IEEE P802.11
Wireless LANs

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| IEEE 802.11 TGbp Ambient Power CommunicationJuly 2025 Interim Meeting MinutesMadrid, Spain |
| Date: 2025-07-28 |
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Abstract

Rev 0: This document contains the IEEE 802.11 TGbp July 2025 plenary meeting minutes.

TG Chair: Bo Sun (Sanechips)

TG Vice Chairs: Steve Shellhammer (Qualcomm)

 Rakesh Taori (Infineon)

TG Secretary: Sebastian Max (Ericsson)

TG Technical Editor: Yinan Qi (OPPO)

Abbrevations:

Q Question

A Answer

C Comment

SP Straw Poll

All times are given in local time of the meeting venue (i.e., CEST / UTC+02)

# Monday PM1 (2025-07-28T14:30)

## Opening

The TG Chair, Bo Sun (Sanechips), presents the TG bp meeting agenda slides (IEEE 802.11-25/0990r1).

* Chair calls the meeting to order at 14:30.
* Chair instructs members to record attendance in IMAT.
* Chair reviews the meeting rules and patent policy (slides 2-6).
* No response to the call for patents.
* Chair reviews IEEE-SA COPYRIGHT POLICY (slides 7-8).
* Chair reviews other Guidelines, Participation, Suggested Best Practices, and Registration (slides 9-12).
* Chair reviews the current TGbp session submission list (slides 13 to 17), the meeting agenda for the week (slide 18), and the distribution of submissions to the meeting slots (slide 19).

## Agenda

Chair presents the agenda of the session (IEEE 802.11-25/0990r1 slide 21).

* Call meeting to order and remind the group to record attendance on imat.ieee.org
* IEEE-SA IPR policies and meeting rules
* Approve meeting agenda
* Approve TG minutes
* SFD (11-24/1613r10) motions
* Spec skeleton (11-25/0614) and PoC assignment review (11-25/0613) [Editor]
* Contribution discussion (PHY)
	+ 11-25/1236, AMP Enhanced Bi-Static Back Scattering Non AP STA with Gains, Dror Regev (Huawei)
	+ 11-25/1260, Enhanced Bi-Static Backscattering AMP STAs for Extended Ranges and Spatial Coverage, Dror Regev (Huawei)
	+ 11-25/1320, A novel application, Guido R. Hiertz (Ericsson GmbH)
	+ 11-25/1215, Discussion on AMP Active Transmission, Alice Chen (Qualcomm)
	+ 11-25/1216, Uplink backscatter SYNC Field Design, Manideep Dunna (Qualcomm)
* Any other business?
* Recess

Chair calls for approval of the agenda of the TGbp session.

No discussion, no objection, agenda approved.

## Motion: Approve TGbp Meeting Minutes

Approve the meeting minutes for TGbp meetings during 802 May interim session and TGbp TCs before 802 Jul plenary session as below:

* <https://mentor.ieee.org/802.11/dcn/25/11-25-0921-00-00bp-2025-05-interim-meeting-minutes.docx>
* <https://mentor.ieee.org/802.11/dcn/25/11-25-0991-03-00bp-teleconference-minutes-may-june-july-2025.docx>

Moved: Sebastian Max

Seconded: Yinan Qi

Result: Approved with unanimous consent

## SFD Motion

Approve the updated 11bp SFD as included in:

* <https://mentor.ieee.org/802.11/dcn/24/11-24-1613-10-00bp-specification-framework-for-tgbp.docx>

Moved: Yinan Qi

Seconded: Sebastian Max

Result: Approved with unanimous consent

## Spec skeleton (11-25/0614) and PoC assignment review (11-25/0613)

### Presentation of IEEE 802.11-25/0614r4, Proposed Specification Skeleton for TGbp D0.1 (Yinan Qi)

The author points out the latest changes.

### Presentation of IEEE 802.11-25/0613r6, TGbp Spec Text Topics and Volunteers (Yinan Qi)

The author points out the latest changes.

## Contributions

### Presentation of IEEE 802.11-25/1236, AMP Enhanced Bi-Static Back Scattering Non AP STA with Gains, Dror Regev (Huawei)

Q: Energy harvesting at S1G has lots of benefits. Do you need an additional, third antenna?

A: Both indicated antennas should be dual band. How to achieve it up to implementation.

Q: Reflection amplifier will have a certain frequency?

A: No, it will be a wide-band reflective type backscatter. See reference 2. No tuning is needed, it's like an envelope detector, a sophisticated inverter.

Q: Slide 7. How to separate the two antennas?

A: Horizontal / vertical antenna. They are inherently isolated.

No more time for additional questions, please discuss offline / via the reflector.

### Presentation of IEEE 802.11-25/1260, Enhanced Bi-Static Backscattering AMP STAs for Extended Ranges and Spatial Coverage, Dror Regev (Huawei)

Q: Slide 9. Reflection amplifier?

A: A wide-band simple amplifier. Not a reflection amplifier.

Q: How do you control the direction?

A: It's a design choice. There can be two amplifiers, for each direction.

Q: Why do we need to differentiate between "simple backscatter" and "enhanced backscatter" in the standard?

A: Enhanced backscatter very much enlarges the distance, adds much more use-cases.

Q: Needs more discussion/motivation why to have a different kind of device in the standard.

### Presentation of IEEE 802.11-25/1320, A novel application, Guido R. Hiertz (Ericsson GmbH)

Q: Suggesting that provisioning happens at the MAC layer?

A: Yes. SSID, credentials, secret are MAC layer messages.

Q: But how to input the provision information?

A: That's enabled with the close proximity. The device is an ordinary .11 device, only the provisioning is via 11bp. The device will only get the information then from one network due to the close proximity.

Q: Agree in principle. Two considerations: (i) Saving in non-volatile memory might need to much power. (ii) What if the bp device is already deployed and is far awar from the AP?

A: NFC is a good analogy. If it's already deployed, use a device to deliver power and allow tunneling for the provisioning. Sufficient power for storage is achieved by assuming really close distances, less than 2cm.

### Presentation of IEEE 802.11-25/1215, Discussion on AMP Active Transmission, Alice Chen (Qualcomm)

C: Need more time to think about FEC for UL. UL is already more robust than DL. UL receiver will be an AP, so likely a coherent receiver.

No more discussion due to lack of time.

### Presentation of IEEE 802.11-25/1216, Uplink backscatter SYNC Field Design, Manideep Dunna (Qualcomm)

Q: This is for the (backscatter) UL?

A: Yes.

Q: Length 8 is picked why?

A: Each sequence W is of length 8.

Q: Title refers to backscatter sync. Is it monostatic or bistatic or both?

A: Close-range monostatic backscatter. But all points are also valid for bistatic.

Q: Slide 7. Two vs. three repetitions. For two the sync is slightly worse than your reference. Further combining is possible, but then you loose PPM estimation capability.

