IEEE P802.11  
Wireless LANs

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| UHR SG September 2022 Meeting Minutes | | | | |
| Date: 2022-09-13 | | | | |
| Author(s): | | | | |
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Abstract

This document contains the minutes for the UHR SG September 2022 Meeting Minutes.

Revision history:

* Rev0: initial version, including mintues for session 1.
* Rev1: adding minutes for session 2.
* Rev2: adding minutes for session 3.

Abbreviations:

# 1st Call: Sep 13 EVE (19:30–21:30 Hawaii Time)

1. The Chair, Laurent Cariou (Intel), calls the meeting to order at 19:30 Hawaii Time. The Chair notifies the attendees that the agenda is in 11-22-[1295r3](https://mentor.ieee.org/802.11/dcn/22/11-22-1295-03-0uhr-uhr-sg-september-2022-meeting-agenda.pptx).
   * Note that this is a hybrid meeting, with some participants in person and some participating online through a webex session
   * Need to pay the registration fee to attend
   * Ross Jian Yu (Huawei) is serving as acting secretary in the absence of a permanent secretary
2. IEEE-SA Policies and Procedure

The chair reviews the IEEE-SA Patent Policy:

If anyone in this meeting is personally aware of the holder of any patent claims that are potentially essential to implementation of the proposed standard(s) under consideration by this group and that are not already the subject of an Accepted Letter of Assurance, please respond at this time by providing relevant information to the WG Chair. Speak up now and respond to this Call for Potentially Essential Patents. **Nobody speaks/writes up**.

1. The chair goes through other guidelines for IEEE WG meetings, Patent-related information, Participation in IEEE 802 Meetings, and Copyright. The Chair asks that it be minuted that the **Copyright Policy** was presented.
2. Chair provides an attendance reminder:

3.1. Please record your attendance during the session by using the IMAT system:

* + 1. login to imat
    2. select “802 Wireless Interim Session - Mixed mode - Sept 2022”
    3. select “C/LM/WG802.11 Attendance” entry
    4. click “UHR SG session that you are attending
  1. If you are unable to record your attendance contact the Chair Laurent Cariou for assistance

1. Agenda:
   * Chair reviews proposed agenda in 11-22-[1295r3](https://mentor.ieee.org/802.11/dcn/22/11-22-1295-03-0uhr-uhr-sg-september-2022-meeting-agenda.pptx)
     1. More than 20 contributions in the queue, 25 minutes per submission including Q&A
     2. The chair groups submissions on similar topic together
   * Discussion:
     1. C: Please defer 1038r0,
     2. 1038r0 is deferred. The chair adds 1512r0 into the queue.
   * Agenda approved with unanimous consent.
2. Announcements:
   * None
3. Submissions for Technical M-AP category:
   * [11-22-1515r0](https://mentor.ieee.org/802.11/dcn/22/11-22-1515-00-0uhr-a-candidate-feature-multi-ap.pptx) A candidate feature: Multi-AP
     1. Jinyoung Chun (LG) presented the material

