IEEE P802.11  
Wireless LANs

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| Minutes 802.11 be PHY ad hoc Telephone Conferences,  September - November 2020 | | | | |
| Date: 2020-10-23 | | | | |
| Author(s): | | | | |
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| Sigurd Schelstraete | ON Semiconductor |  |  | Sigurd.schelstraete@onsemi.com |
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Abstract

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

* Sept 14, 2020 (R0)
* Sept 21, 2020 (R1)
* Sept 24, 2020 (R2)
* Sept 28, 2020 (R3)
* October 8, 2020 (R4)
* October 12, 2020 (R5)
* October 14, 2020 (R6)
* October 19, 2020 (R7, R8)
* October 21, 2020 (R9)
* October 22, 2020 (R10)
* October 26, 2020 (R11)
* October 28, 2020 (R12)

**Monday Sept 14th, 2020 19:00 – 21:00 ET**

**Introduction**

1. The Chair (Tianyu Wu, Apple) calls the meeting to order at 19:00 ET.
2. The Chair follows the agenda in 11-20/1269r3
3. The Chair goes through the IPR policy and asks if anyone is aware of any potentially essential patents. Nobody speaks up.
4. The Chair reminds everyone to report their attendance by sending an e-mail to the Co-chair, Sigurd Schelstraete (ON Semiconductor) or the Chair himself.
5. Announcements: None
6. PDT Status for R1 PHY features:

* PDT Status for R1 PHY features:

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| **Not Uploaded** | **Uploaded** | **And Presented** | **And Passed StrawPoll** |
| Xiaogang (T-Block)  Sameer (U-SIG)  Dandan (EHT LTF)  Chenchen (Scrambler)  Sameer (EHT sound. NDP)  Xiaogang (T-mask & S-flat)  Bin (CCA sens)  Xiaogang (TX procedure)  Xiaogang (RX procedure) | 1307, 1338, 1339, 1337, 1319, 1351, 1403, 1404, 1340, 1447, 1448 | 1276, 1315, 1290, 1371. | [1293r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1293-01-00be-pdt-phy-scope-and-eht-phy-functions.docx), [1295r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1295-01-00be-pdt-phy-overview-of-the-ppdu-enconding-process.docx), [1160r4](https://mentor.ieee.org/802.11/dcn/20/11-20-1160-04-00be-pdt-phy-mu-mimo.docx), [1327r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1327-01-00be-pdt-eht-ppdu-format.docx), [1153r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1153-03-00be-pdt-phy-timing-related-parameters.docx), [1260r4](https://mentor.ieee.org/802.11/dcn/20/11-20-1260-04-00be-pdt-phy-eht-stf.docx), [1349r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1349-03-00be-pdt-constellation-mapping.docx), [1231r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1231-03-00be-pdt-phy-beamforming.docx), [1252r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1252-02-00be-pdt-phy-frequency-tolerance.docx), [1253r6](https://mentor.ieee.org/802.11/dcn/20/11-20-1253-06-00be-pdt-phy-modulation-accuracy.docx), [1254r6](https://mentor.ieee.org/802.11/dcn/20/11-20-1254-06-00be-pdt-phy-receive-specification-general-and-receiver-minimum-input-sensitivity-and-channel-rejection.docx), [1229r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1229-03-00be-pdt-phy-channel-numbering-and-channelization.docx), [1294r4](https://mentor.ieee.org/802.11/dcn/20/11-20-1294-04-00be-pdt-phy-eht-plme.docx), [1329r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1329-02-00be-pdt-eht-preamble-l-stf-l-ltf-l-sig-and-rl-sig.docx). |

1. Agenda:
   * **Technical Submissions: Proposed Draft Text (PDTs) [Discussions and SPs]**
     + [1290r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1290-02-00be-pdt-phy-parameters-for-eht-mcss.docx) Parameters-for-EHT-MCSs Yujin Noh [SP]
     + [1276r5](https://mentor.ieee.org/802.11/dcn/20/11-20-1276-02-00be-pdt-phy-eht-preamble-eht-sig.docx) EHT-preamble-EHT-SIG Ross Jian Yu [SP]
     + [1315r4](https://mentor.ieee.org/802.11/dcn/20/11-20-1315-01-00be-draft-text-for-support-for-large-bandwidth.docx) Support for large bandwidth Yan Xin [SP]
     + [1371r4](https://mentor.ieee.org/802.11/dcn/20/11-20-1371-00-00be-pdt-phy-subcarriers-and-resource-allocation-for-wideband.docx) Subcarriers-and-resource-allocation-for-wideband Yan Xin [SP]
     + [1338r5](https://mentor.ieee.org/802.11/dcn/20/11-20-1338-04-00be-pdt-phy-eht-modulation-and-coding-eht-mcss.docx) EHT Modulation and Coding (EHT-MCSs) Rethna Pulikkoonattu
     + [1339r4](https://mentor.ieee.org/802.11/dcn/20/11-20-1339-04-00be-pdt-phy-data-field-coding.docx) Data-field-Coding Yan Zhang
     + [1337r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1337-01-00be-pdt-phy-mathematical-description-of-signals.docx) Mathematical description of signals Yan Zhang
     + [1340r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1340-01-00be-pdt-phy-packet-extension.docx) Packet Extension Yan Zhang
     + [1319r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1319-01-00be-pdt-phy-preamble-puncture.docx) Preamble-Puncture Oded Redlich
     + [1351r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1351-00-00be-pdt-phy-pilot.docx) Pilot Jinyoung Chun
     + [1403r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1403-00-00be-pdt-phy-txvector-rxvector-trigvector-config-vector.doc) TX/RXVECTOR-TRIGVECTOR-CONFIG\_VECTOR Bo Sun
     + [1404r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1404-00-00be-pdt-phy-support-for-non-ht-ht-vht-he-format-and-regulatory.doc) Support-for-NON-HT-HT-VHT-HE-Format-and-Reg. Bo Sun
     + [1447r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1447-01-00be-pdt-subcarriers-and-resource-allocation-for-multiple-rus.docx) Subcarriers and Resource Allocation for Multiple RUs Jianhan Liu
     + [1448r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1448-00-00be-pdt-resource-unit-interleaving-for-rus-and-multipe-rus.docx) Resource Unit-Interleaving for RUs and Multipe RUs Jianhan Liu
     + [1452r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1452-00-00be-pdt-segment-parser.docx) Segment parser Jianhan Liu
     + [1307r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1307-00-00be-pdt-phy-introduction-to-eht-phy.docx) PHY introduction Bin Tian
     + [1462r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1462-00-00be-pdt-phy-tx-mask.docx) Tx Mask Xiaogang Chen
   * **Technical Submissions:**
     + [1135r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1135-03-00be-papr-issues-for-eht-er-su-ppdu.pptx) PAPR Issues for EHT ER SU PPDU Eunsung Park [3 SPs]
     + [1161r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1161-00-00be-eht-punctured-ndp-and-partial-bandwidth-feedback.pptx) EHT Punctured NDP and Partial bandwidth feedback. Bin Tian [SPs]
     + [1223r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1223-01-00be-subcarrier-grouping-for-eht.pptx) Subcarrier Grouping for EHT Eunsung Jeon
     + [1159r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1159-00-00be-11be-spectral-mask.pptx) 11be spectral mask Bin Tian
     + [1180r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1180-00-00be-spectrum-mask-requirement-for-punctured-transmission.pptx) Spectrum mask requirement for punctured Transmission Wookbong Lee
     + [1165r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1165-00-00be-spectrum-mask-for-puncturing.pptx) Spectrum mask for puncturing Xiaogang Chen
     + [1174r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1174-00-00be-e-sig-with-different-puncturing-patterns.pptx) E-SIG Detection with Different Puncturing Patterns Junghoon Suh
     + [1191r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1191-00-00be-dup-mode-papr-reduction.pptx) DUP mode PAPR reduction Ron Porat
     + [1178r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1178-00-00be-discussions-on-mu-mimo-signaling.pptx) Discussions on MU-MIMO Signaling Mengshi Hu
     + [1206r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1206-00-00be-discussions-on-papr-reduction-methods-for-dup-mode.pptx) Discussions on PAPR Reduction Methods for DUP Mode ChenChen Liu
     + [1238r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1238-00-00be-open-issues-on-preamble-design.pptx) Open Issues on Preamble Design Sameer Vermani
     + [1259r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1259-00-00be-puncturing-patterns-for-ofdma.pptx) Puncturing patterns for ofdma Ron Porat
     + [1310r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1310-00-00be-coding-bit-in-mu-mimo.pptx) Coding bit in MU-MIMO Ron Porat
     + [1311r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1311-00-00be-2x-320mhz-ltf-design.pptx) 2x LTF 320MHz sequences Ron Porat
     + [1317r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1317-00-00be-sig-contents-discussion-for-eht-sounding-ndp.pptx) SIG-contents-discussion-for-eht-sounding-ndp Ross Yu
     + [1347r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1347-00-00be-lpi-ppdu-format.pptx) LPI PPDU format Junghoon Suh
     + [1375r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1375-01-00be-eht-nltf-design.pptx) EHT NLTF Design Rui Cao
     + [1331r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1331-00-00be-eht-pre-fec-padding-and-packet-extension.pptx) EHT pre-FEC padding and packet extension Rui Cao
     + [1132r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1132-00-00be-thoughts-on-extended-range-preamble.pptx) Thoughts on Extended Range Preamble Bin Tian
     + [1377r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1377-00-00be-on-tbd-mcss.pptx) On TBD MCSs Jianhan Liu
     + [1322r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1322-00-00be-phy-signaling-methodology-for-11be-releases.pptx) PHY Signaling Methodology Rui Yang
     + [1446r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1446-00-00be-pilot-polarities-for-small-m-rus.pptx) Pilot Polarities for Small M-RUs Ron Porat
     + [1441r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1441-00-00be-ru-restriction-for-20mhz-operation.pptx) RU Restriction for 20MHz Operation Eunsung Park
     + [1467r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1467-00-00be-bw320-signaling.pptx) 320MHz signaling Ron Porat
     + [1342r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1342-00-00be-eht-sounding-feedback-request-parameters.pptx) EHT Sounding feedback request parameters Genadiy Tsodik

**Attendance**

The following people recorded their attendance for this call:

* Kwok Shum Au (Huawei)
* Hari Ram (Nxp Semiconductors)
* Eugene Baik (Qualcomm Incorporated)
* Jianwei Bei (Nxp Semiconductors)
* Rui Cao (Nxp Semiconductors)
* Gurkan Cepni (Apple, Inc.)
* Xiaogang Chen (Intel)
* Jinsoo Choi (Lg Electronics)
* Seungho Choo (Senscomm Semiconductor Co., Ltd.)
* Yanyi Ding (Panasonic Corporation)
* Dung Doan (Qualcomm Incorporated)
* Ruchen Duan (Samsung)
* Ahmed Elsherif (Qualcomm Incorporated)
* Shuling Feng (Mediatek Inc.)
* James Gardner (Qualcomm Incorporated)
* Alireza Ghaderipoor (Mediatek Inc.)
* Bo Gong (Huawei Technologies Co. Ltd)
* Niranjan Grandhe (Nxp Semiconductors)
* Brian Hart (Cisco Systems, Inc.)
* Ching-Wen Hsiao (Mediatek Inc.)
* Hung-Tao Hsieh (Mediatek Inc.)
* Mengshi Hu (Huawei)
* Lei Huang (Oppo)
* Jeorge Hurtarte (Teradyne, Inc.)
* Eunsung Jeon (Samsung Electronics)
* Chenhe Ji (Huawei Technologies Co. Ltd)
* Feng Jiang (Apple Inc.)
* Jeng-Shiann Jiang (Vertexcom Technologies)
* Allan Jones (Activision)
* Jeffrum Jones (Qorvo)
* Vincent Knowles Iv Jones (Qualcomm Incorporated)
* Ishaque Ashar Kadampot (Qualcomm Incorporated)
* Mahmoud Kamel (Interdigital, Inc.)
* Sugbong Kang (Apple, Inc.)
* Kenneth Kerpez (Assia)
* Myeong-Jin Kim (Samsung)
* Youhan Kim (Qualcomm Incorporated)
* Wookbong Lee (Samsung)
* Jialing Li (Qualcomm Incorporated)
* Qinghua Li (Intel Corporation)
* Dong Guk Lim (Lg Electronics)
* Erik Lindskog (Samsung)
* Der-Zheng Liu (Realtek Semiconductor Corp.)
* Jianhan Liu (Mediatek Inc.)
* Hanqing Lou (Interdigital, Inc.)
* Li Ma (Mediatek Inc.)
* Ebubekir Memisoglu (Istanbul Medipol University; Vestel)
* Jun Minotani (Panasonic Corporation)
* Khashayar Mirfakhraei (Cisco Systems, Inc.)
* Takayuki Nakano (Panasonic Corporation)
* Junyoung Nam (Qualcomm Incorporated)
* Yujin Noh (Newracom Inc.)
* Thomas Pare (Mediatek Inc.)
* Eunsung Park (Lg Electronics)
* Richard Perkins (Qorvo)
* Riku Pirhonen (Nxp Semiconductors)
* Ron Porat (Broadcom Corporation)
* Srinath Puducheri (Broadcom Corporation)
* Rethnakaran Pulikkoonattu (Broadcom Corporation)
* Kapil Rai (Qualcomm Incorporated)
* Oded Redlich (Huawei)
* Meriam Rezk (Qualcomm Incorporated)
* Sigurd Schelstraete (Quantenna Communications, Inc.)
* Stephen Shellhammer (Qualcomm Incorporated)
* Shimi Shilo (Huawei)
* Shree Raman Srinivasan (Qualcomm Incorporated)
* Paul Strauch (Qualcomm Incorporated)
* Jung Hoon Suh (Huawei Technologies Co. Ltd)
* Bo Sun (Zte Corporation)
* Bin Tian (Qualcomm Incorporated)
* Tao Tian (Unisoc Comm.)
* Genadiy Tsodik (Huawei Technologies Co. Ltd)
* Yoshio Urabe (Panasonic Corporation)
* Prabodh Varshney (Nokia)
* Sameer Vermani (Qualcomm Incorporated)
* Yi-Hsiu Wang (Zeku)
* Kanke Wu (Qualcomm Incorporated)
* Yan Xin (Huawei Technologies Co., Ltd)
* Ruifeng Xue (Cisco Systems, Inc.)
* Aiguo Yan (Oppo)
* Rui Yang (Interdigital, Inc.)
* Steve Ts Yang (Mediatek Inc.)
* Yair Yona (Qualcomm Incorporated)
* Christopher Young (Broadcom Corporation)
* Heejung Yu (Korea University)
* Jian Yu (Huawei Technologies Co., Ltd)
* Mao Yu (Nxp Semiconductors)
* Salah Eddine Zegrar (Istanbul Medipol University; Vestel)
* Ruochen Zeng (Nxp Semiconductors)
* Yan Zhang (Nxp Semiconductors)

**Straw polls**

1290r3 Parameters-for-EHT-MCSs (Yujin Noh)

Changes are reviewed. It was decided not to decide on the numbering of DCM and DCM+DUP. They are left TBD for now.

Discussion:

Q: will tables for NSS>1 be listed?

A: this only includes tables for NSS=1.

Q: can we at least have a table listing the data rates.

A: can be added in later versions. Possible a plot can be used instead of a table.

SP#1: Do you agree to accept spec text proposed in 1209r3 in 11be draft 0.1?

No objection. Passed with unanimous consent.

1276r6 EHT-preamble-EHT-SIG (Ross Jian Yu)

Colors are used to track changes in successive versions.

Some more TBDs added. Coding part is made yellow (indicating TBD)

r7 is uploaded to correct some typos.

SP#2: Do you agree to accept text in 1267r7 for 11be draft 0.1

No objection. Passed with unanimous consent.

1315r4 Support for large bandwidth (Yan Xin)

Discussion

Q: 80 MHz can not support 2x996. MRUs have to be added.

A: MRUs are included. MRUs are changed to TBD.

Q: Should include mention of 20 MHz operating devices.

Q: please highlight all 80+80 and 160 to keep them TBD for now.

Document will be revised and reconsidered later.

1371r4 Subcarriers-and-resource-allocation-for-wideband (Yan Xin)

Additional tables for RU allocations for 160 and 320 MHz added.

Described subcarrier index related to MRU.

SP#3: Do you agree to accept text in 1371r4 for 11be draft 0.1

No objection. Passed with unanimous consent.

**New presentations**

1338r5 EHT Modulation and Coding (EHT-MCSs) (Rethna Pulikkoonattu)

Should we include all the tables? Helpful to include for specific scenarios.

A plot could be used to present the data for data rates.

Discussion

Q: Should use Nss,u instead of Nss

Q: should appendix be included.

A: no. up to editor. Will indicate explicitly.

Minor changes made - r6 is uploaded.

SP#4: Do you agree to accept text in 1338r6 for 11be draft 0.1

No objection. Passed with unanimous consent.

1339r4 Data-field-Coding (Yan Zhang)

Mostly similar to HE sections.

Some changes are made based on member’s feedback.

Q: 996-tone RU is not the correct number for DUP case. Use BW for indication DUP modes. Discussion on naming of DUP modes.

A: will indicate as TBD for now.

SP#5: Do you agree to accept text in 1339r5 for 11be draft 0.1

No objection. Passed with unanimous consent.

1337r1 Mathematical description of signals (Yan Zhang)

Midamble highlighted as TBD. Additional parts highlighted in yellow.

More discussion on channel BW use for e.g. gamma rotation.

Updated to r3.

SP#6: Do you agree to accept text in 1337r3 for 11be draft 0.1

No objection. Passed with unanimous consent.

1340r2 Packet Extension (Yan Zhang)

Similar to 11ax. Only MU description.

Non-decided parts (e.g. midamble) highlighted in yellow

SP#7: Do you agree to accept text in 1340r2 for 11be draft 0.1

No objection. Passed with unanimous consent.

**Recess**

Meeting is recessed at 9pm ET.

**Monday Sept 21st, 2020 10:00 – 13:00 ET**

**Introduction**

1. The Chair (Tianyu Wu, Apple) calls the meeting to order at 10:00 ET.
2. The Chair follows the agenda in 11-20/1269r8
3. The Chair goes through the IPR policy and asks if anyone is aware of any potentially essential patents. Nobody speaks up.
4. The Chair reminds everyone to report their attendance by sending an e-mail to the Co-chair, Sigurd Schelstraete (ON Semiconductor) or the Chair himself.
5. Announcements: None

* PDT Status for R1 PHY features:

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| --- | --- | --- | --- |
| **Not Uploaded** | **Uploaded** | **And Presented** | **And Passed StrawPoll** |
|  | 1462, 1464, 1466, 1480, 1479, 1494, 1495. |  | [1293r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1293-01-00be-pdt-phy-scope-and-eht-phy-functions.docx), [1295r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1295-01-00be-pdt-phy-overview-of-the-ppdu-enconding-process.docx), [1160r4](https://mentor.ieee.org/802.11/dcn/20/11-20-1160-04-00be-pdt-phy-mu-mimo.docx), [1327r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1327-01-00be-pdt-eht-ppdu-format.docx), [1153r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1153-03-00be-pdt-phy-timing-related-parameters.docx), [1260r4](https://mentor.ieee.org/802.11/dcn/20/11-20-1260-04-00be-pdt-phy-eht-stf.docx), [1349r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1349-03-00be-pdt-constellation-mapping.docx), [1231r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1231-03-00be-pdt-phy-beamforming.docx), [1252r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1252-02-00be-pdt-phy-frequency-tolerance.docx), [1253r6](https://mentor.ieee.org/802.11/dcn/20/11-20-1253-06-00be-pdt-phy-modulation-accuracy.docx), [1254r6](https://mentor.ieee.org/802.11/dcn/20/11-20-1254-06-00be-pdt-phy-receive-specification-general-and-receiver-minimum-input-sensitivity-and-channel-rejection.docx), [1229r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1229-03-00be-pdt-phy-channel-numbering-and-channelization.docx), [1294r4](https://mentor.ieee.org/802.11/dcn/20/11-20-1294-04-00be-pdt-phy-eht-plme.docx), [1329r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1329-02-00be-pdt-eht-preamble-l-stf-l-ltf-l-sig-and-rl-sig.docx), [1290r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1290-03-00be-pdt-phy-parameters-for-eht-mcss.docx), [1276r7](https://mentor.ieee.org/802.11/dcn/20/11-20-1276-07-00be-pdt-phy-eht-preamble-eht-sig.docx), [1371r4](https://mentor.ieee.org/802.11/dcn/20/11-20-1371-04-00be-pdt-phy-subcarriers-and-resource-allocation-for-wideband.docx), [1338r6](https://mentor.ieee.org/802.11/dcn/20/11-20-1338-06-00be-pdt-phy-eht-modulation-and-coding-eht-mcss.docx), [1339r5](https://mentor.ieee.org/802.11/dcn/20/11-20-1339-05-00be-pdt-phy-data-field-coding.docx), [1337r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1337-03-00be-pdt-phy-mathematical-description-of-signals.docx), [1340r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1340-02-00be-pdt-phy-packet-extension.docx), [1315r6](https://mentor.ieee.org/802.11/dcn/20/11-20-1315-06-00be-draft-text-for-support-for-large-bandwidth.docx), [1319r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1319-03-00be-pdt-phy-preamble-puncture.docx), [1351r5](https://mentor.ieee.org/802.11/dcn/20/11-20-1351-05-00be-pdt-phy-pilot.docx), [1403r4](https://mentor.ieee.org/802.11/dcn/20/11-20-1403-04-00be-pdt-phy-txvector-rxvector-trigvector-config-vector.doc), [1404r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1404-02-00be-pdt-phy-support-for-non-ht-ht-vht-he-format-and-regulatory.doc), [1447r6](https://mentor.ieee.org/802.11/dcn/20/11-20-1447-06-00be-pdt-subcarriers-and-resource-allocation-for-multiple-rus.docx), [1448r7](https://mentor.ieee.org/802.11/dcn/20/11-20-1448-07-00be-pdt-resource-unit-interleaving-for-rus-and-multipe-rus.docx), [1452r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1452-03-00be-pdt-segment-parser.docx), [1307r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1307-02-00be-pdt-phy-introduction-to-eht-phy.docx). |