A: No, we don't loose the capability. Receiver architecture can be adapted.

Q: Need to look at data how the performance looks like when combining three repetitions.

Q: Use noise floor for sync detection threshold?

A: Yes.

Q: Do you have a noise portion before the sync?

A: Yes, there is a small randomness. Around 10µs, randomly.

Q: Slide 4. Two vs. three segments of length 8. What about two times 16?

A: 3dB improvement by length. But reduced to ~1.5dB due to clock error, with 10% clock drift.

## Recess

The chair announced the session recessed at 16:30.

# Monday PM2 (2025-05-12T17:00)

## Opening

The TG Chair, Bo Sun (Sanechips), presents the TG bp meeting agenda slides (IEEE 802.11-25/0990r1).

* Chair calls the meeting to order at 17:00.
* Chair instructs members to record attendance in IMAT.
* Chair reviews the meeting rules and patent policy (slides 2-6).
* No response to the call for patents.
* Chair reviews IEEE-SA COPYRIGHT POLICY (slides 7-8).
* Chair reviews other Guidelines, Participation, Suggested Best Practices, and Registration (slides 9-12).

## Agenda

Chair presents the agenda of the session (slide 25).

* Call meeting to order and remind the group to record attendance on imat.ieee.org
* IEEE-SA IPR policies and meeting rules
* Approve meeting agenda
* Contribution discussion
	+ 11-25/1217, SYNC design for AMP Active Transmission, Alice Chen (Qualcomm)
	+ 11-25/1218, Downlink backscatter SYNC Field Design, Manideep Dunna (Qualcomm)
	+ 11-25/1220, AMP Downlink Special Segment, Steve Shellhammer (Qualcomm)
	+ 11-25/1221, Two AMP Downlink Sync Field Detectors, Steve Shellhammer (Qualcomm)
	+ 11-25/1222, AMP Downlink Sync Field Design, Steve Shellhammer (Qualcomm)
	+ 11-25/1223, Sync Field Design Discussion, Shengquan Hu (MediaTek)
* Any other business?
* Recess

Chair calls for approval of the agenda of the TGbp session.

No discussion, no objection, agenda approved.

## Contributions

### Presentation of IEEE 802.11-25/1217, SYNC design for AMP Active Transmission, Alice Chen (Qualcomm)

Q: Slide 5, 4th bullet. If normalized correlation is used, then extension should be the length of the sequence. Otherwise, there will be a sync error. So the sidelobes after the peak are also important to consider.

A: See slide 3. No sidelobe before the main peak. So, one chip will be enough.

Q: With SNR=0dB it will be different.

A: See appendix, Slide 19. Same performance for one chip.

Q: For 1µs there is a difference.

A: Also depends on the sequence that is used. With the used one it works perfectly.

Q: Slide 5. Definition of chip duration.

A: It's just for the timing search.

C: Support using FEC. If the symbol clock is not locked, we can use much better clock at the receiver.

### Presentation of IEEE 802.11-25/1218, Downlink backscatter SYNC Field Design, Manideep Dunna (Qualcomm)

Q: Slide 2. SNR higher than 50dB. Not correct example. SNR should be much lower.

A: This is the DL.

Q: Slide 3. Thresholding circuit; threshold is adjusted?

A: Yes. On-portion leads to bouncing, this should be avoided by starting with an off-duration and settling the threshold to 0.

Q: What is then the final value of the threshold?

A: Between 0 and 1. It's not about the power consumption, but about detecting what is high and low. We cannot set a fixed threshold like -10dB.

Q: There is no sensitivity of the envelope detector?

A: It's for short-range. ED sensitivity can be around -70dBm. But the tag needs to know what is high and what is low.

Q: Off-delimiter should be smaller than 8µs. Why? CCA-time is currently implementation specific.

A: Wake-up receiver, 11ba.

Q: Specific implementation, dynamic adjusted thresholder. This is not a state-of-art RFID design and not necessary. Tag is able to set the threshold from the start energy. No need to dynamically adjust. Plus, we have some issues if there is low-energy interference coming in.

A: Learned this from RFID-producing company.

### Presentation of IEEE 802.11-25/1220, AMP Downlink Special Segment, Steve Shellhammer (Qualcomm)

Q: Special segment increases probability of missed detection?

A: Yes, that's correct. ~1dB, see slide 10.

Q: Sync sequence 16. If a longer sequence is used, the operation SNR range is lower, -9dB, -10dB. Will the loss of a special segment be larger than 1dB then?

A: Yes. We should use 4 1s, for example, instead of 3. Design of special segment needs to be further discussed.

Q: Could we use the insight of the structure of the sync pattern to do this?

A: Yes, that would be a possibility.

### Presentation of IEEE 802.11-25/1221, Two AMP Downlink Sync Field Detectors, Steve Shellhammer (Qualcomm)

Q: Diff decoder, difference comparer, slide 8, has to have a threshold on its own.

A: Good point. Difference of the two values may not be significant. If the difference is between -0.2 and 0.2 it might output "invalid".

Q: Correlation-based method we have a sampling point for the timing. But here how do we get the timing?

A: Initially you don't know the timing. Use two versions with 1µs timing offset. In the end it's up to the implementer, choose between power consumption or better low-SNR performance.

Q: Power must then be split, resulting in a power loss, SNR loss.

A: Energy capture thing might be shared. But yes, interesting point. We'd like to support both detectors, correlation-based and power-based.

### Presentation of IEEE 802.11-25/1222, AMP Downlink Sync Field Design, Steve Shellhammer (Qualcomm)

Q: Slide 11. Last bullet, should be -3?

A: Correct.

Q: Slide 13. Don't think this propoerty is very important. Only main peak value is important.

A: There might be noise, affecting the main peak value.

Q: Input to the correlator is binary. If we have a high threshold, e.g., 14, we can remove all side-lobes.

A: Need to study more. We think it's important to be able to distinguish the main peak from the side-lobes.

C: 24 is borderline, we might need 32.

C: Correlation of the differential, slide 13. Don't see how we can weight one chip. There's no storage of the data. Maybe consider not to take all bits, this will reduce the side-lobes.

A: You can't wait one bit?

C: We don't have one chip that we can wait.

A: Was not aware of specific receiver characteristics.

### Presentation of IEEE 802.11-25/1223, Sync Field Design Discussion, Shengquan Hu (MediaTek)

No time for Q&A.

## Recess

The chair announced the session recessed at 19:00.

# Tuesday AM2 (2025-07-29T11:30)

## Opening

The TG Chair, Bo Sun (Sanechips), presents the TG bp meeting agenda slides (IEEE 802.11-25/0990r2).