* C: In 11be, we already have some agreement. We can consider those in this generation.
* C: slide 8, these wirelss sharing, they do consume some time. If we can do this using wire, we can achieve a lot of gain.
* A: need to consider more about that.
* C: slide 11, we don’t need a new PPDU format. In 11be, we introduce A-PPDU. We can use it for C-OFDMA.
* A: you are right. If the minimum unit is 80MHz, then we don’t need new PPDU format. But it is not decided yet.
* C: slide 4, are you assuming the shared AP and sharing AP are operating in the same channel, same bandwidth?
* A: yes, we can assume the same channel. But we can split the channel.
* C: did you check if current mesh-AP does that? That’s a good thing to check.
* A: I will check.
  + [11-22-1567r0](https://mentor.ieee.org/802.11/dcn/22/11-22-1567-00-0uhr-c-ofdma-throughput-analysis-in-various-mesh-backhaul-scenarios.pptx) C-OFDMA throughput analysis in various mesh backhaul scenarios
    1. Sigurd Schelstraete (MaxLinear) presented the material
* C: slide 12, inefficiency only exists when the network is heavily loaded. A hybrid approach would be good.
* A: That’s interesting suggestion. If the traffic is low, all things go through. We are trying to see maximum throughput of the extreme case.
* C: for off channel wireless backhaul, does it mean the backhaul and fronthual are in different channel?
* A: yes.
* C: it is like multi-link.
* A: it is not. The different radios are independent. They are mutli-band, rather than mutli-link.
* C: slide 14, I want to echo, we should try to use wired.
* A: I agree with that.
* C: slide 13, the gain is primarily coming from multi-AP SU and multi-AP C-OFDMA. Is the gain coming from the reduction of collision?
* A: Slide 18 has the details.
* C: I think wired backhaul for multi-AP is already used. For the control channel, are you assuming they are over the air?
* A: yes. Even for wire, the protocol exchange is over wireless.
  + [11-22-1516r0](https://mentor.ieee.org/802.11/dcn/22/11-22-1516-00-0uhr-considerations-on-multi-ap-coordination.pptx) Considerations on Multi-AP Coordination
    1. Yusuke Tanaka (Sony Group Corporation) presented the material
* C: which mtuli-AP techs are helping reliability?
* A: all cooridination tech can enable the collision avoidance. The relaiblity can be improved.
* C: I notice you want to bring back some of the discussion previuously. The wired backhaul cases are not considered before. Do we want to limit ourselves to the original discussion?
* A: the network structure should be discussed.
* C: slide for the summary, you are saying we can resue the concept in SFD of 11be, that would be helpful for fast progress. Generally I like your idea. We already have some high level concept. But one thing is that we design those in the very early stage of 11be. Now a lot of PHY and MAC changes have been made in 11be, like multi-link. My recommendation we can better think about it.
* A: there is some modification, we should reexamine it.
* C: my comment is similar as the previous commenter. Are you thinking like taking each item and run SPs again?
* A: I have no idea for now for the procedures.
  + [11-22-1512r0](https://mentor.ieee.org/802.11/dcn/22/11-22-1512-00-0uhr-multi-ap-coordination-for-uhr.pptx) Multi-AP Coordination for UHR
    1. James Yee (MediaTek) presented the material
* C: interesting to talk about MLD for multi-AP coordination. Need to define some signals between interfaces of high MAC and low MAC.
* C: need to have more discussion regarding security.
* C: we believe home mesh are important. Enterprise multi-AP are important too. Regarding the models, could be MLD, and could be separate radios.
* A: we don’t intend to exclude other models.
* C: in 11be, one AP controls distributed APs, which model do you assume?
* A: it is closer to model 1. The agreement in TGbe may be outdated, we should examine them.
* C: for second model, what is being coordinated? Are we assuming C-OFDMA?
* A: could be coordinated spatial reuse.
* C: Model 1, are these AP MLD single link?
* A: we assume they will be multi-band.
* C: let us think how we can scale to large number.
* C: model 3, what level of coordination do you envision? There could be something that is already done.
* A: one new type of information is unsolicited status/resource utilization, reporting to the AP.
* C: like extending some of the status report?
* A: yes
* C: model 1, the idea of central upper MAC for controlling several lower MAC. IThe time cannot be guarantted. It would be necessary to study the time requirement.
* A: have’t looked that part closely. Additional protocol can be defiend.
* C: I also have similar question on model 3. I am hesitiating on the use case. I don’t know what the client is coordinating here.
* A: C-SR, STAs can report interfenrece. Give AP some information, how to reduce the Tx power, shrink the BSSs.
* C: for model 1, you still need those info. Do you mean in model 3, client will make the decision?
* A: the client only provides information. The client doesn’t decide the coordination.
* C: I agree on that part.
  + 1. The SP in the slides is deferred.

1. Recess at 21:30 Hawaii Time

# 2nd Call: Sep 14 AM2 (10:30-12:30 Hawaii Time)

1. The Chair, Laurent Cariou (Intel), calls the meeting to order at 10:30 Hawaii Time. The Chair notifies the attendees that the agenda is in 11-22-[1295r4](https://mentor.ieee.org/802.11/dcn/22/11-22-1295-04-0uhr-uhr-sg-september-2022-meeting-agenda.pptx).
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2. Chair provides an attendance reminder:

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    4. click “UHR SG session that you are attending

3.2 If you are unable to record your attendance contact the Chair Laurent Cariou for assistance

1. Agenda:
   * Chair reviews proposed agenda found in [11-22-1295r4](https://mentor.ieee.org/802.11/dcn/22/11-22-1295-04-0uhr-uhr-sg-september-2022-meeting-agenda.pptx)
     1. 11-22/1395 is removed from the agenda
   * Discussion:
     1. none
   * Agenda approved with unanimous consent.
2. Announcements:
   * None
3. Submissions for General views and band support category:
   * [11-22-1566r0](https://mentor.ieee.org/802.11/dcn/22/11-22-1566-00-0uhr-views-on-uhr.pptx) Views on UHR
     1. Sigurd Schelstraete (MaxLinear) presented the material