* Technical Submissions: **Proposed Draft Text (PDTs)**
  + [1315r6](https://mentor.ieee.org/802.11/dcn/20/11-20-1315-05-00be-draft-text-for-support-for-large-bandwidth.docx) Support for large bandwidth Yan Xin [SP]
  + [1319r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1319-02-00be-pdt-phy-preamble-puncture.docx) Preamble-Puncture Oded Redlich
  + [1351r4](https://mentor.ieee.org/802.11/dcn/20/11-20-1351-03-00be-pdt-phy-pilot.docx) Pilot Jinyoung Chun
  + [1403r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1403-03-00be-pdt-phy-txvector-rxvector-trigvector-config-vector.doc) TX/RXVECTOR-TRIGVECTOR-CONFIG\_VECTOR Bo Sun
  + [1404r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1404-02-00be-pdt-phy-support-for-non-ht-ht-vht-he-format-and-regulatory.doc) Support-for-NON-HT-HT-VHT-HE-Format-and-Reg. Bo Sun
  + [1447r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1447-02-00be-pdt-subcarriers-and-resource-allocation-for-multiple-rus.docx) Subcarriers and Resource Allocation for Multiple RUs Jianhan Liu
  + [1448r4](https://mentor.ieee.org/802.11/dcn/20/11-20-1448-04-00be-pdt-resource-unit-interleaving-for-rus-and-multipe-rus.docx) Resource unit-Interleaving for RUs and Multipe RUs Jianhan Liu
  + [1452r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1452-02-00be-pdt-segment-parser.docx) Segment Parser Jianhan Liu
  + [1307r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1307-01-00be-pdt-phy-introduction-to-eht-phy.docx) Introduction-to-EHT-PHY Bin Tian
  + [1462r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1462-01-00be-pdt-phy-tx-mask.docx) PHY-Tx-Mask Xiaogang Chen
  + [1464r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1464-00-00be-pdt-phy-u-sig.docx) PHY U-SIG Sameer Vermani
  + [1466r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1466-00-00be-pdt-phy-eht-sounding-ndp.docx) PHY EHT Sounding NDP Sameer Vermani
  + [1480r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1480-00-00be-pdt-phy-s-flatness.docx) PHY-S\_flatness Xiaogang Chen
  + [1479r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1479-00-00be-pdt-phy-t-block.docx) PHY-T\_block Xiaogang Chen
  + [1494r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1494-01-00be-pdt-of-eht-phy-data-scrambler-and-descrambler.docx) PHY DATA scrambler and descrambler Chenchen LIU
  + [1495r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1495-01-00be-pdt-of-eht-ltf-sequences.docx) EHT LTF sequences Chenchen LIU
* Technical Submissions:
  + [1135r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1135-03-00be-papr-issues-for-eht-er-su-ppdu.pptx) PAPR Issues for EHT ER SU PPDU Eunsung Park [3 SPs]
  + [1161r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1161-00-00be-eht-punctured-ndp-and-partial-bandwidth-feedback.pptx) EHT Punctured NDP and Partial bandwidth feedback. Bin Tian [SPs]
  + [1223r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1223-01-00be-subcarrier-grouping-for-eht.pptx) Subcarrier Grouping for EHT Eunsung Jeon
  + [1159r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1159-00-00be-11be-spectral-mask.pptx) 11be spectral mask Bin Tian
  + [1180r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1180-00-00be-spectrum-mask-requirement-for-punctured-transmission.pptx) Spectrum mask requirement for punctured Transmission Wookbong Lee
  + [1165r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1165-00-00be-spectrum-mask-for-puncturing.pptx) Spectrum mask for puncturing Xiaogang Chen
  + [1174r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1174-00-00be-e-sig-with-different-puncturing-patterns.pptx) E-SIG Detection with Different Puncturing Patterns Junghoon Suh
  + [1191r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1191-00-00be-dup-mode-papr-reduction.pptx) DUP mode PAPR reduction Ron Porat
  + [1178r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1178-00-00be-discussions-on-mu-mimo-signaling.pptx) Discussions on MU-MIMO Signaling Mengshi Hu
  + [1180r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1180-00-00be-spectrum-mask-requirement-for-punctured-transmission.pptx) Spectrum Mask Requirement for Punctured Transmission Wook Bong Lee
  + [1206r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1206-00-00be-discussions-on-papr-reduction-methods-for-dup-mode.pptx) Discussions on PAPR Reduction Methods for DUP Mode ChenChen Liu
  + [1238r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1238-00-00be-open-issues-on-preamble-design.pptx) Open Issues on Preamble Design Sameer Vermani
  + [1259r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1259-00-00be-puncturing-patterns-for-ofdma.pptx) Puncturing patterns for ofdma Ron Porat
  + [1310r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1310-00-00be-coding-bit-in-mu-mimo.pptx) Coding bit in MU-MIMO Ron Porat
  + [1311r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1311-00-00be-2x-320mhz-ltf-design.pptx) 2x LTF 320MHz sequences Ron Porat
  + [1317r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1317-00-00be-sig-contents-discussion-for-eht-sounding-ndp.pptx) SIG-contents-discussion-for-eht-sounding-ndp Ross Yu
  + [1347r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1347-00-00be-lpi-ppdu-format.pptx) LPI PPDU format Junghoon Suh
  + [1375r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1375-01-00be-eht-nltf-design.pptx) EHT NLTF Design Rui Cao
  + [1331r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1331-00-00be-eht-pre-fec-padding-and-packet-extension.pptx) EHT pre-FEC padding and packet extension Rui Cao
  + [1132r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1132-00-00be-thoughts-on-extended-range-preamble.pptx) Thoughts on Extended Range Preamble Bin Tian
  + [1377r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1377-00-00be-on-tbd-mcss.pptx) On TBD MCSs Jianhan Liu
  + [1322r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1322-00-00be-phy-signaling-methodology-for-11be-releases.pptx) PHY Signaling Methodology Rui Yang
  + [1446r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1446-00-00be-pilot-polarities-for-small-m-rus.pptx) Pilot Polarities for Small M-RUs Ron Porat
  + [1441r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1441-00-00be-ru-restriction-for-20mhz-operation.pptx) RU Restriction for 20MHz Operation Eunsung Park
  + [1467r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1467-00-00be-bw320-signaling.pptx) 320MHz signaling Ron Porat
  + [1342r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1342-00-00be-eht-sounding-feedback-request-parameters.pptx) EHT Sounding feedback request parameters Genadiy Tsodik
  + 1515r0 Signaling for various transmission modes of MU PPDU Dongguk Lim

*\* Note: Need to be uploaded to Mentor website 7 days prior to the conf call*

**Attendance**

The following people recorded their attendance for this call:

* Gary Anwyl (Mediatek Inc.)
* Kwok Shum Au (Huawei Technologies Co.,  Ltd)
* Hari Ram B (Nxp Semiconductors)
* Jinsoo Choi (Lg Electronics)
* Seungho Choo (Senscomm Semiconductor Co., Ltd.)
* Jinyoung Chun (Lg Electronics)
* John Coffey (Realtek Semiconductor Corp.)
* Yanyi Ding (Panasonic Corporation)
* Shuling Feng (Mediatek Inc.)
* Alireza Ghaderipoor (Mediatek Inc.)
* Niranjan Grandhe (Nxp Semiconductors)
* Thomas Handte (Sony Corporation)
* Lili Hervieu (Cablelabs)
* Hung-Tao Hsieh (Mediatek Inc.)
* Lei Huang (Oppo)
* Eunsung Jeon (Samsung Electronics)
* Feng Jiang (Apple Inc.)
* Mahmoud Kamel (Interdigital, Inc.)
* Assaf Kasher (Qualcomm Incorporated)
* Myeong-Jin Kim (Samsung)
* Youhan Kim (Qualcomm Incorporated)
* James Lansford (Qualcomm Incorporated)
* Wookbong Lee (Samsung)
* Jialing Li (Qualcomm Incorporated)
* Dong Guk Lim (Lg Electronics)
* Chenchen Liu (Huawei Technologies Co., Ltd)
* Jianhan Liu (Mediatek Inc.)
* Miguel Lopez (Ericsson Ab)
* Mikael Lorgeoux (Canon Research Centre France)
* Hanqing Lou (Interdigital, Inc.)
* Li Ma (Mediatek Inc.)
* Khashayar Mirfakhraei (Cisco Systems, Inc.)
* Leo Montreuil (Broadcom Corporation)
* Yujin Noh (Newracom Inc.)
* Thomas Pare (Mediatek Inc.)
* Srinath Puducheri (Broadcom Corporation)
* Kapil Rai (Qualcomm Incorporated)
* Oded Redlich (Huawei)
* Sayak Roy (Nxp Semiconductors)
* Sigurd Schelstraete (Quantenna Communications, Inc.)
* Ankit Sethi (Nxp Semiconductors)
* Stephen Shellhammer (Qualcomm Incorporated)
* Shimi Shilo (Huawei)
* Paul Strauch (Qualcomm Incorporated)
* Jung Hoon Suh (Huawei Technologies Co. Ltd)
* Genadiy Tsodik (Huawei Technologies Co. Ltd)
* Allert Van Zelst (Qualcomm Incorporated)
* Daniel Verenzuela (Sony Corporation)
* Sameer Vermani (Qualcomm Incorporated)
* Yan Xin (Huawei Technologies Co., Ltd)
* Aiguo Yan (Oppo)
* Steve Ts Yang (Mediatek Inc.)
* Yongjiang Yi (Futurewei Technologies)
* Jian Yu (Huawei Technologies Co., Ltd)
* Yifan Zhou (Huawei Technologies Co., Ltd)

**Presentations**

[1315r6](https://mentor.ieee.org/802.11/dcn/20/11-20-1315-05-00be-draft-text-for-support-for-large-bandwidth.docx) Support for large bandwidth (Yan Xin)

Support of wideband OFDMA operation. Title has been clarified.

Added 20 MHz operating non-AP STA.

SP#1:

Do you agree to accept text in 1315r6 for 11be draft 0.1?

No objections. Accepted by unanimous consent.

[1351r4](https://mentor.ieee.org/802.11/dcn/20/11-20-1351-03-00be-pdt-phy-pilot.docx) Pilot (Jinyoung Chun)

PDT text for pilot subclause.

Discussion

MRU is only mentioned for 320 MHz. Should we remove sentence or add other BWs? Text will be removed.

Some confusion about 4x LTF and 2x LTF pilot index vs. 1x. Proposed text is consistent with 11ax.

R5 is uploaded with requested changes.

SP#2:

Do you agree to accept text in 1351r5 for 11be draft 0.1?

No objections. Accepted by unanimous consent.

[1319r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1319-02-00be-pdt-phy-preamble-puncture.docx) Preamble-Puncture (Oded Redlich)

Draft text for preamble puncturing.

Discussion

Q: need to add section titles in addition to section numbers.

A: references are to U-SIG and EHT-SIG.

Q: difference between transmission bw and channel bw?

A: different for punctured channel.

Q: Proposed to us “PPDU BW” instead. Text is changed accordingly.

Q: use OFDMA vs. non-OFDMA to distinguish between the two puncturing cases. Need to clarify compression modes.

Text is highlighted as TBD awaiting further clarification.

R3 is uploaded with the requested changes.

SP#3:

Do you agree to accept text in 1319r3 for 11be draft 0.1?

No objections. Accepted by unanimous consent.

[1403r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1403-03-00be-pdt-phy-txvector-rxvector-trigvector-config-vector.doc) TX/RXVECTOR-TRIGVECTOR-CONFIG\_VECTOR (Bo Sun)

Most descriptions taken from 11ax.

More like a framework. More to be added.

Discussion

Q: Why is NON HT MODULATION yellow?

A: hasn’t been discussed yet. Maybe inclusion of inherited parameters can be simplified.

Q: don’t need center 26 RU anymore. Midamble has not been discussed yet – make TBD.

Q: Beam change not there anymore. There is no SU PPDU, and was not supported in MU in 11ax.

Fields are removed. R4 is uploaded.

SP#4:

Do you agree to accept text in 1403r4 for 11be draft 0.1?

No objections. Accepted by unanimous consent.

[1404r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1404-02-00be-pdt-phy-support-for-non-ht-ht-vht-he-format-and-regulatory.doc) Support-for-NON-HT-HT-VHT-HE-Format-and-Reg (Bo Sun)

Similar to 11ax. Reference to Clause 27 added.

No Discussion

SP#5:

Do you agree to accept text in 1404r2 for 11be draft 0.1?

No objections. Accepted by unanimous consent.

[1447r5](https://mentor.ieee.org/802.11/dcn/20/11-20-1447-02-00be-pdt-subcarriers-and-resource-allocation-for-multiple-rus.docx) Subcarriers and Resource Allocation for Multiple RUs (Jianhan Liu)

Discussion:

Q: in 80 MHz, 52+26: not all combinations of 20 and 40 included. In RU allocation subfield, those fields exist. Restrictions should be stated.

A: shown in figures

Q: Restriction should not be a note, is mandatory behavior

A: changed accordingly

Q: for smaller MRU there is no index. Would be great to include indices for small MRUS as well.

Q: is it mandatory for both STA and AP to support the large MRU? Clarify that this only applies within the supported BW.

A: text is changed to reflect this.

Q: change “transmission” to “PPDU”

A: changed in text.

Q: should segment be defined as 80 MHz? term is used here for both 80 and 160 MHz. Proposed to change “segment” to “channel”.

A: changed in text

R6 uploaded

SP#6:

Do you agree to accept text in 1447r6 for 11be draft 0.1?

No objections. Accepted by unanimous consent.

[1448r4](https://mentor.ieee.org/802.11/dcn/20/11-20-1448-04-00be-pdt-resource-unit-interleaving-for-rus-and-multipe-rus.docx) Resource unit-Interleaving for RUs and Multiple RUs (Jianhan Liu)

Parameters for interleaving and LDPC tone mapping.

Discussion

Q: allow for both BCC and LDPC on small size MRUs

A: text modified

R7 uploaded

SP#7:

Do you agree to accept text in 1448r7 for 11be draft 0.1?

No objections. Accepted by unanimous consent.

[1452r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1452-02-00be-pdt-segment-parser.docx) Segment Parser (Jianhan Liu)

Discussion

Q: What is definition of “segment”?

A: will be discussed later

Updated to R3 – uploaded to server

SP#8:

Do you agree to accept text in 1452r3 for 11be draft 0.1?

No objections. Accepted by unanimous consent.

[1307r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1307-01-00be-pdt-phy-introduction-to-eht-phy.docx) Introduction-to-EHT-PHY (Bin Tian)

Based on 11ax and referring to motions that were passed on PHY parts.

Lists supported optional and mandatory features for AP and STAs.

Discussion

Q: some agreement in SFD to support 320 MHz. Here it is shown as TBD. Spec text should reflect SFD, at least in this introduction part.

A: 160+160 not clear enough as mandatory or optional. Let’s put TBD now and clarify later as needed.

Proposed to delete sentence mentioning BW support.

Q: for 20 MHz: why only supported in primary 20 MHz? Should support any channel.

A: depends on SST. This is text from 11ax. Will double check – can be refined in next version.

R2 uploaded.

SP#9:

Do you agree to accept text in 1307r2 for 11be draft 0.1?

No objections. Accepted by unanimous consent.

**Adjourn**

Meeting is adjourned at 12:55pm ET.

**Thursday Sept 24th, 2020 19:00 – 22:00 ET**

**Introduction**

* The Chair (Tianyu Wu, Apple) calls the meeting to order at 19:00 ET.
* The Chair follows the agenda in 11-20/1269r12
* The Chair goes through the IPR policy and asks if anyone is aware of any potentially essential patents. Nobody speaks up.
* The Chair reminds everyone to report their attendance by sending an e-mail to the Co-chair, Sigurd Schelstraete (ON Semiconductor) or the Chair himself.
* Announcements: None
* PDT Status for R1 PHY features:

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| --- | --- | --- | --- |
| **Not Uploaded** | **Uploaded** | **And Presented** | **And Passed StrawPoll** |
|  |  | 1494 | [1293r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1293-01-00be-pdt-phy-scope-and-eht-phy-functions.docx), [1295r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1295-01-00be-pdt-phy-overview-of-the-ppdu-enconding-process.docx), [1160r6](https://mentor.ieee.org/802.11/dcn/20/11-20-1160-06-00be-pdt-phy-mu-mimo.docx), [1327r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1327-01-00be-pdt-eht-ppdu-format.docx), [1153r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1153-03-00be-pdt-phy-timing-related-parameters.docx), [1260r4](https://mentor.ieee.org/802.11/dcn/20/11-20-1260-04-00be-pdt-phy-eht-stf.docx), [1349r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1349-03-00be-pdt-constellation-mapping.docx), [1231r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1231-03-00be-pdt-phy-beamforming.docx), [1252r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1252-02-00be-pdt-phy-frequency-tolerance.docx), [1253r6](https://mentor.ieee.org/802.11/dcn/20/11-20-1253-06-00be-pdt-phy-modulation-accuracy.docx), [1254r6](https://mentor.ieee.org/802.11/dcn/20/11-20-1254-06-00be-pdt-phy-receive-specification-general-and-receiver-minimum-input-sensitivity-and-channel-rejection.docx), [1229r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1229-03-00be-pdt-phy-channel-numbering-and-channelization.docx), [1294r4](https://mentor.ieee.org/802.11/dcn/20/11-20-1294-04-00be-pdt-phy-eht-plme.docx), [1329r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1329-02-00be-pdt-eht-preamble-l-stf-l-ltf-l-sig-and-rl-sig.docx), [1290r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1290-03-00be-pdt-phy-parameters-for-eht-mcss.docx), [1276r7](https://mentor.ieee.org/802.11/dcn/20/11-20-1276-07-00be-pdt-phy-eht-preamble-eht-sig.docx), [1371r4](https://mentor.ieee.org/802.11/dcn/20/11-20-1371-04-00be-pdt-phy-subcarriers-and-resource-allocation-for-wideband.docx), [1338r6](https://mentor.ieee.org/802.11/dcn/20/11-20-1338-06-00be-pdt-phy-eht-modulation-and-coding-eht-mcss.docx), [1339r5](https://mentor.ieee.org/802.11/dcn/20/11-20-1339-05-00be-pdt-phy-data-field-coding.docx), [1337r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1337-03-00be-pdt-phy-mathematical-description-of-signals.docx), [1340r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1340-02-00be-pdt-phy-packet-extension.docx), [1315r6](https://mentor.ieee.org/802.11/dcn/20/11-20-1315-06-00be-draft-text-for-support-for-large-bandwidth.docx), [1351r5](https://mentor.ieee.org/802.11/dcn/20/11-20-1351-05-00be-pdt-phy-pilot.docx), [1319r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1319-03-00be-pdt-phy-preamble-puncture.docx), [1403r4](https://mentor.ieee.org/802.11/dcn/20/11-20-1403-04-00be-pdt-phy-txvector-rxvector-trigvector-config-vector.doc), [1404r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1404-02-00be-pdt-phy-support-for-non-ht-ht-vht-he-format-and-regulatory.doc), [1447r6](https://mentor.ieee.org/802.11/dcn/20/11-20-1447-06-00be-pdt-subcarriers-and-resource-allocation-for-multiple-rus.docx), [1448r7](https://mentor.ieee.org/802.11/dcn/20/11-20-1448-07-00be-pdt-resource-unit-interleaving-for-rus-and-multipe-rus.docx), [1452r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1452-03-00be-pdt-segment-parser.docx), [1307r4](https://mentor.ieee.org/802.11/dcn/20/11-20-1307-04-00be-pdt-phy-introduction-to-eht-phy.docx), [1462r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1462-02-00be-pdt-phy-tx-mask.docx), [1464r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1464-02-00be-pdt-phy-u-sig.docx), [1466r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1466-00-00be-pdt-phy-eht-sounding-ndp.docx), [1480r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1480-01-00be-pdt-phy-s-flatness.docx), [1479r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1479-02-00be-pdt-phy-t-block.docx), [1495r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1495-03-00be-pdt-of-eht-ltf-sequences.docx). |

* Technical Submissions: **Proposed Draft Text (PDTs) [Each: 20 mins first preso, 10 mins SP]**
  + [1307r4](https://mentor.ieee.org/802.11/dcn/20/11-20-1307-04-00be-pdt-phy-introduction-to-eht-phy.docx) Introduction to EHT PHY Bin Tian
  + [1462r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1462-01-00be-pdt-phy-tx-mask.docx) PHY-Tx-Mask Xiaogang Chen
  + [1464r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1464-00-00be-pdt-phy-u-sig.docx) PHY U-SIG Sameer Vermani
  + [1466r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1466-00-00be-pdt-phy-eht-sounding-ndp.docx) PHY EHT Sounding NDP Sameer Vermani
  + [1160r5](https://mentor.ieee.org/802.11/dcn/20/11-20-1160-05-00be-pdt-phy-mu-mimo.docx) MU-MIMO Sameer Vermani
  + [1480r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1480-00-00be-pdt-phy-s-flatness.docx) PHY-S\_flatness Xiaogang Chen
  + [1479r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1479-00-00be-pdt-phy-t-block.docx) PHY-T\_block Xiaogang Chen
  + [1494r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1494-01-00be-pdt-of-eht-phy-data-scrambler-and-descrambler.docx) PHY DATA scrambler and descrambler Chenchen LIU
  + [1495r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1495-01-00be-pdt-of-eht-ltf-sequences.docx) EHT LTF sequences Chenchen LIU
* Technical Submissions:
  + [1191r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1191-00-00be-dup-mode-papr-reduction.pptx) DUP mode PAPR reduction Ron Porat
  + [1206r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1206-00-00be-discussions-on-papr-reduction-methods-for-dup-mode.pptx) Discussions on PAPR Reduction Methods for DUP Mode ChenChen Liu
  + [1135r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1135-03-00be-papr-issues-for-eht-er-su-ppdu.pptx) PAPR Issues for EHT ER SU PPDU Eunsung Park [3 SPs]
  + [1161r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1161-00-00be-eht-punctured-ndp-and-partial-bandwidth-feedback.pptx) EHT Punctured NDP and Partial bandwidth feedback. Bin Tian [SPs]
  + [1223r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1223-01-00be-subcarrier-grouping-for-eht.pptx) Subcarrier Grouping for EHT Eunsung Jeon
  + [1159r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1159-00-00be-11be-spectral-mask.pptx) 11be spectral mask Bin Tian
  + [1180r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1180-00-00be-spectrum-mask-requirement-for-punctured-transmission.pptx) Spectrum mask requirement for punctured Transmission Wookbong Lee
  + [1165r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1165-00-00be-spectrum-mask-for-puncturing.pptx) Spectrum mask for puncturing Xiaogang Chen
  + [1174r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1174-00-00be-e-sig-with-different-puncturing-patterns.pptx) E-SIG Detection with Different Puncturing Patterns Junghoon Suh
  + [1178r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1178-00-00be-discussions-on-mu-mimo-signaling.pptx) Discussions on MU-MIMO Signaling Mengshi Hu
  + [1180r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1180-00-00be-spectrum-mask-requirement-for-punctured-transmission.pptx) Spectrum Mask Requirement for Punctured Transmission Wook Bong Lee
  + [1238r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1238-00-00be-open-issues-on-preamble-design.pptx) Open Issues on Preamble Design Sameer Vermani
  + [1259r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1259-00-00be-puncturing-patterns-for-ofdma.pptx) Puncturing patterns for ofdma Ron Porat
  + [1310r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1310-00-00be-coding-bit-in-mu-mimo.pptx) Coding bit in MU-MIMO Ron Porat
  + [1311r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1311-00-00be-2x-320mhz-ltf-design.pptx) 2x LTF 320MHz sequences Ron Porat
  + [1317r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1317-00-00be-sig-contents-discussion-for-eht-sounding-ndp.pptx) SIG-contents-discussion-for-eht-sounding-ndp Ross Yu
  + [1347r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1347-01-00be-lpi-ppdu-format.pptx) LPI PPDU format Junghoon Suh
  + [1375r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1375-01-00be-eht-nltf-design.pptx) EHT NLTF Design Rui Cao
  + [1331r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1331-00-00be-eht-pre-fec-padding-and-packet-extension.pptx) EHT pre-FEC padding and packet extension Rui Cao
  + [1132r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1132-00-00be-thoughts-on-extended-range-preamble.pptx) Thoughts on Extended Range Preamble Bin Tian
  + [1377r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1377-00-00be-on-tbd-mcss.pptx) On TBD MCSs Jianhan Liu
  + [1322r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1322-00-00be-phy-signaling-methodology-for-11be-releases.pptx) PHY Signaling Methodology Rui Yang
  + [1446r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1466-00-00be-pdt-phy-eht-sounding-ndp.docx) Pilot Polarities for Small M-RUs Ron Porat
  + [1441r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1441-01-00be-ru-restriction-for-20mhz-operation.pptx) RU Restriction for 20MHz Operation Eunsung Park
  + [1467r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1467-00-00be-bw320-signaling.pptx) 320MHz signaling Ron Porat
  + [1342r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1342-00-00be-eht-sounding-feedback-request-parameters.pptx) EHT Sounding feedback request parameters Genadiy Tsodik
  + 1515r0 Signaling for various transmission modes of MU PPDU Dongguk Lim

**Attendance**

The following people recorded their attendance for this call:

* Gary Anwyl (Mediatek Inc.)
* Kwok Shum Au (Huawei Technologies Co.,  Ltd)
* Hari Ram B (Nxp Semiconductors)
* Rui Cao (Nxp Semiconductors)
* Jinsoo Choi (Lg Electronics)
* Seungho Choo (Senscomm Semiconductor Co., Ltd.)
* Jinyoung Chun (Lg Electronics)
* John Coffey (Realtek Semiconductor Corp.)
* Yanyi Ding (Panasonic Corporation)
* Shuling Feng (Mediatek Inc.)
* Alireza Ghaderipoor (Mediatek Inc.)
* Niranjan Grandhe (Nxp Semiconductors)
* Hung-Tao Hsieh (Mediatek Inc.)
* Eunsung Jeon (Samsung Electronics)
* Feng Jiang (Apple Inc.)
* Mahmoud Kamel (Interdigital, Inc.)
* Youhan Kim (Qualcomm Incorporated)
* Wookbong Lee (Samsung)
* Dong Guk Lim (Lg Electronics)
* Erik Lindskog (Samsung)
* Der-Zheng Liu (Realtek Semiconductor Corp.)
* Hanqing Lou (Interdigital, Inc.)
* Li Ma (Mediatek Inc.)
* Jun Minotani (Panasonic Corporation)
* Khashayar Mirfakhraei (Cisco Systems, Inc.)
* Leo Montreuil (Broadcom Corporation)
* Takayuki Nakano (Panasonic Corporation)
* Yujin Noh (Newracom Inc.)
* Eunsung Park (Lg Electronics)
* Ron Porat (Broadcom Corporation)
* Oded Redlich (Huawei)
* Sigurd Schelstraete (Quantenna Communications, Inc.)
* Ankit Sethi (Nxp Semiconductors)
* Stephen Shellhammer (Qualcomm Incorporated)
* Shimi Shilo (Huawei)
* Paul Strauch (Qualcomm Incorporated)
* Jung Hoon Suh (Huawei Technologies Co. Ltd)
* Bo Sun (Zte Corporation)
* Bin Tian (Qualcomm Incorporated)
* Yi-Hsiu Wang (Zeku)
* Kanke Wu (Qualcomm Incorporated)
* Tianyu Wu (Apple, Inc.)
* Yan Xin (Huawei Technologies Co., Ltd)
* Steve Ts Yang (Mediatek Inc.)
* Jian Yu (Huawei Technologies Co., Ltd)
* Yifan Zhou (Huawei Technologies Co., Ltd)

**Presentations**

1307r4 PDT-PHY-Introduction-to-EHT-PHY (Bin Tian)

Minor updates following offline comments

SP#1:

Do you agree to accept text in 1307r4 for 11be draft 0.1?

