IEEE P802.11  
Wireless LANs

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| AMP SG meeting minutes for March 2024 Plenary | | | | |
| Date: 2024-3-22 | | | | |
| Author(s): | | | | |
| Name | Affiliation | Address | Phone | email |
| Hao Wang | Tencent |  |  | Harryhwang@tencent.com |

Abstract

This document includes minutes of AMP SG Sessions of IEEE March 2024 Plenary.

Version Tracking:

R0: Creating the minutes.

# Tuesday 12 March 2024 @10:30-12:30 am ET

## Opening (IEEE 802.11-24/ 0242 r1)

* 1. Call to order 10:30 am ET.
  2. Chair, Bo Sun (Sanechips), instructed members to record attendance in IMAT.
  3. Chair introduced the patent policy and meeting rules (slides 2-8).
  4. No response to the call for patents.
  5. Chair introduced IEEE-SA COPYRIGHT POLICY (slides 9-10)
  6. Chair reviewed other Guidelines, Participation and Guideline for Straw Polls (slides 11-13).
  7. Chair reviewed Suggested Best Practices, Registration, Meeting plan, current AMP SG Session submission list (slides 14-19).
  8. Hao Wang (Tencent) is the secretary.
  9. Chair call for approval of the agenda of the AMP session.

## Agenda (IEEE 802.11-24/0242 r1)

* 1. Chair presented the agenda: https://mentor.ieee.org/802.11/dcn/23/ 11-24-0242-01-0amp-amp-sg-meeting-agenda-for-mar-plenary-2024. (slide 22)
     + Call meeting to order and remind the group to record attendance on imat.ieee.org
     + IEEE-SA IPR policies and meeting rules
     + Approve weekly meeting agenda
     + Approve past meeting minutes
     + AMP SG timeline and progress review
     + PAR/CSD Comments and resolutions (11/24/0479)
     + Contribution discussion
       - 11-24/0404, AMP Energizer Devices and BSS Coloring, Ugo Campiglio (Cisco)
       - 11-24/0421, AMP link access, Solomon Trainin (Wiliot)
     + Any other business?
     + Recess
  2. No objection, Agenda approved.

## Approve AMP SG meeting minutes

* 1. Motion to Approve the meeting minutes for AMP SG meetings during 802 Jan Interim session as below.
     + https://mentor.ieee.org/802.11/dcn/24/11-24-0230-00-0amp-amp-sg-meeting-minutes-for-january-2024-interim.docx

Moved: Harry Hao Wang

Seconded: Sebastian Max

Result: Approved with unanimous consensus

## AMP SG Timeline Plan (IEEE 802.11-24/0242 r1)

* 1. Chair reviewed the AMP SG time plan.

## PAR/CSD Comments

* 1. Review of IEEE 802.11-24/0479r2, Comments, Bo Sun (Sanechips)

Comments are reviewed and discussed.

The document will be updated and presented on Tuesday session.

## Contribution discussion

* 1. Presentation of IEEE 802.11-24/0404, AMP Energizer Devices and BSS Coloring, Ugo Campiglio (Cisco)

C: What is the range of the energizer and how much time is needed to charge?

A: The range will be centimeters between device and energizer. The charging time will depend on the requirement of the AMP device. Even if the charging time is long, it will not impact the rest of the network.

Q: What do you mean by separation of area?

A: It will be the same channel but different BSS color, using the ID in the header to differentiate.

Q: You assume the energizer will estimate its location?

A: Yes, it is one possibility, or it will know the proximity of the device.

Q: My concern is how the energizer could be separated in distance and what if the area is overlapped?

A: It will be not an issue, the AMP device will be powered by either energizer.

Q: Why do you need color yellow on slide 6? And what waveform is used by energizer?

A: We could use the same color for each energizer. The advantage of using different colors is to allow simultaneous transmission for these energizers. The charging frames may be long in order to power the devices.

Q: These charging frames are expected to be the 802.11 frames?

A: yes.

Q: The control of transmission power and sensitivity is complex. It will be challenging to support it in AMP device.

