IEEE P802.11
Wireless LANs

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| Minutes for 802.11 bn PHY ad-hoc in September 2024 Interim session |
| Date: 2024-09-09 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
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Abstract

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

* Monday PM2, September 9, 2024
* Tuesday AM2, September 10, 2024
* Tuesday PM1, September 10, 2024
* Tuesday PM2, September 10, 2024
* Wednesday AM1, September 11, 2024
* Wednesday AM2, September 11, 2024
* Thursday AM1, March 12, 2024
* Thursday AM2, March 12, 2024

## Monday September 9th, 2024 16:00 – 18:00 ET

**Introduction**

1. The Chair (Tianyu, Apple) calls the meeting to order at 16:00pm ET.
2. The Chair follows the agenda in 11-24/**1364r4**.
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, Dongguk Lim (LGE), Sigurd Schelstraete (MaxLinear) 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.
	* SP of 1427 will run after related contribution is presented.

**Technical contributions**

1. **24/1409 Unequal Pattern Discussion Follow up Ross Jian Yu (Huawei)**

Discussions: **No discussion**

1. **24/1427 Signaling for MCS and UEQM in 11bn Dongguk Lim (LGE)**

Discussions:

C: Is it insufficient to indicate the UEQM configuration using the Nss fields?

A: By using the UEQM field, we can distinguish the UEQM and even though one additional combination is added, we can use the Nss field to indicate that because the total case is 8.

C: Since UEQM is used when NSS is equal to or larger than 2, UEQM is conditionally mandatory.

A: Since 11bn should support EQM, it is not mandatory.

C: If beamformee is not supporting, how to use the UEQM?

A: EQM is used for transmission because beamformee is not supporting the UEQM.

Q: Considering the enhancement of throughput in the next Wi-Fi, we may consider the Max Nss =16.

A: Currently 16 SS is not in use and it is not known whether it will be used in the future.

1. **24/1431 A-Unified-Signaling-Scheme-for-EQM-and-UEQM Aiguo Yan (Samsung)**

Discussions: **No Discussion**

1. **24/1451 UEQM Transmission over Spatial Streams Ying Wang (InterDigital)**

Discussions:

C: Generally, I agree to reuse the 11n method. But, you should consider the MU MIMO case.

C: Regarding the calculation of S, we consider the use of difference modulations. So, we need to redefine it.

A: We can reuse the conventional formula because the number of bits per modulation is calculated according to each modulation.

C: We need to discuss whether BSPK is included or not. It is better to reuse the EQM spatial parser rather than create something.

A: If S is equal to 1, it is a problem

C: It would be good to clarify whether BPSK will be excluded from the 11bn formula.

A: This formula can be applied to both EQM and UEQM and only to allowed modulation.

1. **24/1433 Enhancing-BF-Feedback-Mechanism-in-11bn Aiguo Yan (Samsung)**

Discussions: **No discussion**.

1. **24/1411 Signaling for UHR PPDU Ross Jian Yu (Huawei)**

Discussions:

C: Do you have any idea for an indication of 2x LDPC?

A: We don’t need a bit to indicate it in the user field.

C: You consider the consistently 4-bit MCS indication. How do we indicate the new MCSs?

A: we don’t include it because it doesn’t have any gain.

C: I slightly prefer option 1 because, in the future, we can expand the NSS.

**Recess**

The meeting is Recessed at 15:30am ET.

## Tuesday September 10th, 2024 10:30 – 12:30 ET

**Introduction**

1. The Chair (Tianyu, Apple) calls the meeting to order at 10:30am ET.
2. The Chair follows the agenda in 11-24/**1364r5**.
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, Dongguk Lim (LGE), Sigurd Schelstraete (MaxLinear) or the Chair himself if unable to record attendance via IMAT system.
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7. Discussions on the agenda.

**Technical contributions**

1. **24/1461 UHR preamble signaling Sigurd Schelstraete (MaxLinear)**

Discussions:

C: In the MU-MIMO case, if some STA support 2x LDPC and some STAs do not support the 2x LDPC, in this case, do you consider that the indication of the user field is not needed? And we don’t want to define the UEQM in the MU-MIMO.