* Chair calls the meeting to order at 11:30.
* Chair instructs members to record attendance in IMAT.
* Chair reviews the meeting rules and patent policy (slides 2-6).
* No response to the call for patents.
* Chair reviews IEEE-SA COPYRIGHT POLICY (slides 7-8).
* Chair reviews other Guidelines, Participation, Suggested Best Practices, and Registration (slides 9-12).

## Agenda

Chair presents the agenda of the session (slide 27).

* Call meeting to order and remind the group to record attendance on imat.ieee.org
* IEEE-SA IPR policies and meeting rules
* Approve meeting agenda
* Contribution discussion
	+ 11-25/1230, AMP DL SYNC design considerations, Rui Cao (NXP)
	+ 11-25/1231, Backscattering UL SYNC design considerations, Xilin Cheng (NXP)
	+ 11-25/1248 Discussions on DL Sync Field for Non-Backscatter STAs: Part 1, Bin Qian (Huawei)
	+ 11-25/1249 Discussions on DL Sync Field for Non-Backscatter STAs: Part 2, Bin Qian (Huawei)
	+ 11-25/1265, Follow-up on Sync field for AMP PPDU, Ke Wang (OPPO)
	+ 11-25/1002, Comparison between FEC/no-FEC for UL of active TX AMP STA, Amichai Sanderovich (Wiliot)
* Any other business?
* Recess

Chair calls for approval of the agenda of the TGbp session.

No discussion, no objection, agenda approved.

## Contributions

### Presentation of IEEE 802.11-25/1230, AMP DL SYNC design considerations, Rui Cao (NXP)

No time for discussion.

### Presentation of IEEE 802.11-25/1231, Backscattering UL SYNC design considerations, Xilin Cheng (NXP)

No time for discussion.

### Presentation of IEEE 802.11-25/1248 Discussions on DL Sync Field for Non-Backscatter STAs: Part 1, Bin Qian (Huawei)

Q&A takes place after part 2, see below.

### Presentation of IEEE 802.11-25/1249 Discussions on DL Sync Field for Non-Backscatter STAs: Part 2, Bin Qian (Huawei)

C: Also think 24 is too short. Complexity of 32 is not so big, compared to 2\*16.

A: Depends on the correlation duration. 5ms correlation window is long, so reduced complexity is good.

### Presentation of IEEE 802.11-25/1265, Follow-up on Sync field for AMP PPDU, Ke Wang (OPPO)

C: DL Sync, diff decoder limitations, Slide 10. Multiple branch of decoders – which one to trust concerning the timing?

A: The one with the highest peak.

C: But they have different timings, how long to wait?

Q: Slide 12, 2nd bullet, chip duration estimation. Function is needed for RFID, so calibration on chip duration is needed. We only have single 2µs chip rate.

A: We don't know the chip wideness. We need to understand the three '1's, so we need to know the chip duration.

### Presentation of IEEE 802.11-25/1002r1, Comparison between FEC/no-FEC for UL of active TX AMP STA, Amichai Sanderovich (Wiliot)

Q: 4MHz, 2/3 rate, what's the corresponding clock rate?

A: 12MHz.

Q: Is that reasonable?

A: Yes, for active tx.

Q: Based on coherent detector. How to get a coherent channel?

A: Via the sync. Certainly, performance will be degraded.

Q: What about a fading channel?

A: Assume no doppler spread. Fading estimated over the sync is enough, no change over time.

## Recess

The chair announced the session recessed at 13:26.

# Tuesday PM1 (2025-07-29T14:30)

## Opening

The TG Chair, Bo Sun (Sanechips), presents the TG bp meeting agenda slides (IEEE 802.11-25/0990r2).

* Chair calls the meeting to order at 14:30.
* Chair instructs members to record attendance in IMAT.
* Chair reviews the meeting rules and patent policy (slides 2-6).
* No response to the call for patents.
* Chair reviews IEEE-SA COPYRIGHT POLICY (slides 7-8).
* Chair reviews other Guidelines, Participation, Suggested Best Practices, and Registration (slides 9-12).

## Agenda

Chair presents the agenda of the session (slide 29).

* Call meeting to order and remind the group to record attendance on imat.ieee.org
* IEEE-SA IPR policies and meeting rules
* Approve meeting agenda
* Contribution discussion
	+ 11-25/1219, Non-AMP portion of AMP PHY preamble, You-Wei Chen (MediaTek)
	+ 11-25/1232, DL PPDU format for backscattering communication, Rui Cao (NXP)
	+ 11-25/1262, Remaining Issues of AMP PPDU Design, Yinan Qi (OPPO)
	+ 11-25/1227, WPT waveform discussion, Panpan Li (Huawei)
	+ 11-25/1264, WPT PHY Design Considerations, Yinan Qi (OPPO)
	+ 11-25/1028, Uplink BPSK Modulation for AMP Backscatter, Yuxiao Hou (TP-Link System Inc.)
* Any other business?
* Recess

Chair calls for approval of the agenda of the TGbp session.

No discussion, no objection, agenda approved.

## Contributions

### Presentation of IEEE 802.11-25/1219, Non-AMP portion of AMP PHY preamble, You-Wei Chen (MediaTek)

Q: Preamble USIG has 3 validate bits. Set all of them to zero?

A: Yes, can have further discussion.

### Presentation of IEEE 802.11-25/1232, DL PPDU format for backscattering communication, Rui Cao (NXP)

Q: Slide 5. Will there be information held in the tag between the TXOP-1 and TXOP-2?

A: Yes. There will be the need for persistant memory, just some few bits, similar as in RFID.

Q: How man PPDUs per TXOP?

A: 1 to 2, at most 3 maybe.

Q: In total three PPDU types?

A: Depends on how to draft it. Can be sub-types. But not to have any combination, as it is now. Use-cases are more clear now, so we can limit the types of PPDU.

Q: Only first excitation can be one PPDU type.

A: Tag needs to respond immediatelly after the query. Otherwise, the timing has to be changed.

Q: Suggest just a PPDU type that only has an excitation.

A: That would be against the current motion. Also bi-static needs to be considered.

### Presentation of IEEE 802.11-25/1262, Remaining Issues of AMP PPDU Design, Yinan Qi (OPPO)

Q: SP1. Not use unsupported rate, but use 6Mb/s. Also, not use a different version.

A: Agree to follow 11ba.

Q: If validate is set to zero, is the TXOP duration followed?

A: As long as the CRC passes, legacy devices will follow it.

Q: What about the bandwidth?

A: These are not understood by 3rd party devices, if configured as on slide 5.

C: Optional vs mandatory MCS. Prefer to have only one option, for simplicity.

A: Devices will either support or not support. Will report capability to the AMP AP, which has to be flexible.

C: Voiding of AMP-SIG fixed configuration makes extension to other applications difficult.

C: Like to see CRC in the MAC header, not PHY.

A: In conventioal Wi-Fi the FEC coding is for both MAC header and data. Does not make sense to have a separate CRC for the header. Here, it is different.