* C: slide 8, you have yes for wider bandwidth and additional SS. In earlier contribution, you say the feature will be MAC feature only.
* A: that’s not MAC only. But not define new PHY preamble, but reuse 11be preamble. Esepecially for spatial stream.
* C: your presentation makes a lot of sense to me. We didn’t have a SG on full duplex. That was a TIG. You talk the reserved bits, these reserved bits are not really reserved and assumed to be internal set to 0. What would you think How .11 makes sure those bits are ignored but not set to 0.
* A: that should be clear from the standard. How the standard define the reserved bits. Validate vs Disregard. There was a proposal in a sense of reserved bits for internal reserved. In reality, it may be different.
* C: The view on the problems of 11be, we should not make the mistakes again. For mmwave, slide 5, I think the intention is to unify PHY across mmwave and low freq band. It should be within the scope. We want to put mmwave into stream.
* A: I had the impression the physics is very different.
* C: under the MLO framework, you can get the timing for the sector sweep. That would be some higher level requirement. The majority of the PHY could be reused.
* C: Regarding the PAR slide, do you think we should have a set of KPIs?
* A: I don’t know if it is typical. 11be PAR is a little too loose. We need to be more specific.
* C: what is the benefits of reusing 11be preamble?
* A: a lot of things would be duplicated if we define new preamble. On adding feature in future releases, if those bits are reserved. Why not use them.
* C: For wide bandwidth, how do you achieve it if we don’t have new spectrum?
* A: Right now we have 320, I see contributions of 640 and 480.
* C: is that still for sub 7GHz?
* A: 6 GHz.
* C: by calculating the number of channels in 6GHz, the number is very little. Especially for Europe.
* A: I don’t want to go into details. You are right there is not so much number.
* C: for the PAR, we should have a feature list in the PAR. Later we may change mind. My suggestion is to not include feature in the PAR.
* A: you can always revise the PAR.
* C: I also agree that we should not repeat R1 and R2 failure. I also agree to have a light-weight PAR. The question is that you mention RCM produces two PAR. You assume the two PAR can be in parallel or in serial?
* A: that can be discussed. I assume in parallel. If it is in serial, you can follow regular procedure.
  + [11-22-1580r1](https://mentor.ieee.org/802.11/dcn/22/11-22-1580-01-0uhr-aperspectiveonproposeduhrfeaturesforenterpriseusecases.pptx) a Perspective On Proposed Uhr Features For Enterprise Use Cases
    1. Brian Hart (Cisco Systems) presented the material
* C: slide 6, I would second this point. 1-10ms is too much. Do you think of more centralized architecture? Would that be much better?
* A: Cenctralized control is a good thing. We see lots of opportunities.
* C: For mmwave, how low regarding the bandwidth? Coexistence with 11ad/ay?
* A: for mmwave, we don’t have to worry legacy too much. The coexistence problem is the easiest thing. For mmwave, it would rather use high bandwidth rather than low MCS.
* C: slide 8, the red dots are the AP which are performing sharing?
* A: each dot represents an AP. The red ones are the APs on one particular channel.
* C: wired access to each AP?
* A: yes.
* C: slide 16, hitless roaming, you show multi-AP MLD, fast roaming between AP MLD, even a link goes away, it could retransmits the packet on the other link. You flush the packet. Otherwise, you have duplicate issue. All the TCP will go back. Bad things will happen in the high level. You can decide not to transmit.
  + [11-22-1595r1](https://mentor.ieee.org/802.11/dcn/22/11-22-1595-01-0uhr-some-questions-to-answer-in-the-sg.pptx) answering some questions in SG
    1. Laurent Cariou (Intel) presented the material. Jon Rosdahl (Qualcomm) helped to chair during this presentation.
* C: slide 6, regarding your opinion about the 3rd. why only single user transmission is allowed.
* A: just operating in 60 GHz gives you so much benefits. Because of the directionality, it is more complicated for MU. We have chance and time in future generation.
* C: for the PHY, you mention about upclocking, compared with 11ac, 11be has more narrow subcarrier spacing. Which one do you prefer?
* A: ac has larger subcarrier spacing, it is easier.
  + 1. Please get to Laurent for offline discussion for those people in the queue.
  + [11-22-1398r4](https://mentor.ieee.org/802.11/dcn/22/11-22-1398-04-0uhr-rr-tag-mmwave-spectrum-survey.pptx)  RR-TAG mmWave Spectrum Survey
    1. Rich Kennedy (Unlicensed Spectrum Advocates) presented the material. Part of a reference DCN 18-22/0110r1 was also presented.
* C: Slide 3, you mention EN 303 753 can support UHR, but that is for mobile and fixed radio device? How does that help?
* A: We will find the right one to utilize.
* C: Can also have a look at EN 305 550-1.
* A: Yes, that is a suggestion where we may start to look.

