IEEE P802.11
Wireless LANs

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| UHR SG November 2022 Meeting Minutes |
| Date: 2022-11-15 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Ross Jian Yu | Huawei | Huawei Industrial Base, Bantian, Longgang, Shenzhen, Guangdong, China |  | ross.yujian@huawei.com |
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Abstract

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

Revision history:

* Rev0: initial version.

Abbreviations:

* C: Comment
* A: answer

# 1st Call: Nov 15 EVE (19:30–21:30 Bangkok Time)

* + 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 [11-22-1720r5](https://mentor.ieee.org/802.11/dcn/22/11-22-1720-05-0uhr-uhr-sg-november-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
1. IEEE-SA Policies and Procedure

The chair reviews the IEEE-SA Patent Policy:

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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.
	* Chair provides an attendance reminder:

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

* + login to imat
	+ select “802 Wireless Interim Session - Mixed mode - Sept 2022”
	+ select “C/LM/WG802.11 Attendance” entry
	+ 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 in 11-22-[1720r5](https://mentor.ieee.org/802.11/dcn/22/11-22-1720-05-0uhr-uhr-sg-november-2022-meeting-agenda.pptx)
	* Discussion:
		1. None
	* Agenda approved with unanimous consent.
2. Announcements:
	* None
3. Approval of SG Minutes

Move to approve UHR SG minutes of teleconferences listed below:

* + September plenary: <https://mentor.ieee.org/802.11/dcn/22/11-22-1612-02-0uhr-uhr-sg-september-2022-meeting-minutes.docx>
	+ Teleconferences September-November: <https://mentor.ieee.org/802.11/dcn/22/11-22-1656-01-0uhr-uhr-sg-september-october-2022-teleconference-minutes.docx>