A: 11ax defines the mechanism.

Q: Why the energizer is required to connect to the AP?

A: The idea is to protect the legacy station from the energizer. AP and energizer could communicate so that AP could have the knowledge of the energizer.

* 1. Presentation of IEEE 802.11-24/0421, AMP link access, Solomon Trainin (Wiliot)

No time for discussion during the session.

## Recess

* 1. The chair announced the session recessed at 12:30 pm ET.
  2. Next session will be on March 12th.

# Tuesday 12 January 2024 @ 19:30-21:30 pm ET

## Opening (IEEE 802.11-24/0242 r3)

* 1. Call to order 10:30 pm ET.
  2. Chair, Bo Sun (Sanechips), instructed members to record attendance in IMAT.
  3. Chair introduced the patent policy and meeting rules (slides 2-8).
  4. No response to the call for patents.
  5. Chair introduced IEEE-SA COPYRIGHT POLICY (slides 9-10)
  6. Chair reviewed other Guidelines, Participation and Guideline for Straw Polls (slides 11-13).
  7. Chair reviewed Suggested Best Practices, Registration, Meeting plan, current AMP TIG Session submission list (slides 14-19).
  8. Hao Wang (Tencent) is the secretary.
  9. Chair call for approval of the agenda of the AMP session.

## Agenda (IEEE 802.11-24/0242 r2)

* 1. Chair presented the agenda:
     + 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
     + PAR/CSD comments and resolutions (11-24/0479r3)
     + Contribution discussion
     + Any other business?
     + Recess
  2. No objection, Agenda approved.

## PAR/CSD comments and resolutions (11-24/0479r3)

Chair led the group to review and discuss the comments and resolutions.

## Recess

* 1. The chair announced the session recessed at 20:30 pm ET.
  2. Next session will be on March 13th.

# Wednesday 13 March 2024 @ 8:00-10:00 am ET

## Opening (IEEE 802.11-24/0242 r4)

* 1. Call to order 8:00 am ET.
  2. Chair, Bo Sun (Sanechips), instructed members to record attendance in IMAT.
  3. Chair introduced the patent policy and meeting rules (slides 2-8).
  4. No response to the call for patents.
  5. Chair introduced IEEE-SA COPYRIGHT POLICY (slides 9-10)
  6. Chair reviewed other Guidelines, Participation and Guideline for Straw Polls (slides 11-13).
  7. Chair reviewed Suggested Best Practices, Registration, Meeting plan, current AMP TIG Session submission list (slides 14-19).
  8. Hao Wang (Tencent) is the secretary.
  9. Chair call for approval of the agenda of the AMP session.

## Agenda (IEEE 802.11-24/0242 r4)

* 1. Chair presented the agenda:
     + 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
     + PAR/CSD comments and resolutions (11-24/0479r4)
     + Motion to approve PAR/CSD CRs and updated PAR/CSD
     + Contribution discussion
       - 11-24/0421, AMP link access, Solomon Trainin (Wiliot)
     + Any other business?
     + Recess
  2. No objection, Agenda approved.

## PAR/CSD comments and resolutions (11-24/0479r4)

Chair led the group to review and discuss the comments and resolutions.

## Motion to approve PAR/CSD CRs and updated PAR/CSD

* 1. Motion #1: AMP PAR CRs and AMP PAR update

Approve the AMP PAR comment resolutions as marked in green in 11-24/0479r5, allowing the 802.11 WG Chair editing privilege.

Moved: Rakesh Taori

Seconded: Lei Huang

Result: 33Y/0N/2A

* 1. Motion #2: AMP CSD CRs and AMP CSD Update

Approve the AMP CSD comment resolutions as marked in green in 11-24/0479r5, allowing the 802.11 WG Chair editing privilege.

