IEEE P802.11
Wireless LANs

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| UHR SG May 2023 Meeting Minutes |
| Date: 2023-05-15 |
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Abstract

This document contains the minutes for the UHR SG May 2023 Meeting Minutes.

Revision history:

* Rev0: initial version.

Abbreviations:

* C: Comment
* A: answer

# 1st Call: Monday, PM2, (16:00-18:00 ET)

* The Chair, Laurent Cariou (Intel), calls the meeting to order. The Chair notifies the attendees that the agenda is in [11-23-0587r2](https://mentor.ieee.org/802.11/dcn/23/11-23-0587-02-0uhr-uhr-sg-may-2023-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.
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3.1. Please record your attendance during the session by using the IMAT system:

* + - * login to [imat](https://imat.ieee.org/attendance)
			* select “802 Wireless Interim Session - Mixed mode - May 2023”
			* 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
			- Discussion:
				* C: Request to move 355r0 to the first one
			- Agenda approved with unanimous consent.
2. Announcements:
	* + - None
3. Approval of SG Minutes

Move to approve UHR SG minutes listed below:

* + - * March plenary:
		- https://mentor.ieee.org/802.11/dcn/23/11-23-0409-00-0uhr-uhr-sg-march-2023-meeting-minutes.docx
			* Teleconferences March April:
		- <https://mentor.ieee.org/802.11/dcn/23/11-23-0532-02-0uhr-uhr-sg-mar-apr-2023-telecon-minutes.docx>

Move: Ross Jian Yu Second: Allan Jones

Discussion:

* + - * C: 532r1 is updated to r2, adding the attendance list for the May 8th call.