Move: Ross Jian Yu Second: Alfred Asterjadhi

Discussion: None

Result: Approved with unanimous consent

1. Confirmation of UHR secretary appointment

**Move to confirm the appointment of Ross Jian Yu as the UHR SG secretary**

**Move: Wook Bong Lee Second: Stephen Palm**

**Discussion: None**

Result: Approved with unanimous consent

1. Submissions:

Use cases and requirements category

* + [11-22-1809r0](https://mentor.ieee.org/802.11/dcn/22/11-22-1809-00-0uhr-a-perspective-on-uhr-features-for-operator-residential-deployments.pptx) A Perspective on UHR Features for Operator Residential Deployments Lili Hervieu,  CableLabs
* C: mesh idea, you mention easymesh, which relies on tree structure. 802.11s, no hierarchy. Which of the two are you considering for now?
* C: Could you comment on channel planning? Which of the AP do you expect will operate co-channel? You could operate in the same channel or in different channels. Which do you expect for next genearations?
* A: There are many APs in dense scenarios.
* C: slide 8, in the first bullet, you say the AP may be put in the wrong places. In the second bullet, multi-AP coordination helps determine a poor AP placement. It is user’s decision?
* A: What I mean is there could some mechanisms to define KPI to identify what the users should do.
	+ [11-22-1880r1](https://mentor.ieee.org/802.11/dcn/22/11-22-1880-01-0uhr-latency-and-reliability-enhancements-for-uhr.pptx) Latency and Reliability enhancements for UHR Thomas Handte, Sony
* C: slide 5, with preemption, to my mind, you mention event driven. With the first two options, the AP is transmitting to STA1 and then transmits to STA2. For UL case. It seems Opt 3 is the only one that could work.
* A: UL case, it is more challenging. Some signaling relies on MLO.
* C: The TXOP sharing itself is sufficient?
* A: Multi-TID A-MPDU, going to different STAs. Regarding TXOP sharing, if the primary AC is full of data, then could not have room for secondary AC.
* C: In the second intra-PPDU w/PPDU reuse, how to guarantee STAs can decode MPDU. Are you assuming the same channel condition?
* A: Could adjust MCS, beamforming.
	+ [11-22-1926r0](https://mentor.ieee.org/802.11/dcn/22/11-22-1926-00-0uhr-challenges-to-achieve-low-latency.pptx) Challenges to achieve low latency Dmitry Akhmetov, Intel Corporation
* No questions or comments.
	+ [11-22-1928r1](https://mentor.ieee.org/802.11/dcn/22/11-22-1928-01-0uhr-enhanced-long-range-usage-scenarios-design-target-and-feasibility.pptx) Enhanced Long Range-Usage Scenarios, Design Target and Feasibility Jianhan Liu, Mediatek
* C: the direction is generally good for home coverage and IoT. Similar use case and target requirement was proposed. 5 or 6 years have passed, the technology should have evolved, but the target is the same as before.
* A: good question. We can do lower data rate, very longer range. There is tradeoff. If you have much longer range, you may need three beacons. This one is still doable by two beacons. I use 11b beacon, then for data transmission, it can get longer range at the same data rate or the same range with larger data rate.
* C: very encouraging to see this. Have you considered this in 5 or 6GHz?
* A: This is also a question we are thinking a lot. We are thinking 5 or 6 GHz, why not also use this. There are also people thinking this low data rate and long range thing will affect the network. You may affect the higher data rate transmission. At least for given set of devices, low cost effective solution, you give them one solution in 2.4 GHz, for 5 or 6GHz multi-AP or relay may be the solution.
* C: If there are relay in 5 or 6GHz, there should be one in 2.4GHz, for MLO device.
* A: please note in 2.4GHz, the range can be 5-6dB better than in 5GHz or 6GHz due to propagation loss.
	+ [11-22-1936r1](https://mentor.ieee.org/802.11/dcn/22/11-22-1936-01-0uhr-wlan-in-data-centers.pptx) WLAN in Data Centers Jatin Parekh, Arista Networks
* C: Why data centre needs wireless?
* A: Everybody brings a laptop. Not all device are wired available. Also for security reasons.
* C: Where does the noise come from?
* A: The noise is from the switchs, cables, across all spectrum.
* C: you mention ultra-density. Where does this happen?
* A: In order to provide high enough SNR, put APs very close to each other.
* C: Have you tried association and disassociation?
* A: too many disassociation is not good.
* C: We presented similar use case in AMP TIG on data center. It is a very special scenario for IoT devices. It would be very good for the operator of the data centers.
* A: we didn’t see many IoT devices. They don’t have roaming issues. The hand devices have more roaming issues.
* C: there are many more AGVs, which will introduce mobile sceanrios. Also, label devices.
	+ Recess at 21:29 Bangkok Time

# 2nd Call: Sep 16 AM2 (10:30-12:30 Bangkok 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-[1720r5](https://mentor.ieee.org/802.11/dcn/22/11-22-1720-05-0uhr-uhr-sg-november-2022-meeting-agenda.pptx).
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	* Chair provides an attendance reminder:

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	+ select “C/LM/WG802.11 Attendance” entry
	+ click “UHR SG session that you are attending

3.2 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-[1720r5](https://mentor.ieee.org/802.11/dcn/22/11-22-1720-05-0uhr-uhr-sg-november-2022-meeting-agenda.pptx)
	* Discussion:
		1. none
	* Agenda approved with unanimous consent.
2. Announcements:
	* None
3. Submissions