Moved: Lei Huang

Seconded: Sebastian Max

Result: 29Y/0N/3A

* 1. Motion #3: AMP PAR for NesCom Approval

Believing that the PAR incorporating the document 11-24/575r0 <https://mentor.ieee.org/802.11/dcn/24/11-24-0575-00-0amp-p802-11bp-par.pdf> with comment resolutions in 11-24/0479r5, meets IEEE-SA guidelines,

Request that the WG Chair to generate AMP PAR document by incorporating the document 11-24/575r0 <https://mentor.ieee.org/802.11/dcn/24/11-24-0575-00-0amp-p802-11bp-par.pdf> with comment resolutions in 11-24/0479r5, and submit the PAR to the WG to forward to the 802 EC for approval, allowing the WG Chair editing privilege.

Moved: Zhanjing Bao

Seconded: Yinan Qi

Result: 30Y/0N/0A

* 1. Motion #4: AMP CSD for 802 EC Approval

Believing that the CSD contained in the document 11-24/1212r4 <https://mentor.ieee.org/802.11/dcn/23/11-23-1212-04-0amp-ieee-802-11-amp-sg-proposed-csd.docx>, meets IEEE-SA guidelines,

Request that the CSD contained the document 11-24/1212r4 <https://mentor.ieee.org/802.11/dcn/23/11-23-1212-04-0amp-ieee-802-11-amp-sg-proposed-csd.docx> be posted to the IEEE 802 Executive Committee (EC) agenda for 802 EC approval.

Moved: Rolf DE VEGT

Seconded: Yinan Qi

Result: 31Y/0N/1A

## Technical Contribution

* 1. Update of IEEE 802.11-24/0421, AMP link access, Solomon Trainin (Wiliot)

Q: Before discussing details of channel access modes, we need agree on the basic framework. Do all signals transmitted by AMP devices need to be understood by the legacy stations? If not the channel access may be very different. For mode 1, we need to reconsider the trigger energizing signal.

A: The existing access rules cannot be ignored what so ever. The channel access will also depend on the complexity of the receiver.

Q: In mode 1, there is no receiver for the STA. How to align the STA on wake up?

A: The energizer signal is used for triggering. By default, the AMP station knows the size of CTS-to-self. It presets the timer without the sync signal.

Q: Each station may need different time to power. How can AP predict the wake up time of each STA?

A: It doesn’t matter because there is no way for AP to know which devices response. It is not a dynamic process, and we need to discuss and decide how many slots are required for the station to wake up.

Q: For mode 2, what does it mean for link integration?

A: There is no way to provide link integrity and link reliability. It is a potential cons.

Q: For mode 1 and 2, how often for the AP to transmit? How the station decides which way to access the channel.

A: It depends on the energizer and the frequency to send the energizing signal. It requires some algorithm to access the channel.

Q: On slide 5, does the tag have the full MAC address? Does it have the memory to record the AP’s address?

A: It is an open question. It will depend on the complexity and capability design for the tag.

## Recess

* 1. The chair announced the session recessed at 10:00 am ET.
  2. Next session will be on March 14th.

# Thursday 14 March 2024 @ 8:00-10:00 am ET

## Opening (IEEE 802.11-24/0242 r4)

* 1. Call to order 8:00 am ET.
  2. Chair, Bo Sun (Sanechips), instructed members to record attendance in IMAT.
  3. Chair introduced the patent policy and meeting rules (slides 2-8).
  4. No response to the call for patents.
  5. Chair introduced IEEE-SA COPYRIGHT POLICY (slides 9-10)
  6. Chair reviewed other Guidelines, Participation and Guideline for Straw Polls (slides 11-13).
  7. Chair reviewed Suggested Best Practices, Registration, Meeting plan, current AMP TIG Session submission list (slides 14-19).
  8. Hao Wang (Tencent) is the secretary.
  9. Chair call for approval of the agenda of the AMP session.

## Agenda (IEEE 802.11-24/0242 r3)

* 1. Chair presented the agenda:
     + 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
       - 11-24/0452, Overview of the 802.11ba PHY, Steve Shellhammer (Qualcomm)
       - 11-24/0482, AMP Terminology, Shuqiao Chen (Huawei)
       - 11-24/0526, Server-Managed Secure Transaction with AMP Devices, Hui Luo (Infineon)
       - 11-24/0537, close-range-backscattering-feasibility-study, Rui Cao (NXP)
     + Any other business?
     + Recess
  2. No objection, Agenda approved.