A: We don’t mix those STAs in the MU-MIMO.

C: It is better to give flexibility to a transmitter to use the 2x LDPC by indicating this.

A: new information can be added. but, there’s some drawback to signaling the codeword size. Rate adaptation is becoming more complicated.

C: I preferred the indication of 2x LDPC because STA does not know which PPDU is happening

C: I don’t want to define the 2x LDPC as mandatory. If it is defined, the possible codeword size should be fulfilled.

A: it should be optional, but another possibility is if it’s mandatory then the problem is solved.

**SP 1 ( not for SFD)**

**Should UEQM be defined for MU-MIMO?**

**Y: 20 N 46 Abs 18,**

1. **24/1410 Legacy preamble for ELR PPDU Ross Jian Yu (Huawei)**

Discussions :

C: ELR-STF should be the same as EHT-STF. Regarding PPDU detection, please review the Wookbong’s contribution.

A: Yes, I will check the contribution

C: Due to a range issue, the legacy part detection is not decoded correctly so I am confused about how to continue processing the PPDU.

A: It can be done by the detection of ELR-STF.

C: Since L-STF is so weak, even though you can detect it AP probably thinks the medium is not busy and tries to transmit.

A: AP can receive both PPDU and the ELR PPDU, it can perform the verification of the second part if it recognizes the failure of the L-part.

C: In option 2, since the signal is very weak, the receiver has difficulty demodulating this.

A: It is to provide better coexistence for third-party devices.

C: I prefer to option 2. Since it includes 5 version independent fields, the third-party device can know what is going on

A: Regarding version dependent field, we need more study.

C: we need a more robust packet detection design using the ELR-STF and it is not a problem to have a parallel detection.

1. **24/1454 Discussion on configuration/indication of ELR PPDU Ke Zhong ( Ruijie Networks Co., Ltd)**

Discussions: **No discussion**

1. **24/1478 ELR-PPDU-design Lin Yang (Qualcomm)**

Discussions:

C: Do you compare the mark symbol with L-STF?

A: No, we consider the data demodulation.

C: What do you mean by the mapping of BSS color to ELR mark sequence?

A: Depending on what BSS color you got, you know which sequence corresponding

C: You consider the ELR SIG field, so, we can indicate the BSS color by using this field.

A: The early indication of BSS color is more important because the capable receiver is very sensitive.

C: You can have a power boost if the average power is below the regulatory limit.

A: The STF boosting mainly improves the packet detection

C: If a receiver has errors in U-SIG, how does the receiver continue processing? Is all receiver processing always implementation?

A: It has a different stage for that.

C: Which field you can clarify the ELR PPDU

A: L-STF does not declare, just for packet detection, it made by the mark symbol

**Recess**

The meeting is Recessed at 12:30pm ET.

## Tuesday September 10th, 2024 13:30 – 15:30 ET

**Introduction**

1. The Chair (Tianyu, Apple) calls the meeting to order at 13:30pm ET.
2. The Chair follows the agenda in 11-24/**1364r6**
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, Dongguk Lim (LGE), Sigurd Schelstraete (MaxLinear) or the Chair himself if unable to record attendance via IMAT system.
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6. The Chair goes through the Copyright policy.
7. Discussions on the agenda.

**Technical contributions**

1. **24/1478 ELR-PPDU-design (Q&A) Lin Yang (Qualcomm)**

Discussions:

C: The U-SIG has a BSS color in the front, why do you have to add in the mark? Mark symbol used the same tone plan. So, It means that it cannot detected if power is not enough. So do you consider proper power scaling?

A: Yes, Mark has a different tone plan. It has 48 data tones and 4 pilot tone

C: In your simulation for false detection, do you consider two LTF symbols with power-boosting

A: Yes

C: Are you assuming the same modulation when you calculate the 6 dB gain? Is MCS0 used for comparison?

A: Yes, the target is improving the existing by 6 dB range extension.

1. **24/1485 Considerations for ELR PPDU format Dongguk Lim (LGE)**

Discussions:

C: How do you indicate the packet length to the receiver?