No objections. Accepted by unanimous consent.

[1462r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1462-01-00be-pdt-phy-tx-mask.docx) PHY-Tx-Mask (Xiaogang Chen)

320, 80+80 and 160+160 MHz mask are TBD

Discussion

Q: why no text for punctured case?

A: placeholder section is reserved for this

Q: why do captions say “example” transit mask?

A: there is an absolute limit that is not shown in these figures

Q: we should not use example in the figure title, per editorial rules

A: will be fixed in comment resolution

R2 is uploaded

SP#2:

Do you agree to accept text in 1462r2 for 11be draft 0.1?

No objections. Accepted by unanimous consent.

[1464r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1464-00-00be-pdt-phy-u-sig.docx) PHY U-SIG (Sameer Vermani)

Draft text for U-SIG.

General, content, CRC calculation, encoding and modulation.

Encoding process happens on per-80 MHz segment basis.

TBD sections highlighted in yellow.

Discussion

Q: SR is not marked as yellow?

A: assumed it would exist but can be made TBD.

Q: we have motion on alignment for PPDU. Some fields need to be the same across 80 MHz segments. Is that described somewhere?

A: Number of symbols not included yet. Some descriptions not complete.

Q: maybe include the motion text in question?

A: added in text

Q: table doesn’t mention version dependent or independent fields. Are these terms still useful?

A: might be good idea to indicate it in the table itself later

Q: reserved bits should be highlighted

A: changed accordingly

R2 is uploaded

SP#3:

Do you agree to accept text in 1464r2 for 11be draft 0.1?

No objections. Accepted by unanimous consent.

[1466r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1466-00-00be-pdt-phy-eht-sounding-ndp.docx) PHY EHT Sounding NDP (Sameer Vermani)

EHT sounding NDP format. Some elements are known, some sections are still TBD.

Discussion

Q: why is text on beamforming removed?

A: with merging of SU and MU, there may be no need for this.

Q: PE is missing in the figure

A: text mentions it

SP#4:

Do you agree to accept text in 1466r0 for 11be draft 0.1?

No objections. Accepted by unanimous consent.

1160r5 PDT-PHY MU-MIMO (Sameer Vermani)

Simple change made after SP was run.

Total number of streams that is supported for the reception of EHT MU PPDU is explicitly mentioned as TBD.

Discussion

Q: non-AP STA always supports UL MU-MIMO, no need to include it as a restriction

A: text removed.

R6 is uploaded

SP#5:

Do you agree to accept text in 1160r6 for 11be draft 0.1?

No objections. Accepted by unanimous consent.

[1480r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1480-00-00be-pdt-phy-s-flatness.docx) PHY- Spectral flatness (Xiaogang Chen)

Procedure mostly copied from 11ax. Changes to subcarrier indices.

320 MHz added to the table. 80+80 MHz is TBD.

Discussion

Q: should we mention 160+160?

A: text added for 160+160.

R1 is uploaded.

SP#6:

Do you agree to accept text in 1480r1 for 11be draft 0.1?

No objections. Accepted by unanimous consent.

[1479r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1479-00-00be-pdt-phy-t-block.docx) PHY-Transmitter block diagram (Xiaogang Chen)

STBC was removed from the diagram.

Minor changes relative to 11ax.

Discussion

Q: do we need block for duplication?

A: TBD block added for DUP.

R2 is uploaded

SP#7:

Do you agree to accept text in 1479r2 for 11be draft 0.1?

No objections. Accepted by unanimous consent.

[1494r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1494-01-00be-pdt-of-eht-phy-data-scrambler-and-descrambler.docx) PHY DATA scrambler and descrambler (Chenchen LIU)

Based on 11ax scrambler.

Service field changed due to changes in scrambler length.

Discussion

Q: should reserved bits be set to 0?

A: followed the HE standard.

Q: for MU-RTS, why “should” be set to all zero, instead of “shall”?

A: changed to “shall”

Q: disagreement on the figure.

A: different from previous amendments. Switch was introduced to control the first bits of Data Out (for signaling TA). For MU-RTS, we need to control the first 7 bits.

Leave as is for now and have further offline discussion before running SP.

[1495r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1495-01-00be-pdt-of-eht-ltf-sequences.docx) EHT LTF sequences (Chenchen LIU)

320 MHz sequences are TBD.

No discussion

SP#8:

Do you agree to accept text in 1495r1 for 11be draft 0.1?

No objections. Accepted by unanimous consent.

[1191r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1191-00-00be-dup-mode-papr-reduction.pptx) DUP mode PAPR reduction (Ron Porat)

PAPR of duplicate mode is not very good. Preferred PAPR reduction scheme is proposed. Parts of the data tones have inverted sign. Pilot tones are not changed.

Discussion:

Q: Performance of DCM with DUP mode shows little gain. DCM gain is bigger for smaller RUs. For DUP, it doesn’t help much. DCM is not a good design for DUP mode. Simple repetition may be better.

A: prefer DCM to building another mode. Tried other duplication, but results were not very good.

Q: DUP is on top of DCM. PAPR is critical issue for DUP. Maybe further optimization is possible. Doubling the BW leads to doubling of noise as well.

A: if SNR per tone is the same, there will be gain. Most useful for LPI.

SP to be run after all presentations on the topic

[1206r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1206-00-00be-discussions-on-papr-reduction-methods-for-dup-mode.pptx) Discussions on PAPR Reduction Methods for DUP Mode (ChenChen Liu)

Duplication should be done before the IFFT. Several options are evaluated for reducing PAPR.

Discussion

Q: 3 of the options duplicate the signal and multiply parts with -1. Cleaner to operate on the data tones only and on one segment only. Option 2 shows marginal improved PAPR. PER will be worse however because of lack of diversity.

Q: all options have good PAPR. Better to compare PAPR with 80 MHz transmission. Option 3 and 4 are sufficient.

Q: need to check both PER and PAPR for all options. Criterion should be best PAPR and PER.

[1135r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1135-03-00be-papr-issues-for-eht-er-su-ppdu.pptx) PAPR Issues for EHT ER SU PPDU (Eunsung Park)

Previously presented. SPs still to be run.

Discussion

Q: duplication should be only on data tones. Motions already passed. DUP on pilot tone should not be TBD.

A: disagree. Does not apply to PAPR issue.

Q: is this similar to 1191, but with difference on the pilots?

Q: don’t think scheme should be applied to pilots. This leads to two different pilot processing schemes.

A: willing to modify SP to say that PAPR scheme is not applied to pilot tones.

R5 uploaded to server

SP#9

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

11be supports the following duplication and phase rotation methods which are applied to the data field of the PPDU transmitted to a single user and limited to {MCS0+DCM, Nss=1}

refer to SP2a in 1135r5

Y/N/A: 23/9/8

**Adjourn**

Meeting is adjourned at 10:00 pm ET.

**Monday Sept 28th, 2020 19:00 – 22:00 ET**

**Introduction**

* The Chair (Tianyu Wu, Apple) calls the meeting to order at 19:00 ET.
* The Chair follows the agenda in 11-20/1269r14
* The Chair goes through the IPR policy and asks if anyone is aware of any potentially essential patents. Nobody speaks up.
* The Chair reminds everyone to report their attendance by sending an e-mail to the Co-chair, Sigurd Schelstraete (ON Semiconductor) or the Chair himself.
* Announcements: None
* PDT Status for R1 PHY features:

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| --- | --- | --- | --- |
| **Not Uploaded** | **Uploaded** | **And Presented** | **And Passed StrawPoll** |
|  |  | 1494 | [1293r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1293-01-00be-pdt-phy-scope-and-eht-phy-functions.docx), [1295r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1295-01-00be-pdt-phy-overview-of-the-ppdu-enconding-process.docx), [1160r4](https://mentor.ieee.org/802.11/dcn/20/11-20-1160-04-00be-pdt-phy-mu-mimo.docx), [1327r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1327-01-00be-pdt-eht-ppdu-format.docx), [1153r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1153-03-00be-pdt-phy-timing-related-parameters.docx), [1260r4](https://mentor.ieee.org/802.11/dcn/20/11-20-1260-04-00be-pdt-phy-eht-stf.docx), [1349r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1349-03-00be-pdt-constellation-mapping.docx), [1231r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1231-03-00be-pdt-phy-beamforming.docx), [1252r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1252-02-00be-pdt-phy-frequency-tolerance.docx), [1253r6](https://mentor.ieee.org/802.11/dcn/20/11-20-1253-06-00be-pdt-phy-modulation-accuracy.docx), [1254r6](https://mentor.ieee.org/802.11/dcn/20/11-20-1254-06-00be-pdt-phy-receive-specification-general-and-receiver-minimum-input-sensitivity-and-channel-rejection.docx), [1229r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1229-03-00be-pdt-phy-channel-numbering-and-channelization.docx), [1294r4](https://mentor.ieee.org/802.11/dcn/20/11-20-1294-04-00be-pdt-phy-eht-plme.docx), [1329r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1329-02-00be-pdt-eht-preamble-l-stf-l-ltf-l-sig-and-rl-sig.docx), [1290r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1290-03-00be-pdt-phy-parameters-for-eht-mcss.docx), [1276r7](https://mentor.ieee.org/802.11/dcn/20/11-20-1276-07-00be-pdt-phy-eht-preamble-eht-sig.docx), [1371r4](https://mentor.ieee.org/802.11/dcn/20/11-20-1371-04-00be-pdt-phy-subcarriers-and-resource-allocation-for-wideband.docx), [1338r6](https://mentor.ieee.org/802.11/dcn/20/11-20-1338-06-00be-pdt-phy-eht-modulation-and-coding-eht-mcss.docx), [1339r5](https://mentor.ieee.org/802.11/dcn/20/11-20-1339-05-00be-pdt-phy-data-field-coding.docx), [1337r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1337-03-00be-pdt-phy-mathematical-description-of-signals.docx), [1340r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1340-02-00be-pdt-phy-packet-extension.docx), [1315r6](https://mentor.ieee.org/802.11/dcn/20/11-20-1315-06-00be-draft-text-for-support-for-large-bandwidth.docx), [1351r5](https://mentor.ieee.org/802.11/dcn/20/11-20-1351-05-00be-pdt-phy-pilot.docx), [1319r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1319-03-00be-pdt-phy-preamble-puncture.docx), [1403r4](https://mentor.ieee.org/802.11/dcn/20/11-20-1403-04-00be-pdt-phy-txvector-rxvector-trigvector-config-vector.doc), [1404r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1404-02-00be-pdt-phy-support-for-non-ht-ht-vht-he-format-and-regulatory.doc), [1447r6](https://mentor.ieee.org/802.11/dcn/20/11-20-1447-06-00be-pdt-subcarriers-and-resource-allocation-for-multiple-rus.docx), [1448r7](https://mentor.ieee.org/802.11/dcn/20/11-20-1448-07-00be-pdt-resource-unit-interleaving-for-rus-and-multipe-rus.docx), [1452r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1452-03-00be-pdt-segment-parser.docx), [1307r4](https://mentor.ieee.org/802.11/dcn/20/11-20-1307-04-00be-pdt-phy-introduction-to-eht-phy.docx), [1462r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1462-02-00be-pdt-phy-tx-mask.docx), [1464](https://mentor.ieee.org/802.11/dcn/20/11-20-1464-02-00be-pdt-phy-u-sig.docx)r2, [1466r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1466-00-00be-pdt-phy-eht-sounding-ndp.docx), [1480r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1480-01-00be-pdt-phy-s-flatness.docx), [1479r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1479-02-00be-pdt-phy-t-block.docx), [1495r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1495-03-00be-pdt-of-eht-ltf-sequences.docx). |

* Technical Submissions: **Proposed Draft Text (PDTs) [Each: 20 mins first preso, 10 mins SP]**
  + [1494r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1494-01-00be-pdt-of-eht-phy-data-scrambler-and-descrambler.docx) PHY DATA scrambler and descrambler Chenchen LIU [SP]
* Technical Submissions: **PHY Discussion on MAC PDT:**
  + [1395r12](https://mentor.ieee.org/802.11/dcn/20/11-20-1395-12-00be-pdt-mac-mlo-multi-link-channel-access-general-non-str.docx) Multi-Link-Channel-Access-General-Non-STR Matthew Fischer
* Technical Submissions:
  + [1191r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1191-00-00be-dup-mode-papr-reduction.pptx) DUP mode PAPR reduction Ron Porat [SPs]
  + [1206r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1206-00-00be-discussions-on-papr-reduction-methods-for-dup-mode.pptx) Discussions on PAPR Reduction Methods for DUP Mode ChenChen Liu [SPs]
  + [1238r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1238-00-00be-open-issues-on-preamble-design.pptx) Open Issues on Preamble Design Sameer Vermani
  + [1317r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1317-00-00be-sig-contents-discussion-for-eht-sounding-ndp.pptx) SIG-contents-discussion-for-eht-sounding-ndp Ross Yu
  + [1474r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1474-01-00be-ndp-design-for-eht.pptx) NDP design for EHT Eunsung Jeon
  + [1178r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1178-00-00be-discussions-on-mu-mimo-signaling.pptx) Discussions on MU-MIMO Signaling Mengshi Hu
  + [1310r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1310-00-00be-coding-bit-in-mu-mimo.pptx) Coding bit in MU-MIMO Ron Porat
  + [1347r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1347-01-00be-lpi-ppdu-format.pptx) LPI PPDU format Junghoon Suh
  + [1322r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1322-00-00be-phy-signaling-methodology-for-11be-releases.pptx) PHY Signaling Methodology Rui Yang
  + 1515r0 Signaling for various transmission modes of MU PPDU Dongguk Lim
  + 1546r0
  + [1161r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1161-00-00be-eht-punctured-ndp-and-partial-bandwidth-feedback.pptx) EHT Punctured NDP and Partial bandwidth feedback. Bin Tian [SPs]
  + [1223r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1223-01-00be-subcarrier-grouping-for-eht.pptx) Subcarrier Grouping for EHT Eunsung Jeon
  + [1159r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1159-00-00be-11be-spectral-mask.pptx) 11be spectral mask Bin Tian
  + [1180r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1180-00-00be-spectrum-mask-requirement-for-punctured-transmission.pptx) Spectrum mask requirement for punctured Transmission Wookbong Lee
  + [1165r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1165-00-00be-spectrum-mask-for-puncturing.pptx) Spectrum mask for puncturing Xiaogang Chen
  + [1174r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1174-00-00be-e-sig-with-different-puncturing-patterns.pptx) E-SIG Detection with Different Puncturing Patterns Junghoon Suh
  + [1259r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1259-00-00be-puncturing-patterns-for-ofdma.pptx) Puncturing patterns for ofdma Ron Porat
  + [1311r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1311-00-00be-2x-320mhz-ltf-design.pptx) 2x LTF 320MHz sequences Ron Porat
  + [1375r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1375-01-00be-eht-nltf-design.pptx) EHT NLTF Design Rui Cao
  + [1331r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1331-00-00be-eht-pre-fec-padding-and-packet-extension.pptx) EHT pre-FEC padding and packet extension Rui Cao
  + [1132r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1132-00-00be-thoughts-on-extended-range-preamble.pptx) Thoughts on Extended Range Preamble Bin Tian
  + [1377r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1377-00-00be-on-tbd-mcss.pptx) On TBD MCSs Jianhan Liu
  + [1446r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1466-00-00be-pdt-phy-eht-sounding-ndp.docx) Pilot Polarities for Small M-RUs Ron Porat
  + [1441r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1441-01-00be-ru-restriction-for-20mhz-operation.pptx) RU Restriction for 20MHz Operation Eunsung Park
  + [1467r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1467-00-00be-bw320-signaling.pptx) 320MHz signaling Ron Porat
  + [1342r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1342-00-00be-eht-sounding-feedback-request-parameters.pptx) EHT Sounding feedback request parameters Genadiy Tsodik

**Attendance**

The following people recorded their attendance for this call:

* Gary Anwyl (Mediatek Inc.)
* Eugene Baik (Qualcomm Incorporated)
* David Boldy (Broadcom Corporation)
* Jinsoo Choi (Lg Electronics)
* Seungho Choo (Senscomm Semiconductor Co., Ltd.)
* Thomas Derham (Broadcom Corporation)
* Yanyi Ding (Panasonic Corporation)
* Ruchen Duan (Samsung)
* Vinko Erceg (Broadcom Corporation)
* Matthew Fischer (Broadcom Corporation)
* Alireza Ghaderipoor (Mediatek Inc.)
* Bo Gong (Huawei Technologies Co. Ltd)
* Niranjan Grandhe (Nxp Semiconductors)
* Hung-Tao Hsieh (Mediatek Inc.)
* Lei Huang (Oppo)
* Feng Jiang (Apple Inc.)
* Ishaque Ashar Kadampot (Qualcomm Incorporated)
* Sugbong Kang (Apple, Inc.)
* Youhan Kim (Qualcomm Incorporated)
* James Lansford (Qualcomm Incorporated)
* Jialing Li (Qualcomm Incorporated)
* Dong Guk Lim (Lg Electronics)
* Chenchen Liu (Huawei Technologies Co., Ltd)
* Der-Zheng Liu (Realtek Semiconductor Corp.)
* Li Ma (Mediatek Inc.)
* Jun Minotani (Panasonic Corporation)
* Khashayar Mirfakhraei (Cisco Systems, Inc.)
* Leo Montreuil (Broadcom Corporation)
* Takayuki Nakano (Panasonic Corporation)
* Junyoung Nam (Qualcomm Incorporated)
* Yujin Noh (Newracom Inc.)
* Stephen Palm (Broadcom Corporation)
* Eunsung Park (Lg Electronics)
* Brian Petry (Broadcom Corporation)
* Ron Porat (Broadcom Corporation)
* Srinath Puducheri (Broadcom Corporation)
* Meriam Rezk (Qualcomm Incorporated)
* Sigurd Schelstraete (Quantenna Communications, Inc.)
* Ankit Sethi (Nxp Semiconductors)
* Stephen Shellhammer (Qualcomm Incorporated)
* Shimi Shilo (Huawei)
* Shree Raman Srinivasan (Qualcomm Incorporated)
* Paul Strauch (Qualcomm Incorporated)
* Jung Hoon Suh (Huawei Technologies Co. Ltd)
* Bo Sun (Zte Corporation)
* Bin Tian (Qualcomm Incorporated)
* Genadiy Tsodik (Huawei Technologies Co. Ltd)
* Prabodh Varshney (Nokia)
* Yi-Hsiu Wang (Zeku)
* Kanke Wu (Qualcomm Incorporated)
* Yan Xin (Huawei Technologies Co., Ltd)
* Aiguo Yan (Oppo)
* Steve Ts Yang (Mediatek Inc.)
* Yair Yona (Qualcomm Incorporated)
* Christopher Young (Broadcom Corporation)
* Jian Yu (Huawei Technologies Co., Ltd)
* Yan Zhang (Nxp Semiconductors)
* Yifan Zhou (Huawei Technologies Co., Ltd)

**Presentations**

[1494r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1494-01-00be-pdt-of-eht-phy-data-scrambler-and-descrambler.docx) PHY DATA scrambler and descrambler (Chenchen Liu)

Figure highlighted in yellow to allow further discussion on use of the “switch”

Discussion

Q: also mark note as yellow, because sequence may be different.

Q: should align language with figure.

Q; B11-B15: what is definition of reserved?

A: same language used in HE

R4 uploaded to server

SP#1:

Do you agree to accept text in 1494r4 for 11be draft 0.1?

No objections. Accepted by unanimous consent.

[1395r12](https://mentor.ieee.org/802.11/dcn/20/11-20-1395-12-00be-pdt-mac-mlo-multi-link-channel-access-general-non-str.docx) Multi-Link-Channel-Access-General-Non-STR (Matthew Fischer)

Definition of NSTR: transmission on one link affects reception on the other under some circumstances. When should the device indicate NSTR? List of parameters with specified outcome for each combination?

Agreement in MAC so far is to start with basic information. Just binary information, independent of transmit and receive parameters. However, should there be a way to provide additional optional combinations?

Discussion:

Q: this definition is static. You want to make it dynamic on the fly based on a set of parameters. Is that the discussion?

A: tx power could vary and affect receiver differently.

Q: ok with static. Two issues with how to select NSTR: (1) max allowed tx power. Not all STAs can transmit with max power, (2) max power being defined on primary 20

A: max allowed tx power does not refer to regulatory power. Imprecise now, but could be improved in comment resolution.

Q: PHY has receiver requirement. Don’t understand how this can be one value. Refer to PHY receiver requirements. Need to tune parameters that make it possible to meet RX PHY requirements.

Q: need to specify conditions under which a STA can declare itself STR.

A: text added

Q: why “should not transmit” instead of shall. This should be a requirement.

A: some people want to allow tx under certain conditions.

Q: interop testing does not include performance. Simple criterion should be used.

Q: it’s a pair of links, not necessarily symmetric. What to do in that case?

A: will be dealt with in signaling.

Following discussion, several text options are listed.

A SP is run on the following option:

SP#2:

Do you agree to accept the following text in yellow for 11be draft 0.1?

An MLD may indicate a pair of links as STR by setting the TBD field in the TBD elements that it transmits if the receiver requirements specified in clause 34 on one link are met whenever it is transmitting on the other link.A pair of links that is not indicated as STR shall be indicated as NSTR.

Q: Is this TBD in the draft or not?

A: will put in yellow.

Agreed and recorded that this proposed is intended to be TBD (yellow)

Y/N/A: 47/1/23

Updates to 1395 will be posted and discussed in the joint session on 9/30.

Follow-up SP on DUP PAPR:

SP in 1191r1 has been updated for further clarification.

Discussion:

Some people still feel this is not the best PAPR reduction scheme and alternatives need to be investigated.

SP#3:

Do you support that the PAPR reduction scheme for the DUP mode consists of flipping the sign of data tones only, as shown in red?

Please refer to SP1 in 1191r1 for the full SP text.

Y/N/A: 51/13/5

SP in 1206 is skipped as it conflicts with SP#3

There is a request to move preamble related discussions to the head of the queue.