## Contribution discussion

* 1. Presentation of IEEE 802.11-24/0452, Overview of the 802.11ba PHY, Steve Shellhammer (Qualcomm)

Q: Slide 16, how the sequence is generated?

A: One approach is the maximum length sequence of 32 bits. The sequence has good correlation performance.

Q: Slide 21, how to remove the spectral line? Why to use the combination of two methods?

A: The initial idea is to use the first one, and the second helps to flatten the spectrum.

Q: WUR sync can be used for timing, performance is good. Not sure about the frequency sync. If low complexity oscillator is used by AMP STA, some calibration may be required. WUR sync can be used to calibrate frequency?

A: Design parameters like accuracy requirement should be defined. BPSK or FSK may be used for uplink, there will be freq offset. Using downlink to correct the uplink offset is possible. It will be robust to allow the receiver to tolerate the offset.

Q: Slide 9, how to get 2ms symbol out of 4ms OFDM symbol?

A: 4ms symbol consists of 2 replicas of 2ms symbol. During IFFT, take first half of the tones to transmit. The first and second portion is the same.

Q: What is the BPSK mark1 and mark2?

A: One example is that 11ax has a repeated signal field for re-sync.

Q: Why not use repeated L-SIG?

A: We test it with equipment, but I don’t recall with details.

Q: Just one comment on sub-GHz: Channel bandwidth in the order of several GHz will not be available in Europe with acceptable duty cycle parameters.

A: Agree. We have to check with the bandwidth in Sub-1Ghz band. New design is required for the new khz bandwidth. But similar design may apply.

Q: Any testing on other codes besides Manchester encoding? Is any means to reduce the out-of-band emission?

A: Only consider Manchester encoding. These devices are simple, high data rate is optional. AP knows how to switch to high data rate. It requires the receiver to detect. The transmitter on AP is good and has good spectrum mask. No issues on DL.

Q: More explanation on mark1 and mark2. These are dummy sequences introduced to differentiate the 11n and 11ac frames.

A: It seems to be the repeated L-SIG field.

Q: Why has different symbol length for the sync field?

A: There is 4ms and 2ms symbol. With 2ms symbol, we could use 32 bits and get a better sequence.

* 1. Presentation of IEEE 802.11-24/0482, AMP Terminology, Shuqiao Chen (Huawei)

Q: For backscatter transmitter, how does it fit in the definitions?

A: Reader will be type A and tag is type C.

Q: What do you mean that type B STA is not compliant with existing WLAN?

A: The active transmitter uses different new design.

Q: We need agreement on terminology. But I suggest we start with feature selection and definition and keep device types simple.

A: I think AMP devices are different because these may not have common PHY capability.

Q: whether you consider differentiation of CW transmission to be an implementation choice. Not necessary to define separate entities.

A: Type B and C are both AMP tags but have different functions. Relay nodes need to be defined. We are open to discuss the terminology.

C: Slide 5, type B may have different options. It is too early to decide whether it is compliant to the legacy or not.

Q: We already define the AMP assist and AMP only STA.

A: Type A is an AMP assisted device, and type C is AMP only device.

Q: Type A should be an AMP STA which will not be a smartphone. Type B and C should support extended functions like WUR.

A: Agreed.

## Recess

* 1. The chair announced the session recessed at 10:00 am ET.
  2. Next session will be on March 14th.

# Thursday 14 March 2024 @ 13:30-15:30 pm ET

## Opening (IEEE 802.11-24/0242 r4)

* 1. Call to order 13:30 pm ET.
  2. Chair, Bo Sun (Sanechips), instructed members to record attendance in IMAT.
  3. Chair introduced the patent policy and meeting rules (slides 2-8).
  4. No response to the call for patents.
  5. Chair introduced IEEE-SA COPYRIGHT POLICY (slides 9-10)
  6. Chair reviewed other Guidelines, Participation and Guideline for Straw Polls (slides 11-13).
  7. Chair reviewed Suggested Best Practices, Registration, Meeting plan, current AMP TIG Session submission list (slides 14-19).
  8. Hao Wang (Tencent) is the secretary.
  9. Chair call for approval of the agenda of the AMP session.