C: Other missing issue is the receiving clock on the DL. Is it 10'000ppm?

C: FEC should be just mandatory. Adding FEC encoding is really simple.

### Presentation of IEEE 802.11-25/1227, WPT waveform discussion, Panpan Li (Huawei)

No questions.

### Presentation of IEEE 802.11-25/1264, WPT PHY Design Considerations, Yinan Qi (OPPO)

Q: Slide 3. WPT signals from 2 or more transmitters are allowed to occupy the same channel simultaneously. WPT can be sine or continuous wave. Do you consider destructive interference?

A: That's a problem of using the sine waveform. Not sure how often this will happen.

Q: It's dependent on the deployment. Other signals may also behave like CW.

Q: Do energizers have to receive in S1G?

A: Energizer needs to understand the current transmitted signal, if it's WPT or not.

Q: Is it an implementation decision to do LBT?

A: We need some kind of specification to define the behavior of the energizer.

Q: Other standards can transmit without LBT. It might be an option to have one type of energizer without receiver.

A: Not sure how to ensure that the current communication is not interrupted?

Q: Coexistence must consider the freedom that the energizer has.

A: AP is still controlling the energizer.

Q: In that case we don't need the preamble. Only waveform. AP controls the energizer.

A: But AP and energizer are not in the same location.

Q: Slide 8. Charging efficiency of PAPR high/low, why?

A: That's according to literature.

### Presentation of IEEE 802.11-25/1028, Uplink BPSK Modulation for AMP Backscatter, Yuxiao Hou (TP-Link System Inc.)

Q: Combine BPSK with frequency translation?

A: For this proposal frequency translation is not considered. It belongs to the principle of OFDM. Here, it's only about the fundamental modulation, frequency shift is orthogonal to this and might be combined with this.

Q: No details on BPSK modulation. Does it work for OFDM carrier? Or only for 11b?

A: Also works for OFDM, but here only focused on 11b.

Q: The question is if the BPSK can fit to the current waveform discussion. Can it work for every carrier?

A: Works for OFDM symbols as well.

Q: Does it need synchronization?

A: Yes, should be. OFDM symbol is 4µs. We can achieve that resolution and synchronization.

Q: Need to see feasibility analysis for the synchronization.

C: This form of modulation is compatible with OFDM.

A: Will submit a contribution on timing requirements later.

C: Suggest to defer SP until we have the detailed analysis.

Request to ammend the agenda to present IEEE 802.11-25/1243 in the remaining time. No objection.

### Presentation of IEEE 802.11-25/1243, Follow-up on AMP Operation Status Reporting, Ian Bajaj (Huawei)

No time for questions.

## Recess

The chair announced the session recessed at 16:30.

# Tuesday PM2 (2025-07-29T17:00)

## Opening

The TG Chair, Bo Sun (Sanechips), presents the TG bp meeting agenda slides (IEEE 802.11-25/0990r2).

* Chair calls the meeting to order at 17:00.
* Chair instructs members to record attendance in IMAT.
* Chair reviews the meeting rules and patent policy (slides 2-6).
* No response to the call for patents.
* Chair reviews IEEE-SA COPYRIGHT POLICY (slides 7-8).
* Chair reviews other Guidelines, Participation, Suggested Best Practices, and Registration (slides 9-12).

## Agenda

Chair presents the agenda of the session (slide 31).

* Call meeting to order and remind the group to record attendance on imat.ieee.org
* IEEE-SA IPR policies and meeting rules
* Approve meeting agenda
* Contribution discussion
	+ 11-25/1224, Initial thought on AMP-S1G channelization, Panpan Li (Huawei)
	+ 11-25/1225, Initial thought on AMP-S1G PHY design, Panpan Li (Huawei)
	+ 11-25/1226, Initial thought on AMP-S1G transmit mask, Panpan Li (Huawei)
	+ 11-25/1261, PHY Design for AMP in S1G, Yinan Qi (OPPO)
	+ 11-25/1228, Interference mitigation in bistatic backscatter - part 1, Nelson Costa (HaiLa Technologies)
	+ 11-25/1229, Interference mitigation in bistatic backscatter - part 2, Nelson Costa (HaiLa Technologies)
* Any other business?
* Recess

Chair calls for approval of the agenda of the TGbp session.

No discussion, no objection, agenda approved.

## Contributions

### Presentation of IEEE 802.11-25/1224, Initial thought on AMP-S1G channelization, Panpan Li (Huawei)

Q: On the bandwidth. 250kHz might work in China and US, but in EU it does not. What about using 200kHz everywhere?

A: 250kHz should be one of the choices.

Q: Slide 11. Option 2 is more reasonable than option 1.

A: Not clear if we really need the preamble. Without preamble, option 1 is also feasible.

C: Preamble is needed for coexistence.

C: On the EU regulations. Only the 200kHz are available all over Europe. This gives 4 RFID channels.

A: 4 for DL, 16 for UL.

C: EU spectral mask is very strict. Easy to follow by single carrier system, but not with multicarrier.

A: Single carrier is also my preference.

Q: SP2. Will we define different channelizations for different areas?

A: No.

Q: Also, preamble is not yet defined.

A: For China the preamble is not needed, as there are no 11ah channels.

### Presentation of IEEE 802.11-25/1225, Initial thought on AMP-S1G PHY design, Panpan Li (Huawei)

Q: Suggest data rate corresponds to China's channel bandwidth. What about the other regions?

A: US is not much higher.

Q: You can use only one channel?

A: Yes.

Q: If 31.25kb/s is mandatory, how would it work in the US?

A: For US, only use 62.5kb/s.

Q: There must be one mode that fulfils the requirements in the US, which cannot be the 31.25kb/s. Otherwise FH must be used.

A: 31.25kb/s must not be mandatory.

Q: How is the 500kHz bandwidth achieved to be able to operate in the US without frequency hopping? Maybe frequency hopping should be considered, it's a good solution.

### Presentation of IEEE 802.11-25/1226, Initial thought on AMP-S1G transmit mask, Panpan Li (Huawei)

Q: Slide 9, also regarding previous presentation. Scaling is good. However, before we approve anything we need a solution covering all three regulatory domains, if we cover them all. Not do one region first, and then another later.

A: Unified design would be my preference as well.

Q: US has a minimum bandwidth of 500kHz, China has a maximum bandwidth. Scaling might be tricky.

Q: Add to previous comments. Need to make decision. Maybe go for the most strict regulation, which is Europe? The product should be useable all over the world. US is always more relaxt, 6dB bandwidth has to be 500kHz. Tend to just go for European regulations, then we are well prepared.

A: Focus is currently on China to not waste 50kHz.

Q: Need to consider spectrum mask, also taking into account the filters. If tx power is high, non-linearities are challenging. Following European regulations will prepare for the whole world.