Order of submissions rearranged accordingly.

1238r4 Open Issues on Preamble Design (Sameer Vermani)

New U-SIG and EHT-SIG contents

Proposal to remove STBC from 11be

No Doppler bit/midambles in R1

Preamble design for DUP.

Discussion

Q: MCS 5 used extensively. Are the proposed MCS values for EHT-SIG an example, mostly intended to determine the number of bits?

A: these are proposed MCS. Going higher is not beneficial.

Q: most products use MCS0, not losing anything by not having MCS5.

Q: puncturing patterns for non-OFDMA case. In 320 MHz we have staggered channels. Could there be ambiguity for unassociated STA to find the pattern?

Q: defer discussion on NDP until later presentations

Q: GI+LTF: 1x LTF now only used in TB PPDU.

A: is desirable for some implementations.

Q: for data mostly MCS 8 or above is used, should keep higher MCS for preamble. Request presentation of other submission before straw polling DUP mode here.

Q: spatial reuse is 4 bits, for 11ax we do not use all entries. Do we need 4 bit for this? Maybe keep SR for R2.

Q: U-sig content. 6 reserved bits after txop for version independent.

A: could be either in version independent or version dependent.

Q: is this reserved for 11be or for future versions?

A: for 11be.

Q: what about potential R2 feature indication in preamble?

A: reserved bits are available.

**Adjourn**

Meeting is adjourned at 10:00 pm ET.

**Thursday Oct 10th, 2020 19:00 – 22:00 ET**

**Introduction**

* The Chair (Tianyu Wu, Apple) calls the meeting to order at 19:00 ET.
* The Chair follows the agenda in 11-20/1269r19
* The Chair goes through the IPR policy and asks if anyone is aware of any potentially essential patents. Nobody speaks up.
* The Chair reminds everyone to report their attendance by sending an e-mail to the Co-chair, Sigurd Schelstraete (ON Semiconductor) or the Chair himself.
* Announcements:
  + Guidelines for solving TBDs on TGbe draft: [984r3](https://mentor.ieee.org/802.11/dcn/20/11-20-0984-03-00be-tgbe-teleconference-guidelines.docx)
    - Chair goes through the guidelines for resolving TBDs
* Technical Submissions: **Run SPs from Previous Topics [nominally 10 mins total]**
  + [1161r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1161-00-00be-eht-punctured-ndp-and-partial-bandwidth-feedback.pptx) EHT Punctured NDP and Partial bandwidth feedback. Bin Tian [SPs]
* Technical Submissions: **Proposed Draft Text (PDTs) for fixings TBDs**
  + [1584r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1584-00-00be-resolving-tbd-in-section-36-1.docx) Resolving TBD in section 36.1 Wook Bong Lee
* Technical Submissions:
  + [1317r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1317-00-00be-sig-contents-discussion-for-eht-sounding-ndp.pptx) SIG-contents-discussion-for-eht-sounding-ndp Ross Yu
  + [1474r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1474-01-00be-ndp-design-for-eht.pptx) NDP Design for EHT Eunsung Jeon
  + [1178r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1178-00-00be-discussions-on-mu-mimo-signaling.pptx) Discussions on MU-MIMO Signaling Mengshi Hu
  + [1310r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1310-00-00be-coding-bit-in-mu-mimo.pptx) Coding bit in MU-MIMO Ron Porat
  + [1347r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1347-01-00be-lpi-ppdu-format.pptx) LPI PPDU format Junghoon Suh
  + [1322r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1322-00-00be-phy-signaling-methodology-for-11be-releases.pptx) PHY Signaling Methodology Rui Yang
  + [1515r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1515-01-00be-signaling-for-various-transmission-modes-of-mu-ppdu.pptx) Signaling for various transmission modes of MU PPDU Dongguk Lim
  + [1546r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1546-00-00be-u-sig-design-for-tb-ppdu.pptx) U-SIG Design for TB PPDU Alice Chen
  + [1223r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1223-01-00be-subcarrier-grouping-for-eht.pptx) Subcarrier Grouping for EHT Eunsung Jeon
  + [1159r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1159-00-00be-11be-spectral-mask.pptx) 11be spectral mask Bin Tian
  + [1180r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1180-00-00be-spectrum-mask-requirement-for-punctured-transmission.pptx) Spectrum mask requirement for punctured Transmission Wookbong Lee
  + [1165r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1165-00-00be-spectrum-mask-for-puncturing.pptx) Spectrum mask for puncturing Xiaogang Chen
  + [1174r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1174-00-00be-e-sig-with-different-puncturing-patterns.pptx) E-SIG Detection with Different Puncturing Patterns Junghoon Suh
  + [1259r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1259-00-00be-puncturing-patterns-for-ofdma.pptx) Puncturing patterns for ofdma Ron Porat
  + [1311r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1311-00-00be-2x-320mhz-ltf-design.pptx) 2x LTF 320MHz sequences Ron Porat
  + [1375r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1375-01-00be-eht-nltf-design.pptx) EHT NLTF Design Rui Cao
  + [1331r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1331-00-00be-eht-pre-fec-padding-and-packet-extension.pptx) EHT pre-FEC padding and packet extension Rui Cao
  + [1132r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1132-00-00be-thoughts-on-extended-range-preamble.pptx) Thoughts on Extended Range Preamble Bin Tian
  + [1377r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1377-00-00be-on-tbd-mcss.pptx) On TBD MCSs Jianhan Liu
  + [1446r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1466-00-00be-pdt-phy-eht-sounding-ndp.docx) Pilot Polarities for Small M-RUs Ron Porat
  + [1441r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1441-01-00be-ru-restriction-for-20mhz-operation.pptx) RU Restriction for 20MHz Operation Eunsung Park
  + [1467r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1467-00-00be-bw320-signaling.pptx) 320MHz signaling Ron Porat
  + [1342r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1342-00-00be-eht-sounding-feedback-request-parameters.pptx) EHT Sounding feedback request parameters Genadiy Tsodik
  + [1381r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1381-00-00be-reduction-of-peak-to-average-power-ratio-exploiting-multi-numerology-structure.pptx) Reduction of Peak to Average Power Ratio Exploiting Multi-Numerology Structure Ebubekir Memişoğlu
  + [1387r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1387-00-00be-eht-via-reconfigurable-surfaces.pptx) EHT via Reconfigurable Surfaces Salah Zegrar
  + [1439r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1439-00-00be-11be-cca-levels.pptx) 11be CCA levels Lin Yang

*\* Note: Need to be uploaded to Mentor website 7 days prior to the conf call*

* AoB:
* Adjourn

**Attendance**

The following people registered their attendance for the meeting:

* Gary Anwyl (Mediatek Inc.)
* Kwok Shum Au (Huawei Technologies Co.,  Ltd)
* Eugene Baik (Qualcomm Incorporated)
* Rui Cao (Nxp Semiconductors)
* Jinsoo Choi (Lg Electronics)
* Seungho Choo (Senscomm Semiconductor Co., Ltd.)
* Jinyoung Chun (Lg Electronics)
* Ruchen Duan (Samsung)
* Shuling Feng (Mediatek Inc.)
* Bo Gong (Huawei Technologies Co. Ltd)
* Niranjan Grandhe (Nxp Semiconductors)
* Hung-Tao Hsieh (Mediatek Inc.)
* Lei Huang (Guangdong Oppo Mobile Telecommunications Corp.,Ltd)
* Eunsung Jeon (Samsung Electronics)
* Chenhe Ji (Huawei Technologies Co. Ltd)
* Feng Jiang (Apple Inc.)
* Mahmoud Kamel (Interdigital, Inc.)
* Youhan Kim (Qualcomm Incorporated)
* Wookbong Lee (Samsung)
* Jialing Li (Qualcomm Incorporated)
* Dong Guk Lim (Lg Electronics)
* Chenchen Liu (Huawei Technologies Co., Ltd)
* Der-Zheng Liu (Realtek Semiconductor Corp.)
* Jianhan Liu (Mediatek Inc.)
* Hanqing Lou (Interdigital, Inc.)
* Li Ma (Mediatek Inc.)
* Jun Minotani (Panasonic Corporation)
* Junyoung Nam (Qualcomm Incorporated)
* Yujin Noh (Newracom Inc.)
* Eunsung Park (Lg Electronics)
* Ron Porat (Broadcom Corporation)
* Srinath Puducheri (Broadcom Corporation)
* Oded Redlich (Huawei)
* Meriam Rezk (Qualcomm Incorporated)
* Sigurd Schelstraete (On Semiconductor)
* Ankit Sethi (Nxp Semiconductors)
* Stephen Shellhammer (Qualcomm Incorporated)
* Shimi Shilo (Huawei)
* Jung Hoon Suh (Huawei Technologies Co. Ltd)
* Bo Sun (Zte Corporation)
* Genadiy Tsodik (Huawei Technologies Co. Ltd)
* Prabodh Varshney (Nokia)
* Yi-Hsiu Wang (Zeku)
* Kanke Wu (Qualcomm Incorporated)
* Tianyu Wu (Apple, Inc.)
* Yan Xin (Huawei Technologies Co., Ltd)
* Aiguo Yan (Oppo)
* Rui Yang (Interdigital, Inc.)
* Yair Yona (Qualcomm Incorporated)
* Mao Yu (Nxp Semiconductors)
* Yan Zeng (Huawei Technologies Co.,  Ltd)
* Yifan Zhou (Huawei Technologies Co., Ltd)

**Presentations**

[**1584r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-1584-00-00be-resolving-tbd-in-section-36-1.docx) **Resolving TBD in section 36.1 (Wook Bong Lee)**

Deferred

[**1161r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-1161-00-00be-eht-punctured-ndp-and-partial-bandwidth-feedback.pptx) **EHT Punctured NDP and Partial bandwidth feedback. Bin Tian**

SPs deferred pending further discussion and presentations

**1238r4 Open Issues on Preamble Design (Sameer Vermani)**

Presented on previous call - Continued discussion

Discussion

Q: can we defer NDP discussion?

Q: do we need 5 bits puncturing information for OFDMA?

A: same number of bits but not all bits are used

Q: why not use table as in 80 MHz non-ofdma case. Some patterns are not allowed. Having a table similar to non-ofdma case would make it clearer.

A: bitmap is simple. Not clear what was allowed for non-ofdma case.

Q: special AID for NDP. Why is this necessary?

A: need user field to convey number of spatial streams

Q: for R2, how to signal options

A: there are many reserved bits available

Q: first 6 reserved bits is for version independent?

A: bits are on the boundary between the two. Can be either.

SP#1

Do you support punctured channel information field in U-SIG to be ‘5 bits + 1 reserved bit adjacent to it’ in the version dependent section ?

* Non-OFDMA:  use a 5 bit BW dependent table to signal the puncturing pattern of the entire PPDU BW
* OFDMA: a bitmap field of 4 bits to indicate which 20MHz is punctured in the current 80MHz
* 1 bit out of the 5 bits is not used
* 1 reserved bit for possible future expansion (e.g, more puncturing patterns in R2) of non-OFDMA puncturing modes

(see SP1 in 1238R5)

Discussion

Q: add that one bit is not used on ofdma

A: SP updated

Q: prefer to have table as we have for non-ofdma case. Bitmap does not allow easy expansion.

Q: use similar signaling method for ofdma and non-ofdma. Need more discussion on PPDU type & compression mode field.

A: SP can be modified

Y/N/A: 29/14/12

Propose to run the same only for non-OFDMA case.

Deferred

SP#2

Do you agree with the EHT-SIG User Field Design shown below?

The ordering of the fields will be as shown below.

Refer to 1238r5 for the tables.

Discussion

Q: only for non-mu mimo allocation?

Q: maybe coding bit can be put above spatial config for better alignment

Q: only support LDPC for mu-mimo?

A: for 20 MHz BCC can be used

Y/N/A: 41/2/8

SP#3

Do you agree that the EHT-SIG common field will include the following?

* U-SIG overflow
* Repeated in each content channel to be friendly to 20MHz operating devices
* Total number of non-OFDMA users (3 bits for 1-8 users)
* Only present in the non-OFDMA compressed mode
* Repeated in each content channel (just like 11ax where the number of MU-MIMO users in the compressed mode was carried in HE-SIG-A)
* RU allocation subfields (RUA)
* Only present in the uncompressed mode

Refer to 1238r4 for complete SP3 text

Y/N/A: 47/1/4

SP4/1238r4

Discussion

Q: SU with DUP is part of MCS and for SU only. Should emphasize that. Would request deferring NDP-related agreements until further presentations.

A: make NDP agreement conditional

Q: there is a proposal to remove EHT-SIG for DUP mode.

Deferred

SP5/1238r4

Deferred

SP#4

Do you agree to encode the EHT-SIG common field together with the first user field for the non-OFDMA compressed modes?

Applicable only if EHT-SIG field exists.

Y/N/A: 41/0/11

SP7/1238r4

Deferred

SP#5

Do you agree for the EHT-SIG common field in the uncompressed mode, we will have the following coding structure for various BWs

* In case of 20/40/80 MHz, just 1 code block is present
* In case of 160/320MHz, 2 code blocks are present
* 1st code block has fixed size (U-SIG overflow + 2 RUA fields )
* 2nd code block includes all remaining RU allocation subfields (2 RUA fields in 160MHz, 6 RUA fields in 320MHz)

Y/N/A: 33/1/17

SP9/1238r4

Deferred

SP10/1238r4

Deferred

SP11/1238r4

Deferred

SP#6

SP12/1238r4

Do you agree that EHT-SIG will support the following MCSs?

MCS0, MCS1, MCS3 and ‘MCS0+DCM’

Discussion

Q: most of the time MCS for payload is above 8. We should include higher MCS for EHT-SIG.

A: higher MCS offer diminishing returns

Q: only MCS0 is useful

Y/N/A: 36/10/9

SP#7

Do you agree that for the EHT MU PPDU, only the following GI/LTF combinations will be supported?

* 2x LTF + 0.8us GI
* 2x LTF + 1.6us GI
* 4x LTF + 3.2us GI
* 4x LTF + 0.8us GI

Y/N/A: 44/1/14

SP#8

Do you agree that 11be will not have Doppler bit in EHT-SIG for R1?

No midamble support in R1

Y/N/A: 39/1/18

SP#9

Do you agree that 11be will not support STBC?

Y/N/A: 37/2/15

[**1317r1**](https://mentor.ieee.org/802.11/dcn/20/11-20-1317-00-00be-sig-contents-discussion-for-eht-sounding-ndp.pptx) **SIG-contents-discussion-for-eht-sounding-ndp (Ross Yu)**

Discussion

Q: 16 bits overflow for all 3 modes. Why needed for all modes?

A: agree – does not have to be like that.

Q: in 11ax, NDP follows SU format. Logical that NDP has two symbols like SU. NDP is not that frequent – why care about saving one symbol?

A: enable higher efficiency and better latency

Q: NDP should use unified format.

Q: NDP is infrequent and is already short.

Q: supportive of proposal. In some cases need every 5 msec feedback.

Q: saving 4 usec not very beneficial. Additional number of HE-LTF not possible with this approach.

SP Deferred

[**1474r1**](https://mentor.ieee.org/802.11/dcn/20/11-20-1474-01-00be-ndp-design-for-eht.pptx) **NDP Design for EHT (Eunsung Jeon)**

Proposes EHT NDP with no EHT-SIG. This allows alignment with HE NDP.

Discussion

Q: receiver should base decisions on NDPA.

**1310 Coding bit in MU-MIMO (Ron Porat)**

Proposes to define the coding bit to be reserved for RU > 242 tones.

SP#10

Do you support defining the meaning of the coding bit in MU-MIMO per-user field for RU>242 as reserved?

Discussion:

Q: is there a default value for reserved bit?

A: should be specified

Y/N/A: 38/0/10

**1467 BW320 signaling (Ron Porat)**

Signal which “set” of 320 MHz channels a transmission belongs to.

Discussion

Q: indication will still be the same for all 80 MHz?

A: yes

**Adjourn**

Meeting is adjourned at 10 pm ET

**Monday Oct 12th, 2020 19:00 – 22:00 ET**

* The Chair (Tianyu Wu, Apple) calls the meeting to order at 19:00 ET.
* The Chair follows the agenda in 11-20/1269r21
* The Chair goes through the IPR policy and asks if anyone is aware of any potentially essential patents. Nobody speaks up.
* The Chair reminds everyone to report their attendance by sending an e-mail to the Co-chair, Sigurd Schelstraete (ON Semiconductor) or the Chair himself.
* Announcements:

None

* Technical Submissions: **Run SPs from Previous Topics [nominally 10 mins total]**
  + [1161r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1161-00-00be-eht-punctured-ndp-and-partial-bandwidth-feedback.pptx) EHT Punctured NDP and Partial bandwidth feedback. Bin Tian [SPs]
  + [1238r5](https://mentor.ieee.org/802.11/dcn/20/11-20-1238-05-00be-open-issues-on-preamble-design.pptx) Open Issues on Preamble Design Sameer Verman [6 SPs]
  + [1317r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1317-01-00be-sig-contents-discussion-for-eht-sounding-ndp.pptx) SIG-contents-discussion-for-eht-sounding-ndp Ross Yu [SPs]
  + [1474r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1474-01-00be-ndp-design-for-eht.pptx) NDP Design for EHT Eunsung Jeon [SPs]
* Technical Submissions: **Proposed Draft Text (PDTs) for fixings TBDs**
  + [1584r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1584-00-00be-resolving-tbd-in-section-36-1.docx) Resolving TBD in section 36.1 Wook Bong Lee
  + [1612r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1612-00-00be-pdt-phy-spatial-configuration-table-typo-fixed.docx) Spatial-configuration-table-typo-fixed Ross Jian Yu
* Technical Submissions:
  + [1178r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1178-01-00be-discussions-on-mu-mimo-signaling.pptx) Discussions on MU-MIMO Signaling Mengshi Hu
  + [1347r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1347-01-00be-lpi-ppdu-format.pptx) LPI PPDU format Junghoon Suh
  + [1322r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1322-00-00be-phy-signaling-methodology-for-11be-releases.pptx) PHY Signaling Methodology Rui Yang
  + [1515r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1515-01-00be-signaling-for-various-transmission-modes-of-mu-ppdu.pptx) Signaling for various transmission modes of MU PPDU Dongguk Lim
  + [1546r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1546-00-00be-u-sig-design-for-tb-ppdu.pptx) U-SIG Design for TB PPDU Alice Chen
  + [1223r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1223-02-00be-subcarrier-grouping-for-eht.pptx) Subcarrier Grouping for EHT Eunsung Jeon
  + [1159r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1159-00-00be-11be-spectral-mask.pptx) 11be spectral mask Bin Tian
  + [1180r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1180-01-00be-spectrum-mask-requirement-for-punctured-transmission.pptx) Spectrum mask requirement for punctured Transmission Wookbong Lee
  + [1165r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1165-00-00be-spectrum-mask-for-puncturing.pptx) Spectrum mask for puncturing Xiaogang Chen
  + [1174r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1174-00-00be-e-sig-with-different-puncturing-patterns.pptx) E-SIG Detection with Different Puncturing Patterns Junghoon Suh
  + [1259r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1259-00-00be-puncturing-patterns-for-ofdma.pptx) Puncturing patterns for ofdma Ron Porat
  + [1311r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1311-02-00be-2x-320mhz-ltf-design.pptx) 2x LTF 320MHz sequences Ron Porat
  + [1375r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1375-01-00be-eht-nltf-design.pptx) EHT NLTF Design Rui Cao
  + [1331r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1331-00-00be-eht-pre-fec-padding-and-packet-extension.pptx) EHT pre-FEC padding and packet extension Rui Cao
  + [1132r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1132-00-00be-thoughts-on-extended-range-preamble.pptx) Thoughts on Extended Range Preamble Bin Tian
  + [1377r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1377-00-00be-on-tbd-mcss.pptx) On TBD MCSs Jianhan Liu
  + [1446r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1466-00-00be-pdt-phy-eht-sounding-ndp.docx) Pilot Polarities for Small M-RUs Ron Porat
  + [1441r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1441-01-00be-ru-restriction-for-20mhz-operation.pptx) RU Restriction for 20MHz Operation Eunsung Park
  + [1342r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1342-00-00be-eht-sounding-feedback-request-parameters.pptx) EHT Sounding feedback request parameters Genadiy Tsodik
  + [1381r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1381-00-00be-reduction-of-peak-to-average-power-ratio-exploiting-multi-numerology-structure.pptx) Reduction of PAPR Exploiting Multi-Numerology Struct. Ebubekir Memişoğlu
  + [1387r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1387-00-00be-eht-via-reconfigurable-surfaces.pptx) EHT via Reconfigurable Surfaces Salah Zegrar
  + [1439r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1439-00-00be-11be-cca-levels.pptx) 11be CCA levels Lin Yang
  + [1565r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1565-00-00be-mu-mimo-in-320mhz-bw-with-reduced-overhead.pptx) MU-MIMO in 320MHz BW with Reduced Overhead Oded Redlich
  + [~~1623r0~~](https://mentor.ieee.org/802.11/dcn/20/11-20-1623-00-00be-multi-ru-indication-in-ru-allocation-subfield-follow-up.pptx) ~~Multi-RU Indication in RU Allocation Subfield Follow up Mengshi Hu\*~~

*\* Note: Need to be uploaded to Mentor website 7 days prior to the conf call*

**Attendance**

The following people registered their attendance for the meeting:

* Song-Haur An (Independent)
* Gary Anwyl (Mediatek Inc.)
* Kwok Shum Au (Huawei Technologies Co.,  Ltd)
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* Lei Huang (Guangdong Oppo Mobile Telecommunications Corp.,Ltd)
* Eunsung Jeon (Samsung Electronics)
* Chenhe Ji (Huawei Technologies Co. Ltd)
* Feng Jiang (Apple Inc.)
* Youhan Kim (Qualcomm Incorporated)
* James Lansford (Qualcomm Incorporated)
* Wookbong Lee (Samsung)
* Jialing Li (Qualcomm Incorporated)
* Dong Guk Lim (Lg Electronics)
* Der-Zheng Liu (Realtek Semiconductor Corp.)
* Jianfei Liu (Huawei)
* Jianhan Liu (Mediatek Inc.)
* Mikael Lorgeoux (Canon Research Centre France)
* Hanqing Lou (Interdigital, Inc.)
* Li Ma (Mediatek Inc.)
* Ebubekir Memisoglu (Istanbul Medipol University; Vestel)
* Jun Minotani (Panasonic Corporation)
* Khashayar Mirfakhraei (Cisco Systems, Inc.)
* Takayuki Nakano (Panasonic Corporation)
* Yujin Noh (Newracom Inc.)
* Thomas Pare (Mediatek Inc.)
* Eunsung Park (Lg Electronics)
* Ron Porat (Broadcom Corporation)
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* Tianyu Wu (Apple, Inc.)
* Yan Xin (Huawei Technologies Co., Ltd)
* Aiguo Yan (Oppo)
* Steve Ts Yang (Mediatek Inc.)
* Yongjiang Yi (Futurewei Technologies)
* Christopher Young (Broadcom Corporation)
* Jian Yu (Huawei Technologies Co., Ltd)
* Yan Zhang (Nxp Semiconductors)

**Pending Straw Polls**

[**1161r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-1161-00-00be-eht-punctured-ndp-and-partial-bandwidth-feedback.pptx) **EHT Punctured NDP and Partial bandwidth feedback (Bin Tian)**

SPs deferred

[**1238r5**](https://mentor.ieee.org/802.11/dcn/20/11-20-1238-05-00be-open-issues-on-preamble-design.pptx) **Open Issues on Preamble Design (Sameer Vermani)**

SPs deferred

[**1317r1**](https://urldefense.proofpoint.com/v2/url?u=https-3A__mentor.ieee.org_802.11_dcn_20_11-2D20-2D1317-2D01-2D00be-2Dsig-2Dcontents-2Ddiscussion-2Dfor-2Deht-2Dsounding-2Dndp.pptx&d=DwMFaQ&c=MHZppzMdXMt3JYjCV71UsQ&r=E_UCG_vQb_LAb2AFKqof1Dlh1DyZd2NfC69b1hG83jY&m=F7lAqHT1ApsMPAjb3jObT446RVTKR8gsW6oBXKY1zz8&s=B1uYACZX_i6Ay6IY5WsnQoVxnTMvS7rNjSs7ALZAENc&e=) **SIG-contents-discussion-for-eht-sounding-ndp (Ross Yu)**

SPs deferred

[**1474r1**](https://urldefense.proofpoint.com/v2/url?u=https-3A__mentor.ieee.org_802.11_dcn_20_11-2D20-2D1474-2D01-2D00be-2Dndp-2Ddesign-2Dfor-2Deht.pptx&d=DwMFaQ&c=MHZppzMdXMt3JYjCV71UsQ&r=E_UCG_vQb_LAb2AFKqof1Dlh1DyZd2NfC69b1hG83jY&m=F7lAqHT1ApsMPAjb3jObT446RVTKR8gsW6oBXKY1zz8&s=4tvq-J8EERUKJH2Wee_Fm32LQBQQyL7izv_dNdhiIGs&e=) **NDP Design for EHT (Eunsung Jeon)**

SPs deferred

**1467 BW320 Signaling (Ron Porat)**

SPs deferred

**Presentations**

[**1612r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-1612-00-00be-pdt-phy-spatial-configuration-table-typo-fixed.docx) **Spatial-configuration-table-typo-fixed (Ross Jian Yu)**

Correct index for spatial configuration table

SP#1:

Do you accept to incorporate the proposed text change in 20/1612r0 into P802.11be D0.1?

