IEEE P802.11
Wireless LANs

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| AMP TIG meeting minutes for Nov plenary 2022 session  |
| Date: 2022-11-17 |
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Abstract

This document includes minutes of AMP TIG meetings during IEEE 802 November 2022 plenary session.

Version Tracking:

R0: Initial draft.

# Monday 14 November 2022 @ 13:30-15:30, Bangkok local time

## Opening (IEEE 802.11-22/1707r1)

* 1. Call to order 13:30 Time Bangkok.
	2. Yinan Qi (OPPO) appointed as executive secretary
	3. Chair instructed members to record attendance in IMAT.
	4. Chair introduced the patent policy and meeting rules (slides 2-7).
	5. No response to the call for patent claims.
	6. Chair introduced IEEE-SA COPYRIGHT POLICY (slides 9-10)
	7. Chair reviewed other Guidelines and new Motion rules for IEEE WG Meetings, and Registration requirements for attending November plenary session (slides 11-15).
	8. Chair reviewed AMP TIG meeting plan during Nov 2022 plenary session, submission list, and AMP TIG meeting Agenda (slides 16-19).
	9. Chair call for approval of the agenda of AMP TIG meeting.

## Agenda (IEEE 802.11-22/1707r1)

* 1. Chair presented the agenda: https://mentor.ieee.org/802.11/dcn/22/11-22-1707-00-0amp-amp-tig-meeting-agenda-for-nov-plenary-2022.pptx. (slide 19)
		+ Call meeting to order and remind the group to record attendance on imat.ieee.org
		+ IEEE-SA IPR policies and meeting rules
		+ Approval of agenda
		+ AMP TIG Oct TC summary
		+ Contribution discussion
			- 11-22/1960, Summary and recommendation for AMP IoT, Weijie Xu (OPPO)
			- 11-22/1961, Prototype Presentation for AMP IoT, Yinan Qi (OPPO)
		+ Reminding the group of the AMP tutorial on Monday EVE (18:00:19:20)
		+ Any other business?
		+ Recess
	2. OPPO proposes to swap two presentations. No objection, Agenda approved.

## Contribution discussion

* 1. IEEE 11-22/1961, Prototype Presentation for AMP IoT, presented by Yinan Qi (OPPO):

Q: Wondering what the motivation and protocol were using

A: Lora for prototype 3

Q: What is the distance for energy harvesting?

A: Up to 16 meters.

Q: What kind of waveform that they used for backscattering?

A: For backscattering, I think they use LoRa.

Q: If lora works, why to use AMP?

A: Because this is just a prototype, we try to show some feasible solutions using existing technologies. But for our thinking, for AMP device, we are thinking some new technologies. In weijie’s presentation, we show some potential candidate techniques for backscattering communication. For example, WUR, one candidate solution for downlink. And we use backscattering for uplink communication. We have done link budget analysis, for indoor case, we can go up to 20-30 meters.

Q: What is the difference between RFID and AMP IoT?

A: The difference has been presented in previous meetings. In weijie’s presentation, he will try to introduce the difference between RFID, AMP IoT and cellular NB IoT/WLAN. From technical perspective, we see some significant difference between the three types devices.

Q: What bands do you consider?

A: From coverage perspective, our preference is sub 1GHz for better coverage. For 2.4GHz, I think it is also feasible. But coverage is smaller. Based on our link budget analysis, the coverage can be 10 meters? It can be used for some use cases, but not for all the use cases.

Q: Do you consider the instability of energy harvesting?

A: For the solar source, during the night, there is no energy to harvest. It is not stable. That is why we cannot rely on it to support consistent or high throughput communication. For this type of AMP devices, we only target at very low data rate and very long duty cycle.

Q: Difference between RFID and the technology?

A: different coverage, power consumption, cost, capability, system efficiency.

* 1. IEEE 11-22/1960, Summary and recommendation for AMP IoT, presented by Weijie Xu (OPPO)

Q: Is it maybe a bit shortsighted in that for RF harvesting, coordinated APs could be used to greatly enhance the power received by the AMP device? This has been demonstrated for UHF RFID

A: We can consider to use this method.

Q：Revised device price

A：Will do

Q: It seems it is using different PHY, frequency and MAC. Why in 802.11?

A: We can use WUR as starting point, which is 802.11 technique. AMP will also complement the eco-system of 802.11 and AMP will also benefit from the eco-system of 802.11.

Q: Focus on energy but not power transfer.

A: Noted.

## Closing

* 1. The chair announced the session recessed at 15:30 Time Bangkok.
	2. Next session will be on Thursday Nov. 17th.

# Thursday 17 November 2022 @ 10:30-12:30 Time Bangkok.

## Opening (IEEE 802.11-22/1707r3)

* 1. Call to order 10:30 Time Bangkok.
	2. Chair instructed members to record attendance in IMAT.
	3. Chair introduced the patent policy, Copyright Policy, and other meeting rules (slides 2-15).
	4. No response to the call for patent claims.
	5. Chair reviewed current AMP TIG meeting Plan and updated AMP session Agenda (slides 16-21).