### Presentation of IEEE 802.11-25/1261, PHY Design for AMP in S1G, Yinan Qi (OPPO)

C: Coexistence is important. There are a lot of non .11-devices in this spectrum.

C: Related to regulation in Europe. Don't think we can achieve spectrum mask with an OFDM system. Needs to be single carrier, like UHF RFID. They also use OOK Manchester modulation. In the US we should use frequency hopping instead of the min. 500kHz signals, which also interferes with many existing systems. This problem does not exist with frequency hopping.

A: Open to use single carrier waveform.

C: Agree, use single carrier, not OFDM.

Q: Slide 9. How to achieve 125kb/s in China? Do you assume Manchester coding?

A: Just examples, maybe not exact values. Data rates will be lower than in 2.4GHz for sure.

C: Frequency hopping should be considered. The jump from 200kHz/250kHz to 1MHz is too big.

A: Maybe 200kHz should be the baseline.

C: SP4, don't agree to have the WPT field.

C: Slide 4. On FH. 802.11 had frequency hopping many years ago, but now they are OFDM based. We should think hard if we really want it.

Q: Slide 5. Do we care about 100mW?

A: For 250kHz bw, we get additional channels. We could only focus on the central part, ignoring first and last two channels.

C: The purpose is to get range, so the middle one matters the most.

C: In FCC, digital modulated, 6dB bandwidth of 500kHz means a very flat spectrum. Actual bandwidth will be close to 1MHz to fulfil this requirement.

C: FH is not difficult to achieve. Receiver will simply demodulate the signal, no matter where it is. Similar to RFID, receiver has very open reception window. There are devices that work in both EU and US S1G, as their receivers don't care where the signal is.

C: Understand that the tag does not care. But the transmitter matters. Need to see that it is practical on the AP side.

C: Need new hardware for S1G anyways, unlike in 2.4GHz. So could consider a different transmitter. Nobody will want to use OFDM to comply to the spectrum mask in EU.

### Presentation of IEEE 802.11-25/1228, Interference mitigation in bistatic backscatter - part 1, Nelson Costa (HaiLa Technologies)

Q&A after part 2, see below.

### Presentation of IEEE 802.11-25/1229, Interference mitigation in bistatic backscatter - part 2, Nelson Costa (HaiLa Technologies)

Q: Doc. 1228, slide 7. 20dBm is the limit, but there's a backoff. How does this connect to the PAPR?

A: The backoff is from the 20dBm limit. It has nothing to do with the PAPR.

C: Single-side frequency shifting. There should be a 3rd harmonic, but it's not shown.

Q: Doc.1229, slide 4. Do you assume a linear receiver model?

A: I assume everything is ideal. It's for comparison, not to have an accurate receiver model.

Q: But the leakage will be affected by the non-linearity of the receiver.

A: Any non-linearity will affect everything, all scenarios. The scenario least affected is with the most separation. There are a lot of impairments, but everything being equal the comparison still holds.

Q: Slide 5. Top-left figure. Spectral mask is not realistic. Previous commenter is right. There are non-linearities. From top to bottom it's 80dB.

A: Trying to compare solutions, which gives the best margin.

C: To get realistic results non-linearities of the transmitter should be included. Even a good transmitter will never reach 70dB roll-off.

C: Slide 4, suggesting to not add the noise figure, but non-linearities of the IP3.

Q: 40MHz in 2.4GHz, how will the channel be reserved?

A: We have 40MHz in 2.4GHz, we'll just re-use existing methods.

Q: It's always reserving 40MHz?

A: Technically it's not needed.

Q: Slide 4. After adding NF, the filering is done in analog?

A: In digital, for simplicity.

Q: ADC model?

A: No, infinite dynamic range.

Q: Slide 7. What is the actual LOS interference power?

A: -20dBm.

Q: That means the backscattering part is 80dB lower than the interference?

A: Yes.

Q: The filter itself is ideal?

A: Yes, near-ideal.

Q: How much is suppressed by the filter?

A: Need to check the numbers. Non-ideal filter will affect all scenarios. All plots will shift to the right. The decision what waveform to use will not change. Sensitivity, link margin etc. requires different analysis.

Q: So, conclusion is to have 40MHz with 10MHz excitation. Down-clocked version will have longer OFDM symbol duration.

A: Open to discuss waveform, chopped-up LTF also worked very well.

Q: Receiver non-linearity. -20dBm leakage, realistic dynamic range. Backscattered signal will be under the noise.

A: Agree that we're interference limited. Let's talk offline further.

Request to ammend the agenda with 5min Q&A on IEEE 802.11-25/1243. No objection.

### Q&A on Presentation of IEEE 802.11-25/1243, Follow-up on AMP Operation Status Reporting, Ian Bajaj (Huawei)

Q: On the mode. Do we have a clear definition on the modes?

A: We've discussed tx, rx, sensing mode quite a bit. The idle mode is specified in the note.

Q: Reporting of the timing. Reporting of the remaining power might be more straight forward. Work should be done by the AP.

A: AP needs to guess a lot of variables to be able to make useful conclusions if it only knows the power.

## Recess

The chair announced the session recessed at 19:00.

# Wednesday AM1 (2025-07-30T09:00)

## Opening

The TG Chair, Bo Sun (Sanechips), presents the TG bp meeting agenda slides (IEEE 802.11-25/0990r3).

* Chair calls the meeting to order at 09:00.
* Chair instructs members to record attendance in IMAT.
* Chair reviews the meeting rules and patent policy (slides 2-6).
* No response to the call for patents.
* Chair reviews IEEE-SA COPYRIGHT POLICY (slides 7-8).
* Chair reviews other Guidelines, Participation, Suggested Best Practices, and Registration (slides 9-12).

## Agenda

Chair presents the agenda of the session (slide 33).

* Call meeting to order and remind the group to record attendance on imat.ieee.org
* IEEE-SA IPR policies and meeting rules
* Approve meeting agenda
* Contribution discussion
	+ 11-25/1086, Low-Complexity Provisioning Methods for Low-Complexity Secure AMP Communications Follow Up, Hui Luo (Infineon)
	+ 11-25/1239, MAC Aspects of Backscatter non-AP AMP STAs, Rojan Chitrakar (Huawei)
	+ 11-25/1128, ACK Message in Time-Slot Based Channel Access, Ugo Campiglio (Cisco)
	+ 11-25/1242, AMP Acknowledgments, Rojan Chitrakar (Huawei)
	+ 11-25/1240, AMP Channel Access, Rojan Chitrakar (Huawei)
	+ 11-25/1244, Power Savings with AMP Service Period, Ian Bajaj (Huawei)
* Any other business?
* Recess

Chair calls for approval of the agenda of the TGbp session.

No discussion, no objection, agenda approved.

## Contributions

### Presentation of IEEE 802.11-25/1086, Low-Complexity Provisioning Methods for Low-Complexity Secure AMP Communications Follow Up, Hui Luo (Infineon)

No time for Q&A.