General views and band support

* + [11-22-1804r0](https://mentor.ieee.org/802.11/dcn/22/11-22-1804-00-0uhr-band-complexity-discussion.pptx) Band Complexity Discussion Vinko Erceg, Broadcom
* No questions or comments.
	+ [11-22-1865r0](https://mentor.ieee.org/802.11/dcn/22/11-22-1865-00-0uhr-considerations-on-the-phy-for-60-ghz.pptx) Considerations on the PHY for 60 GHz Miguel Lopez, Ericsson
* C: slide 8, you mention OFDMA transmission. Do you think it is reasonable for mmwave with directional antenna? Most of the users need to be close.
* A: Good question. Maybe one can have quasi-omni direction operation. AR/VR boxes are very close to each other. May be benefit from that.
* C: Slide 7, 1.28GHz system, in the legend you show 11ac/ax. Do you refer to upclocking version?
* A: Upclocked 8 times. Subcarrier spacing (SCS) is 625KHz for 11ax, 2.5MHz for 11ac.
* C: What will be the problem for Wi-Fi?
* A: The pilot design we have can be reused and can have good performance.
* C: 3GPP simulations, y-axis is BLER, for Wi-Fi, it is PER. Is it a fair comparison?
* A: I don’t intend to compare. 3GPP usually compares BLER. We have a different layer for Wi-Fi, we look at the PER.
* C: slide 7, no changes to the PHY are required. In straw poll, you said only upclocking PHY is required.
* A: I think this is related with the previous question. The upclocking is necessary and useful. The signal is upclocked by 8 times for both signals. Upclocking would be the only necessary changes.
* C: When is the ICI compensation applied?
* A: After done channele estimation and in freq domain after CP removal.
* C: Don’t know if ICI can be seen as a baseline.
* A: for 3GPP, 120KHz SCS, if they don’t have ICI. It cannot work.
* C: if they don’t have ICI in sub 7GHz. Cannot assume mmwave can have ICI.
* A: It will be necessary in implemantion
* C: SCS is only one of the changes in high frequency. What determines the channel sapcing is not only ICI, including the signaling overhead. There are many other considerations. Even we implement ICI, the changes would be necessary.
* A: I am not sure if I totally agree with you. SCS is only one of them. Only single user, that is suggested for first wave, what bandwidth is needed, needs carefully studied.
	+ [11-22-1969r0](https://mentor.ieee.org/802.11/dcn/22/11-22-1969-00-0uhr-uhr-operation-in-lightly-licensed-spectrum.pptx) UHR Operation in Lightly Licensed Spectrum Rolf De Vegt, Qualcomm
* C: I am supportive of this. There are important use cases. This is more industry friendly. Putting it in UHR is a good direction
* C: What is the difference between lightly licensed spectrum and licensed spectrum?
* A: The light licensed spectrum is more for private parties.
* C: The PAR will probably contain frequency range. We don’t call it out we should not exclude something. That’s use case for private networks. I don’t think the PAR need to change anything.
* A: As a network manager, you have full control of the spectrum. In 11n/ac, we want to take of the overlapping network. Here you can exclude those considerations. That’s feature-wise.
* C: the light licensed spectrum seems to me multiple parties pays to share the band?
* A: No. For industry usage, people can specify the location, which spectrum wants to use. The government enables them to use. A nominal fee. Excluse use for a particular location.
* C: a very good direction overall. You mention AFC based. What do you think abou the mobile case?
* A: It depends on the way the licensed are made available. It is georgraphic specific. It is hard to support mobility. Maybe support within a bound.
* C: Good to increase the UHR spectrum for sub7GHz. KPI is about PAR for UHR. Main usage of UHR is for unlicensed spectrum. Those KPIs should be verified in unlincensed spectrum.
* A: this could make the KPI more attractive. It is debatable if we want to put stricit KPIs.
* C: What is the anticipated timeline?
* A: The Germany one is issued today. Need to justify and explain we can meet the regularoty requirement. It is not far out there.
* C: even with this, it is never really easy. Even the US, it is not neccesarily true. I am more cautious.
* A: it is not the mainstream use case. Great opportunity for IoT.
	+ [11-22-1872r0](https://mentor.ieee.org/802.11/dcn/22/11-22-1872-00-0uhr-considerations-on-phy-designs-for-mmwave-band.pptx) Considerations on PHY Designs for mmWave Band Eunsung Park, LGE
* C: slide 12, you can use UHR-STF and LTF in sub 7GHz. The L-STF and L-LTF may still have some usage, for degrading frequency offset. Do you think it is fine for the performance? Do we need to increase the length of UHR-STF/LTF in mmwave compared with 7GHz?
* A: I haven’t studied regarding the impact. We can further disucss and further study.
* C: Maybe you can have some analysis and the power consumption. The power consumption would be an issue if you want to implement it in a smartphone.