A: If we consider it on the AP side, it does not need. Let’s think more about this.

C: To apply the LDPC in ELR transmission, we need information related to LDPC.

A: The described information is an example. open for that.

C: Instead of the Length field in the L-SIG, the use of the TXOP field is to indicate the larger packet length.

A: Regardless of packet size, using of TXOP field can provide reliable protection.

1. **24/1486 Performance evaluation of ELR transmission Dongguk Lim (LGE)**

Discussions: No discussion.

1. **24/1488 ELR PPDU Transmission Design Shengquan Hu ( Mediatek )**

Discussions:

C: Regarding the coefficient, you suggest one case. Do you consider the other coefficient case?

A: Yes, we consider all cases configured with 1 or -1

C: Consideration of PAPR optimization, are you considering the adaptation of coefficient for ELR-LTF?

A: We need simulation and depending on the LTF mode, it is different. But, this PAPR is enough low. The same

C: In the SISO case, MCS0 can obtain the 8 dB gain. It is over-designed. What do you think about it?

A: It is under ideal PD without impairment. So, in the real detection and channel estimation, the performance will be degraded.

C: The main target of ELR is UL.

A: By using the 11b in 2.4GHz, we can get a similar range in DL but, by using ELR, we can improve the data rate in DL

C: Regarding the coefficient for the data field, we need more checks because, in terms of PAPR, some coefficients have similar PAPR.

C: Do you clarify why you include the 3Mbps data rate because we have already defined the DCM?

A: The DCM is not testified in WFA.

1. **24/1571 Extended Long Range (ELR) Mark Symbol Design Rethna Pulikkoonattu (Broadcom )**

Discussions:

C: Why do you consider the J matrix?

A: We need this to minimize the false alarm probability

C: When you do the detection of the marker, you consider the channel estimation is already done at LTF

A: Channel estimation results may not be good enough.

C: Do you compare the false detection and performance of L-STF?

A: Yes, it is better than what you can get from L-STF

C: Does this non-ELR mean any signal that is not marked? it could be any other signal or combination of BPSK and QPSK.

1. **24/1573 An ELR PPDU Follow Up Wook Bong Lee (Apple)**

Discussions:

C: How do you pre-calculate the CFO at the TX or RX?

A: It can just perform based on the DL packet as a beacon frame

C: What STF do you use in scheme two?

A: I don’t consider any specific design for it.

**Recess**

The meeting is Recessed at 15:30pm ET.

## Tuesday September 10th, 2024 16:00 – 18:00 ET

**Introduction**

1. The Chair (Tianyu, Apple) calls the meeting to order at 16:00pm ET.
2. The Chair follows the agenda in 11-24/**1364r**6
3. Reminder for registration for the Interim meeting.
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**Technical contributions**

1. **24/1590 Enhanced Long Range Signaling Juan Fang ( Intel)**

Discussions:

C: Why do you indicate firstly the ELR version?

A: We don’t want to design another spoofing method to differentiate whether this is a new version or not.

C: I think that BCC could be good enough. Do you have any simulation results for that?

A: We don’t have it.

C: If we use the two CRC and tail, when one symbol has an error, do you just drop the packet?

A: Yes

C: Regarding performance, for the small packet size, BCC has outperformed but, LDPC still gave somehow gains around 0.5-0.8 dB when the packet length is larger than a certain length.

C: For consistency, it is better to use the PHY version identifier and, if we need the CRC and tail in each symbol, we need more study about it.

C: Regarding the tail and CRC, we can have the advantage of doing this because you make sure that the BCC decoder is back to zero state.

C: 11 AID ie., partial AID is not used popularly. Do you have a particular reason to bring in this STA-ID?

A: It is for the power save of non-intended STA.

1. **24/1592 USIG fields in an ELR PPDU Hari Ram (NXP )**

Discussions:

C: Regarding STA-ID, I think we should limit this to uplink and I wonder whether we really need an STA ID.