### Presentation of IEEE 802.11-25/1239, MAC Aspects of Backscatter non-AP AMP STAs, Rojan Chitrakar (Huawei)

No questions.

### Presentation of IEEE 802.11-25/1128, ACK Message in Time-Slot Based Channel Access, Ugo Campiglio (Cisco)

Q: Slide 6. One bit of ACK. If two STA transmitted in the slot, and there is only one bit, the STAs do not know which was ACKed.

A: The problem is always there when ACK'ing without the destination address.

Q: Assumes same length of slots if ACK + SYNC is combined?

A: Yes, if not, then we need a specific ACK frame.

C: Reception of too many SYNCs may be problematic for the energy consumption.

A: Yes, but not more than receiving an ACK.

Q: Feasibility on the impact of the PHY sync. Does it change the correlation?

A: Need to look for two different signals. Has an impact.

Q: The sync is for correcting of sleeping STAs?

A: Yes, so they can wake up at their slot and then fix the timing.

Q: It's an immediate ACK feedback. STA will switch from TX to RX to detect the ACK. SIFS is needed.

A: I assume that there is some interval between the data and the sync.

C: Like general idea, but too early for the detailed implementation. SYNC is still under definition, cannot suggest detailed optimization now.

Q: Is this applied also to the ACK of the random access?

A: Yes, it could be.

### Presentation of IEEE 802.11-25/1242, AMP Acknowledgments, Rojan Chitrakar (Huawei)

C: Prefer one option to make it simple to implement it.

C: Not call it BlockAck, different from the legacy BlockAck.

C: Prefer to have only one ACK type.

A: Which one?

C: Delayed ACK.

C: Tags have to keep on listening for the delayed BlockAck, need to stay awake. Also, slots may have different length, complicates listening time.

A: See Slide 5. Tag knows when BlockAck is transmitted, no need to stay awake all the time.

### Presentation of IEEE 802.11-25/1240, AMP Channel Access, Rojan Chitrakar (Huawei)

Q: Efficient scheme. Why two trigger frame types, poll and re-poll?

A: Re-poll is just a simplification of the poll.

C: Prefer to have just one version for the random access.

Q: More general field than response type, vendor specific message?

A: Need to talk offline.

C: Differ from UHF RFID, where the contention window (Q) is controlled by the AP. Need to analyze further what it means.

A: In RFID retransmissions will not happen ever in the current query round, but in the next query round. The proposed scheme here is closer to the IEEE 802.11 retransmission / contention window scheme.

Q: Slide 5. No response in the upper figure?

A: AP transmits filling to avoid empty time during the TXOP. Has nothing to do with the specific channel access scheme.

Q: Reduce the number of variations of frames to reduce complexity.

A: Clear distinction of variants will reduce the number of optional fields.

### Presentation of IEEE 802.11-25/1244, Power Savings with AMP Service Period, Ian Bajaj (Huawei)

C: Also, lower than 100µs is interesting.

Q: Slide 7. Different assumptions for the two compared solutions. Duty cycle solution has same interval as SP solution. AMP STA will not detect the blue frames. In the end, power consumption will be the same.

A: Decoding of the blue frames is almost mandated by the frames. The STA needs to wake up for each of the frames. E.g., 1h SP, blue frames will be every 100ms. Results will be worse.

Q: In our case the interval is short, 100ms, 200ms. AMP STA only detects the trigger for timing sync.

A: Let's discuss offline. We think our approach is very different.

Q: Why compare these two power saving schemes? What is the implication? The two schemes have two different applications, long vs. short duration.

A: Understand that for inventory use cases the short duration can be applied. But even for shot durations the SP approach has gains.

Q: We think the assumptions are wrong. We don't wake up for every trigger, this gives wrong results.

A: Need to talk offline.

## Recess

The chair announced the session recessed at 11:00.

# Wednesday AM2 (2025-07-30T11:30)

## Opening

The TG Chair, Bo Sun (Sanechips), presents the TG bp meeting agenda slides (IEEE 802.11-25/0990r3).

* Chair calls the meeting to order at 11:30.
* Chair instructs members to record attendance in IMAT.
* Chair reviews the meeting rules and patent policy (slides 2-6).
* No response to the call for patents.
* Chair reviews IEEE-SA COPYRIGHT POLICY (slides 7-8).
* Chair reviews other Guidelines, Participation, Suggested Best Practices, and Registration (slides 9-12).

## Agenda

Chair presents the agenda of the session (slide 35).

* Call meeting to order and remind the group to record attendance on imat.ieee.org
* IEEE-SA IPR policies and meeting rules
* Approve meeting agenda
* Contribution discussion
	+ 11-25/1245, AMP SP Timing Synchronization for Positive Clock Drift, Ian Bajaj (Huawei)
	+ 11-25/1251, Follow up on TSF for trigger based AMP communication, Chuanfeng He (OPPO)
	+ 11-25/1252, Further details of Duty-cycle operation for AMP, Chuanfeng He (OPPO)
	+ 11-25/1259, Some Issues for Access of AMP Devices, Amichai Sanderovich (Wiliot)
	+ 11-25/1253, Trigger based UL access for Active Tx AMP STAs, Chuanfeng He (OPPO)
	+ 11-25/1309, Discussion on OFDMA Multiple Access Mechanism, Yaoshen Cui (TP-LINK)
* Any other business?
* Recess

Chair calls for approval of the agenda of the TGbp session.

No discussion, no objection, agenda approved.

## Contributions

### Presentation of IEEE 802.11-25/1245, AMP SP Timing Synchronization for Positive Clock Drift, Ian Bajaj (Huawei)

C: Seems a bit of over-engineering. AMP STA should adapt its wake up time on its known maximum clock drift. Not the responsibility of the AP.

A: Ok, SP is limited to only the reporting of the clock drift, not the complete proposed solution.

Q: Do the beacons reduce the TXOP duration?

A: Beacons are sent separately as broadcast.

Q: This increases the channel usage quite a lot.

C: Slide 4, scale of the image is off, the beacons do not occupy so much time as drawn here, it's much less.

### Presentation of IEEE 802.11-25/1251, Follow up on TSF for trigger based AMP communication, Chuanfeng He (OPPO)

Q: SP2. Why include inside the trigger? Trigger should be very simple, prefer dedicated message for the TSF with less frequency. Decouples trigger with the session ID.

A: Optimization for the short time stamp in the trigger can be considered.

Q: SP2. Similar as previous comment. Maybe just support the indication of the presence of the short timestamp, and make the short timestamp itself optional?

A: Yes, agree.

### Presentation of IEEE 802.11-25/1252, Further details of Duty-cycle operation for AMP, Chuanfeng He (OPPO)

C: Group support in the tag is over-optimization. A single duty cycle is sufficient. It's complicating the access to much if there are too many groups.