* + [11-22-1884r0](https://mentor.ieee.org/802.11/dcn/22/11-22-1884-00-0uhr-mmwave-operation-for-uhr.pptx) mmWave operation for UHR Laurent Cariou, Intel
* C: Wi-Fi 4/5/6/7 main stream. UHR will be Wi-Fi 8. Mmave is a failure twice. There are companies putting a lot of resources. I really doubt putting the twice failure into this main stream. Should have a separate task group. You try to narrow the scope. The right way is to do the work together in a separate group. If UHR group gets to the market in 4 years, there will be no commercial device for mmwave at that time.
* A: For a seperate group, this will come with the next generation.
	+ Recess at 12:32 Bangkok Time

# 3rd Call: Sep 17 PM2 (16:00-18:00 Bangkok 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-[1720r7](https://mentor.ieee.org/802.11/dcn/22/11-22-1720-07-0uhr-uhr-sg-november-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 [11-22-1720r7](https://mentor.ieee.org/802.11/dcn/22/11-22-1720-07-0uhr-uhr-sg-november-2022-meeting-agenda.pptx):
	* Agenda approved with unanimous consent.
2. Announcements:
	* None
3. Submissions

**Misc technical**

* [11-22-1910r0](https://mentor.ieee.org/802.11/dcn/22/11-22-1910-00-0uhr-seamless-roaming-for-uhr.pptx) Seamless Roaming for UHR Duncan Ho, Qualcomm
	+ - * C: You want to have this scalable. How much you can scale on this? How can you put 100 APs in this framework?
			* A: Understand. If you go to the office with 50 APs, the STA will do MLD association. We don’t need to maintain all the APs. Maintain the number of APs covering the client.
			* C: I have similar thought. When you are saying target client, you can reduce the number of AP. Need to think broadly for all the associated STAs. You need all APs to be in the same MLD. The AP MLD is static or formed on demand?
			* A: Good question. We can discuss more. Need some localization for a few APs.
			* C: Important problem. Slide 7, need to move a lot of data from AP2 to AP1. Need to deliver bunch of work very fast.
			* C: in 11be AP2 and AP3 are different MLDs. In this contribution, AP1 to APn in logic entity MLD. How to differentiate it?
			* A: AP2 or AP3 is just an affiliated AP.
			* C: For example, AP2 operates on 3 bands.
			* A: Here we only show one link. If there are 3 bands, then there will be three lines from AP2 to AP3.
			* C: cannot use AP MLD MAC address.
			* C: You assume Wi-Fi 7 device can support this?
			* A: yes. Wi-Fi 6 device cannot do this.
			* C: AP1 and AP2 are of the same link or different link?
			* A: they could be on different channel or same channel.
			* C: if they are on the same channel, you mention the packet transist. It can see two APs.
			* A: We have TA in the MAC header. The packets will have different TAs in the MAC header.
			* C: Do you envision is it possible the STA maintains some of the link with AP1, and some other links with AP2?
			* A: yes, it is possible.
* [11-22-1842r0](https://mentor.ieee.org/802.11/dcn/22/11-22-1842-00-0uhr-channel-information-feedback-for-smooth-beamforming.pptx) Channel Information Feedback for Smooth Beamforming Eunsung Jeon, Samsung
	+ - * C: Slide 6, you show the simulation results black line is the conventional line. You said the discontunity when V is near zero…
			* Chair: suggest offline discussion
			* C: Slide 8, this solution you propose here, this requires some extra feedback?
			* A: yes
			* C: could be done without some additional feedback. Will check. Could be smoothed without additional information
			* C: Partially agree with the previous commenter.
			* C: slide 5, when Nrx=1, when the last row is nearly zero. When does this happen?
			* A: When the channel is defading, this value can go to zero. Because of the phase unstable.
			* C: When Nrx=1, the matrix V is a MISO V. Different channel may be similar. Zero value is still confusing.
			* Chair: let’s take the discussion offline.
			* C: Slide 6, what channel do you use for simulation?
			* A: Ch D.
			* C: One is with smoothing, the other is without smoothing? What smoothing bandwidth? The smoothing has gain, can also have other method to get the gain. You can also have extra LTF. You can compare the additional LTF overhead compared with additional feedback. For multiple Nrx, is the channel also D NLOS?
			* A: yes.
			* C: When you have two eigenvalues are close to each other, the eigenvalue swap. If you use NLOS, it is not a good channel to simulate it.
			* C: the overhead is worth looking.

