP trigger frame sent in the future Cross-BSS sounding / Joint Sounding sequence**
  + **When there are multiple OBSS STAs to feedback the CSI report, the Recommended CSI MCS can be set to the lowest MCS among all those OBSS STAs**

No Objection

**25/0128r0 Discussion on PE requirement for UEQM (Mengshi Hu)**

Proposed that the PE requirements of an UEQM with a highest constellation order x is equal to the PE requirements of a EQM with a constellation order x.

Discussion

Some clarification questions on the SP.

**SP in 25/0128r0:**

**Do you support to include the following into the 11bn SFD?**

* **In the UHR MU PPDU in 11bn, the PE requirements of UEQM with the constellation order x of the first spatial stream is equal to the PE requirements of EQM with the constellation order x.**

No Objection

**25/0104r0 Co-SR Preamble Signaling (Ross Jian Yu)**

Proposed two modes of co-SR preamble signaling and proposed to enable both modes in 802.11bn.

Discussion

Q: How each AP knows what power to transmit.

A: For UHR STA, we can define new protocol to help the power estimation. For non-UHR STA, we can reuse some of the existing MAC protocols to assist the power estimation.

Q: Questions on Packet on Packet detection problem if CoSR packets not arriving at same time.

Q: In what showed on slide 4, it seems similar to CoBF.

A: CoBF can be seen as a special case of CoSR.

Q: Are the symbols aligned?

A: Start and end at same time and aligned up to end of LTFs. After that, it is up to implementation.

Q: Some clarification questions on SP.

**SP in 25/0104r0:**

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

* **11bn supports the following modes for co-SR transmission:**
  + **Mode 1: trigger + same L-SIG contents, could be different U-SIG contents.**
    - **For UHR+EHT, or EHT+UHR or EHT+EHT co-SR transmission.**
    - **Provided no changes to non-UHR EHT non-AP STAs are needed.**
  + **Mode 2: Tigger + same L-SIG contents + same U-SIG contents**
    - **For UHR+UHR co-SR transmission.**
  + **For all modes, the two PPDUs will start and end at the same time.**
  + **UHR PPDU for co-SR transmission will be used for either mode 1 or mode 2 when UHR transmission exists.**
    - **There exists an indication in U-SIG field to indicate the UHR PPDU is a UHR PPDU for co-SR transmission.**

Y/N/A: 41/7/20

**Recess**

The meeting is Recessed at 17:55 JST.

## Wednesday January 15th, 2025 10:30 – 12:30 JST

**Introduction**

1. The Chair (Sigurd Schelstraete, MaxLinear) calls the meeting to order at 10:30 JST.
2. The Chair follows the agenda in 11-24/**2074r11**.
3. Reminder for registration for the Interim meeting.
4. 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), Dongguk Lim (LGE) or the Chair himself if unable to record attendance via IMAT system.
5. The Chair goes through the IPR policy and asks if anyone is aware of any potentially essential patents. **Nobody speaks up.**
6. The Chair goes through the Copyright policy.
7. Discussions on the agenda:

**Straw Polls (30 mins)**

**PDTs (30 mins)**

* + [24/2043r0](https://mentor.ieee.org/802.11/dcn/24/11-24-2043-00-00bn-pdt-phy-receiver-specification.docx) PDT-PHY- Receiver specification Juan Fang [SP]
  + [24/2015r5](https://mentor.ieee.org/802.11/dcn/24/11-24-2015-05-00bn-pdt-phy-cobf.docx) PDT-PHY-CoBF Ron Porat [SP]
  + ~~24/2036r0 PDT-PHY-Data field Chenchen Liu~~
  + 24/1977r6 PDT-PHY-U-SIG Alice Chen
  + ~~24/2014r0 PDT-PHY-Mathematical Description of Signals Edward Au~~
    - Will be prepared after TGbn D0.1.
  + ~~24/2021r0 PDT PHY Transmit Specification Genadiy Tsodiz~~

**Submissions – CBF + Sounding**

* + [24/1836](https://mentor.ieee.org/802.11/dcn/24/11-24-1836-01-00bn-on-cobf-capabilities.pptx) On CoBF Capabilities Aiguo Yan
  + [24/2142](https://mentor.ieee.org/802.11/dcn/24/11-24-2142-00-00bn-multi-ap-sounding-analysis.pptx) Multi-AP Sounding Analysis Rainer Strobel
  + ~~25/0083 CFO correction and related simplifications for COBF Sameer Vermani~~
  + ~~25/0103 Simplified carrier synchronization for CoBF transmissions Shuling Feng~~
  + [25/0111](https://mentor.ieee.org/802.11/dcn/25/11-25-0111-00-00bn-robust-beamforming-nulling-for-cbf-follow-up.pptx) Robust Beamforming Nulling for CBF - follow up Ken Tanaka
  + ~~25/0098 Receiver specification Fang, Juan~~
  + ~~25/0101 On Mandatory and Optional 11bn Feature Jianhan Liu~~
  + ~~25/0109 UHR Receive Procedure Lin Yang~~
  + 25/0093 On the Maximum number of spatial streams support in Coordinated spatial reuse Jianhan Liu
  + 25/0089 Enhancing Spatial Reuse with MAP Coordination Rui Yang

**PDTs and Straw Polls on PDTs**

**24/2043r1 PDT-PHY- Receiver specification (Juan Fang)**

**SP1:**

Do you agree to incorporate the proposed draft text in 11-24/2043r1(PDT-PHY-Receiver specification) into 802.11bn D0.1?