A: AP can control the number of groups. It's flexible for the AP.

C: But the tags need to support too many options.

A: It can be considered as a part of the random access. Each group has its own random access procedure.

Q: Do you want to have QoS for multiple device classes? We think it's a little bit premature.

Q: Slide 4. Duty cycle period is defined as the interval for the trigger frame. For the inventory case, the STA opens its receiver for this receiver. What happens afterwards? It's one-shot. STA does not need to maintain any timing.

A: Yes.

Q: This is for the active STA?

A: Yes.

Q: When does the STA then wake-up for the next time? Does it need to sense every trigger of the duty cylce?

A: It's based on the random access mechanism. Each trigger has a session id. The AMP STA decides to respond to one of the session ids.

Q: But what happens after the successful inventory round. Does it need to wake up?

A: After finishing the UL transmission, it does not need to wake up again.

Q: The SP that we're defining is about the sleep duration. This is different to your proposal.

Q: Duty cycle is useful for power saving. But mixing with random access complicates it for the tag. Tag grouping is good, but no need to couple this to the random access.

A: Coupling with random access is for the inventory use case. Grouping reduces the collisions.

### Presentation of IEEE 802.11-25/1259, Some Issues for Access of AMP Devices, Amichai Sanderovich (Wiliot)

C: Agree with assessment on low voltage range for good efficiency.

Q: Slide 4. What is the ED sensitivity?

A: -55dBm.

Q: Is this the sensitivity or the signal at the antenna?

A: Both.

Q: So, it's at the margin. Interference 10dB below the sensitivity still results in errors?

A: Yes. One error bit is enough.

Q: No filters. What about two isolated antennas, pointing in different directions. Will this ease the problem? Also for energy harvesting.

A: Agree, more antennas is always better. But is more expensive and has larger area.

Q: Slide 5. Is this an inventory use case? If it's inventory, in RFID the tag needs to be discovered. Collisions can happen. In approach B a collision will be very long.

A: We simulated two scenarios: Reading one EPC from one device, then reading from three devices. First has no collision. For three devices, with collisions, with low DL PER, approach A is better. But with high DL PER, approach B is much better. The value of approach A (management of collisions) makes it less robust for high DL PER. Approach B is more robust for high DL PER.

Q: What if the number of tags is much higher? Then each collision wastes a lot of channel time.

Q: RFID inventory as reference. This will not affect the close-range backscattering, which has low DL PER.

A: Correct.

Q: Which direction do you prefer?

A: Simple approach, approach B. Should be robust in high DL PER.

Q: Do we need to support 10k tags?

A: 10k tags need to be split / distributed. But per TXOP random access, we have few slots, it can only be 3 tags.

### Presentation of IEEE 802.11-25/1253, Trigger based UL access for Active Tx AMP STAs, Chuanfeng He (OPPO)

No questions.

### Presentation of IEEE 802.11-25/1309, Discussion on OFDMA Multiple Access Mechanism, Yaoshen Cui (TP-LINK)

Q: Slide 4. Three tags backscatter at the same time, different frequency?

A: Yes.

Q: Seen this in 3GPP. Power control is in UL and DL, so that they line up at the receiver. Without power control the power at the receiver will be very different.

A: Yes, power control is needed. It is considered in the reference 4.

Q: Slide 5. What is the OFDMA control? Why does the AP reject a STA?

A: No details yet. Contains information for the OFDMA. For example, the frequency of the backscatter, and estimated starting time.

Q: The backscatter STAs will be very simple. Happy to see more details in future presentation.

A: For example, maximum frequency shift can be signalled to the AP, so that AP can allocate the best subcarriers for them.

Q: This can be a capability.

A: For a dynamic environment this can change.

The chair announces that SPs will be held in the PM1 session on Thursday. SPs are to be announced via the reflector until Thursday noon.

## Recess

The chair announced the session recessed at 13:25.

# Thursday AM1 (2025-07-31T09:00)

## Opening

The TG Chair, Bo Sun (Sanechips), presents the TG bp meeting agenda slides (IEEE 802.11-25/0990r3).

* Chair calls the meeting to order at 09:00.
* Chair instructs members to record attendance in IMAT.
* Chair reviews the meeting rules and patent policy (slides 2-6).
* No response to the call for patents.
* Chair reviews IEEE-SA COPYRIGHT POLICY (slides 7-8).
* Chair reviews other Guidelines, Participation, Suggested Best Practices, and Registration (slides 9-12).

## Agenda

Chair presents the agenda of the session (slide 37).

* Call meeting to order and remind the group to record attendance on imat.ieee.org
* IEEE-SA IPR policies and meeting rules
* Approve meeting agenda
* Contribution discussion
	+ 11-25/0776r1, AMP frame format recap, Alfred – 10 mins
	+ 11-25/1102r1, AMP Frame format, Rojan Chitrakar (Huawei) - Quick recap - 10 mins
	+ 11-25/1246, AMP WUR Frame Format, Ian Bajaj (Huawei)
	+ 11-25/1247, AMP Beacon, Ian Bajaj (Huawei)
	+ 11-25/1257, WUR-based frame formats for AMP devices, Kamran Nishat (Haila Technologies)
	+ 11-25/1258, WUR-based Trigger frame for AMP devices, Kamran Nishat (Haila Technologies)
	+ 11-25/1363, frame format follow up, Liwen Chu (NXP)
* Any other business?
* Recess

Chair calls for approval of the agenda of the TGbp session.

No discussion, no objection, agenda approved.

## Contributions

### Presentation of IEEE 802.11-25/0776r1, AMP frame format recap, Alfred Asterjadhi (Qualcomm Technologies Inc.)

Presenter is not in the meeting.

### Presentation of IEEE 802.11-25/1102r1, AMP Frame format, Rojan Chitrakar (Huawei) - Quick recap

Q: Slide 4. Length of the header can be variable, 8 to 64, not fixed. Maybe better to fix and put variable fields in the payload?

A: Min size will be 24. Some frame types the size may be constant. For other it's not possible.

Q: 16b ID is in RFID used only to identify the slot. Is it enough in large populations?

A: Good to reduce the collision probability. 16b is a good compromise, better than 12b.

Q: Slide 9, Response Type. The STA may send multiple types of responses?

A: Yes, I think so.

Q: Do we need the response type? It can be just AMP data.

A: AP also might indicate the response type in the trigger frame, then it knows what to expect. But also the AP may not know in advance. AMP data, i.e., higher-layer data, is only one category.

### Presentation of IEEE 802.11-25/1246, AMP WUR Frame Format, Ian Bajaj (Huawei)

Q: TSF encapsulation, why do we need 23b?

A: See Slide 3. 16b can support 10min @100ppm. We expect 10^4ppm, resulting in 6s. For 10min, we need 23b.