A: We don’t have any consensus for UL or DL. I think in downlink mode will be useful

1. **24/1243 100 MHz PPDU Ross Jian Yu (Huawei)**

Discussions: No discussion

1. **24/1455 Discussion on TB ELR PPDU Mengshi Hu (Huawei)**

Discussions:

C: What is the benefit of ELR TB compared with regular TB?

A: The motivation for this is improvement

C: Due to the diversity gain of 52 tones, we may get a 2-3dB difference. Probably you should compare it with DRU

A: I will check it

1. **24/1432 Unified-CoBF-and-MUMIMO-Schemes-with-Zero-MUI Aiguo Yan ( Samsung)**

Discussions: No Discussion.

1. **24/1463 Robust Beamforming Nulling for CBF Ken Tanaka (Sony)**

Discussions:

C:Why are $h\_{2}\left(t-Δt\right)$ and $h\_{2}(t-2Δt)$ linear?

C: Is your proposal to predict future channel by using two past CSI

C: It seems like beamformer can implement it, but why does beamformee need to know?

C: What I said in my contribution is not the left singular matrix FB. This is the FB of the SVD of the equivalent OBSS channel with the left singular matrix of the desired channel applied.

A: Okay

**Recess**

The meeting is Recessed at 18:00am ET.

## Wednesday September 11th, 2024 08:00 – 10:00 ET

**Introduction**

1. The Chair (Tianyu, Apple) calls the meeting to order at 08:00am ET.
2. The Chair follows the agenda in 11-24/**1364r8**.
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, Dongguk Lim (LGE), Sigurd Schelstraete (MaxLinear) or the Chair himself if unable to record attendance via IMAT system.
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6. The Chair goes through the Copyright policy.
7. Discussions on the agenda.

**Straw Polls**

**SP1**

 **Do you agree that ELR PPDU starts with a legacy preamble in the PPDU for the ELR transmission?**

**– The legacy preamble contains the L-STF, L-LTF, L-SIG, RL-SIG, and U-SIG.**

**Result: No Objection.**

**SP2**

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

* **In an UHR MU PPDU, the transmitter may set the LDPC Extra Symbol Segment field to 1 regardless of the value derived from the calculations.**

Discussion:

Q: Does UHR MU PPUD include the MU-MIMO mode for multiple user when you set to this access?

A: Yes, please delete the note.

Results: 31Y, 24N, 29A

**SP3**

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

* **A per RU phase rotation is applied to the pilot sequence in OFDMA transmission?**

The pattern of phase rotation is TBD. (e.g. [1 -1 j -j])

Results: 7Y, 36N, 25A

**Technical contributions**

1. **24/1484 Coordinated BF: Figures of Merit Shimi Shilo (Huawei)**

Discussions: No discussion.

1. **24/1515 Coordinated Beamforming for 11bn – Follow Up Insik Jung ( LGE)**

Discussions: No discussion.

1. **24/1542 Sounding Schemes for Coordinated Beamforming Sameer Vermani ( Qualcomm)**

Discussions:

C: I wonder which AP coordinates the COBF transmission?

A: It is out of the scope of this presentation. I am open to that.

C: Is it possible to send AP1 and AP2 NDP frame at the same time?

A: There is already UL MU-MIMO in the Wi-Fi and Multiple STA transmitting the same spectrum at the same time

C: Should two APs synchronize in the frequency domain?

A: Yes

C: In your sounding procedure, since you use the exact same FB, partial nulling will not work well.

C: For CoBF, it needs to collect the other link CSI. How do you think so?

A: You mean that AP 1 and AP 2 share the CSI. I don’t think so.

C: For the OBSS reorganization of the FB information, the FB can be transmitted by using the robust MCS such as MCS0.

C: Joint sounding may be a problem. I think a large joint matrix incurs large SVD and increases the complexity inside of the station.

A: We support sequential sounding as well as joint sounding. We don’t want to restrict it. According to scenarios, each sounding method has a benefit.

C: In slide 11, do you consider the sounding overhead?

C: For the partial nulling, we should use the joint sounding. Is it enabling?

A: Sure, it is not a problem. It works well for full nulling as well as partial nulling.