Result: approved with unanimous consensus

1. Submissions
	* + - [11-23-0355r](https://mentor.ieee.org/802.11/dcn/23/11-23-0355-00-0uhr-enhanced-rtwt-and-map-operation.pptx)0 Enhanced rTWT and MAP operation Hanqing Lou (InterDigital)
		+ C: Agree with most of the points. You mention TSF synchronization. Not sure if we need that.
		+ A: A lot of people still prefer one AP could advertise OBSS r-TWT SP. Overhead could be introduced to the beacon.
		+ C: Slide 7, STA11 is also associated to AP2?
		+ A: Depends on the architetcutre. The two AP may form a multiple AP group. The STA associates with the MAP group.
		+ C: Slide 8, TXOP sharing, extended TXOP sharing between multiple APs?
		+ A: the AP shares its r-TWT schedule with its associated STAs and APs.
		+ C: slide 6, what is the main difference between Opt 1 and Opt2?
		+ A: Opt1 is to establish MAP coordinated rTWT, multiple AP will coordinate r-TWT schedule according to MAP cooperation, MAP may be synchroinzed. Opt2, still use tradtional ways. Don’t consider MAP coordination. Can do some coordination if they realize some overlapping r-TWT SPs.
			- [11-23-0295r](https://mentor.ieee.org/802.11/dcn/23/11-23-0295-01-0uhr-discussion-on-multi-ap-coordination.pptx)1 Discussion on Multi-AP Coordination Xiaofei WANG (InterDigital)
		+ C: Slide 6, the UHR STA should understand roaming AP MLD
		+ A: should be transparent to EHT, should not be transparent to UHR.
		+ C: slide 6, Opt 2 is more natural.
		+ A: Faster, regulating its own functionality. From the general of AP MLD, it is better. Potential for backward.
		+ C: For Opt2, some AP may be co-located?
		+ A: I think general we have a place to manage local MLD. Then the over-architecture can be somewhere else.
		+ C: slide 5, may not support association EHT functions?
		+ A: have to define additional signaling. Because the MLD will locate somewhere else.
		+ C: seem opt 1, what is the assumption? You assume it is not EHT locally AP MLD? And also co-located set. There may be some misunderstanding.
			- [11-23-0325r](https://mentor.ieee.org/802.11/dcn/23/11-23-0295-01-0uhr-discussion-on-multi-ap-coordination.pptx)0 Coordinated Spatial Reuse for UHR Jason Yuchen Guo (Huawei)
		+ C: For the hardware test, what placement of these 3 non-AP STAs are? The same distance to the AP?
		+ A: All the 3 STAs are equally distance to the same STA.
		+ C: Do you just change the Tx power of each STA?
		+ A: It is DL. The Tx power of the shared AP.
		+ C: which AP do you do the power adjustment
		+ A: the sharing AP will ensure it make sure its own MCS can be reached to the highest.
		+ C: This one is based on the protocol you shown in the previous pages?
		+ A: yes
		+ C: the APs are weired connected?
		+ A: just over the air.
		+ C: the Tput is only DL?
		+ A: yes.
		+ C: the STA has to feedback some info, for example the pathloss.
		+ A: we didn’t build everything here. For the pathloss estimation, the AP can receive the BA from its associated AP. And can get the estimation of the pathloss.
		+ C: The throughput is the BSS Tput. Do you have the per-STA Tput?
		+ A: I didn’t put in the slides. But there may not be difference for the STAs. The STAs are of similar distance to the APs.
		+ C: depending on the directions, and where the STAs are located respect to the STAs. Do you have latency numerics?
		+ A: Didn’t put it here. The main focus is to calculate Tput.
		+ C: when you have the SR is off. The 11ax/be SR is off?
		+ A: In this scenario, it does not satisfy the condition for 11ax based SR.
		+ C: should compare with 11ax based SR.
		+ A: cannot initiate 11ax based SR.
			- [11-23-0420r](https://mentor.ieee.org/802.11/dcn/23/11-23-0420-00-0uhr-spatial-reuse-improvements-for-uhr.pptx)0 Spatial reuse improvements for UHR Leonardo Lanante (Ofinno)
		+ C: slide 4, STA2 may cause high interference. For STA 3, it does cost low interference. If it does not hear anything from AP1 or STA1, it can transmit anything it likes.
		+ A: If it hears the transmission of STA1, it will not transmit.
		+ C: slide 5, without receiving the trigger frame, can transmit if the STA does not hear anything from the trigger frame.
		+ A: STA3 is hearing STA1, but not cannot hear AP1. The rule is that you need to hear STA1.
		+ C:You mention according to the spec, the AP has to receive the trigger frame. I doubt that. From STA perspective, the Rx can use the beacon for the power management. The only function of the trigger frame is to carry the PSR value, which is also included in the SIG field of the TB PPDU. The flexibility is there. You don’t have to follow the spec. We can confirm on that part first.
		+ A: you are referring to the requirement. We can discuss this offline.
			- [11-23-0767r](https://mentor.ieee.org/802.11/dcn/23/11-23-0295-01-0uhr-discussion-on-multi-ap-coordination.pptx)0 M-AP Coordination Agreement Arik Klein (Huawei)
		+ C: See a lot of good things. Want to broden the discussion.
		+ A: Don’t just focus on one of the markets which is enterprise. The coorperation can be done for any AP, and for any market.
		+ A: Some of them has been done in 11aa. What you do may be more general.
		+ C: How can you guarantee the behavior?
		+ A: the issue is that coordination agreement. One of the outcomes, each of them would share its resources in one way. Because coordination agreement needs to decide upon a list of parameters.
		+ C: I like this wishful thinking. Shared AP2 which grabs the medium, but may have a lot of low latency traffic, it cannot share the resource to AP1 as a return.
		+ A: it is not for a single TXOP, but for a long-term operation. You can choose which AP to have agreement with AP which respects the agreement.
		+ C: the main goal is for latency improvement?
		+ A: we are not focusing on the Tput. The main benefit is about interference and latency.
		+ C: for 11ay, it has done some sharing mechanism. You can take a look at that part.
		+ A: yes.