No objection – accepted by unanimous consent.

[**1178r1**](https://mentor.ieee.org/802.11/dcn/20/11-20-1178-01-00be-discussions-on-mu-mimo-signaling.pptx) **Discussions on MU-MIMO Signaling (Mengshi Hu)**

Overhead reduction method for signaling MU-MIMO indication in case of multi-segment Mu-MIMO.

Discussion

Q: special field will be overhead for all cases?

A: no, only for multi-segment MU-MIMO

Q: per-segment scheduled users need special treatment

Q: if special user field cannot be decoded properly, following codeblocks also fail.

A: only present at start of common field.

Q: do we need another bit to signal multi-segment MU-MIMO?

A: not needed

Q: will spatial user field still have same size?

SP to be run next time. Allow more time for offline discussion.

[**1347r1**](https://mentor.ieee.org/802.11/dcn/20/11-20-1347-01-00be-lpi-ppdu-format.pptx) **LPI PPDU format (Junghoon Suh)**

Discussion of DUP mode for preamble portion. This is intended to make the preamble more robust.

Proposal to repeat U-SIG and remove EHT-SIG. U-SIG content for LPI is proposed.

Discussion

Q: is legacy STF repeated? Otherwise that may be the bottleneck. DCM has better performance than repetition.

A: simulation include L-LTF, not robustness of L-STF detection.

Q: new PPDU format for LPI PPDU?

A: same as DUP mode

Q: on autodetection: too late if only identified at U-SIG. NDP only has U-SIG, so correlation would be between U-SIG and EHT-ETF.

A: NDPA is used before NDP.

Q: only improving sensitivity of U-SIG may not be useful.

A: you don’t know whether incoming packet is regular of LPI packet

Q: Beacon in legacy format could be the bottleneck

SP will be run next meeting

[**1322r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-1322-00-00be-phy-signaling-methodology-for-11be-releases.pptx) **PHY Signaling Methodology (Rui Yang)**

How to support potential features in R2? Three possible options are discussed.

Use one bit to indicate existence of R2-related signaling.

Discussion

Q: new R2 feature may need new PPDU format or reinterpretation. Earlier proposal has reserved bit adjacent to format field. You want to explicitly name this? Is there any other difference?

A: depends on how reserved bits will be used. We need to remind people that we need to set aside bits for this particular purpose.

Q: needed for R2 features. Changing reserved bits can be difficult, so recommend allowing use of reserved bits for future indications.

Q: why not add note that some reserved bits will be used for R2?

Skip SP – will bring SP for next meeting.

[**1515r1**](https://mentor.ieee.org/802.11/dcn/20/11-20-1515-01-00be-signaling-for-various-transmission-modes-of-mu-ppdu.pptx) **Signaling for various transmission modes of MU PPDU (Dongguk Lim)**

How to indicate different transmission modes for MU-PPDU? PPDU type field can indicate details of the PPDU format.

SP1/1515r1

Deferred

SP2/1515r1

Deferred

SP3/1515r1

Deferred

[**1546r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-1546-00-00be-u-sig-design-for-tb-ppdu.pptx) **U-SIG Design for TB PPDU (Alice Chen)**

In TB PPDU, we have 2-symbol U-SIG, but no EHT-SIG. Discussing user contents of U-SIG.

Version independent fields are the same as MU format. 17 bits have TBD values.

Discussion

Q: SR hasn’t been discussed in 11be. Need discussion on this first.

A: maybe add language “if SR is supported” and add bound on number of bits.

Q: puncturing not indicated in trigger frame. Do you expect to have such an indication?

A: this is only about TB PPDU. If there is puncturing in TB PPDU, it will have to be carried in the Trigger frame.

To be continued next meeting

**Adjourn**

Meeting is adjourned at 22:00 ET

**Wednesday Oct 14th, 2020 10:00 – 13:00 ET**

* The Chair (Tianyu Wu, Apple) calls the meeting to order at 10:00 ET.
* The Chair follows the agenda in 11-20/1269r22
* The Chair goes through the IPR policy and asks if anyone is aware of any potentially essential patents. Nobody speaks up.
* The Chair reminds everyone to report their attendance by sending an e-mail to the Co-chair, Sigurd Schelstraete (ON Semiconductor) or the Chair himself.
* Announcements:

None

* Technical Submissions: **Run SPs from Previous Topics [nominally 10 mins total]**
  + [1161r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1161-00-00be-eht-punctured-ndp-and-partial-bandwidth-feedback.pptx) EHT Punctured NDP and Partial bandwidth feedback. Bin Tian [SPs]
  + [1238r5](https://mentor.ieee.org/802.11/dcn/20/11-20-1238-05-00be-open-issues-on-preamble-design.pptx) Open Issues on Preamble Design Sameer Verman [6 SPs]
  + [1317r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1317-01-00be-sig-contents-discussion-for-eht-sounding-ndp.pptx) SIG-contents-discussion-for-eht-sounding-ndp Ross Yu [SPs]
  + [1474r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1474-01-00be-ndp-design-for-eht.pptx) NDP Design for EHT Eunsung Jeon [SPs]
  + [1467r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1467-00-00be-bw320-signaling.pptx) 320MHz signaling Ron Porat [SPs]
  + [1178r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1178-01-00be-discussions-on-mu-mimo-signaling.pptx) Discussions on MU-MIMO Signaling Mengshi Hu [SPs]
  + [1347r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1347-01-00be-lpi-ppdu-format.pptx) LPI PPDU format Junghoon Suh [SPs]
  + [1322r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1322-00-00be-phy-signaling-methodology-for-11be-releases.pptx) PHY Signaling Methodology Rui Yang [SPs]
  + [1515r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1515-01-00be-signaling-for-various-transmission-modes-of-mu-ppdu.pptx) Signaling for various TX modes of MU PPDU Dongguk Lim [SPs]
  + [1546r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1546-00-00be-u-sig-design-for-tb-ppdu.pptx) U-SIG Design for TB PPDU Alice Chen [SPs]
* Technical Submissions: **Proposed Draft Text (PDTs) for fixings TBDs**
  + *None for this call.*
* Technical Submissions:
  + [1132r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1132-00-00be-thoughts-on-extended-range-preamble.pptx) Thoughts on Extended Range Preamble Bin Tian
  + [1223r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1223-02-00be-subcarrier-grouping-for-eht.pptx) Subcarrier Grouping for EHT Eunsung Jeon
  + [1342r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1342-00-00be-eht-sounding-feedback-request-parameters.pptx) EHT Sounding feedback request parameters Genadiy Tsodik
  + [1159r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1159-00-00be-11be-spectral-mask.pptx) 11be spectral mask Bin Tian
  + [1180r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1180-01-00be-spectrum-mask-requirement-for-punctured-transmission.pptx) Spectrum mask requirement for punctured Transmission Wookbong Lee
  + [1165r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1165-00-00be-spectrum-mask-for-puncturing.pptx) Spectrum mask for puncturing Xiaogang Chen
  + [1174r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1174-00-00be-e-sig-with-different-puncturing-patterns.pptx) E-SIG Detection with Different Puncturing Patterns Junghoon Suh
  + [1259r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1259-00-00be-puncturing-patterns-for-ofdma.pptx) Puncturing patterns for ofdma Ron Porat
  + [1311r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1311-02-00be-2x-320mhz-ltf-design.pptx) 2x LTF 320MHz sequences Ron Porat
  + [1375r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1375-01-00be-eht-nltf-design.pptx) EHT NLTF Design Rui Cao
  + [1331r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1331-00-00be-eht-pre-fec-padding-and-packet-extension.pptx) EHT pre-FEC padding and packet extension Rui Cao
  + [1377r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1377-00-00be-on-tbd-mcss.pptx) On TBD MCSs Jianhan Liu
  + [1446r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1466-00-00be-pdt-phy-eht-sounding-ndp.docx) Pilot Polarities for Small M-RUs Ron Porat
  + [1441r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1441-01-00be-ru-restriction-for-20mhz-operation.pptx) RU Restriction for 20MHz Operation Eunsung Park
  + [1381r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1381-00-00be-reduction-of-peak-to-average-power-ratio-exploiting-multi-numerology-structure.pptx) Reduction of PAPR Exploiting Multi-Numerology Struct. Ebubekir Memişoğlu
  + [1387r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1387-00-00be-eht-via-reconfigurable-surfaces.pptx) EHT via Reconfigurable Surfaces Salah Zegrar
  + [1439r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1439-00-00be-11be-cca-levels.pptx) 11be CCA levels Lin Yang
  + [1565r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1565-00-00be-mu-mimo-in-320mhz-bw-with-reduced-overhead.pptx) MU-MIMO in 320MHz BW with Reduced Overhead Oded Redlich
  + [~~1623r0~~](https://mentor.ieee.org/802.11/dcn/20/11-20-1623-00-00be-multi-ru-indication-in-ru-allocation-subfield-follow-up.pptx) ~~Multi-RU Indication in RU Allocation Subfield Follow up Mengshi Hu\*~~

*\* Note: Need to be uploaded to Mentor website 7 days prior to the conf call*

* AoB:
* Adjourn

**Attendance**

The following people registered their attendance for the meeting:

|  |
| --- |
| * Gary Anwyl (Mediatek Inc.) * Edward Au (Huawei) |
| * Rui Cao (Nxp Semiconductors) |
| * Seungho Choo (Senscomm Semiconductor Co., Ltd.) |
| * Jinyoung Chun (Lg Electronics) |
| * Bo Gong (Huawei Technologies Co. Ltd) |
| * Hung-Tao Hsieh (Mediatek Inc.) |
| * Lei Huang (Guangdong Oppo Mobile Telecommunications Corp.,Ltd) |
| * Chenhe Ji (Huawei Technologies Co. Ltd) |
| * Mahmoud Kamel (Interdigital, Inc.) |
| * Myeong-Jin Kim (Samsung) |
| * Jialing Li (Qualcomm Incorporated) |
| * Dong Guk Lim (Lg Electronics) |
| * Wei Lin (Huawei Technologies Co. Ltd) |
| * Chenchen Liu (Huawei Technologies Co., Ltd) |
| * Miguel Lopez (Ericsson Ab) |
| * Hanqing Lou (Interdigital, Inc.) |
| * Ebubekir Memisoglu (Istanbul Medipol University; Vestel) |
| * Khashayar Mirfakhraei (Cisco Systems, Inc.) |
| * Leo Montreuil (Broadcom Corporation) |
| * Junyoung Nam (Qualcomm Incorporated) |
| * Yujin Noh (Newracom Inc.) |
| * Basak Ozbakis (Vestel) |
| * Eunsung Park (Lg Electronics) |
| * Ron Porat (Broadcom Corporation) |
| * Srinath Puducheri (Broadcom Corporation) |
| * Sigurd Schelstraete (Quantenna Communications, Inc.) |
| * Ankit Sethi (Nxp Semiconductors) |
| * Stephen Shellhammer (Qualcomm Incorporated) |
| * Jung Hoon Suh (Huawei Technologies Co. Ltd) |
| * Bo Sun (Zte Corporation) |
| * Francois Thoumy (Canon Research Centre France) |
| * Bin Tian (Qualcomm Incorporated) |
| * Prabodh Varshney (Nokia) |
| * Daniel Verenzuela (Sony Corporation) |
| * Sameer Vermani (Qualcomm Incorporated) |
| * Leif Wilhelmsson (Ericsson Ab) |
| * Kanke Wu (Qualcomm Incorporated) |
| * Tianyu Wu (Apple, Inc.) |
| * Steve Ts Yang (Mediatek Inc.) |
| * Yongjiang Yi (Futurewei Technologies) |
| * Christopher Young (Broadcom Corporation) |
| * Jian Yu (Huawei Technologies Co., Ltd) |
| * Yan Zhang (Nxp Semiconductors) |

**Straw Polls**

[**1161r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-1161-00-00be-eht-punctured-ndp-and-partial-bandwidth-feedback.pptx) **EHT Punctured NDP and Partial bandwidth feedback (Bin Tian)**

SP Deferred

[**1238r5**](https://mentor.ieee.org/802.11/dcn/20/11-20-1238-05-00be-open-issues-on-preamble-design.pptx) **Open Issues on Preamble Design (Sameer Vermani)**

SP Deferred

[**1317r1**](https://mentor.ieee.org/802.11/dcn/20/11-20-1317-01-00be-sig-contents-discussion-for-eht-sounding-ndp.pptx) **SIG-contents-discussion-for-eht-sounding-ndp (Ross Yu)**

SP Deferred

[**1474r1**](https://mentor.ieee.org/802.11/dcn/20/11-20-1474-01-00be-ndp-design-for-eht.pptx) **NDP Design for EHT (Eunsung Jeon)**

To be updated

SP Deferred

[**1467r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-1467-00-00be-bw320-signaling.pptx) **320MHz signaling (Ron Porat)**

Signal which “set” of 320 MHz channels a transmission belongs to.

Discussion

Q: channelization can be learned from beacon. Don’t see the need for two entries. Decoding U-SIG is enough for most cases. For SR exact BW may be needed, but not otherwise.

A: Beacon works for own BSS, not OBSS.

Q: could check OBSS Beacon and RNR

A: could be much more complicated

Q: have you checked other changes that need to be made, e.g. for MAC?

A: No, only looked at U-SIG signaling. Open to further modifications.

Q: this keeps the status quo. For contiguous channels, we should know exactly which part of the spectrum is occupied. If primary 20 are in different 80 MHz, beacons will not be seen.

Q: STA already knows which channel it should be using, so BW alone is enough.

A: doesn’t apply to OBSS

SP deferred

[**1178r1**](https://mentor.ieee.org/802.11/dcn/20/11-20-1178-01-00be-discussions-on-mu-mimo-signaling.pptx) **Discussions on MU-MIMO Signaling (Mengshi Hu)**

SP deferred

[**1347r1**](https://mentor.ieee.org/802.11/dcn/20/11-20-1347-01-00be-lpi-ppdu-format.pptx) **LPI PPDU format (Junghoon Suh)**

SP deferred

[**1322r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-1322-00-00be-phy-signaling-methodology-for-11be-releases.pptx) **PHY Signaling Methodology (Rui Yang)**

SP deferred

[**1515r1**](https://mentor.ieee.org/802.11/dcn/20/11-20-1515-01-00be-signaling-for-various-transmission-modes-of-mu-ppdu.pptx) **Signaling for various TX modes of MU PPDU (Dongguk Lim)**

SP deferred

[**1546r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-1546-00-00be-u-sig-design-for-tb-ppdu.pptx) **U-SIG Design for TB PPDU (Alice Chen)**

SP#1

Do you support not to have punctured channel indication in the U-SIG of TB PPDU?

Y/N/A: 31/3/12

SP#2

Do you support to have two SR fields (4 bits each, total 8 bits), with granularity of half PPDU BW, but no smaller than 20MHz, in the U-SIG of TB PPDU?

* Note: 11ax has 4 SR fields in HE-SIG-A of the HE TB PPDU

Discussion:

Q: is there performance analysis from having only two fields?

A: confined by number of TBD bits

Q: what about multi-AP SR?

A: in that case, everything is coordinated. This information is not needed.

Q: SP should say “do you support to reduce the fields from 4 to 2”

A: maybe add note to highlight difference with 11ax

Q: not clear whether SR will be reused. Also, not just a PHY topic. Why not leave 8 reserved bits?

Q: should first decide whether SR is R1 feature

Y/N/A: 21/19/12

**Presentations**

[**1132r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-1132-00-00be-thoughts-on-extended-range-preamble.pptx) **Thoughts on Extended Range Preamble (Bin Tian)**

Suggests not defining EHT ER for R1.

Need to think about forward compatibility if not defined in R1.

Proposed possible format of ER PPDU similar to 11ax.

Discussion

Q: in favor of ER, either R1 or R2. Can we define better ER preamble in 11be?

A: 11ax design is good. 11be features don’t currently improve it.

Q: agree – no need for EHT ER. HE is good enough. There may be no need for ER preamble.

Q: agree – need to focus on avoiding interop issues in the future.

Q: need ER for EHT.

Q: clarify that intention is different from earlier proposal to repeat U-SIG for DUP.

A: intention is to have 11ax-style definition

Q: what is the value if R1 devices don’t understand the new U-SIG

A: version-independent fields can be understood.

SP#3

Do you support to define ER preamble (classification and U-SIG decoding only for forward compatibility) but not ER PPDU in 11be in R1?

* ER preamble structure is described in slide 3 of 1132r0
* No payload definition

Y/N/A: 27/12/11

[**1223r2**](https://mentor.ieee.org/802.11/dcn/20/11-20-1223-02-00be-subcarrier-grouping-for-eht.pptx) **Subcarrier Grouping for EHT (Eunsung Jeon)**

Beamforming feedback overhead can be significantly increased compared to 11ax. Different subcarrier groupings (4, 16, 32) don’t show a lot of difference.

Discussion

Q: how much reduction is achieved? How much throughput gain?

A: no performance results

Q: we have done similar analysis, but with different conclusion. Gain in SU is minimal, so no point in feedback size reduction scheme. For MU, improvement may be possible. You haven’t checked 16 SS. We need to simulate those cases.

SP deferred

[**1342r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-1342-00-00be-eht-sounding-feedback-request-parameters.pptx) **EHT Sounding feedback request parameters (Genadiy Tsodik)**

Discussing Ng values for sounding feedback.

Only small gains for SU throughput.

Ng=16 provides reasonable performance degradation.

Suggested to reuse the Ng values defined in 11ax (N=4 and Ng=16).

Codebook size: A codebook size of (9,11) bits provided no performance degradation for all the scenarios whereas codebook size of (8,10) slightly degrades the performance in full rank MU-MIMO.

SP 1/1223r2

Do you agree that 802.11be supports a separate set of Ng values for SU-MIMO and MU-MIMO, respectively?

* Note: Ng values are TBD.

Discussion:

Q: like to se more results for higher rank channels before running SP

A: OK to defer

SPs 1-3 in 1223r2 deferred

SP1-3 in 1342 deferred

SP#4

Do you agree to support Ng values same as defined in 802.11ax?

* Note: this is for R1

Y/N/A: 35/5/4

SP#5

Do you agree that Ng mandatory/optional support requirement is the same as in 802.11ax?

* Note: this is for R1

Y/N/A: 39/2/5

**Adjourn**

Meeting is adjourned at 13:00 ET

**Monday Oct 19th, 2020 10:00 – 13:00 ET**

* The Chair (Tianyu Wu, Apple) calls the meeting to order at 10:00 ET.
* The Chair follows the agenda in 11-20/1269r25
* The Chair goes through the IPR policy and asks if anyone is aware of any potentially essential patents. Nobody speaks up.
* The Chair reminds everyone to report their attendance by sending an e-mail to the Co-chair, Sigurd Schelstraete (ON Semiconductor) or the Chair himself.
* Announcements:

None

* Technical Submissions: **Run SPs from Previous Topics [nominally 10 mins total]**
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  + [1066r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1066-00-00be-4x-eht-ltf-sequence.pptx) 4x EHT-LTF Sequence Jinyoung Chun [SPs]
  + [1073r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1073-03-00be-4x-eht-ltf-sequences-design.pptx) 4x EHT-LTF Sequences Design Chenchen Liu [SPs]
* Technical Submissions: **Proposed Draft Text (PDTs) for fixings TBDs**
  + *Pending requests.*
* Technical Submissions:
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*\* Note: Need to be uploaded to Mentor website 7 days prior to the conf call*

* AoB:
* Adjourn

**Attendance**

The following people registered their attendance for the meeting:

* Shubhodeep Adhikari (Broadcom Corporation)
* Song-Haur An (Independent)
* Carol Ansley (Ieee Member / Self Employed)
* Gary Anwyl (Mediatek Inc.)
* Alfred Asterjadhi (Qualcomm Incorporated)
* Kwok Shum Au (Huawei Technologies Co.,  Ltd)
* Hari Ram B (Nxp Semiconductors)
* Eugene Baik (Qualcomm Incorporated)
* David Boldy (Broadcom Corporation)
* Albert Bredewoud (Broadcom Corporation)
* Rui Cao (Nxp Semiconductors)
* Xilin Cheng (Nxp Semiconductors)
* Jinsoo Choi (Lg Electronics)
* Seungho Choo (Senscomm Semiconductor Co., Ltd.)
* Jinyoung Chun (Lg Electronics)
* Chulho Chung (Samsung)
* Thomas Derham (Broadcom Corporation)
* Rolf De Vegt (Qualcomm Incorporated)
* Rui Du (Huawei Technologies Co. Ltd)
* Shuling Feng (Mediatek Inc.)
* Alireza Ghaderipoor (Mediatek Inc.)
* Sachin Godbole (Broadcom Corporation)
* Bo Gong (Huawei Technologies Co. Ltd)
* Niranjan Grandhe (Nxp Semiconductors)
* Lili Hervieu (Cable Television Laboratories Inc. (Cablelabs))
* Hung-Tao Hsieh (Mediatek Inc.)
* Lei Huang (Guangdong Oppo Mobile Telecommunications Corp.,Ltd)
* Chenhe Ji (Huawei Technologies Co. Ltd)
* Feng Jiang (Apple Inc.)
* Ishaque Ashar Kadampot (Qualcomm Incorporated)
* Naveen Kakani (Qualcomm Incorporated)
* Mahmoud Kamel (Interdigital, Inc.)
* Myeong-Jin Kim (Samsung)
* Namyeong Kim (Lg Electronics)
* Youhan Kim (Qualcomm Incorporated)
* James Lansford (Qualcomm Incorporated)
* Wookbong Lee (Samsung)
* Jialing Li (Qualcomm Incorporated)
* Dong Guk Lim (Lg Electronics)
* Wei Lin (Huawei Technologies Co. Ltd)
* Chenchen Liu (Huawei Technologies Co., Ltd)
* Der-Zheng Liu (Realtek Semiconductor Corp.)
* Miguel Lopez (Ericsson Ab)
* Hanqing Lou (Interdigital, Inc.)
* Li Ma (Mediatek Inc.)
* Ebubekir Memisoglu (Istanbul Medipol University; Vestel)
* Khashayar Mirfakhraei (Cisco Systems, Inc.)
* Leo Montreuil (Broadcom Corporation)
* Junyoung Nam (Qualcomm Incorporated)
* Yujin Noh (Newracom Inc.)
* Basak Ozbakis (Vestel)
* Burak Ozpoyraz (Vestel)
* Stephen Palm (Broadcom Corporation)
* Eunsung Park (Lg Electronics)
* Srinath Puducheri (Broadcom Corporation)
* Kapil Rai (Qualcomm Incorporated)
* Oded Redlich (Huawei)
* Sayak Roy (Nxp Semiconductors)
* Sigurd Schelstraete (Quantenna Communications, Inc.)
* Ankit Sethi (Nxp Semiconductors)
* Stephen Shellhammer (Qualcomm Incorporated)
* Shimi Shilo (Huawei)
* Shree Raman Srinivasan (Qualcomm Incorporated)
* Paul Strauch (Qualcomm Incorporated)
* Jung Hoon Suh (Huawei Technologies Co. Ltd)
* Bo Sun (Zte Corporation)
* Yingxiang Sun (Huawei Technologies Co. Ltd)
* Danny Tan (Huawei Technologies Co., Ltd)
* Semiha Tedik Basaran (Vestel)
* Bin Tian (Qualcomm Incorporated)
* Solomon Trainin (Qualcomm Incorporated)
* Genadiy Tsodik (Huawei Technologies Co. Ltd)
* Seda Ustunbas (Vestel)
* Prabodh Varshney (Nokia)
* Daniel Verenzuela (Sony Corporation)
* Sindhu Verma (Broadcom Corporation)
* Menzo Wentink (Qualcomm)
* Leif Wilhelmsson (Ericsson Ab)
* Kanke Wu (Qualcomm Incorporated)
* Yan Xin (Huawei Technologies Co., Ltd)
* Aiguo Yan (Oppo)
* Steve Ts Yang (Mediatek Inc.)
* Christopher Young (Broadcom Corporation)
* Salah Eddine Zegrar (Istanbul Medipol University; Vestel)
* Meihong Zhang (Huawei Technologies Co., Ltd)
* Yan Zhang (Nxp Semiconductors)

**Straw Polls**

[**1161r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-1161-00-00be-eht-punctured-ndp-and-partial-bandwidth-feedback.pptx) **EHT Punctured NDP and Partial bandwidth feedback (Bin Tian)**

SP#1

SP3 in 1161

Discussion

None

Results

**Do you support the following for 11be?**

* 1. The partial BW CSI feedback request uses 20MHz (RU242) granularity

Note: Feedback request granularity change doesn’t impact the CSI computation scheme. For example, CQI feedback computation is still based on RU26

Y/N/A: 67/0/8

SP4 in 1161 deferred

**1238r6 Open Issues on Preamble Design (Sameer Vermani)**

SP#2

SP1 in 1238

Discussion:

Q: why not used unified table-based mapping for OFDMA case?