## Agenda (IEEE 802.11-22/1707r3)

* 1. Chair presented the agenda: https://mentor.ieee.org/802.11/dcn/22/11-22-1707-03-0amp-amp-tig-meeting-agenda-for-nov-plenary-2022.pptx (slide 22)
		+ Call meeting to order and remind the group to record attendance on imat.ieee.org
		+ IEEE-SA IPR policies and meeting rules
		+ Approval of agenda
		+ Contribution discussion
			- 11-22/1562r4, Draft Technical Report on support of AMP IoT devices in WLAN, Weijie Xu (OPPO)
			- 11-22/2017, discussion-on-scope-of-AMP-in-WLAN, Weijie Xu (OPPO)
			- 11-22/2022, questions-and-answers-on-regulation-requirements-for-amp-iot, Weijie (OPPO)
		+ Teleconference plan
		+ Any other business?
		+ Adjourn
	2. Agenda was approved without objection.

## Contribution discussion

* 1. Presentation 11-22/1562r4, Draft Technical Report on support of AMP IoT devices in WLAN, by Weijie Xu (OPPO)

Q: Whether it makes sense to add the regulation requirements to this report? Highlight the current situation at one chapter on these aspects, because I think it makes sense for other people to see what we do already and we have to change.

A: I think it is a good suggestion. Later on, we will share the information we get from the discussion with 802.18 group to the AMP group and then we will update the TR, including the information.

Q: In the figure 6.1, AMP IoT is differentiated from WLAN IoT. However, AMP IoT should be part of WLAN IoT and the original WLAN IoT is specifically referring to 801.11ah

A: Noted and will correct following suggestion.

* 1. Presentation 11-22/2017r0, discussion-on-scope-of-AMP-in-WLAN, by Weijie Xu (OPPO)

Q: Clarify in power is for both transmission and reception

A: Yes and revised.

Q: Include energy limited operation for 802.11ah.

A: Ok, thanks, ELO is added to the table.

Q: What do you mean the WALN device? You do not mean the access point. You mean the tag device, right?

A: Yes, just for the device we focus on.

Q: 1mW is not the average power, is it the same understanding? We should write it down, peak power?

A: Peak power would be fine.

Q: It this the power or energy?

A: Power in mW.

Q: For item 2, it is hard to take energy harvesting completely out of scope. Because if we are harvesting from WLAN infrastructure, there is a lot that can be done to get the infrastructure to deliver more power to be harvested. More AP devices and beamforming of AP can deliver more power to tag for harvesting.

A: Thanks. If we use RF power, do you think there are some specification impacts? Or it is just based on the AP implementation.

Q: But I think there is some communication required between the infrastructure, like CSI report.

A: I think the specification has already support the procedure.

Q: I think there are a lot of protocol related things for the communication between AMP device and other 802.11 device. Any protocol required to maximize power to AMP device that has to be a part of standard.

A: How about we say that for energy harvesting, except RF power, it is based implementation. We can further study this.

Q: Some clarification on number one. I do not think this group ever specifies devices like the low power consumption AMP device, so the AP and so on. I would like you to clarify what is it? The capabilities if the devices, the protocols needed to support the devices or what? I think it is a bit confused.

A: change specify to support

Q: For bullet two, to improve the power transfer to tag, I think we have a lot of work there. This is the main part of the work.

A: Energy harvesting except RF power is up to implementation. But for RF power source, it is TBD.

Q: We really have to take a look at things inside the access point.

A: For example, if we use solar or light as power source, I think it is purely based on implementation. For RF power source, we can discuss whether there are specific impacts on how to provide the power source, like beamforming, and so on.

C: In some cases, there is already a RF radio wave on the air. You don’t actually need some power source transfer. There is no specification efforts to do this. I agree that if we have a dedicated power link, then maybe we need to consider that. So I think now it tends to be a good statement. But if we really go for backscattering, then we would have to define that if we have an active transmitter, we will find a possibility to harvest the energy. For the carrier for backscattering, it is not one hundred percent. The backscatter can have another power source. Here we are focusing on power harvesting. Communication is another thing.

Q: 1mW may not be enough to provide the power. We need to specify the self-supply energy source.

A: 1mW is an initial value. Maybe we can change it to another value.

C: What we are talking about here is the power consuming includes receiving, internal process and transmit, which is different here.

Q: Interworking with WLAN infrastructure is not necessarily supporting WUR using 2.4GHz as downlink. For example, 802.11b downlink, waveform, PPDU format are not WUR. We will present something in the couple of months, demo.

A: Ok, thank you. Noted and what is the power consumption for such system? State that other scheme is not precluded at this stage.

Q: PSK can be added

A: OK

Q: WUR is only for control signaling

A: Yes. We need to consider to transmit data when we design AMP using WUR as a starting point.

Q: It would be good to reach as much as consensus to shorten the duration of SG

A: Yes

Q: For MAC design, it should be backward compatible

A: OK and revised as suggested

Q: it might be good to have separate chapters for backscattering and active transmitter and also energy harvesting in TR.

A: Two types of devices including AMP-only and AMP-assisted have been defined in the TR and there is a chapter for energy harvesting. We need to check if further work is needed in TIG stage or maybe it can be done in the next stage.

Q: 5G shall be considered

A: added

Q: TU Ilmenau will contribute to the TR

A: All contributions are welcome

* 1. Presentation 11-22/2022r0, Questions and answers on regulation requirements for AMP IoT, by Weijie Xu (OPPO)

Q: IEEE broadcasting can be checked

A: OK.

Q: For mode 2-2, the answer to question 3 is unknow.

A: For mode 1 and mode 2-1 passive mode, there is no new requirements for regulation. For mode 2-2, it can follow the existing requirement.

## Future teleconference plan

* 1. Chair propose a tele con on Dec. 13.

Dec. 13th, 2022, 09:00am ~ 11:00am, ET

No objection, time approved.

## Closing

* 1. Chair adjourned the session at 12:30 Time Bangkok.