Discussion on the agenda:

11-23/294r1 is added to the agenda

* + - * [11-23-0294r1](https://mentor.ieee.org/802.11/dcn/23/11-23-0294-01-0uhr-channel-usage-enhancements-for-p2p-in-uhr.pptx) Channel Usage Enhancements for P2P in UHR Rubayet Shafin (Samsung Research America)
		- C: I understand the use case. I am very confused on the channel usage. TWT extension or r-TWT extension.
		- A: basically, it is like STA seeks the guidance from the AP, to recommend something.
		- C: These are on channel or off channel.
		- A: May suggest use on channel or off channel, rather than use some random channels.
		- C: what is the difference from broadcast TWT?
		- A: broadcast TWT is only for UL or DL. Here it is for P2P.
		- C: thanks for sharing the thoughts. For the transmission window, it could be done with r-TWT with additional signaling. What is the additional benefits of sharing the common windows rather than doing individual between the AP and STA.
		- A: you get membership for particular. There is no clear negotiation. This will help all the STAs.
		- C: channel usage, r-TWT, allow the STAs to do what you mention. We could discuss on top of that.
* Recess at 17:58 ET

# 2nd Call: Wednesday, AM1, (08:00-10:00 ET)

* The Chair, Laurent Cariou (Intel), calls the meeting to order. The Chair notifies the attendees that the agenda is in [11-23-0587r3](https://mentor.ieee.org/802.11/dcn/23/11-23-0587-03-0uhr-uhr-sg-may-2023-meeting-agenda.pptx).
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1. Agenda:
	* + - Chair reviews proposed agenda.
			- Discussion:
				* One comment on version update of the contribution
			- Agenda approved with unanimous consent.
2. Announcements:
	* + - None
3. Submissions
	* + - [11-23-0231r](https://mentor.ieee.org/802.11/dcn/23/11-23-0231-00-0uhr-thoughts-on-seamless-roaming-under-the-non-collocated-ap-mld-architecture.pptx)0 Thoughts on Seamless Roaming Under the Non-collocated AP MLD Architecture Guogang Huang (Huawei)
		+ C: Slide 9, I do have a straightforward answer. 802.11 will be faster. Communication between AP could be either wireless or wired. We can define frames for wireless. We do this already for FT.
		+ C: This shall be defined in .11. Low MAC communication belong to L2.
		+ C: slide 5, I think regarding transitition, AP MLD needs to be in different co-located AP MLDs. You will be using TIDs to control soft roaming. The non-AP MLD could be served by several co-located MLDs.
		+ A: Maybe we could, but it is a little complex.
		+ C: slide 8, the AP MLD should be in range of each other, for the wireless.
		+ A: in my understanding, the AP MLD finds the quality is degraded, needs to ML configuration or BSS transition, sends the query to the AP.
		+ C: so the BTM is between the AP and STA.
		+ A: yes
		+ C: do the co-located AP MLD in a non-colocated AP MLD share AID space?
		+ A: it is related to co-located AP MLD. For example, non-colocated AP MLD sets up with multiple AP MLDs. When it communicates with this co-located AP MLD, shoud use AID space of this co-located AP MLD. When it communicates with antoehr co-located AP MLD, it should use another AID.
		+ C: We are very interested side for the client side. How do you see what is the client role in the roaming and handovers? Are you seeing changes in client side for architecture?
		+ A: most of the changes are AP side. We can reuse ML element. For EHT STA, it can recogonize the info defined in 11be, in UHR, can notice the exitence of this non-co-located AP MLD. Builds on top of the current co-located AP MLD>
			- [11-23-032](https://mentor.ieee.org/802.11/dcn/23/11-23-0322-00-0uhr-improve-roaming-between-mlds.pptx)2r0 Improve roaming between MLDs Po-Kai Huang (Intel)
		+ C: Slide 7, from the current AP MLD to the target AP MLD, it could go to the DS as well?
		+ A: that is the reason why I try to focus on the functionality. You can define the framework. You would have a way to transfer the contents. How do we call this, how do we define this, how to define the archietcutre, I don’t have an answer right now.
		+ C: We cannot buffer all the contents for all the AP MLDs. That would be too much works.
		+ C: Slide 7, what info will be transmitted?
		+ A: I think you are talking about the contents. Simply to say, it is .11 contents. To make sure you can continue, need to ensure the other side need to know what is the SN, context. Similar to the previous contribution.