A: would still not be entirely unified between OFDMA and non-OFDMA. Let’s run as is to see group’s feedback. Can reconsider if SP fails.

A: remove the words “bitmap field”

SP updated in 1238r7

Results

* Do you support punctured channel information field in U-SIG to be ‘5 bits + 1 reserved bit adjacent to it’ in the version dependent section ?
  + Non-OFDMA:  use a 5 bit BW dependent table to signal the puncturing pattern of the entire PPDU BW
  + OFDMA: 4 bits to indicate which 20MHz is punctured in the current 80MHz
  + 1 bit out of the 5 bits is not used for the OFDMA case
  + Refer to SP1 in 1238r7.

Y/N/A: 50/7/16

SP1a in 1238 deferred

SP2 in 1238 deferred

SP3 in 1238 deferred

SP#3

SP4 in 1238 – updated in r7

Discussion

None

Results

* Do you agree that an EHT NDP transmission will use an 11ac/11ax like method of signaling an NDP L-SIG length along with N\_LTF/N\_STS and number of EHT-SIG symbols can be used at the receiver to conclude that there are no data symbols

Y/N/A: 56/0/17

SP5 in 1238 deferred

SP6 in 1238 deferred

[**1317r1**](https://mentor.ieee.org/802.11/dcn/20/11-20-1317-01-00be-sig-contents-discussion-for-eht-sounding-ndp.pptx) **SIG-contents-discussion-for-eht-sounding-ndp (Ross Yu)**

Deferred

[**1474r2**](https://mentor.ieee.org/802.11/dcn/20/11-20-1474-02-00be-ndp-design-for-eht.pptx) **NDP Design for EHT (Eunsung Jeon)**

Proposes constellation based NDP setting. U-SIG2 will be QBPSK modulated for NDP.

Discussion

Q: depends on outcome of ER PPDU discussion. Rotation could be used for that. Shouldn’t be used just to indicate NDP.

A: no confusion, could be used for both purposes when combined with knowledge of L-SIG length.

[**1347r1**](https://mentor.ieee.org/802.11/dcn/20/11-20-1347-01-00be-lpi-ppdu-format.pptx) **LPI PPDU format (Junghoon Suh)**

Need auto-classification prior to U-SIG to indicate DUP mode. Based on using QBPSK for U-SIG.

Discussion

Q: Not in favor of time-domain repetition. unnecessary complexity for the specification. DUP mode should be seen as additional MCS.

A: different from previous proposal. There is no time-domain repetition.

Q: why do we need this early classification?

A: need combining for good reception.

Q: bottleneck is not U-SIG. If L-SIG is bottleneck, other detection mechanism is needed anyway.

A: U-SIG repetition has been removed.

Q: only applies to 6 GHz, meaning different processing in 5 and 6 GHz?

A: yes, but only involves small additional complexity

Q: this proposal simplifies the detection

Q: MRC for L-SIG is needed anyway. Extra complexity of this proposal is unnecessary.

SP#4

SP2 in 1238r7

Discussion

Q: we prefer NDP without EHT-SIG.

Q: we have different proposal to indicate PPDU type

Results

* Do you agree to have a 2 bit combined “PPDU type and compression mode” field to signal the following?
  + Refer to SP2 in 1238r6

Y/N/A: 53/29/6

Modified SP2 (SP2a): remove NDP from the first column. Leave NDP signaling TBD for now.

Deferred

SP#5

SP3 in 1238r7

Results

* Do agree that the DUPed transmission in EHT will be signaled using a value of the MCS field in EHT-SIG user field of the SU transmission?

Y/N/A: 64/13/12

SP#6

SP5 in 1238r7

Results

* **Do you agree that in an NDP, the EHT-SIG** 
  1. Will carry a SU-like per-user info field
     1. Nsts of the NDP will be signaled in it
  2. Will always be sent at MCS0, jointly encoded 2 symbols
     1. U-SIG carries an EHT-SIG MCS field that is set to MCS0

Y/N/A: 58/27/8

SP#7

SP6 in 1238r7

Results

* Do you agree with the U-SIG and U-SIG overflow contents shown in slide 5 (other than NDP and TB packets)?
  + Ordering of fields is TBD
  + TxOP/BSS Color bits are TBD
  + Reserved bits will reduce if these fields get more bits

Y/N/A: 59/10/20

SP#8

SP1 in 1317

Discussion

Q: this requires Rx state machine to remember NDPA.

A: we already rely on this. This enables A-PPDU transmission of NDP.

Q: this is new PPDU format. Is there enough time to process EHT-STF?

Q: how do we identify this PPDU format?

A: intended receiver knows NDP is coming from NDPA

Q: how does 3rd party know?

A: does not need AGC

Q: involving NDPA in detention is new behavior.

A: 11az already needs to know, so this has been used before.

Results

* **Do you agree to add the following text in the TGbe SFD:**
  1. There exists no EHT-SIG field in the EHT sounding NDP.
     1. This is for R1.

Y/N/A: 25/53/8

SP#9

SP2 in 1317

Proposes one-symbol EHT-SIG.

Discussion

Q: can we modify to greater than or equal to one symbol?

Q: prefer to keep NDP format the same as other PPDU formats

Results

* Do you agree to add the following text in the TGbe SFD:
  + The EHT-SIG of EHT sounding NDP is always modulated with BPSK R 1/2, and has only one symbol.
  + The EHT-SIG of EHT sounding NDP contains 16 bit U-SIG overflow bits and 4 bit CRC and 6 bit Tail.
  + This is for R1.

Y/N/A: 19/54/12

SP#10

SP3 in 1317

Discussion

Q: number of EHT-SIG will not be equal to 1. We don’t need this given other agreements.

Q: we have enough bits, don’t need spoofing.

Results

* Do you agree to add the following text in the TGbe SFD:
  + An EHT sounding NDP is signaled through:
    - Number of EHT-SIG symbols is set to 1, and
    - EHT-SIG MCS is set to BPSK R ½
  + This is for R1.

Y/N/A: 19/42/19

SP4 and 5 in 1317 are deferred

SP#11

SP3 in 1474r2

Discussion

Ray: what does entity mean?

A: SP modified. change to entry.

Q: can be done by doing length calculation, so this new proposal is not needed.

Results

* Do you support to have a separate dedicated value of the PPDU type and compression mode field to indicate EHT-NDP?

Y/N/A: 24/36/16

SP#12

SP4 in 1474r2

Results

* **Do you agree that following constellation in U-SIG?**
  1. U-SIG1: BPSK
  2. U-SIG2: QBPSK for NDP, and BPSK for others

Y/N/A: 6/47/13

[**1467r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-1467-00-00be-bw320-signaling.pptx) **320MHz signaling (Ron Porat)**

SP#13

SP1 in 1467

Discussion

Q: no clear motivation for this. Don’t see the benefit.

Results

* In addition to four entries for 20/40/80/160MHz, do you support having two entries in U-SIG BW field for 320 MHz?

320-1 if PPDU channel center frequency is 31, 95, 159

320-2 if PPDU channel center frequency is 63, 127, 191

Y/N/A: 53/17/10

[**1515r2**](https://mentor.ieee.org/802.11/dcn/20/11-20-1515-01-00be-signaling-for-various-transmission-modes-of-mu-ppdu.pptx) **Signaling for various TX modes of MU PPDU (Dongguk Lim)**

SP#14

SP1 in 1515r2

Results

* **Do you agree to add the following text in the TGbe SFD:**
  1. In the SU transmission and SU-DUP transmission,
     1. The compressed mode is used.
     2. The number of non-OFDMA users subfield is set to 0 to indicate the one user
     3. The User field for a non-MU-MIMO allocation is used

Y/N/A: 57/3/18

SP#15

SP2 in 1515r2

Results

* **Do you agree to add the following text in the TGbe SFD:**
  1. In NDP transmission,
     1. The compressed mode is used.
     2. The number of non-OFDMA users subfield is set to 0
     3. One user field is present in EHT-SIG and the STA-ID is set to a TBD value
     4. The User field for a non-MU-MIMO allocation is used

Y/N/A: 45/17/7

SP#16

SP3 in 1515r2

Discussion:

Q: hasn’t this passed already?

A: similar to using MCS index. Difference is in the note.

Results

* **Do you agree to add the following text in the TGbe SFD:**
  1. SU-DUP is indicated by using the specific MCS index of 11be MCS table in SU transmission.
     1. Note : specific MCS means MCS0 + DCM + DUP
     2. Note: this specific MCS only apply to Nss = 1

Y/N/A: 45/4/15

SP4 – SP6 in 515r2 deferred

[**1223r2**](https://mentor.ieee.org/802.11/dcn/20/11-20-1223-02-00be-subcarrier-grouping-for-eht.pptx) **Subcarrier Grouping for EHT (Eunsung Jeon)**

SPs withdrawn

[**1066r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-1066-00-00be-4x-eht-ltf-sequence.pptx) **4x EHT-LTF Sequence (Jinyoung Chun)**

Discussion:

Q: Can we deal with all EHT-LTF related submissions together?

To be continued next call.

**Adjourn**

Meeting is adjourned at 12:58 ET.

**Wednesday Oct 21st, 2020 10:00 – 13:00 ET**

* The Chair (Tianyu Wu, Apple) calls the meeting to order at 10:00 ET.
* The Chair follows the agenda in 11-20/1269r27
* The Chair goes through the IPR policy and asks if anyone is aware of any potentially essential patents. Nobody speaks up.
* The Chair reminds everyone to report their attendance by sending an e-mail to the Co-chair, Sigurd Schelstraete (ON Semiconductor) or the Chair himself.
* Announcements:

None

* Technical Submissions: **Run SPs from Previous Topics [nominally 10 mins total]**
  + [1178r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1178-01-00be-discussions-on-mu-mimo-signaling.pptx) Discussions on MU-MIMO Signaling Mengshi Hu [SPs]
  + [1322r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1322-00-00be-phy-signaling-methodology-for-11be-releases.pptx) PHY Signaling Methodology Rui Yang [SPs]
  + [1342r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1342-00-00be-eht-sounding-feedback-request-parameters.pptx) EHT Sounding feedback request parameters Genadiy Tsodik [SPs]
  + [1066r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1066-00-00be-4x-eht-ltf-sequence.pptx) 4x EHT-LTF Sequence Jinyoung Chun [SPs]
  + [1073r3](https://mentor.ieee.org/802.11/dcn/20/11-20-1073-03-00be-4x-eht-ltf-sequences-design.pptx) 4x EHT-LTF Sequences Design Chenchen Liu [SPs]
* Technical Submissions: **Proposed Draft Text (PDTs) for fixings TBDs**
  + *Pending requests.*
* Technical Submissions:
  + [1311r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1311-02-00be-2x-320mhz-ltf-design.pptx) 2x LTF 320MHz sequences Ron Porat
  + [1377r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1377-00-00be-on-tbd-mcss.pptx) On TBD MCSs Jianhan Liu
  + [1159r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1159-00-00be-11be-spectral-mask.pptx) 11be spectral mask Bin Tian
  + [1180r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1180-01-00be-spectrum-mask-requirement-for-punctured-transmission.pptx) Spectrum mask requirement for punctured Transmission Wookbong Lee
  + [1165r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1165-00-00be-spectrum-mask-for-puncturing.pptx) Spectrum mask for puncturing Xiaogang Chen
  + [1174r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1174-00-00be-e-sig-with-different-puncturing-patterns.pptx) E-SIG Detection with Different Puncturing Patterns Junghoon Suh
  + [1259r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1259-00-00be-puncturing-patterns-for-ofdma.pptx) Puncturing patterns for ofdma Ron Porat
  + [1375r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1375-01-00be-eht-nltf-design.pptx) EHT NLTF Design Rui Cao
  + [1331r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1331-00-00be-eht-pre-fec-padding-and-packet-extension.pptx) EHT pre-FEC padding and packet extension Rui Cao
  + [1446r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1466-00-00be-pdt-phy-eht-sounding-ndp.docx) Pilot Polarities for Small M-RUs Ron Porat
  + [1441r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1441-01-00be-ru-restriction-for-20mhz-operation.pptx) RU Restriction for 20MHz Operation Eunsung Park
  + [1381r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1381-00-00be-reduction-of-peak-to-average-power-ratio-exploiting-multi-numerology-structure.pptx) Reduction of PAPR Exploiting Multi-Numerology Struct. Ebubekir Memişoğlu
  + [1387r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1387-00-00be-eht-via-reconfigurable-surfaces.pptx) EHT via Reconfigurable Surfaces Salah Zegrar
  + [1439r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1439-00-00be-11be-cca-levels.pptx) 11be CCA levels Lin Yang
  + [1565r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1565-00-00be-mu-mimo-in-320mhz-bw-with-reduced-overhead.pptx) MU-MIMO in 320MHz BW with Reduced Overhead Oded Redlich
  + [1623r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1623-01-00be-multi-ru-indication-in-ru-allocation-subfield-follow-up.pptx) Multi-RU Indication in RU Allocation Subfield Follow up Mengshi Hu
  + [~~1672r0~~](https://mentor.ieee.org/802.11/dcn/20/11-20-1672-00-00be-ul-beamforming-for-tb-ppdus.pptx) ~~UL Beamforming for TB PPDUs Shimi Shilo\*~~

*\* Note: Need to be uploaded to Mentor website 7 days prior to the conf call*

* AoB:
* Adjourn

**Attendance**

The following people registered their attendance for the call:

* Shubhodeep Adhikari (Broadcom Corporation)
* Carol Ansley (Ieee Member / Self Employed)
* Gary Anwyl (Mediatek Inc.)
* Hari Ram B (Nxp Semiconductors)
* Sunhee Baek (Lg Electronics)
* Olfa Ben Yahia (Olfa Ben Yahia  Vestel)
* Nehru Bhandaru (Broadcom Corporation)
* David Boldy (Broadcom Corporation)
* Rui Cao (Nxp Semiconductors)
* Xilin Cheng (Nxp Semiconductors)
* Seungho Choo (Senscomm Semiconductor Co., Ltd.)
* Jinyoung Chun (Lg Electronics)
* Thomas Derham (Broadcom Corporation)
* Rui Du (Huawei Technologies Co. Ltd)
* Shuling Feng (Mediatek Inc.)
* Alireza Ghaderipoor (Mediatek Inc.)
* Bo Gong (Huawei Technologies Co. Ltd)
* Niranjan Grandhe (Nxp Semiconductors)
* Lili Hervieu (Cable Television Laboratories Inc. (Cablelabs))
* Ching-Wen Hsiao (Mediatek Inc.)
* Hung-Tao Hsieh (Mediatek Inc.)
* Lei Huang (Guangdong Oppo Mobile Telecommunications Corp.,Ltd)
* Eunsung Jeon (Samsung Electronics)
* Chenhe Ji (Huawei Technologies Co. Ltd)
* Naveen Kakani (Qualcomm Incorporated)
* Mahmoud Kamel (Interdigital, Inc.)
* Oren Kedem (Huawei Technologies Co. Ltd)
* Myeong-Jin Kim (Samsung)
* Namyeong Kim (Lg Electronics)
* Sang Gook Kim (Lg Electronics)
* Youhan Kim (Qualcomm Incorporated)
* James Lansford (Qualcomm Incorporated)
* Wookbong Lee (Samsung)
* Jialing Li (Qualcomm Incorporated)
* Dong Guk Lim (Lg Electronics)
* Chenchen Liu (Huawei Technologies Co., Ltd)
* Hanqing Lou (Interdigital, Inc.)
* Li Ma (Mediatek Inc.)
* Ebubekir Memisoglu (Istanbul Medipol University; Vestel)
* Khashayar Mirfakhraei (Cisco Systems, Inc.)
* Leo Montreuil (Broadcom Corporation)
* Yujin Noh (Newracom Inc.)
* Burak Ozpoyraz (Vestel)
* Thomas Pare (Mediatek Inc.)
* Eunsung Park (Lg Electronics)
* Brian Petry (Broadcom Corporation)
* Ron Porat (Broadcom Corporation)
* Srinath Puducheri (Broadcom Corporation)
* Kapil Rai (Qualcomm Incorporated)
* Oded Redlich (Huawei)
* Sigurd Schelstraete (Quantenna Communications, Inc.)
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* Stephen Shellhammer (Qualcomm Incorporated)
* Paul Strauch (Qualcomm Incorporated)
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* Jung Hoon Suh (Huawei Technologies Co. Ltd)
* Bo Sun (Zte Corporation)
* Yingxiang Sun (Huawei Technologies Co. Ltd)
* Danny Tan (Huawei Technologies Co., Ltd)
* Bin Tian (Qualcomm Incorporated)
* Genadiy Tsodik (Huawei Technologies Co. Ltd)
* Allert Van Zelst (Qualcomm Incorporated)
* Prabodh Varshney (Nokia)
* Sindhu Verma (Broadcom Corporation)
* Sameer Vermani (Qualcomm Incorporated)
* Leif Wilhelmsson (Ericsson Ab)
* Kanke Wu (Qualcomm Incorporated)
* Yan Xin (Huawei Technologies Co., Ltd)
* Rui Yang (Interdigital, Inc.)
* Steve Ts Yang (Mediatek Inc.)
* Yair Yona (Qualcomm Incorporated)
* Christopher Young (Broadcom Corporation)
* Jian Yu (Huawei Technologies Co., Ltd)
* Mao Yu (Nxp Semiconductors)
* Salah Eddine Zegrar (Istanbul Medipol University; Vestel)
* Ruochen Zeng (Nxp Semiconductors)
* Hongyuan Zhang (Nxp Semiconductors)
* Meihong Zhang (Huawei Technologies Co., Ltd)
* Yan Zhang (Nxp Semiconductors)
* Baojian Zhou (Huawei Technologies Co. Ltd)

**Straw Polls**

[**1178r1**](https://mentor.ieee.org/802.11/dcn/20/11-20-1178-01-00be-discussions-on-mu-mimo-signaling.pptx) **Discussions on MU-MIMO Signaling (Mengshi Hu)**

deferred. Needs more simulations

[**1322r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-1322-00-00be-phy-signaling-methodology-for-11be-releases.pptx) **PHY Signaling Methodology (Rui Yang)**

Waiting for feedback. SP deferred.

[**1342r1**](https://mentor.ieee.org/802.11/dcn/20/11-20-1342-00-00be-eht-sounding-feedback-request-parameters.pptx) **EHT Sounding feedback request parameters (Genadiy Tsodik)**

SP#1

SP2 in 1342r1

Discussion

Q: The purpose of the reserved does not have to be specified. Need to be open to actual use of the bit.

A: want to use for codebook but could be used for other purposes.

Q: OK with reserved bit, but we don’t name reserved bit for specific purpose.

A: OK with changing the wording of the SP

Q: not fully convinced. Can we just say “one reserved bit” without further indication of purpose or location?

Q: how will this be presented in the spec? In description of reserved bit?

A: this is just guidance.

Results

* Do you agree to have at least one reserved bit in EHT NDPA STA Info Subfield and EHT MIMO Control field?
  + Note: If needed, this reserved bit may be used for codebook size expansion or other purpose

Y/N/A: 40/10/14

[**1066r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-1066-00-00be-4x-eht-ltf-sequence.pptx) **4x EHT-LTF Sequence (Jinyoung Chun)**

SP#2

SP1 in 1066r0

Discussion

Q: do you have comparison between different proposals?

A: some other proposals may have lower PAPR, but this proposal is based on reuse of HE LTF.

A: there’s comparison table in 1073.

Q: you also have proposals based on new sequence that can get lower PAPR?

A: many members wanted to reuse HE-LTF

Q: we want lower PAPR for 320 MHz.

Results

* Do you agree to add the below text in SFD?
* In 320MHz transmission, 4x EHT-LTF sequence is given as below.
* Refer to 1066r0 SP1 for complete SP text.

Y/N/A: 44/16/10

[**1073r3**](https://mentor.ieee.org/802.11/dcn/20/11-20-1073-03-00be-4x-eht-ltf-sequences-design.pptx) **4x EHT-LTF Sequences Design (Chenchen Liu)**

Comparison shows that for most RUs, this proposal has better PAPR.

SP#3

SP1 in 1073r3

Results

* Do you support to add to SFD:
  + 320MHz/160+160MHz 4x EHT-LTF sequences(Opt 2A in slides 8):
* Refer to SP1 in 1073r3.

Y/N/A: 35/34/13

[**1311r2**](https://mentor.ieee.org/802.11/dcn/20/11-20-1311-02-00be-2x-320mhz-ltf-design.pptx) **2x LTF 320MHz sequences (Ron Porat)**

New 80 MHz base sequence is proposed and how to build 320 MHz sequence from that.

PAPR is analyzed.

SP#4

SP1 in 1311

Results

* Do you support the 2x 320MHz LTF sequence described in slide 3 ?

Refer to 1311r2.

Y/N/A: 47/29/8

**Presentations**

[**1377r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-1377-00-00be-on-tbd-mcss.pptx) **On TBD MCSs (Jianhan Liu)**

MCS number for DCM + MCS0 is TBD. Similarly for DUP mode.

Proposal:

* MCS12: 4096-QAM with ¾ coding rate
* MCS13: 4096-QAM with 5/6 coding rate
* MCS14: MCS0 + DCM + EHT Dup
* MCS15: MCS0 + DCM

SP#5

SP1 in 1377r1

Discussion

Q: better to define MCS0 + DCM as MCS 14?

A: there’s some rationale based on two’s complement

Q: 4096 QAM already agreed?

A: yes- will remove

Q: don’t refer to MCS0 in definition of MCS 14 and 15, use BPSK instead.