No Objection

**24/2015r5 PDT-PHY- CoBF (Ron Porat)**

**SP2:**

Do you agree to incorporate the proposed draft text in 11-24/2015r6(PDT-PHY-CoBF) into 802.11bn D0.1?

No Objection

**24/1977r6 PDT-PHY- U-SIG (Alice Chen)**

**SP3:**

Do you agree to incorporate the proposed draft text in 11-24/1977r6(PDT-PHY-U-SIG) into 802.11bn D0.1?

No Objection

**Technical contributions**

**24/1836r1 On CoBF Capability (Aiguo Yan)**

Proposed max total number of users, max number of total streams, and max NSTS per AP for CoBF.

Discussion

No discussions.

**24/2142r0 Multi-AP Sounding Analysis (Rainer Strobel)**

The contribution assessed overhead impact of the current sounding proposals, analyzed (timing) impairments for joint sounding and also analyzed joint optimization of precoding matrices.

Discussion

Q: Slide 4: The joint beamforming report may be more challenge than it seems to be. Adding recommended MCS may help.

Q: People don’t want to change the existing beamforming report schemes. This is our design criteria. For CFO, we need to check our results.

Q: We don’t always assume MCS0 for beamforming feedback, we pick MCS based on some reasonable assumptions on path loss etc.

Q: Agree sounding overhead is the problem we need to consider. There are several other issues we need to consider as well, such as security etc.

**25/0111r1 Robust Beamforming Nulling for CBF - follow up (Ken Tanaka)**

This contribution discussed potential issues with the robust beamforming nulling and candidate solution addressing the issue.

Discussion

Q: For SP1, is your intention to enable OFDMA based feedback?

A: No, it’s subgroup based steering matrix feedback.

Q: Request to defer the SP1.

Q: Is this for CoBF or is this for DL MU-MIMO as well?

A: Just for CoBF, not for DL MU-MIMO.

Q: Why the issue is only for CoBF?

A: DL MU-MIMO is more robust.

Q: Our study shows CoBF is more robust due to STAs are typically closer to their AP.

A: Need more study, will defer the SPs.

**25/0093r0 On the Maximum number of spatial streams support in Coordinated spatial reuse**

**(Jianhan Liu)**

Informative contribution explain the selection of the max number of spatial streams in CoSR.

Discussion

Q: It makes more sense to use a protocol to pass the parameters instead of set a fixed parameter.

A: Limiting the number can eliminate corner cases.

No SP.

**25/0089r0 Enhancing Spatial Reuse with MAP Coordination (Rui Yang)**

The contribution discussed the problems in 11ax/11be PSR and how to enhance it via MAP coordination, CoSR.

Discussion

Some discussions for clarification.

No SP.

**Recess**

The meeting is Recessed at 12:30 JST.

## Wednesday January 15th, 2025 16:00 – 18:00 JST

**Introduction**

1. The Chair (Sigurd Schelstraete, MaxLinear) calls the meeting to order at 16:00 JST.
2. The Chair follows the agenda in 11-24/**2074r12**.
3. Reminder for registration for the Interim meeting.
4. 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), Dongguk Lim (LGE) or the Chair himself if unable to record attendance via IMAT system.
5. The Chair goes through the IPR policy and asks if anyone is aware of any potentially essential patents. **Nobody speaks up.**
6. The Chair goes through the Copyright policy.
7. Discussions on the agenda:

**Submissions – Miscellaneous**

* + [**25/0126**](https://mentor.ieee.org/802.11/dcn/25/11-25-0126-00-00bn-ppdu-parameters-for-multi-ap-coordination.pptx) **PPDU Parameters for Multi-AP Coordination Leonardo Lanante**
  + **24/1480r1 UHR-LTF for DRU Rainer Strobel [SP]**

**Technical contributions**

**25/0126r0 PPDU Parameters for Multi-AP Coordination (Leonardo Lanante)**

The contribution discussed how to support Multi-AP coordination where one AP may send frames to another AP. Specifically, when management frames are carried in HE/EHT/UHR PPDU, values of the UL/DL flag, BSS Color and STA\_ID need to be defined.

Discussion

Q: Some discussions to clarify the proposal.

Q: Need more time to think and understand. Request to defer the SP.

**24/1480r1 UHR-LTF for DRU (Rainer Strobel)**

The contribution defined a new combination of 4xLTF/GI for use with TB-PPDU for DRU.

Discussion

Q: Some discussions on the value definition in slide 5.

Q: Some comments on SP text.

SP1: **Do you agree to include the following into the 11bn SFD?**

* + UHR-LTF shall define 4xUHR-LTF with GI=1.6 usec for use with DRU TB-PPDU

Y/N/A: 17/28/15

**Adjourn**

The meeting is Adjourned at 16:35 JST.