		+ C: what do you deal with resource constraints?
		+ A: that is simiar to the third figure, you cannot finish anything when you move. The client is too fast, or the backhaul is too slow. Another may be the memory, you may have implementation specific operation. This is not like one time done, once you have interface, you can continue to do.
		+ C: the tool we need to communicate.
		+ C: are you assuming reassociation.
		+ A: I focus on the data continuity part.
		+ C: you assume SN continuity as well.
		+ A: it is most intituive way.
		+ C: Are you assuming the controller, have a mesh with no controller.
		+ A: I would say as you can see, most of the operations can be, the client plays a critical part, you need to have a way to transfer the contents. About the backhaul, in the ESS, they need to have a way to transfer. The physical link may not be wireless, could be Ehternet, fiber. The context is what we can control. As for the physical way, we cannot control.
			- [11-23-0324r](https://mentor.ieee.org/802.11/dcn/23/11-23-0324-01-0uhr-roaming-requirements.pptx)1 Roaming Requirements Brian Hart (Cisco Systems)
		+ C: opt B and Opt C, they have capability to transfer states. On opt B, you want to have a minimum set of states.
		+ A: B will not transfer A-MSDU, from AP to another AP, for wireless.
		+ C: It does not need to be one time. We need to define the context.
		+ A: This is the simplest way. There is improved version of this.
		+ C: slide 7, step 5, you only mention the stages
		+ A: reorder buffers, replay information
		+ C: Step 7, in my understanding, it can transmit after all residule MSDUs are transmitted.
		+ A: if we have slow connectivity, AP MLD 1 and AP MLD 2, may take a long time. You need to give up. Step 4, can still have some frames, even you didn’t expect.
			- [11-23-0705r](https://mentor.ieee.org/802.11/dcn/23/11-23-0705-00-0uhr-non-colocated-ap-mld-framework-for-uhr.pptx)0 non-colocated AP MLD framework for UHR Jay Yang(Nokia)
		+ No Q&A
			- [11-23-0632r](https://mentor.ieee.org/802.11/dcn/23/11-23-0632-00-0uhr-smooth-roaming-follow-up.pptx)0 smooth roaming follow up Liwen Chu (NXP)
		+ C: Slide 6, for the first bullet, you mention all APs afficliated with roaming AP MLD, use the same for SN. At the AP MLD level?
		+ A: AP MLD level.
		+ C: In that case, the non-AP MLD cannot retrieve group addresss from different AP MLD.
		+ A: Yes that’s true. This will not be used for normal frame change. Just for roaming.
		+ C: slide 4, on the right-hand side, AP MLD which has four affiliated APs, each of two co-located links. What do you mean by question mark?
		+ A: If it can do this roaming, AP MLD can serve this one non-AP MLD smoothly. It doesn’t matter whether this AP is in one location or not. 11be, AP will be in one location. If the AP is so powerful, you can do this. Whether this is in the same location or not, it is transparent.
		+ C: Opt2, look at the complexity and requirement. It does feel we need a new bar for nontransient, may be not the good direction.
		+ A: how to define nontransient, you think TID-to-link, all these need to be redefined. Just use the basic one. The group will need to decide early.
		+ C: we are in the same page.
		+ C: Regarding AP MLD common MAC, does it clarify upper MAC or lower MAC.
		+ A: slide 7, in the first slide, some feature will in roaming AP MLD level, almost all the other features will be at this AP MLD level. Only ok for transient mode. Roaming, we can restricit it. Once we restricit with mutlple serving MLD. Then for this, we still not need to define new TID to link mapping, all these kinds of stuffs. This is good news for the transition.
		+ C: what is common MAC, it is upper MAC or lower MAC?
		+ A: common MAC, MLD level MAC. Will be shared by multiple links.
		+ C: I assuminmg AP MLD roaming common MAC is upper MAC. Common AP MLD MAC is local MAC.
		+ A: for real time, no. STR EMLSR will be under this AP MLD.
		+ C: generally Opt 1 is for roaming. I agree.
		+ A: after roaming, you will do data exchange.
		+ C: there may be other things to the level of synchronization. May require similar on Opt 1 or Opt2.
		+ A: we don’t want Opt2. Opt1, may be possible.
			- Recess at 09:59 ET