A: OK

Q: specify that these new MCS only apply to NSS=1

A: OK – text modified

Results

* Do you agree to define the following MCSs in IEEE 802.11be?
* MCS14: BPSK + ½ rate coding + DCM + Dup
* MCS15: BPSK + ½ rate coding + DCM

Note: These MCSs are only applicable to Nss=1.

Y/N/A: 57/6/5

[**1159r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-1159-00-00be-11be-spectral-mask.pptx) **11be spectral mask (Bin Tian)**

Propose to reuse HE PSD masks, except for punctured cases.

Different puncturing masks are discussed (ETSI vs. 11ax)

For 11be punctured mask: use 11ax resolution BW and 1st slope. Use ETSI Mask floor level.

Discussion

Q: 320 is new BW. Should be use the spectral mask that is proposed here for non-HT DUP?

A: should not be difficult to meet EHT mask with non-HT.

Q: this is tighter than ETSI?

A: anyway need to meet the first slope. Also, ETSI resolution BW is different.

Q: should we have spec for the second transition?

A: will be discussed in separate submission.

Q: there were concerns in 11ax on OOB floor. We should see if these concerns are addressed with this proposal.

A: proposal is different from 11ax.

[**1180r1**](https://mentor.ieee.org/802.11/dcn/20/11-20-1180-01-00be-spectrum-mask-requirement-for-punctured-transmission.pptx) **Spectrum mask requirement for punctured Transmission (Wookbong Lee)**

320 MHz non-HT DUP.

For 160 MHz, non-HT DUP is different from HE 160 MHz. We need to define 320 MHz mask for non-HT DUP. We can have single mask option, or separate mask for non-HT.

Discussion

Q: separate mask for non-HT. For EHT 320 are you proposing we use mask similar to scaled160?

A: yes. Not sure we should do single or separate masks for non-HT.

Q: what’s the case for 160 MHz.

A: see presentation. VHT transition is 2 MHz instead of 1 MHz. if going with single mask, we should relax a little a transition point.

Q: leaning towards having two masks.

Q: for punctured non-HT transmission, which masks to use?

A: should be non-HT mask, but with additional spec for puncturing.

[**1165r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-1165-00-00be-spectrum-mask-for-puncturing.pptx) **Spectrum mask for puncturing (Xiaogang Chen)**

Punctured masks in 11be should be tighter than 11ax. ETSI has specified a mask.

ETSI procedure for determining punctured masks is reviewed.

Proposal is to reuse this mask in 11be.

Discussion

Q: not exactly equal to ETSI

A: keep transition BW of 11ax. Open to changes.

SP#6

SP1 in 1159r1

Result

* Do you support the following mask for 320MHz transmission in EHT PPDU?

Refer to SP1 in 1159r1

Y/N/A: 40/1/11

SP#7

SP2 in 1159r1

Result

* Do you support using a 100 kHz resolution bandwidth for 11be spectrum measurement?

Same as 11ax

Y/N/A: 39/1/10

SP#8

SP3 in 1159r1

Result

* For 11be puncturing mask do you support using 0.5MHz transition band at the 1st slope from 0dBr to -20dBr, starting at the punctured band edge?
  + [N\*10, N\*10+0.5] at the right edge of transmission band
  + [N\*10-0.5, N\*10] at the left edge of transmision band

Note: This is for EHT PPDU.

Note: Same as 11ax.

Y/N/A: 42/5/8

(Note: 1 Y vote added manually)

SP#9

SP2a in 1180r2

Discussion:

Q: Is this scaling of 160 MHz non-HT DUP?

A: other than transition, this is just scaling.

Result

* Do you support following spectral mask for 320 MHz Non-HT DUP PPDU?
  + -0dBr: 159 MHz
  + -20 dBr: 161 MHz
  + -28 dBr: 320 MHz
  + -40 dBr: 480 MHz

Note: separate transmit spectral mask for Non-HT DUP

Note: Spectral mask for Non-HT DUP PPDU puncturing case is TBD

Y/N/A: 29/2/15

SP#10

SP1 in 1165r1

Result

* Do you agree with the rule of edge channel puncturing below?

When the lowest and/or the highest subchannel(s) is/are punctured in an EHT PPDU, an additional subchannel edge mask as in figure below shall be applied at the lower edge of the lowest occupied subchannel and at the higher edge of the highest occupied subchannel.

M is the separation in MHz between the lower edge of the lowest occupied subchannel and the higher edge of the highest occupied subchannel in the EHT PPDU.

Refer to SP1 in 1165r0.

Y/N/A: 41/1/9

SP#11

SP2 in 1165r1

Result

* Do you agree with the rule of middle subchannel (>=40MHz) puncturing below?

When there are two or more contiguous 20MHz subchannels are punctured in an EHT PPDU, an additional subchannel edge mask as in figure below shall be applied at the lower edge of the lowest punctured subchannel(s) and at the higher edge of the highest punctured subchannel(s).

M is the contiguous occupied bandwidth adjacent to the punctured subchannel(s).

Refer to 1165r1 SP2 for complete SP text.

Y/N/A: 35/2/8

SP#12

SP3 in 1165r1

Result

* Do you agree with the rule of middle 20MHz channel puncturing below?

When the puncturing only includes one 20MHz subchannel and the punctured 20MHz subchannel is not at the edge of the EHT PPDU, an additional mask as in figure below shall be applied at the punctured 20MHz subchannel.

Y/N/A: 28/0/7

[**1174r1**](https://mentor.ieee.org/802.11/dcn/20/11-20-1174-00-00be-e-sig-with-different-puncturing-patterns.pptx) **E-SIG Detection with Different Puncturing Patterns (Junghoon Suh)**

Additional diversity gain can be achieved by using the 40 MHz repetition of the content channels.

Proposal: apply DCM on secondary 40 in each 80 MHz segment.

Simulation results show that MCS3 shows about 1 dB gain.

Discussion

Q: curves show similar slope. Not sure this is diversity gain.

A: shows comparison between MRC and DCM

Q: DCM is only applied to MCS0. Not sure we should do something special for EHT-SIG.

Q: this is new design to support this.

Q: why not do it on each 40 MHz?

Q: which 40 MHz does DCM depends on primary?

A: yes – needs to be defined.

Q: in practice, MCS0 is used. This scheme will hurt possible use of MCS3 since it is more complicated.

SP#13

SP1 in 1174r1

Discussion

Q: SP should be more specific. This is too general.

Result

* For each 80 MHz segment of any EHT-PPDU larger than or equal to 80 MHz BW, do you agree to enhance the EHT-SIG for robust detection and PAPR reduction?

Y/N/A: 10/28/12

**Adjourn**

Meeting is adjourned at 13:00 ET

**Thursday Oct 22nd, 2020 19:00 – 22:00 ET**

* The Chair (Tianyu Wu, Apple) calls the meeting to order at 19:00 ET.
* The Chair follows the agenda in 11-20/1269r29
* The Chair goes through the IPR policy and asks if anyone is aware of any potentially essential patents. Nobody speaks up.
* The Chair reminds everyone to report their attendance by sending an e-mail to the Co-chair, Sigurd Schelstraete (ON Semiconductor) or the Chair himself.
* Announcements:

None

* Technical Submissions: **Run SPs from Previous Topics [nominally 10 mins total]**
  + [1178r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1178-01-00be-discussions-on-mu-mimo-signaling.pptx) Discussions on MU-MIMO Signaling Mengshi Hu [SPs]
  + [1322r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1322-00-00be-phy-signaling-methodology-for-11be-releases.pptx) PHY Signaling Methodology Rui Yang [SPs]
* Technical Submissions: **Proposed Draft Text (PDTs) for fixings TBDs**
  + *Pending requests.*
* Technical Submissions:
  + [828r3](https://mentor.ieee.org/802.11/dcn/20/11-20-0828-03-00be-ru-allocation-subfield-design-for-eht-trigger-frame.pptx) RU Allocation Subfield Design for EHT Trigger Frame Myeongjin KIM
  + [1259r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1259-00-00be-puncturing-patterns-for-ofdma.pptx) Puncturing patterns for ofdma Ron Porat
  + [1375r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1375-01-00be-eht-nltf-design.pptx) EHT NLTF Design Rui Cao
  + [1331r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1331-00-00be-eht-pre-fec-padding-and-packet-extension.pptx) EHT pre-FEC padding and packet extension Rui Cao
  + [1446r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1466-00-00be-pdt-phy-eht-sounding-ndp.docx) Pilot Polarities for Small M-RUs Ron Porat
  + [1441r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1441-01-00be-ru-restriction-for-20mhz-operation.pptx) RU Restriction for 20MHz Operation Eunsung Park
  + [1381r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1381-00-00be-reduction-of-peak-to-average-power-ratio-exploiting-multi-numerology-structure.pptx) Reduction of PAPR Exploiting Multi-Numerology Struct. Ebubekir Memişoğlu
  + [1387r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1387-00-00be-eht-via-reconfigurable-surfaces.pptx) EHT via Reconfigurable Surfaces Salah Zegrar
  + [1439r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1439-00-00be-11be-cca-levels.pptx) 11be CCA levels Lin Yang
  + [1565r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1565-00-00be-mu-mimo-in-320mhz-bw-with-reduced-overhead.pptx) MU-MIMO in 320MHz BW with Reduced Overhead Oded Redlich
  + [1623r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1623-01-00be-multi-ru-indication-in-ru-allocation-subfield-follow-up.pptx) Multi-RU Indication in RU Allocation Subfield Follow up Mengshi Hu
  + [~~1672r0~~](https://mentor.ieee.org/802.11/dcn/20/11-20-1672-00-00be-ul-beamforming-for-tb-ppdus.pptx) ~~UL Beamforming for TB PPDUs Shimi Shilo\*~~

**Attendance**

The following people registered their attendance for the call:

* Gary Anwyl (Mediatek Inc.)
* Kwok Shum Au (Huawei Technologies Co.,  Ltd)
* Hari Ram B (Nxp Semiconductors)
* Eugene Baik (Qualcomm Incorporated)
* Rui Cao (Nxp Semiconductors)
* Xilin Cheng (Nxp Semiconductors)
* Jinsoo Choi (Lg Electronics)
* Jinyoung Chun (Lg Electronics)
* Vinko Erceg (Broadcom Corporation)
* Alireza Ghaderipoor (Mediatek Inc.)
* Bo Gong (Huawei Technologies Co. Ltd)
* Niranjan Grandhe (Nxp Semiconductors)
* Lili Hervieu (Cable Television Laboratories Inc. (Cablelabs))
* Hung-Tao Hsieh (Mediatek Inc.)
* Lei Huang (Guangdong Oppo Mobile Telecommunications Corp.,Ltd)
* Eunsung Jeon (Samsung Electronics)
* Chenhe Ji (Huawei Technologies Co. Ltd)
* Mahmoud Kamel (Interdigital, Inc.)
* Myeong-Jin Kim (Samsung)
* Youhan Kim (Qualcomm Incorporated)
* Manish Kumar (Marvell Semiconductor, Inc.)
* James Lansford (Qualcomm Incorporated)
* Jialing Li (Qualcomm Incorporated)
* Dong Guk Lim (Lg Electronics)
* Wei Lin (Huawei Technologies Co. Ltd)
* Chenchen Liu (Huawei Technologies Co., Ltd)
* Jianhan Liu (Mediatek Inc.)
* Hanqing Lou (Interdigital, Inc.)
* Li Ma (Mediatek Inc.)
* Jun Minotani (Panasonic Corporation)
* Khashayar Mirfakhraei (Cisco Systems, Inc.)
* Leo Montreuil (Broadcom Corporation)
* Takayuki Nakano (Panasonic Corporation)
* Yujin Noh (Newracom Inc.)
* Stephen Palm (Broadcom Corporation)
* Thomas Pare (Mediatek Inc.)
* Eunsung Park (Lg Electronics)
* Srinath Puducheri (Broadcom Corporation)
* Oded Redlich (Huawei)
* Sigurd Schelstraete (Quantenna Communications, Inc.)
* Ankit Sethi (Nxp Semiconductors)
* Shimi Shilo (Huawei)
* Paul Strauch (Qualcomm Incorporated)
* Jung Hoon Suh (Huawei Technologies Co. Ltd)
* Bin Tian (Qualcomm Incorporated)
* Tsung-Han Tsai (Mediatek Inc.)
* Genadiy Tsodik (Huawei Technologies Co. Ltd)
* Seda Ustunbas (Vestel)
* Prabodh Varshney (Nokia)
* Sameer Vermani (Qualcomm Incorporated)
* Yi-Hsiu Wang (Zeku)
* Lisa Ward (Rohde & Schwarz)
* Kanke Wu (Qualcomm Incorporated)
* Tianyu Wu (Apple, Inc.)
* Yan Xin (Huawei Technologies Co., Ltd)
* Aiguo Yan (Oppo)
* Steve Ts Yang (Mediatek Inc.)
* Christopher Young (Broadcom Corporation)
* Mao Yu (Nxp Semiconductors)
* Malia Zaman (Ieee Staff)
* Ruochen Zeng (Nxp Semiconductors)
* Yan Zhang (Nxp Semiconductors)
* Xiayu Zheng (Nxp Semiconductors)

**Straw Polls**

[**1178r1**](https://mentor.ieee.org/802.11/dcn/20/11-20-1178-01-00be-discussions-on-mu-mimo-signaling.pptx) **Discussions on MU-MIMO Signaling (Mengshi Hu)**

Discussion

Q: why “park” full BW STAs in secondary 80?

A: can save some overhead

Q: expect full BW to operate in primary 80. Don’t see this as important problem.

Q: in example 1 and 2 (full BW/large MRU), how much overhead is saved?

A: around 4 symbols

Q: saving may not be there. For full BW cases, the difference is not much. Savings could be achieved with using MCS1 or MCS 3.

Q: receiver has to accommodate the proposal, whether or not the field is there?

A: yes

Q: may be corner case. For R1, SST is not defined, so there may not be a use for this in R1.

Q: can we use spoofing in common field instead?

A: we need spatial configuration subfield.

SPs Deferred

[**1322r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-1322-00-00be-phy-signaling-methodology-for-11be-releases.pptx) **PHY Signaling Methodology (Rui Yang)**

SP#1

Discussion

Q: is description appropriate?

A: description is temporary placeholder

Q: can we just name the field as “reserved”. We can not use TBD for D1.0.

A: TBD removed

Q: looks like multiple possible modes for just one bit

A: this is not the only bit that can be used, but this is the bit immediately after PPDU types.

Q: what is expected behavior of release 1 device? Discard if value is different from reserved? In that case R2 is a different “alphabet”, not necessarily working with R1. If R1 device needs to process the packet, this requires more thinking.

A: only want to make sure vendors don’t use the bit for other purpose.

Q: You are trying to SP receiver behavior of R2 devices. R1 devices needs to know how to react. Description is not important.

Q: some R2 features may not affect receive behavior of R1, others may.

Q: let’s wait till R1 is more complete

SP results

* Do you agree the following?

In Table 36-19 (U-SIG field of an EHT MU PPDU) of D0.1, add the following row immediately after the Compression Mode field

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| U-SIG1 | TBD | Reserved | 1 | Maybe used for an expanded set of PPDU types, compressed modes, or certain modes in Release 2 |

Y/N/A: 33/15/10

**Presentations**

[**828r3**](https://mentor.ieee.org/802.11/dcn/20/11-20-0828-03-00be-ru-allocation-subfield-design-for-eht-trigger-frame.pptx) **RU Allocation Subfield Design for EHT Trigger Frame (Myeongjin KIM)**

Define RU Allocation subfield for 320 MHz. Extend current 8-bit subfield to 9 bits.

Also proposes indices for MRU.

Discussion

Q: MRU index is good to have in DL OFDMA as well.

Q: need more time for the details for the SP. High-level SP are OK.

SP deferred

[**1259r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-1259-00-00be-puncturing-patterns-for-ofdma.pptx) **Puncturing patterns for ofdma (Ron Porat)**

Q: SP was run in earlier contribution and is part of compendium document.

SP withdrawn

[**1375r1**](https://mentor.ieee.org/802.11/dcn/20/11-20-1375-01-00be-eht-nltf-design.pptx) **EHT NLTF Design (Rui Cao)**

Decoupling N\_LTF and N\_STS can give 1-2 dB gain. Processing #LTF is not a big burden.

Proposing to allow it as a capability.

Discussion

Q: In BF case, do both NDP and packet have same N\_LTF?

A: N\_LTF same as 11ax for NDP.

Q: is this proposed for both SU and NDP?

A: first SP says non-OFDMA. Amount of gain from NDP is not as significant. It is no extra burden for STA to support.

Q: propose to leave NDP TBD

Q: max N\_LTF capability – can it be different for SU, MU, … or is it single value?

A: single value

Q: performance in terms of PER. Longer LTF is more overhead. Do you have throughput numbers?

A: depends on packet lengths. Transmitter can use this considering packet length.

Q: how to make use of extra LTF?

A: combining through addition

Q: Do you do freq domain smoothing?

A: no smoothing in this simulation

Q: which P12x12 was used

A: Hadamard based

Straw Polls

SP#2

SP1/1375r1

* Do you agree that the number of EHT-LTF in 11be non-OFDMA transmissions, is larger than or equal to the initial number of EHT-LTF determined by the number of total spatial streams?
* The maximum number of EHT-LTFs supported by the receiving STA(s) can be claimed by capability.
* The Num of EHT-LTFs is signaled separately from Nss or Nss\_total.
* This feature is optional for receiver.
* The allowed number of extra LTFs is TBD
* The support for NDP is TBD.

Y/N/A: 47/3/7

SP#3

SP2/1375r1

* Do you agree that 11be defines three PHY capability fields to indicate an EHT STA’s maximum supported number of EHT-LTFs
* One bit to indicate the support of Extra LTFs for non-OFDMA PPDU
* One field to indicate the maximum number of LTFs supported for data transmission to non-OFDMA single user
* Note: Larger than or equal to Nss capability
* One field to indicate the maximum number of LTFs supported for data transmission to multiple users
* Note: Larger than or equal to beamformee Nss capability

Y/N/A: 41/2/14

SP#4

SP3 in 1375r1

* Do you agree that the allowed values of maximum NLTF receive capability for single-user transmission are 4, 8 and 16?

Y/N/A: 34/2/17

SP#5

SP4 in 1375r1

* Do you agree that the allowed values of maximum NLTF receive capability for multiple-user transmission are 4, 8 and 16?

Note: This capability is for both OFDMA and non-OFDMA MU-MIMO transmission

Y/N/A: 38/2/15

SP#6

SP5 in 1375r1

* Do you agree that, if extra LTF is applied to non-OFDMA transmission, the number of EHT-LTF should be chosen from the set [2 4 8].
  + Up to 2 times of initial NLTF for all Nss.

Y/N/A: 38/2/14

[**1331r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-1331-00-00be-eht-pre-fec-padding-and-packet-extension.pptx) **EHT pre-FEC padding and packet extension (Rui Cao)**

Prefer to keep same definitions as 11ax, but some modifications needed: MRUs, wider BW and max allowed PE.

Discussion

Q: PE can be defined through nominal value and through PPE TH fields. Should we add 20 usec in PPE TH as well?

A: yes - needs to be updated as well

Straw Polls

SP#7

SP1 in 1131r0

* Do you agree that EHT uses the same two-step padding procedure as 11ax? i.e.
* pre-FEC padding to one of the four pre-FEC padding boundary.
* Post-FEC padding to the OFDM symbol boundary.

Y/N/A: 40/2/4

SP#8

SP2 in 1131r0

* Do you agree that the NSD,short is defined as in the following table:
* For EHT PPDU of X MHz modulated with MCS0+DCM+EHT DUP, uses the Nsd,short values for RU size corresponding to X/2 MHz and with DCM=1.
* X = 80 or 160 or 320.
* Refer to SP2 in 1331r0 for the table.

Y/N/A: 36/1/10

SP3 and SP4 in 1131r0 deferred

SP#9

SP5 in 1131r0

* Do you agree that the TPE value for EHT sounding NDP is:
* 4us for BW<=160MHz and Nss<=8
* 8us, otherwise

Y/N/A: 33/0/12

**Adjourn**

Meeting is adjourned at 22:00 ET

**Monday Oct 26th, 2020 19:00 – 22:00 ET**

* The Chair (Tianyu Wu, Apple) calls the meeting to order at 10:00 ET.
* The Chair follows the agenda in 11-20/1269r31
* The Chair goes through the IPR policy and asks if anyone is aware of any potentially essential patents. Nobody speaks up.
* The Chair reminds everyone to report their attendance by sending an e-mail to the Co-chair, Sigurd Schelstraete (ON Semiconductor) or the Chair himself.
* Announcements:

None

* Technical Submissions: **Run SPs from Previous Topics [nominally 10 mins total]**
  + [828r4](https://mentor.ieee.org/802.11/dcn/20/11-20-0828-04-00be-ru-allocation-subfield-design-for-eht-trigger-frame.pptx) RU Allocation Subfield Design for EHT Trigger Frame Myeongjin KIM [SPs]
  + [1331r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1331-00-00be-eht-pre-fec-padding-and-packet-extension.pptx) EHT pre-FEC padding and packet extension Rui Cao [SPs]
* Technical Submissions: **Proposed Draft Text (PDTs) for fixings TBDs**
  + *Pending requests.*
* Technical Submissions:
  + [1446r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1466-00-00be-pdt-phy-eht-sounding-ndp.docx) Pilot Polarities for Small M-RUs Ron Porat
  + [1441r2](https://mentor.ieee.org/802.11/dcn/20/11-20-1441-01-00be-ru-restriction-for-20mhz-operation.pptx) RU Restriction for 20MHz Operation Eunsung Park
  + [~~1381r0~~](https://mentor.ieee.org/802.11/dcn/20/11-20-1381-00-00be-reduction-of-peak-to-average-power-ratio-exploiting-multi-numerology-structure.pptx) ~~Reduction of PAPR Exploiting Multi-Numerology Struct. Ebubekir Memişoğlu~~
  + [~~1387r0~~](https://mentor.ieee.org/802.11/dcn/20/11-20-1387-00-00be-eht-via-reconfigurable-surfaces.pptx) ~~EHT via Reconfigurable Surfaces Salah Zegrar~~
  + [1439r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1439-00-00be-11be-cca-levels.pptx) 11be CCA levels Lin Yang
  + [~~1565r0~~](https://mentor.ieee.org/802.11/dcn/20/11-20-1565-00-00be-mu-mimo-in-320mhz-bw-with-reduced-overhead.pptx) ~~MU-MIMO in 320MHz BW with Reduced Overhead Oded Redlich~~
  + [1623r1](https://mentor.ieee.org/802.11/dcn/20/11-20-1623-01-00be-multi-ru-indication-in-ru-allocation-subfield-follow-up.pptx) Multi-RU Indication in RU Allocation Subfield Follow up Mengshi Hu
  + [1672r0](https://mentor.ieee.org/802.11/dcn/20/11-20-1672-00-00be-ul-beamforming-for-tb-ppdus.pptx) UL Beamforming for TB PPDUs Shimi Shilo
  + [~~1700r1~~](https://mentor.ieee.org/802.11/dcn/20/11-20-1700-01-00be-dual-carrier-index-modulation.pptx) ~~Dual-Carrier Index Modulation Ali Tugberk Dogukan\*~~
  + 1656r0 TBDs of 11be PHY Capabilities Bin Tian

*\* Note: Need to be uploaded to Mentor website 7 days prior to the conf call*

* AoB:
* Adjourn

**Attendance**

The following people registered their attendance for the call:

* Gary Anwyl (Mediatek Inc.)
* Hari Ram B (Nxp Semiconductors)
* Jinsoo Choi (Lg Electronics)
* Seungho Choo (Senscomm Semiconductor Co., Ltd.)
* Jinyoung Chun (Lg Electronics)
* Ruchen Duan (Samsung)
* Vinko Erceg (Broadcom Corporation)
* Shuling Feng (Mediatek Inc.)
* Alireza Ghaderipoor (Mediatek Inc.)
* Bo Gong (Huawei Technologies Co. Ltd)
* Hung-Tao Hsieh (Mediatek Inc.)
* Lei Huang (Guangdong Oppo Mobile Telecommunications Corp.,Ltd)
* Eunsung Jeon (Samsung Electronics)
* Chenhe Ji (Huawei Technologies Co. Ltd)
* Feng Jiang (Apple Inc.)
* James Lansford (Qualcomm Incorporated)
* Wookbong Lee (Samsung)
* Dong Guk Lim (Lg Electronics)
* Wei Lin (Huawei Technologies Co. Ltd)
* Chenchen Liu (Huawei Technologies Co., Ltd)
* Der-Zheng Liu (Realtek Semiconductor Corp.)
* Hanqing Lou (Interdigital, Inc.)
* Li Ma (Mediatek Inc.)
* Ebubekir Memisoglu (Istanbul Medipol University; Vestel)
* Jun Minotani (Panasonic Corporation)
* Khashayar Mirfakhraei (Cisco Systems, Inc.)
* Leo Montreuil (Broadcom Corporation)
* Takayuki Nakano (Panasonic Corporation)
* Basak Ozbakis (Vestel)
* Thomas Pare (Mediatek Inc.)
* Eunsung Park (Lg Electronics)
* Srinath Puducheri (Broadcom Corporation)
* Oded Redlich (Huawei)
* Meriam Rezk (Qualcomm Incorporated)
* Sigurd Schelstraete (On Semiconductor)
* Stephen Shellhammer (Qualcomm Incorporated)
* Bo Sun (Zte Corporation)
* Bin Tian (Qualcomm Incorporated)
* Genadiy Tsodik (Huawei Technologies Co. Ltd)
* Prabodh Varshney (Nokia)
* Sameer Vermani (Qualcomm Incorporated)
* Yi-Hsiu Wang (Zeku)
* Kanke Wu (Qualcomm Incorporated)
* Tianyu Wu (Apple, Inc.)
* Yan Xin (Huawei Technologies Co., Ltd)
* Aiguo Yan (Oppo)
* Rui Yang (Interdigital, Inc.)
* Steve Ts Yang (Mediatek Inc.)
* Yongjiang Yi (Futurewei Technologies)
* Mao Yu (Nxp Semiconductors)
* Malia Zaman (Ieee Staff)
* Yan Zhang (Nxp Semiconductors)

**Straw Polls**

[**828r4**](https://mentor.ieee.org/802.11/dcn/20/11-20-0828-04-00be-ru-allocation-subfield-design-for-eht-trigger-frame.pptx) **RU Allocation Subfield Design for EHT Trigger Frame (Myeongjin Kim)**

SPs deferred till next call

[**1331r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-1331-00-00be-eht-pre-fec-padding-and-packet-extension.pptx) **EHT pre-FEC padding and packet extension (Rui Cao)**

SP#1

SP3 in 1331r0

SP Results

Do you agree that the duration of PE field in EHT MU PPDU may take value of 20us for any modes with constellation>1024 or NSS>8 or RU>996\*2?

