IEEE P802.11
Wireless LANs

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| Minutes for Task Group (TG) 802.11 beExtremely High ThroughputPHY ad hoc Telephone Conferences in December 2019 and January 2020 |
| Date: 2019-12-12 |
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Abstract

This document contains the PHY ad hoc meeting minutes from TGbe telcos in December and January.

* Rev0: Added meeting minutes for PHY ad hoc meeting on Thursday December 12.

**Thursday 12 December 2019, 10:00 – 13:00 ET**

**Introduction**

1. The Chair (Sigurd Schelstraete, Quantenna) calls the meeting to order at 10:00.
2. The Chair follows the agenda in 11-19/2107r4. Agenda document updated to 11-19/2107r5 after the meeting.
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 Cochair, Tianyu Wu (Apple) or the Chair himself. According to the Webex app, it appears to be around 40 people in the call.

**Recorded attendance through the Webex app and/or reported attendance through e-mail:**
	* Bin Tian (Qualcomm)
	* Chenhe Ji (Huawei)
	* Dandan Liang (Huawei)
	* Dennis Sundman (Ericsson)
	* Dongguk Lim
	* Eunsung Park
	* Greg Ko
	* Humengshi
	* Jinmin Kim
	* Jinsoo
	* John Son (WILUS)
	* L. Sun (idcc)
	* Lei Wang
	* Lily Yunping Lyu
	* Ming Gan (Huawei)
	* Myeongjin Kim
	* Paul Nikolich
	* Patrice Nezou
	* Ross Jian Yu
	* Ruchen Duan (Samsung)
	* Rui Yang (InterDigital)
	* Sameer Vermani
	* Shimini Shilo
	* Si-Chan Noh
	* Sindhu Verma
	* Steve Shellhammer (Qualcomm)
	* Steve Yang
	* Thomas Handte
	* Tianyu Wu (Apple)
	* Wook Bong Lee (Samsung)
	* Yan Xin
	* Yujin Noh
5. Announcements: This session is a PHY ad hoc session.
6. Presentation order update:
	* Move 1911r0 to the top since the author can’t attend Jan F2F meetings.
	* Group the contributions on Multi-RU allocation to present together.

**Contributions**

1. **[1911r0](https://mentor.ieee.org/802.11/dcn/19/11-19-1911-00-00be-11be-channelization-discussion.pptx), “11be channelization discussion” – Si-Chan Noh (Newratek)**

**Summary:** The authors propose using segment parser to support 320MHz channel and multiple RU allocation in 11be.

**Comments:**
No dicussions.

1. [**1579r1**](https://mentor.ieee.org/802.11/dcn/19/11-19-1579-01-00be-adapting-the-11be-channel-model-to-modern-doppler-use-cases.pptx)**, “Adapting the 802.11be Channel Model to Modern(Doppler) Use cases” – Shimi Shilo (Huawei)**

**Summary:** The authors presented some Doppler channel measurement results and show TGn/ac channel model Doppler PSD does not reflect the True PSD generated by STA movement. Suggest the group to work on accommodating real-life Doppler in the channel model.

**Comments:**
C (BinTian): In the measurement, the author gives ~4Hz Doppler. Given the short wi-fi PPDU length, will this small Doppler make a difference in the performance?
A: We observe MU-MIMO severely degrade the performance when some person entering a room. MU-MIMO is very sensitive to channel change.
C: There are two layers of problem: First layer problem is what is the real-world Doppler looks like. The author did a good job to prove the theory match the measurement results pretty good. But in more complicated environment, what does the Doppler looks like? It’s very hard to capture the dopper if there are many moving objectives. Second layer, what is the sounding interval? Once you have the Dopple model, how severe will the Doppler impact the performance?
A: We can surely do more measurement. However, I think 90% of the scenarios can be covered by our measurement. I agree we can work together and discuss the measurement and impact of Doppler.

C: Do you propose to include 1-5Hz Doppler to the channel model?

A: Currently it’s only 0.5Hz in channel model for 5GHz. It does not capture the moving STA’s channel. It’s worth discuss on this topic.
C(Sameer): Slide 8. Some results look strange. Why stationary case has wider Doppler spread than person moving case?

A: Could be some environment impact during the test.

C: It will be helpful if more results or statistics can be provided.

1. [**1606r0**](https://mentor.ieee.org/802.11/dcn/19/11-19-1606-00-00be-preamble-puncturing-and-sig-b-signaling.pptx)**, “Preamble puncturing and SIG B Signaling” – John Son (WILUS)**

**Summary:** The author presented 3 options for SIG B structure and compare the performance for preamble puncturing with each option .

**Comments:**
C(Sameer): Do you consider other option such as keep 1,2,1,2 structure in one 160 and triple in other 160MHz.
A: We did not compare the performance for other options but can further consider them.
C: (Comment to the commenter) The performance should be similar.

C: Asked an option similar to Sameer. It can be mandatory in 11be for STA to decode 160MHz.