# 3rd Call: Thursday, AM2, (10:30-12:30 ET)

1. The Chair, Laurent Cariou (Intel), calls the meeting to order. The Chair notifies the attendees that the agenda is in [11-23-0587r3](https://mentor.ieee.org/802.11/dcn/23/11-23-0587-03-0uhr-uhr-sg-may-2023-meeting-agenda.pptx).
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	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
			- Discussion
				* None
			- Agenda approved with unanimous consent.
2. Submissions
	* + - [11-23-0262r](https://mentor.ieee.org/802.11/dcn/23/11-23-0262-01-0uhr-reducing-link-adaptation-convergence-time.pptx)1 Reducing Link Adaptation Convergence Time Shimi Shilo (Huawei)
* C: I like the idea, in terms of convergence time. The convergence time, it is very subjective. What are the medium, frame you want to use. Second, I want to hear your opinion you want for the feedback.
* A: should reduce by half. Make sure latency, transmission reliability. For the second question, we are looking for options we try to simulate. But it is pretty early. Will share later.
* C: Agree with this direction. What kind of changes are needed for PHY and MAC protocol, from the client point of view?
* A: From Rx point of view, it is not necessarily DL. I do think PHY and MAC, not MAC only. Perform some measurement, it is too early for being to say. Not sure yet.
* C: The current link adaptation, HLA, ELA, recommoned MCS, I am not sure the transmitter parameters, can you clarify?
* A: I said it is the transmitter is accountable for the successful transfer of data. What are the compuations and measurements. Some of thease are just not trusted. We should look that.
* A: Ref 4 mentioned feedback by based on what the Rx implemented to compute, it doesn’t necessarily align with Tx, SNR for example. The Tx doesn’t necessarily trust the Rx.
* C: slide 4, about the first motivation, the alogirthm issue, how would the link adaptation should solve this?
* A: link adaptation in some cases, many of the inputs available today are not trusted completely or directly used.
	+ - * [11-23-0473r](https://mentor.ieee.org/802.11/dcn/23/11-23-0473-01-0uhr-discussions-on-csi-feedback-reduction-in-uhr.pptx)1 Discussions on CSI Feedback Reduction in UHR Zinan Lin (InterDigital)
* C: you show SU-MIMO performance. For MU-MIMO performance, highly rely on accurate CSI report. Even though overhead is reduced, if inaccuracy, the error floor expecially for 4K QAM. Need to verify MU-MIMO performance.
* A: I totally agree. Hasn’t tried. We can do this later.
* C: I use time-based channel. For SU beamforming, the frequency of sounding is very low, 100ms. Need to evaluate how frequency you need to do the sounding. Tput gain is almost 0 even for 16SS. That’s the reason why we still stick to the current mechanism. You can check my presenation.
* A: Hear you. If the channel frequency is low, the gain will not be that significant.
* C: Have similar question. What is the frequency for CSI feedback, in your Tput results.
* A: Here basically, we just try one package with one sounding sequence.
* C: the time duration of sounding, and the time duration of data transmission.
* A: If the channel changes very slow, no need to trigger the sounding for every packet. Maybe one sounding sequence used for multiple data transmission.
	+ - * [11-23-0667r](https://mentor.ieee.org/802.11/dcn/23/11-23-0667-01-0uhr-revisiting-of-the-rate-matching-for-ldpc.pptx)1 Revisiting of the rate matching for LDPC Xiaogang Chen (ZEKU)
* C: the table is 3GPP table. Could you analyze the 3GPP LDPC on Wi-Fi, and see if there is a performance gap?