1. Recess at 12:24 Hawaii Time

# 3rd Call: Sep 15 PM2 (16:00-18:00 Hawaii Time)

1. The Chair, Laurent Cariou (Intel), calls the meeting to order at 16:00 Hawaii Time. The Chair notifies the attendees that the agenda is in [11-22-1295r5](https://mentor.ieee.org/802.11/dcn/22/11-22-1295-05-0uhr-uhr-sg-september-2022-meeting-agenda.pptx).
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    4. click “UHR SG session that you are attending
  1. If you are unable to record your attendance contact Laurent Cariou (laurent.cariou@intel.com) and Ross Jian Yu (ross.yujian@huawei.com) for assistance

1. Agenda:
   * Chair reviews proposed agenda found in [11-22-1295r5](https://mentor.ieee.org/802.11/dcn/22/11-22-1295-05-0uhr-uhr-sg-september-2022-meeting-agenda.pptx)
   * Discussion:
     1. PM1 should be PM2 in the title
   * Agenda approved with unanimous consent.
2. Announcements:
   * None
3. Submissions for Use case and requirements category
   * [11-22-1493r1](https://mentor.ieee.org/802.11/dcn/22/11-22-1493-01-0uhr-use-cases-for-wi-fi-business-solutions-in-uhr.pptx) Use Cases for Wi-Fi Business Solutions in UHR
     1. Akira Kishida (NTT) presented the material

* No comments or questions.
  + [11-22-1414r1](https://mentor.ieee.org/802.11/dcn/22/11-22-1414-01-0uhr-low-power-listening-mode.pptx) Low power listening mode
    1. Xiaogang Chen (ZEKU) presented the material
* C: Can you further explain how to implement the low power listening mode? Do you mean you need PLL with low power? What’s the difference between low power PLL and high power PLL?
* A: It is really an implementation issue. You want to achieve low noise, you just use a high current PLL, to make the phase noise down. That’s the general rule.
* C: in order to respond CTS, you need to open 320.
* A: depending on implementation, your low power is 20MHz or 320MHz. Has to transmit the CTS the same bandwidth as the RTS.
* C: CCA often happens before RTS happens.
* C: CCA is done in between.
* C: 11be has the framework, what you are showing can be supported today. There can be something we can work on in next gen. The breakdown power consumptions number, is TWT used?
* A: for the 2nd question, I thought about this. We are testing using Wi-Fi 6 platform. TWT is already covered in sleeping percentage and reflected here. For breakdown, TWT is not reflected in the breakdown. This is just for receiving/listening.
* C: what is the reasoning of listening, the power consumption is that high.
* A: that’s something true. You don’t know what the packet is coming, you need to prepare the high QAM, large bandwidth PPDU.
* C: slide 4, when you do some transmition, we do listen before talk. These kind of CCA includes the Tx phase?
* A: this is for listening mode.
* C: the info can be transmitted just before?
* A: yes within the listening status stage.
* C: how much percentage of these activitys among the power consumption in total? Good to know.
* A: not having them now. Will talk offline.
* C: slide 12, the Tx will always need to transmit MU-RTS?
* A: just like SMPS.
* C: slide 7, is this quote based on 24 mbps max rate.
* A: yes.
* C: How much switch time is needed? Similar as EMLSR?
* A: EMLSR has pretty wide range. We don’t need that much.
* C: are you envisioning an architecture similar as EMLSR?
* A: either has a dedicated or not, depending on implementation.
* C: Slide 12, your low power starts at the beginning of the CTS.
* A: depends on the implementation.