1. [**1867r0**](https://mentor.ieee.org/802.11/dcn/19/11-19-1867-00-00be-performance-comparisons-for-ltf-designs-for-eht.pptx)**, “Performance Comparison of LTF Designs for EHT” – Sameer Vermani (Qualcomm)**

**Summary:** The author compared two approaches of LTF design to support 16SS: Tone interleaved and frequency domain P matrix. Analysis and simulation results are provided with a conclusion that P-matrix in frequency domain is not a good direction to go.

**Comments:**
C: It feels to me the performance of the two methods should be very similar. The Tone-interleaved method assumes the channel on adjacent tone is very similar. Some smoothing method is needed for this approach.
A: The cross-stream leakage is the problematic part for the freq P matrix mapping method.

C: It’s fair to also apply smoothing for freq P-matrix method for comparison.

A: With simple receiver, freq P-matrix performance is much worse.

C: The cross-stream leakage term in slide 6 is very close to zero. Further smoothing will help a lot for the performance of freq P matrix method.

A: You need to have very complicated receiver to improve the performance for freq P matrix method.

C: Smoothing will help. This is same for tone-interleaved method.

C: Do you consider apply the tone interleave method to 2xLTF and 1xLTF as well?

A: This presentation is NOT proposing tone-interleaved method. But we do provided results for all 4x, 2x and 1x LTF cases.

1. [**1869r0**](https://mentor.ieee.org/802.11/dcn/19/11-19-1869-00-00be-preamble-puncturing-and-ru-aggregation.pptx)**, “Preamble puncturing and RU aggregation” – Bin Tian (Qualcomm)**

**Summary:** The author discussed three options to support RU aggregation: Multiple PSDU, Single PSDU+pre-encoding parsing and Single PSDU + post-encoding parsing. The last option is preferred by the author.

**Comments:**
C: Opiton 3 is to make new combined RU with new RU sizes?
A: Yes, we can define new interleaver etc. This presentation is about high level concept.
C: Slide 3: If one 20MHz is interfered, adjacent channel may also be affected. So, we may not want to force using RU242 on adjacent channel.

A: Preamble puncturing generally apply to >=80MHz BW. Looking at entire PPDU there are many tones, a few interfered tones may not have significant impact on the performance.

C: Does Option 3 keep same existing archeteture at transmitter?

A: For each STA, before the parser part, everything is the same. Coding is per entire PSDU across multiple RUs.

C: Do you have any simulation results for option 2 and 3?

A: From past study, we have the knowledge that option 3 has some diversity gain over option 2. But how much diversity gain depends on many things such as what RUs are combined.

SP deferred to Jan f2f meeting.

1. [**1907r0**](https://mentor.ieee.org/802.11/dcn/19/11-19-1907-00-00be-multiple-ru-combinations-for-eht.pptx)**, “Multiple RU combinations for EHT” – Jianhan Liu (Mediatek)**

**Summary:** The author proposed a number of RU combination rules and proposed a set of allowed RU combinations.

**Comments:**
C: The proposed cases seem too restricted. We should also consider average throughput gain and efficiency. I doult whether we can get enough gain with such limited set of RU combinations.
A: We can further discuss if you can show some results in your contribution.
C: Do you separate SU and MU for RU combinations?

A: We can separate them. Need further discussions.

C: What about 320MHz?

A: We may have some different design for 320MHz case but we do not have detailed solution yet.

C: You proposed to improve efficiency but not diversity gain. I donot see problem to achieve both. For small RU, optimal one and bad one may have big SNR difference. Why not consider diversity gain?

A: If you find best 52 or 106, the additional 26 may not bring much diversity gain. It’s a tradeoff between complexity of more modes and diversity gain. Efficiency is more important metric comparing to 1-2dB diversity gain. I am open to designs with diversity gain though.

1. [**1908r0**](https://mentor.ieee.org/802.11/dcn/19/11-19-1908-00-00be-multi-ru-support.pptx)**, “Multi RU support” – Ron Porat (Broadcom)**

**Summary:** The author proposed conditional mandatory list of supported large RU combinations for BW up to 160MHz. Also presented a list of small RU combinations within 20MHz and a rule that not to mix small and large RUs in RU combination.

**Comments:**
C: Recommend author to provide some simulation result to decide contiguous or non-contiguous RU combination. Slide 5: Do you always assume primary 20 is on the left most 20MHz?

A: If there is 30MHz incumbent in the middle you can put primary 20 on the left most 20. C: Why is not a good idea for partially overlap 40MHz?

A: Starting from 11ac time, the group decided to design the channelization non-overlapping. There is some problem for channel access with partial overlapping 40.

C: Why supporting [1010] configuration is difficult? With other signalling method, [1010] could be easy to support.

A: Do you have contribution? We donot like this also because there are too many holes in this mode. Even without SIG B problem, we still donot like this mode.

C: Supporting non-contiguous small RU could be important. Similar to contiguous case and can also provide better diversity gain.

A: Supporting too many modes means too many testing and other complexity. We want to limit the modes.

C: You mentioned conditional mandatory. Do you think we should define some mandatory preamble puncturing modes as a differentiate point for 11be? This can be a good mandatory feature.

A: I think it’s a good direction. We can think more on it.

**Concluding remarks**

1. Telco adjourned.