* A: They don’t have the fixed size. They are very flexible. The H matrix is used in a different way. They are using a scalable. I just try to show the candidate TB size.
* C: one of the potentional soluation is to have more CW size? An interesting topic.
* C: slide 7, I do agree LDPC performance depends on the effective coding rate. Do you have anything like in 11n performance is better than 11ac performance with different payload size?
* A: the blue curve taks more airtime, it is not a fair comparison. 11n and 11ac has the airtime and better performance. 11ac has better performance with more airtime.
* C: what is the definition of effective coding rate. It only enhances your log likelihood. Suppose you duplicate your CW, how do you reduce your code.
* C: another question, your coding rate is Zigzag, continue change. Suppose you send a package, how you use link adaptation. Within a certain of bytes, it will be stable. Maybe you change 100 byte, the SNR sensitivity is still the same.
* A: I understand your point. Link adaptation is hard to gurantee we have the same payload size.
* C: It doesn’t make the link adaptation any easier.
	+ - * [11-23-0711r](https://mentor.ieee.org/802.11/dcn/23/11-23-0667-01-0uhr-revisiting-of-the-rate-matching-for-ldpc.pptx)0 Follow up on the enhanced link adaptation Xiaogang Chen (ZEKU)
* C: slide 6, the left table, there is sometimes good, sometimes bad. Suppose to feedback SS=1, SS=2, it doesn’t which MCS can be used.
* A: MMSE you don’t need to optimize.
* C: Depends on the Rx side.
* A: Yes.
* C:slide 8, you are saying if 2SS, no matter what, always feedback 2SS?
* A: yes.
* C: For the same NDP, you have two feedback, 2x2, 2x1.
* A: yes.
* C: according to my knowledge, the default link adaptation is Minstrel. This is Minstrel related?
* A: this is the measurement in real products.
* C: Is that your phone?
* A: I also tried laptop, and phone.
* C: On your second topic, if you make it easier for device, this will encourage device to have worse devices. Do you have ideas?
* A: what is the problem for in-device coexisentence?
* C: Opt 1 is to minimize the interference. Another option is to tell the AP it is interfered.
* A: Some vendor, they do see the issues. These should be parallel. ACI is pretty Strule for high MCS.
* C: very high MCS, is MCS 12, 13 very sensitive.
* A: the AP always try to use the highest rate of the associated STA’s capability. If the Rx can tell the AP not to use the highest rate. That should make sense.
* C: How long is the ACI present?
* A: it is very short.
* C: seconds scale or ms scale?
* A: ms scale.
	+ - * [11-23-0725r](https://mentor.ieee.org/802.11/dcn/23/11-23-0725-00-0uhr-uplink-mu-mimo-precoding-follow-up.pptx)0 Uplink MU MIMO Precoding - Follow-up Rainer Strobel (MaxLinear)
* C: Precoder calculation, slide 15, on the downstream, this is DL MU MIMO. Not for a single user. You are suggesting use the same precoder?
* A: sounding together. Precodes the transmission together.
* C: take it offline.
* C: when you deliver the info the beamformer. Did you consider the quantization level.
* A: Yes, should be more than enough.
* C: Slide 9, non-AP STA has done a regular UL SU sounding. The non-AP has two double its memory. One is used for UL SU, one is for the joint UL sounding.
* A: the same sounding process. Different way of computing the precoder.
* C: Slide 6, in reality UL MU-MIMO, the users may not be fixed all the time. Based on different pair of STAs.
* A: this is average. The STA has to fixed the location.
* C: each time, exactly the same STAs.
* A: yes.