1. Submissions for Misc technical category
   * [11-22-1392r0](https://mentor.ieee.org/802.11/dcn/22/11-22-1392-00-0uhr-beamforming-improvement-for-uhr.pptx) Beamforming Improvement for UHR
     1. Eunsung Jeon (Samsung) presented the material

* C: slide 6 and 7, when you talk about implicit beamforming, how do you calculate precoding/beamsteering matrix. 802.11n, the discussion on implicit beamforming, that part doesn’t get to the standard. What’s the difference here?
* A: slide 6, in this case, the STA can calculate CBF by using NDP. It also generates the beamsteering matrix using CBF.
* C: For this one, we are doing sounding for DL. On the STA part, we can calculate the CBF and feedback to the AP. You want the STA to the beamformer.
* C: once you receive NDP, assuming channel reciprocity, you use DL for UL beamforming.
* C: Need calibration.
* C: On the UL beamforming, each STA has multiple STAs, and beamform its own attennas or beamform upon multiple STAs.
* A: independent.
* C: what type of beamforing report do you assume?
* A: MU-MIMO.
* C: currently use open loop beamforming?
* A: yes, without feedback channel information
* C: the BFer knows what resources it can use. After the reception of the trigger frame. I am not sure STA can make matrix right after the reception of the NDP.
* A: yes
* C: Slide 4, for smoomthing, we do phase update. Based on this proposal, the phase update is done by each element separately.
* A: yes.
* C: For UL beamforming, if UL beamforming is done independently, then power imbalance is an issue.
  + [11-22-1393r0](https://mentor.ieee.org/802.11/dcn/22/11-22-1393-00-0uhr-latency-reduction-scheme-for-uhr.pptx) Latency Reduction Scheme for UHR
    1. Wook Bong Lee (Samsung) presented the material
* C: I like your idea to use A-PPDU. In the DL, I have one question. You need to indicate the channel for the interested PPDU.
* A: That’s more detail. Could be multiple designs. In SIG, indicate there may be multiple PPDUs.
* C: For UL, it is hard to gurantee the low latency. Need to further consider other ways.
* A: If there are multiple STAs want to do channel access. The AP needs to assign more RA-RUs.
* C: slide 8, you mention RA-RU1, RA-RU2. Do you mean there will be different groups of STAs?
* A: That’s more detail.
* C: The same slide, RA-RU 1 doesn’t need to be RA-RU, right?
* A: The trigger frames, the AP already knows how much resources are needed.
* C: For non-AP STA2, STA3, alignment is also needed to re-do the AGC?
* A: Open for the suggestion.
* C: UORA is in 11ax. In UHR, low latency is a goal. Are you considering UORA in UHR?
* A: yes.
* C: you want to insert PPDU then PPDU 3 may fail? A: we can define mechanism to avoid that.
* A: we need to inform what will be the STA in the new RUs. In this way, even for 11be portion, new PPDU can be inserted. If we want to conider a way, then only UHR PPDU can be interrupted. It is up to members’ decision. We can discuss more on other options.
* C: What is the actual benefit compared with multi-TID?
* A: it is only to the same user.
* C: You want to assign it to different user. That’s very fancy.
* C: for slide 8, the backoff is still needed?
* A: CCA before SIFS, probably.
* C: the non-AP STA does the backoff in ahead.
* A: it is trigger based.
* C: when do STAs do CCA?
* A: that’s detail discussion we can do.

One additional contribution is added to the agenda. Updated agenda is approved with no objections.

* + [11-22-1466r0](https://mentor.ieee.org/802.11/dcn/22/11-22-1466-00-0uhr-potential-phy-features-for-uhr.pptx) Potential PHY Features for UHR
    1. Eunsung Park (LG Electronics) presented the material
* C: For wideband, do you think of 240 MHz? That could be used in 5GHz. That’s more useful than 480/640MHz.
* A: good suggestion.
* C: SST, no test. We don’t have a lot of experience regarding SST. We don’t have many implementations. Do you have a sense people are OK with it? Or it is a dead feature.
* A: Operating bandwidth for non-AP STA is limited. SST is essential for Tput.
* C: slide 8, why inserted PPDU must come with A-PPDU.
* C: I think it is OK to be RUs instead of PPDUs. Just don’t want to waste all 320MHz to solve the latency.
* C: any difference between header and preamble?
* A: in the A-PPDU there may be some previous version. The A-PPDU header is different from the prevous preamble.
* C: connection of SST and large bandwidth does not really match. There is no way to get 320/640MHz in dense scenario.

1. Goals for November 2022
   * Continue submissions on the different topics
     1. Objectives and targets/KPI’s
     2. Frequency bands to be addressed
     3. Potential technologies to be considered
     4. Naming of the taskgroup
   * Initiate discussions on PAR and CSD.

No discussions

1. Teleconference Plan
   * Sept 26 (Monday) 10:00-12:00 ET
   * Oct 24 (Monday) 10:00-12:00 ET

No Discussions

1. Adjourn at 17:55 Hawaii Time