Y/N/A: 39/0/15

SP#2

SP4 in 1331r0

SP Results

Do you agree that EHT Nominal Packet Padding has two capability bits, defined as follows?

Refer to 1331r0 for the table.

Y/N/A: 34/0/15

SP#3

SP Results

Do you agree to change from +-2 ppm to +-25 ppm for 2.4 GHz band transmit center frequency tolerance?Note that it is a typo in section 36.3.18.3. Please refer 11-20/1252r2.

Accepted by unanimous consent

**Presentations**

[**1441r3**](https://mentor.ieee.org/802.11/dcn/20/11-20-1441-01-00be-ru-restriction-for-20mhz-operation.pptx) **RU Restriction for 20MHz Operation (Eunsung Park)**

Propose that 11be support 20Mhz only operating STA. RU restrictions are proposed for RUs that have data tones modulated on DC or guard tones of 20 MHz operation.

SP#4

SP3 in 1441r3

SP Results

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

242-tone RUs may be allocated to 20MHz operating STAs for 40 / 80 / 160 / 320 MHz DL OFDMA transmission but shall not be allocated to 20MHz operating STAs for 40 / 80 / 160 / 320 MHz UL OFDMA transmission

80+80 / 160+160 MHz is TBD

Note: For Downlink OFDMA, receiving 242-tone RUs is optional for 20MHz operating STAs

This is for rel. 1

Y/N/A: 23/9/14

SP#5

Modified SP3 in 1441r3

SP Results

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

* 242-tone RUs may be allocated to 20MHz operating STAs for 40 / 80 / 160 / 320 MHz DL OFDMA
  + 80+80 / 160+160 MHz is TBD
* Note: For Downlink OFDMA, receiving 242-tone RUs is optional for 20MHz operating STAs
* Note: UL OFDMA case is TBD.
* This is for rel. 1

Y/N/A: 39/1/10

SP#6

SP2 in 1441r3

SP Results

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

Middle 26-tone RUs shall not be allocated to 20MHz operating STAs for 40 / 80 / 160 / 320 MHz DL / UL OFDMA transmission

80+80 / 160+160 MHz is TBD

This is for rel. 1

Y/N/A: 41/0/5

SP#7

SP4 in 1441r3

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

Middle 26 + 52/106 MRUs shall not be allocated to 20MHz operating STAs for 40 / 80 / 160 / 320 MHz DL / UL OFDMA transmission

80+80 / 160+160 MHz is TBD

This is for rel. 1

Y/N/A: 38/0/8

[**1446r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-1466-00-00be-pdt-phy-eht-sounding-ndp.docx) **Pilot Polarities for Small M-RUs (Ron Porat)**

For MRU with 6 pilots: use modulo 6 in the pilot polarities, rather than consider it as separate 26 + 52 or 26+106.

Initial polarities are also proposed for small MRUs.

Discussion

Q: how about 484+242, …

A: all large RUs are multiples of 8, so modulo 8 works for all of them

SP#8

SP1 in 1446r0

SP Results

* For small multi-RUs 106+26 and 52+26, do you agree to use a modulo 6 for the pilot polarity rotation?

Y/N/A: 38/0/9

SP#9

SP2 in 1446r0

SP Results

* Do you agree to use below 6 initial pilot values for 52+26 and 106+26 multi-RU?

Refer to 1446r0 for complete SP text.

Y/N/A: 34/0/10

[**1439r1**](https://mentor.ieee.org/802.11/dcn/20/11-20-1439-00-00be-11be-cca-levels.pptx) **11be CCA levels (Lin Yang)**

CCA levels for wider BW. 11ax supports up to 160 MHz. current format may not be easy to understand. Issue was recently addressed in Revmd. 11be proposal builds on Revmd agreement. Proposed to only keep per-20 MHz CCA within aCCAMidTime as the only non-primary CCA mechanism.

SP#10

SP1 in 1439r1

* Do you support 11be defines start of packet CCA check (PD) for primary 20MHz channel up to 320MHz?

Start of a PPDU for which its power measured within the primary 20 MHz channel is at or above –82 dBm

Discussion

Q: this follows Revmd?

A: yes. STA should be able to detect packet of higher BW that occupies primary 20.

Q: is there plan to change 11ax?

A: already changed for Draft 8.0

Y/N/A: 45/0/5

SP#11

SP2 in 1439r2

Discussion:

Q: you mean CCA TH for mid-packet detection

Q: confusion about mid-threshold

SP Results

* Do you support 11be not define CCA on secondary channels and only define per 20MHz check up to 320MHz?

CCA threshold for detection of WLAN signal in non-primary channel is -72dBm

ED threshold is -62dBm

Y/N/A: 28/3/14

[**1623r1**](https://mentor.ieee.org/802.11/dcn/20/11-20-1623-01-00be-multi-ru-indication-in-ru-allocation-subfield-follow-up.pptx) **Multi-RU Indication in RU Allocation Subfield Follow up (Mengshi Hu)**

Proposal for large MRU entries requiring 9-bit allocation table.

Discussion

Q: reduction from 9 to 8 bits involves a lot of extra work. Looks overengineered.

A: always need to decode CC correctly. Not a lot of complexity release.

Q: prefer Option 1 – allows to identify CRC error.

Q: only the two listed MRU use this implicit method. Do we need to check all combination tables?

A: yes

Q: easier to read from table and directly interpret the value.

SPs Deferred

[**1672r0**](https://mentor.ieee.org/802.11/dcn/20/11-20-1672-00-00be-ul-beamforming-for-tb-ppdus.pptx) **UL Beamforming for TB PPDUs (Shimi Shilo)**

In 11ax, BF is not supported for Trigger-based PPDU. Performance with UL BF is calculated as PER and goodput. Sounding protocol is proposed for TB PPDUs.

Discussion

Q: Did you evaluate NSS=2?

A: not in presentation. Will be included in revision. Not sure that’s an interesting case.

Q: time to apply the BF may be too short in the proposed protocol.

A: we believe there is plenty of time.

Q: gains appear for lower SNR. Power gain, but no diversity gain. Power gain is easily offset by sounding overhead. Don’t see SNR below 10-12 dB as a case that needs to be improved. Also, with NSS=2, the gains will disappear.

A: precoding could still make channels orthogonal.

**Adjourn**

Meeting is adjourned at 22:00 ET

**Wednesday Oct 28th, 2020 10:00 – 13:00 ET**

* The Chair (Tianyu Wu, Apple) calls the meeting to order at 10:00 ET.
* The Chair follows the agenda in 11-20/1269r34
* The Chair goes through the IPR policy and asks if anyone is aware of any potentially essential patents. Nobody speaks up.
* The Chair reminds everyone to report their attendance by sending an e-mail to the Co-chair, Sigurd Schelstraete (ON Semiconductor) or the Chair himself.
* Announcements:

None

* Presentations
  + 828r5 RU Allocation Subfield Design for EHT Trigger Frame Myeongjin KIM [SPs]
  + 1623r1 Multi-RU Indication in RU Allocation Subfield Follow up Mengshi Hu [SPs]
  + 1672r0 UL Beamforming for TB PPDUs Shimi Shilo [SPs]
  + 1066r1 4x EHT-LTF Jinyoung Chun [SP]
  + 1073r4 4x EHT LTF sequences design Chenchen Liu [SPs]
  + 1311r2 2x EHT LTF Ron Porat [SP]
  + 1317r1 SIG contents discussion for EHT sounding NDP Ross Jian Yu [SPs]
  + 1100r1 Discussions on EHT non-contiguous PPDU Rui Cao [SPs]
  + 985r6 RU allocation Subfield design in EHT-SIG follow up Myeongjin Kim [SP]
  + 1238r7 Open issues on Preamble design Sameer Vermani [SP]
  + 1515r3 Signaling ofr various transmission modes of MU-PPDU Dongguk Lim. [SP]
  + 1161r1 EHT Punctured NDP and Partial BW feedback Bin Tian
  + 1132r0 Thoughts on Extended Range Preamble Bin Tian [SPs]
  + 1703r0 Trigger frame RU allocation Table Steve Shellhammer
  + 1565r0 MU-MIMO in 320MHz BW with Reduced Overhead Oded Redlich
  + 1700r1 Dual-Carrier Index Modulation Ali Tugberk Dogukan
  + 1656r0 TBDs of 11be PHY Capabilities Bin Tian

**Attendance**

The following people registered their attendance for the call:

* Edward Au (Huawei)
* Gary Anwyl (Mediatek Inc.)
* Hari Ram B (Nxp Semiconductors)
* Sunhee Baek (Lg Electronics)
* David Boldy (Broadcom Corporation)
* Albert Bredewoud (Broadcom Corporation)
* Rui Cao (Nxp Semiconductors)
* Xiaogang Chen (Intel)
* Jinsoo Choi (Lg Electronics)
* Seungho Choo (Senscomm Semiconductor Co., Ltd.)
* Jinyoung Chun (Lg Electronics)
* Chulho Chung (Samsung)
* Rui Du (Huawei Technologies Co. Ltd)
* Ruchen Duan (Samsung)
* Vinko Erceg (Broadcom Corporation)
* Shuling Feng (Mediatek Inc.)
* Bo Gong (Huawei Technologies Co. Ltd)
* Niranjan Grandhe (Nxp Semiconductors)
* Hung-Tao Hsieh (Mediatek Inc.)
* Lei Huang (Guangdong Oppo Mobile Telecommunications Corp.,Ltd)
* Insun Jang (Lg Electronics)
* Feng Jiang (Apple Inc.)
* Mahmoud Kamel (Interdigital, Inc.)
* Myeong-Jin Kim (Samsung)
* Namyeong Kim (Lg Electronics)
* Youhan Kim (Qualcomm Incorporated)
* Manish Kumar (Marvell Semiconductor, Inc.)
* James Lansford (Qualcomm Incorporated)
* Wookbong Lee (Samsung)
* Dong Guk Lim (Lg Electronics)
* Wei Lin (Huawei Technologies Co. Ltd)
* Chenchen Liu (Huawei Technologies Co., Ltd)
* Hanqing Lou (Interdigital, Inc.)
* Hui-Ling Lou (Nxp Semiconductors)
* Li Ma (Mediatek Inc.)
* Stephen Mccann (Huawei Technologies Co.,  Ltd)
* Ebubekir Memisoglu (Istanbul Medipol University; Vestel)
* Khashayar Mirfakhraei (Cisco Systems, Inc.)
* Leo Montreuil (Broadcom Corporation)
* Basak Ozbakis (Vestel)
* Burak Ozpoyraz (Vestel)
* Eunsung Park (Lg Electronics)
* Srinath Puducheri (Broadcom Corporation)
* Oded Redlich (Huawei)
* Sayak Roy (Nxp Semiconductors)
* Sigurd Schelstraete (Quantenna Communications, Inc.)
* Ankit Sethi (Nxp Semiconductors)
* Shimi Shilo (Huawei)
* Bo Sun (Zte Corporation)
* Yingxiang Sun (Huawei Technologies Co. Ltd)
* Francois Thoumy (Canon Research Centre France)
* Bin Tian (Qualcomm Incorporated)
* Genadiy Tsodik (Huawei Technologies Co. Ltd)
* Seda Ustunbas (Vestel)
* Allert Van Zelst (Qualcomm Incorporated)
* Prabodh Varshney (Nokia)
* Yan Xin (Huawei Technologies Co., Ltd)
* Steve Ts Yang (Mediatek Inc.)
* Jian Yu (Huawei Technologies Co., Ltd)
* Mao Yu (Nxp Semiconductors)
* Malia Zaman (Ieee Standards Association (Ieee-Sa))
* Ruochen Zeng (Nxp Semiconductors)
* Meihong Zhang (Huawei Technologies Co., Ltd)
* Yan Zhang (Nxp Semiconductors)

**Straw Polls**

**828r5 RU Allocation Subfield Design for EHT Trigger Frame (Myeongjin Kim)**

SP2 in 828r5

Request to defer as there is another submission on the same topic

Deferred

**1623r1 Multi-RU Indication in RU Allocation Subfield Follow up (Mengshi Hu)**

Deferred

**1672r0 UL Beamforming for TB PPDUs (Shimi Shilo)**

Discussion

Q: which channel model?

A: channel D

Q: is there problem for power control? Should STA adjust its power?

A: AP can decide

Q: should STA send its precoding coefficients? This would make the packet quite long.

Q: AP knows how STA is going to beamform? This would need interpolation etc.

SPs deferred

**Presentations**

**1656r0 TBDs of 11be Capabilities (Bin Tian)**

Addressing TBDs in PHY Introduction section 36.1.1

* Preamble puncturing
* DCM support
* DCM + DUP
* LTF + GI combinations
* LTF modes for UL MU-MIMO

Discussion

Q: what about puncturing for TB PPDU?

A: TB PPDU has its own rules (no legacy preamble in unoccupied 20 MHz channels)

Q: optional support for DCM +DUP. not sure this is only for 6 GHz.

A: think we already have agreement this is only for 6 GHz

SP#1

SP1 in 1656r0

SP Results

* Do you support that in 11be:

For non-AP STA, mandatory to support

* In OFDMA Rx, any preamble puncturing pattern allowed by Motion 131, #SP195
* In non-OFDMA Tx and Rx, any preamble puncturing pattern needed to support mandatory MRU for non-OFDMA as specified in D0.1 36.3.2.3.3

For AP, mandatory to support

* In OFDMA Tx and non-OFDMA Tx and Rx, any preamble puncturing pattern that needs to be supported for mandatory MRU in non-OFDMA as specified in D0.1 36.3.2.3.3

Y/N/A: 45/0/10

SP#2

SP2 in 1656r0

Discussion

Q: gain is seen in small RUs. Why make it mandatory for large RU?

A: less gain for large RU. Large BW is mostly for LPI channels. Not big burden to support.

SP Results

* Do you agree the following DCM+MCS0 support requirement in 11be

Mandatory in

* RU 26, 52, 106 and 242 for 20 MHz-only STAs
* RU 26, 52, 106, 242, 484 and 996 for non 20 MHz-only STAs

Conditional mandatory in

* RU 2x996 when STA supports 160 MHz
* RU 2x996 and 4x996 when STA supports 320 MHz

Optional in

* MRU 52+26, 106+26, 484+242, 996+484, 996+484+242, 3x996

Not supported in

* MRU 2x996+484, 3x996+484

Y/N/A: 43/0/11

SP#3

SP3 in 1656r0

SP Results

* Do you agree the optional support of Dup+DCM mode for 6GHz band LPI channel in 11be?

Y/N/A: 43/0/11

SP#4

SP4 in 1656r0

Discussion

Q: add note that 1x LTF/1.6 GI is only for UL MU-MIMO

A: SP text updated accordingly

SP Results

* Do you agree the following mandatory/optional support requirement of LTF+GI combinations in 11be ?

MU PPDU

* + 2x LTF + 0.8us GI (M)
  + 2x LTF + 1.6us GI (M)
  + 4x LTF + 3.2us GI (M)
  + 4x LTF + 0.8us GI (O)

TB PPDU

* + 2x LTF+1.6us GI (M)
  + 4x LTF + 3.2us GI (M)
  + 1x LTF + 1.6us GI (M)
  + Note: 1x LTF + 1.6us GI only for non-OFDMA transmission

NDP

* + 2x LTF + 0.8us GI (M)
  + 2x LTF + 1.6us GI (M)
  + 4x LTF + 3.2us GI (O)

Y/N/A: 43/0/5

SP#5

SP5 in 1656r0

SP Results

* Do you agree that in 11be UL MU-MIMO in TB PPDU does not support masked LTF mode and only mandate non-AP STA to support
  + 1x LTF without pilot
  + 2x and 4x LTF with single stream pilot

Y/N/A: 39/0/9

SP#6

SP6 in 1656r0

SP Results

* Do you support in 11be the non-AP EHT STA shall support transmitting UL MU-MIMO where the total spatial streams summed across all users is less than or equal to 8 in R1?

Note: same as in 11ax

Y/N/A: 43/0/5

SP#7

SP7 in 1656r0

SP Results

* Do you support to amend motion 124, #SP181 as

DL MU-MIMO

* + Mandatory support for AP with >=4 antennas
  + Mandatory support for client
  + Mandatory for non-OFDMA on all RU/M-RU size>=242 in supported BW
  + Optional for OFDMA+MU-MIMO operation

UL MU-MIMO

* + Mandatory support for AP with >=4 antennas
  + Mandatory support for client
  + Mandatory for non-OFDMA on all RU/M-RU size>=242 in supported BW
  + Optional for OFDMA+MU-MIMO operation

Y/N/A: 49/0/3

**1066r14x EHT-LTF (Jinyoung Chun)**

Based on reuse of HE-LTF sequences.

**1073r4 4x EHT LTF sequences design (Chenchen Liu)**

SP#8

SP1 in 1073r4

SP Results

* Do you support to add to SFD：320MHz 4x EHT-LTF sequences:

Refer to SP1 in 1073r4 for the remaining part of the SP text.

Y/N/A: 48/9/9

**1311r2 2x EHT LTF (Ron Porat)**

SP#9

SP Results

* Do you support the 2x 320MHz LTF sequence described in slide 3 in 1311r2?

Y/N/A: 39/3/7

**1317r1 SIG contents discussion for EHT sounding NDP (Ross Jian Yu)**

SP#10

SP2 in 1317r1

SP Results

* Do you agree to add the following text in the TGbe SFD:

The EHT-SIG of EHT sounding NDP is always modulated with BPSK R 1/2, and has only one symbol.

The EHT-SIG of EHT sounding NDP contains 16 bit U-SIG overflow bits and 4 bit CRC and 6 bit Tail.

This is for R1.

Y/N/A: 53/4/7

**1100r2 Discussions on EHT non-contiguous PPDU (Rui Cao)**

SP#11

SP in 1100r2

SP Results

* Do you agree that 11be only defines PPDU with contiguous signal bandwidth, including 20MHz, 40MHz, 80MHz, 160MHz and 320MHz?

Note: non-contiguous 80+80MHz and 160+160MHz are not defined.

Y/N/A: 45/2/9

**985r6 RU allocation Subfield design in EHT-SIG follow up (Myeongjin Kim)**

SP#12

SP6 in 985r6

SP Results

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

The RU Allocation subfield corresponding to RU242 in large-size MRU combinations of 484+242 is set to x (TBD) to indicate the zero users.

x is a value corresponding to the entry of ‘242-tone RU; contributes zero User fields to the User Specific field in the same EHT-SIG content channel as this RU Allocation subfield and is not punctured’ in RU Allocation subfield table.

Refer to SP6 in 985r6 for complete SP text.

Y/N/A: 26/1/18

**1238r10 Open issues on Preamble design (Sameer Vermani)**

SP#13

SP1 in 1238r10

SP Results

* Do you support the punctured channel information in U-SIG for the DL OFDMA case to be a 4 bits bit-map that tells which 20MHz channel is punctured in the relevant 80MHz ?

Information may vary from one 80MHz to the other

The information is located in the 4 LSBs of the overall 5 bit punctured channel indication field, MSB is reserved

The LSB to 4th bit of the field apply from the lowest frequency 20MHz channel to the highest frequency 20MHz channel

Y/N/A: 41/1/9

SP#14

SP2 in 1238r10

Discussion

Q: still offline discussion on other submission. Ask to defer.

Q: based on NDP SP that just passed, NDP can not be combined with other SU cases.

A: 1 symbol EHT-Sig can be the indication for NDP

Q: there are other potential formats. Let’s keep value 3 reserved.

A: OK to modify SP

SP Results

* Do you agree to have a 2 bit combined “PPDU type and compression mode” field to signal the following?

- Other values are reserved.

Refer to SP2 in 1238r10 for the table.

Y/N/A: 36/1/10

**1515r3 Signaling of various transmission modes of MU-PPDU (Dongguk Lim)**

Already covered – no need to run

**1161r1EHT Punctured NDP and Partial BW feedback (Bin Tian)**

SP2 and SP4 in 1161r1 presented – deferred

**1132r0 Thoughts on Extended Range Preamble (Bin Tian)**

SP#15

SP1 in 1132r0

Discussion

Q: can not be used for control frame etc. ER SU has limited usage. Don’t know whether we need it. We already have ER SU in 11ax, not sure what can be improved further.

Q: agree with observation. No need for ER SU, but better to have this for forward compatibility.

Q: not sure we can decouple this mandatory processing from the decision to support ER SU.

A: benefits may extend beyond 11be

Q: what bits do we define in U-SIG?

A: version independent field – all other bits reserved.

SP Results

* Do you support to define ER preamble (classification and U-SIG decoding of version independent field only for forward compatibility) but not ER PPDU in 11be in R1?

If defined, the ER preamble design shall be defined as in P3 of 1132r0.

Y/N/A: 27/7/12

**1703 Trigger frame RU allocation Table (Steve Shellhammer)**

Separate 80 MHz segment indicator.

Adds indexing for small MRUs, with consistent numbering for different bandwidths.

All remaining MRU/RU values can be fit within the table.

21 reserved entries remain.

Discussion

Q: RU19 is not defined. Maybe 11be RU indexing needs to be modified.

Q: better to harmonize between UL and DL numbering.

Q: for small RU why not use 12 entries to indicate absolute position?

A: we do use 12, some values are not shown/reserved.

SP deferred

**Adjourn**

The meeting is adjourned at 13:00 ET.