Discussion on the agenda

* + - * 11-23-0060r2 will be presented in the following conference calls due to time limit.
1. Adjourn at 12:30 ET

# 4th Call: Thursday, PM2, (16:00-18:00 ET)

1. The Chair, Laurent Cariou (Intel), calls the meeting to order. The Chair notifies the attendees that the agenda is in [11-23-0587r4](https://mentor.ieee.org/802.11/dcn/23/11-23-0587-04-0uhr-uhr-sg-may-2023-meeting-agenda.pptx).
2. Note that this is a hybrid meeting, with some participants in person and some participating online through a webex session
3. Need to pay the registration fee to attend
4. 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:

* + - * login to [imat](https://imat.ieee.org/attendance)
			* select “802 Wireless Interim Session - Mixed mode - May 2023”
			* 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
			- Discussion
				* None
			- Agenda approved with unanimous consent.
2. Submissions
	* [11-23-0060r](https://mentor.ieee.org/802.11/dcn/23/11-23-0060-02-0uhr-layered-qos-and-multi-layer-transmission-follow-up.pptx)2 Layered QoS and multi-layer transmission follow-up Ross Jian Yu (Huawei)
* No Q&A
	+ - * [11-23-0378r0](https://mentor.ieee.org/802.11/dcn/23/11-23-0046-02-0uhr-multi-ap-coordination-for-low-latency-traffic-delivery-usage-scenarios-and-potential-features.pptx) Enhanced Scheduling Method for Low Latency Traffic Serhat Erkucuk
* C: why does not send the data itself?
* A: That’s one option. For enhancing reliability, TXOP sharing could be one way.
* C: BSR, I have that stream, has TID. Why you need something else. Just signal SCSID, or TID.
* A: signaling TID as well as BSR. The existing way of allocation for low latency traffic, like I also show here, we should not only look at the TID, we could differentiate more urgent data from more fine level, same TID, different latency level.
* C: what kind of traffic model are you assuming, SCS can handle many applications.
* A: You have an urgenet packet, could be short.
* C: SCS is not able to schedule those?
* A: those are not periodic.
* C: what is the application?
* A: I may not name it now. New urgent travel come in. You want to transmit it right away.
* C: slide 5, EDCA for BSR. Why don’t transmit data directly.
* A: that’s one way of doing it. You want to do a more reliable, requesting an AP to assign a TXOP.
* A: we are gonna look at the overhead and shares the results. Sending directly is one direction. More reliable way, one way is just to ask for the TXOP.
	+ - * [11-23-0389r0](https://mentor.ieee.org/802.11/dcn/23/11-23-0389-00-0uhr-consideration-on-edca-operation-for-low-latency-traffic-delivery.pptx) Consideration on EDCA operation for low latency traffic delivery Liuming Lu (OPPO)
* C: Slide 3, under HE dot, the 2nd bullet, EDCA backoff procedures for trigger based transmission, what do you mean by that?
* A: there is some updates for event, such as how to handle the trigger frames.
* C: How about UORA? Now you talk about non-trigger-based transmission. Do you consider UORA under current trigger-based solution.
* A: I think for trigger-based solution, it has been specified clearly in the draft. For non-TB SP, it needs to be specified. Because some service, trigger enabled SPs are not suitable for unscheduled traffic.
* C: we can discuss offline.
* C: 2nd subbullet of 2nd bullet, STA will provide something to the AP, could be known to the AP.
* A: in this bullet, I mean for some service, the traffic is unpredictable, the traffic will arrive immediately. The AP does not know the traffic will arrive, for IoT devices. So in this case, the AP cannot immediately know. This is the benefit for non-TB SPs. As we know, there are other cases need to be considered. It is hard for the STAs to obtain TXOP. Maybe during SP, more EDCA rules need to be specified. Such as limit the maximum TXOP duration. Other STAs may have more opportunity to get the channel.