1. **24/1568 Sounding Design for C-BF1 Ron Porat (Broadcom)**

Discussions:

C: Is the PHY capability for C-BF the same as the DL MU-MIMO case?

A: To support the joint sounding, it requires to support 8 spatial stream

C: Regarding capability, it would have to be done for both APs and STAs. STA also indicates that it supports FB for 8 streams.

A: It is for AP.

**Recess**

The meeting is Recessed at 10:00am ET.

## Wednesday September 11th, 2024 10:30 – 12:30 ET

**Introduction**

1. The Chair (Tianyu, Apple) calls the meeting to order at 10:30am ET.
2. The Chair follows the agenda in 11-24/**1364r9**.
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, Dongguk Lim (LGE), Sigurd Schelstraete (MaxLinear) or the Chair himself if unable to record attendance via IMAT system.
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6. The Chair goes through the Copyright policy.
7. Discussions on the agenda.

**Technical contributions**

1. **24/1582 Coordinated Sounding for CoBF You-Wei Chen (MediaTek)**

Discussions:

C: Are you considering 6x2 or 8x2 for the FB matrix in joint sounding?

A: I consider a 6x2 size

C: Are you considering the total number of LTF symbols for sharing AP and shared AP?

A: For overhead calculation, we assumed. The detail is not included in the presentation.

C: It seems to need to be exchanged between Aps. So, the NDPA frame may be defined for the C-BF sequence. How do you have any idea about this?

A: We can further discussion.

1. **24/1575 Guard Interval Coordination for Coordinated Beamforming Jiayi Zhang (Ofinno )**

Discussions: No Discussion.

1. **24/1580 cbf-smoothing Xiaogang Chen (Spreadtrum US)**

Discussions:

C: If the compressed information is not used, this problem is not a big problem.

A: That is not the point, this is always a problem

C: Is the CBF coordinated beamforming?

A: No, it is a compressed BF.

C: There is no indication for that. To solve this, another approach is to use the high capability bit.

1. **24/1456 Discussion on DCM of DRU Mengshi Hu (Huawei )**

Discussions:

C: Does your proposal duplicate the DRU in two different distributed BW

A: Right

C: Do you consider the reasonable number of users scheduled on the DRU BW to be two or three?

A: For that, DBW is divided with the maximum size of DRU supported by STA, and other DRU is not used by others.

C: The duplication is only defined in SU

C: The DCM cannot support MCS0. And I don’t think the DCM is not needed for a certain power level.

A: By using the DCM, we can get the 3dB gain.

C: We define the MCS15 in EHT. But how to combine it with DRU, we need to think about it.

A: Yes

C: I don’t think you need to introduce a new mode to get the gain from DCM.

A: When the DBW is 20+20+40 case, this is useful to obtain the gain.

1. **24/1483 Index Modulation Applied to DRU Junghoon Suh (Huawei )**

Discussions:

C: My concern is the implementation burden because many STA should be memorized in TX until the tone election.

A: Symbol-by-symbol processing is operating.

1. **24/1465 Updated Proposal for 80MHz DRU Tone Plan Chenchen Liu (Huawei )**

Discussions:

C: Many suggestions have different tone plans for each BW. And, based on the 20MHz DRU tone plan, the 40/80MHz tone plan for DRU is expanded. Since it caused some new problems, we need to time for that.

A: We can achieve a little bit of performance gain with this proposal. What is the new problem?

C: I support this proposal because it provides good performance and lower PAPR

A: Thanks

**Recess**

The meeting is Recessed at 12:30pm ET.

## Thursday September 12th, 2024 08:00 – 10:00 ET

**Introduction**

1. The Chair (Tianyu, Apple) calls the meeting to order at 08:00am ET.
2. The Chair follows the agenda in 11-24/**1364r11**.
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, Dongguk Lim (LGE), Sigurd Schelstraete (MaxLinear) or the Chair himself if unable to record attendance via IMAT system.
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6. The Chair goes through the Copyright policy.
7. Discussions on the agenda

**Straw Polls**

**SP1:**

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

 Introduce new MCSs which are applicable to single spatial stream transmissions, as well as to equal modulation and unequal modulation cases in multiple spatial stream transmissions.