## Agenda (IEEE 802.11-24/0242 r4)

* 1. Chair presented the agenda:
     + 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
       - 11-24/0178, Security Considerations in Ambient Power Communications, Hui Luo (Infineon)
       - 11-24/0526, Server-Managed Secure Transaction with AMP Devices, Hui Luo (Infineon)
       - 11-24/0537, close-range-backscattering-feasibility-study, Rui Cao (NXP)
     + Any other business?
     + Recess
  2. No objection, Agenda approved.

## Contribution discussion

* 1. Presentation of IEEE 802. 11-24/0178, Security Considerations in Ambient Power Communications, Hui Luo (Infineon)

This contribution has been presented in previous session and discussion allowed during the meeting.

Q: The shared secret is preset among the AMP devices. Is it equal to all devices.

A: It should be unique per device. It is assumed to be known by the user device.

Q: There is a lightweight SCOM tutorial presented during the week. It seems very relevant.

A: yes, the SCOM solution will be an option to encrypted data communication.

Q: Is there a key update during the procedure?

A: The shared secret remains unchanged. SAE can prevent the offline dictionary attack.

Q: What if the reader doesn’t have the knowledge of the ID, e.g in logistics use cases?

A: We will further develop the protocol to deal with such cases.

* 1. Presentation of IEEE 802.11-24/0526, Server-Managed Secure Transaction with AMP Devices, Hui Luo (Infineon)

Q: Slide 6, some parameters are provided with the data request message without encryption?

A: We can add the nounce to the data so that security can be ensured.

Q: Is it correct to repeat the handshake to deliver the next part of data?

A: If both sides finish authentication, they don’t have to carry SAE parameter anymore. There are two basic assumptions, one is if AMP device finish data communication and power off it will lose the context.

Q: The handshake may take some time and fail on the AMP device.

A: Yes, the awake time of the AMP devices may not be enough for the process.

C: It would be good to list the assumptions necessary for the AMP devices.

Q: URL will not change often so it is not necessary to obtain the information on every occurrence of the handshake?

A: URL is fixed and points to the owner of the device. It can be optimized in next version. We haven’t consider group addresses. The key is unique to the AMP devices.

Q: Between S and R, the communication is beyond 802.11 spec?

A: yes, it is an application layer protocol.

* 1. Presentation of IEEE 802.11-24/0537, close-range-backscattering-feasibility-study, Rui Cao (NXP)

Q: Slide 5, in your assumptions, what functions will the AMP tag have?

A: Just energized by the reader and do backscatter.

Q: Slide 9, the received bandwidth is 40Mhz?

A: Signal bandwidth is 20Mhz.

Q: The reader needs to send some information to the tag?

A: It will be a different use case when the reader needs to write information to the tag.

Q: Slide 5, the AMP delivers the same information as the RFID tag?

A: In the immediate use case it will be the same.

Q: In the simulation, what are phase change and delay of transmission?

A: As the ppm is within the limited range, it will not impact the performance. The results shown doesn’t include those parameters.

Q: Question about the method to wake up the tag?

A: There has to be an energizer signal.

Q: How many bits can be delivered per uplink transmission?

A: Around several hundred bits.

Q: All subcarriers will be used for the backscatter waveform? The carrier signal is not modulated.

A: Yes, it is not modulated, and backscatter will change the energy.

Q: Is there any restrictions to support the two models. In a shared band, same peak rate or uplink waveform need to be supported.

A: I don’t think the restriction exists. As long as OOK is used, the processing capability will be the same to support both models.

Q: Slide 9, why reading range is different for OFDM waveform?

A: PAPR affects the waveform. At some samples, the energy is low but noise is constant.

## Teleconference Plan

No teleconference is planned.

## Adjourn

* 1. The group finished all the work.
  2. The chair announced the session adjourned at 3:30 pm ET.