* C: The SP is scheduled, and the traffic/services are not scheduled/unpredictable.
* A: in these cases, the scheduled transmission time need not be too long. We give more opportunities to obain the TXOP.
* C: the AP somehow allocates time for low latency.
* C: more offline discussion.
	+ - * [11-23-0650r1](https://mentor.ieee.org/802.11/dcn/23/11-23-0650-01-0uhr-qos-re-visited.pptx) QoS Re-visited Nima Namvar (Charter Communications, Inc.)
* C: slide 11, classification is by higher layer, and mapped to 802.11 MAC, out of the scope of 802.11 standardization?
* A: Mapping of IP traffic is to user prority is done in upper layer. Need to have support within the standard. Need to know what the tag means and the expcted behavior.
* C: Could you clarify what the latency requirement for L4S?
* A: it doesn’t tailor to a specific requirement. It is a solution. There are no specific values.
* C: there are several factors can be configured. The application can do the configuration on the APP layer.
* A: better to take it offline.
	+ - * [11-23-0740r0](https://mentor.ieee.org/802.11/dcn/23/11-23-0740-00-0uhr-dynamic-qos-feedback-for-uhr.pptx) Dynamic QoS Feedback for UHR Abdel Karim Ajami (Qualcomm Inc.)
* C: compared with in A-control field, BSR in QOS control could be more natural
* A: I think we allow BSR to be transmitted to A-control in addition to QoS control. Because we have the flexible to design if we use A-control. We can benefit the number of bits we can use and potential expansion.
* C: A-control, it does have more flexibility.
* A: We can do some optimization regarding signaling. We can discuss further.
* C: I agree with the general direction we should provide more feedback. Slide 4, do you think we should include some statistic on the average? The HOL packet may have very different statistic.
* A: thanks for the inputs. Do agree more info will provide benecial. Could look at most urgenet traffic. Then it does not necessarily need to be a specific of a queue client. Mangament level of signaling of statitistics.
* C: assuming multiple buffers, different buffers may have different deadline. Will lead to large overhead. This is for one or for multiple. How do you think of this issue?
* A: you bring a good point. Not just reporting BSR, may need to report other things. Depend on the management of the queues. I would say, the number of TIDs, limited by mapping… I do see, we are having a tradeoff between reporting and need to extend those TIDs. I do see it could be additional discussion.
* C: you talk about providing the HOL delay. Do you want to provide some of the flow? The AP can determine the pattern.
* A: You may even provide some kind of information of the flow itself.
* A: depending on the number flows between the AP and STA. The STA determines the flow ID is what I am looking for. I do see the benefit of doing that.
* C: Could you explain why we need in-queue time?
* A: when we look the timeing component, there are two ways, other than delay bound, signal out of band, out of this particular reporting. Provide the information, the AP has the delay bound information, for example SCS. Even the STA does not provide the bound information The AP can better scheulding. Alternaitve the in-queue time can get the expire time with respect to partial TSF. This is the first order of anlysis.
	+ - * 11-23-[0885r0](https://mentor.ieee.org/802.11/dcn/23/11-23-0885-00-0uhr-considerations-on-qos-enhancement-in-uhr.pptx) Considerations on QoS Enhancement in UHR Peshal Nayak (Samsung)
* No Q&A
1. Goals for July 2023
* Technical submissions and discussion on the different PAR KPIs
1. Teleconference/ad-hoc plan
* June 1st 10am-12pm
* June 5th 10am-12pm
* June 12th 10am-12pm
* June 19th 10am-12pm
* June 26th 10am-12pm
1. AoB
2. Adjourn at 17:54 ET