[DCN# 11/24-1186]

**Results : No Objection.**

**SP2:**

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

In the U-SIG field of a UHR ELR PPDU, the PHY Version Identifier is set to 1. And the PPDU Type And Compression Mode is used to indicate ELR PPDU.

[DCN# 11/24-1410r0]

**Results : No Objection.**

**SP3:**

Do you agree to add to the TGbn SFD the following:

Define a mode with additional pilots, located within the data portion of the PPDU, which are used for interference estimation & mitigation

Note: zero-energy pilots to be considered as well

This SP is in relation to DCN 11-24/1264

Results: 60Y, 17N, 34A

SP4:

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

ELR-SIG is located right after ELR-LTF in ELR PPDU

(Note that ELR-LTF is the short name of UHR-LTF for ELR PPDU)

This SP is in relation to DCN 11-24/1478

Results: 64Y, 3N, 15A

**Technical contributions**

1. **24/1541 Tone distribution in DRU - follow up Yan Xin (Huawei )**

Discussions:

C: You use a different way to generate a design of 20MHz. and, the same distribution index is proposed.

A: Yes. The granularity of Preamble puncturing is 20MHz sub-channel base. So, we consider it.

C: When we design our tone plan, we follow the same with regular RU. I think we first would like to follow the regular RU tone plan.

C: It may not be useful and it makes the DUR a little bit complicated. So I think we keep the 20, 40, 80MHz

A: In the puncturing case, we see the benefit with 60MHz BW since we can use the whole available spectrum.

C: Why do you like using the two shifts in DRU2?

A: for the later on for the combining of 242 tones to generate.

1. **24/1471 Signaling for DRU in Trigger Frame Eunsung Park (LGE)**

Discussions:

C: I’m in favor of this direction of using the common part to signal this which saves the overhead of the user info field. Regarding the flag bit, we may need more bits and it can be indicated by a special user info field.

A: My point is that if we have a specific special user info field to contain that, it will be enough.

C: Why do you include the 12 bits in the common info field?

A: The special user info field can be used because it is a common bit.

C: We need to split into some in common and special user info fields. It is not a clean design. I think it would be better this combine some common part information in the common field similar design of RRU.

A: The user info field can be used and it can be changed at other 80MHz channels.

1. **24/1489 Signaling for DRU Transmission Shengquan Hu (Mediatek )**

Discussions:

C: The signaling bits are very valuable because many other features that have an impact on the performance also need the signaling bit in the info field. The 4 + 2 multiplier is a little bit too many.

A: The common info field based on the current existing available number of bits is not enough

C: In your design, you need to go through three different steps of decoding to know your allocation.

A: We can use the same RU allocation. And, first step, we know if each 80MHz subblock is RRU or DUR.

C: If we use the common info field, the needed bits are 8 instead of 12 bits.

C: Some members still consider the hybrid mode and it is better that we first off consider the 80MHz. Why do you consider the 2bit for DBW using spatial configuration bits?

A: As with UL-MIMO, if DRU is used, 2 or 3 spatial streams may be used.

C: I don’t think the signaling of a common field is everything. It cannot scale the number of STA.

**Recess**

The meeting is Recessed at 10:00am ET.

## Thursday September 12th, 2024 10:30 – 12:30 ET

**Introduction**

1. The Chair (Tianyu, Apple) calls the meeting to order at 10:30am ET.
2. The Chair follows the agenda in 11-24/1364r12.
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, Dongguk Lim (LGE), Sigurd Schelstraete (MaxLinear) or the Chair himself if unable to record attendance via IMAT system.
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**Technical contributions**

1. **24/1472 Consideration-on-DRU-for-11bn Lei Zhou (New H3C)**

Discussions: No discussion

1. **24/1510 Open-issues-on-DRU Lin Yang (Qualcomm)**

Discussions:

C: I agree the 4x-LTF would be the best choice. In my contribution, I showed that 2x-LTF has a problem. What is your preference for the new LTF sequence?

A: The new sequence is a different issue from what LTF sequence is used for DRU.