* [11-22-1869r1](https://mentor.ieee.org/802.11/dcn/22/11-22-1869-01-0uhr-txbf-based-on-the-optimal-svd.pptx) TXBF based on the Optimal SVD Aiguo Yan, ZEKU
	+ - * C: Could you elabaorte the overhead?
			* A: I have a contribution, doesn’t have time to present it. You can refer to that. Similar as Eunsung’s contribution. If there are two Nrx, you need to feedback two additional phases.
			* C: For 1x, 2x LTF, we need to smoothing anyway, to recover the channel. Currently the beamformer can already do this.
			* A: Yes and No. Feedback the V that is very smooth does not mean H multiply V is very smooth. That’s the key difference.
			* C: even smooth the CSI feedback, you can do anything without changing the spec.
			* A: need to have the theta included.
			* C: this is unitary matrix anyway.
			* A: this is what I am trying to say. V is optimized for V itself. I am trying to optimize H multiply V.
			* C: could you clarify limit freedom of TxBF. Each device may have its circuity restrication. It is not good to limit the whole freedom. For TxBF, it is mandatory to support 2 SS.
			* C: How do you define optimal here?
			* A: there are so many ways to define criteria. In my simulation, I have bunch of optimization criteria. Just simple way for simulation. Still room for improvement. Once the standard supports the optimize V, each company can have the freedom.
			* C: page 4, you feedback V-tail, is V multiply diagonal? Is it similar as Eunsung’s method?
			* A: yes
			* C: I don’t think diagnol can solve the eigenvalue swap issues. You mention V is not normalized. What do you mean?
			* A: need to feedback theta.
			* C: if you can paramerize the channel, you can feedback those parameters, like angles. What’s your thought?
			* A: I do have a contribution on feedback compression. You can take a look. There could be many different ways to implement. The concept of SVD is important. How to feedback can be discussed later.
* [11-22-1908r0](https://mentor.ieee.org/802.11/dcn/22/11-22-1908-00-0uhr-uhr-rate-vs-range-enhancement-with-relay.pptx) UHR rate-vs-range enhancement with relay Rui Cao, NXP
	+ - * C: Beacon, beacon, beacon, relay beacon.
			* …

* [11-22-1930r0](https://mentor.ieee.org/802.11/dcn/22/11-22-1930-00-0uhr-layered-qos-and-multi-layer-transmision.pptx) Layered QoS and multi-layer transmission Ross Jian Yu, Huawei
	+ - * C: I like the use case. But the problem is that different frames are simply grouped together.
			* A: yes, it is also related with work from 802.3.
			* C: not only 802.3, also IETF.
			* C: If there is no seprate queue from MAC. Then multi-layer transmission may not be helpful.
			* A: also have other gains.
			* C: How about using different PPDUs?
			* A: It is one of the options to achieve UEP. For multiple PSDUs, it has additional benefits, like taking advantage of the channel selective gain, mitigating interference.
			* C: The PHY needs to know the I/P/B frames.
			* A: The MAC needs to know. Then for PHY, it is implementation. The difficult part is link adaptation.
			* C: introducing more queues will increase jitter.
1. Goals for January 2023
	* In January, the agenda will focus more on PAR and CSD documents
	* Chair will organize discussion on key decisions to be made in January/March regarding those documents

No discussions

1. Teleconference/ad-hoc plan
* December 5th 10am-12pm ET
* December 19th 10am-12pm ET

No Discussions

1. Adjourn at 18:00 Bangkok Time