C: In hybrid mode, the same LTF mode is not only used. for example, 8 streams are used for MU-MIMO in RRU.

A: It may not use a large number of spatial streams.

C: In 40MHz, if 18 26-tone DRUs are used, the nine DRUs are only located even index of carriers. It is natural to use transmission of 2x LTF, what do you think?

C: In hybrid mode, is RRU still allowed 2x LTF?

A: For the alignment, it is better to use 4x LTF

**SP1**

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

* + DUR only support up to 2ss

SP results: No objection.

**SP2**

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

UL MU-MIMO is not applicable to DRU

SP results: No objection.

1. **24/1540 Power Imbalance Issue Analysis for DRU Bo Gong (Huawei)**

Discussions:

C: We will limit the transmission power. and by transmission, it will lose about one dB of power distribution. We need further discussion.

C: It would be clearer if you could translate this sheet to how many dBs.

C: Need for the discussion, please defer the SPs.

**Straw Polls**

**SP3:**

Do you agree to include the following into the 11bn SFD?
For 4 SS, the UEQM pattern only include:
1st ss, 2nd ss, 3rd ss, 4th ss,
[M, M, M, M-1]
[M,M,M,M-2]
[M,M,M-1,M-2]
[M,M-1,M-1,M-2]

Note:
· M is the modulation order
· M-1 refers to the modulation that is one order lower than M
· M-2 refers to the modulation that is two orders lower than M
in 11-24/1409

SP results: No Objection.

**SP 4:**

Do you agree to include the following into the 11bn SFD?
For a (non-ELR) UHR MU PPDU, there exists a 1bit EQM/UEQM indication in a User field for non-MU-MIMO in the UHR-SIG field.
in 11-24/1411

SP results: 88Y, 6N, 12A

**SP 5:**

Do you agree to include the following into the 11bn SFD?
For a (non-ELR) UHR MU PPDU, when EQM/UEQM flag indicates UEQM in a User field for non-MU-MIMO, there exists a MCS field, a NSS field and a 2 bit field indicating UEQM pattern.
in 11-24/1411

SP results: 64Y, 10N, 12A

**SP6**

[11-24/498r2]: Do you agree to add the following text to 11bn SFD?

UEQM QAM pattern for Nss=3 is limited to the following three :
[M, M, M-1]
[M, M, M-2]
[M, M-1, M-2]
Note:
M is the modulation order index.
M-1 refers to the modulation that is one order lower than M.
M-2 refers to the modulation that is two orders lower than M.

SP results: 77Y, 3N, 14A

**SP7**

**Do you agree to include the following text to the 11bn SFD? [ 11-24/1186r1 ]**

 Add the following modulation and code rate combinations as the new MCSs for 11bn:

•Modulations of {QPSK, 16QAM, 256QAM} with code rate R=2/3

•Modulation of 16QAM with code rate R=5/6

SP results: No objection

**SP8**

[11-24/474r3]: Do you agree to add the following text to 11bn SFD?
UEQM patterns for Nss=2 are limited to two as:
·[M, M-1]
·[M, M-2]
·Note:
·M is the modulation order index
·M-1 refers to the modulation that is one order lower than M
·M-2 refers to the modulation that is two orders lower than M

SP results: No objection

**SP9**
[11-24/474r3]: Do you agree to add the following text to 11bn SFD?
UHR defines unequal modulation only for LDPC

SP results: No objection

**SP10**

[24/1472r2] : Do you agree to include the following into the 11bn SFD?

– The following distribution bandwidth modes are allowed in an 40 MHz subblock without puncturing:

• 20 MHz + 20 MHz

SP deferred.

**SP11**

[11-24/1427]: 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.

SP deferred.

**SP12**

* a modulation order index can be defined as an index associated with each modulation order such as 0: BPSK, 1: QPSK, 2: 16QAM, 3: 64QAM, 4: 256QAM, 5: 1024QAM, 6: 4096QAM

SP withdraw

**SP13**

Unequal modulation is applied in a PPDU only if beamforming is applied.

SP deferred.

**Adjourn**

The meeting is Adjourned at 12:30am ET.