Q: This is a different TSF than earlier proposed for the duty cycle?

A: Yes. The earlier 8b / 12b are for the duty cycle period, 12b corresponds to 2s. The field here is for sleeping for durations in the order of minutes. We assume 2ms granularity.

### Presentation of IEEE 802.11-25/1247, AMP Beacon, Ian Bajaj (Huawei)

Q: 1s beacon interval means that the AMP STA needs to search for 1s, consuming a lot of power.

A: Beacon interval needs to be smaller than the min wakeup time. 1s is just an example, showing the required granularity. If the maximum time is 100ms, the number changes.

Q: How often is a realistic beacon interval?

A: Thinking of minimum 100ms to maximum 1s.

### Presentation of IEEE 802.11-25/1257, WUR-based frame formats for AMP devices, Kamran Nishat (Haila Technologies)

Q: Slide 6. Fixed 32b. What happens with the 16b FCS?

A: Even for small frames the gains of time save for an 8b FCS is neglegible.

Q: Question was about the 32b, processing is better with implementation due to registers. What about the 16b?

A: MAC header should be aligned at 32b, constant size. This is easier for implementation. No variable size. With a fixed MAC header size, all bits can be inserted into an FCS compute engine to compare to the given FCS.

Q: Time is a more critical aspect. The TXOP is only 2.5ms. Look at airtime efficiency.

A: Need to estimate how often we have this gain.

C: Maybe defer SPs on the specific lengths for now.

### Presentation of IEEE 802.11-25/1258, WUR-based Trigger frame for AMP devices, Kamran Nishat (Haila Technologies)

C: SP1. Backscatter and active will have different PHY sync field. No chance to mix them. Will not need a common trigger frame for both.

A: Trigger frames should be as similar as possible for different types of communication. No need to add fields when using the UHF trigger for the EPC Gen2 protocol.

Q: This is for the backscatter case?

A: Yes. Similar for active tx case, we should define triggers for each subtype (see Slide 6).

C: Trigger will be very complex to process.

A: We are only proposing to put the type in the frame control, to the complexity is in the header or the frame body.

C: SP2. Earlier submission on requiring the sync reception. Reception of all ACKs is energy consuming.

Q: Slide 10. This is for scheduled access? Could you elaborate how the scheduling information might not be required?

A: Only the first one is in the body of the trigger, the next one is in the ACK. Simplifies design of the trigger frame. ACK is re-purposed to also contain the scheduling for the next slot.

C: SP3, UHF-Trigger frame. Need to have some form of MAC header for UL and DL. May not be possible as proposed here, although it's more efficient. See Slide 4, this may not be possible.

### Presentation of IEEE 802.11-25/1363, frame format follow up, Liwen Chu (NXP)

Presenter is not in the meeting.

Proposal to ammend the agenda by adding

* IEEE 802.11-25/1235, AMP Multi Energizer/Exciter Deployment Scenarios, Dror Regev (Huawei)
* IEEE 802.11-25/1263, Remaining Issues on WPT Protocols, Yinan Qi (OPPO) (if time allows)

No discussion, no objection, agenda change approved.

### Presentation of IEEE 802.11-25/1235, AMP Multi Energizer/Exciter Deployment Scenarios, Dror Regev (Huawei)

C: Multiple energizers are required, managed by AP to improve efficiency. Slide 7. AP managment needs link between energizer and AMP STA. For example, if AMP STA 4 is in region 4 it's more efficient to only activate energizer 4, and not the others.

A: Currently there's no way to know where each STA is located. AP does not know the location.

C: Exciter and energizer, there are differences. Energizer work in S1G, exciter in both S1G and 2.4. Exciters can be used for communication. If on Slide 7 E1-E4 are exciters, they will use different channels. Suggest differentiating between exciter and energizer.

A: Do you consider simultaneous excitement, using different channels? Exciters use the center frequency.

C: This is my understanding.

A: This is very complicated, and out of scope of the presentation.

Q: What type of distances are considered here?

A: I like 10m x 10m, maybe a bit larger. Big meeting room, for example. Not a warehouse.

Q: AP knows the tag position after the discovery phase?

A: We did not yet discuss mechanisms for location discovery. Rough location estimation may be feasible.

C: Energizer can do multiple things. Can transmit WPT, or excitation waveform, depending on their capability.

Chair reminds attendees that on PM1 SPs will be run. Discussion on how to run all SPs in the limited time.

## Recess

The chair announced the session recessed at 10:55.

# Thursday PM1 (2025-07-31T14:30)

## Opening

The TG Chair, Bo Sun (Sanechips), presents the TG bp meeting agenda slides (IEEE 802.11-25/990r4).

* Chair calls the meeting to order at 14:30.
* Chair instructs members to record attendance in IMAT.
* Chair reviews the meeting rules and patent policy (slides 2-6).
* No response to the call for patents.
* Chair reviews IEEE-SA COPYRIGHT POLICY (slides 7-8).
* Chair reviews other Guidelines, Participation, Suggested Best Practices, and Registration (slides 9-12).

## Agenda

Chair presents the agenda of the session (slide 39).

* Call meeting to order and remind the group to record attendance on imat.ieee.org
* IEEE-SA IPR policies and meeting rules
* Approve meeting agenda
* SPs and Motions
* Timeline Review
* Teleconference Plan
* Any other business?
* Recess

Chair calls for approval of the agenda of the TGbp session.

No discussion, no objection, agenda approved.

## Straw Polls

The chair starts to present the SPs from page 40 of IEEE 802.11-25/990r4.

### SP Set #1

SP1: No discussion. No objection to the SP.

### SP Set #2

SP1: No discussion. No objection to the SP.

SP2:

Q: In 11ba the SYNC duration and the data part, are they following the same chip duration?

A: Data rate is already known by the trigger frame.

No objection to the SP.

### SP Set #3

SP1: No discussion. No objection to the SP.

SP2: No discussion. No objection to the SP.

### SP Set #4

SP1:

Q: Is this for backscatter?

A: Yes. Ammended the text with "11bp defines two PPDU variants of the AMP DL PPDU for backscattering operation in 2.4GHz".

Q: Does this preclude the DL PPDU trigger multiple UL transmissions?

A: The purpose is that we restrict to one UL transmission for backscatter.

Q: Can we add AMP-SYNC field is TBD?

C: Suggest to change "WiFi preamble" to "IEEE 802.11bp preamble".

Q: This is more specific than the more general one. So this replaces the general variant?

A: Yes, unless other use cases are defined that require other frame formats.

No objection to the modified SP.

SP2:

Q: Will there be a different sync sequence in the two bands?

A: Yes. The tag will not have a separate RF for the two bands. Only possible differentiation is on the digital side.

Q: Replace "indicate" by "differentiate"?

A: Ok.

Q: There are different data rates in S1G and 2.4, so what's the meaning?

A: Still need to differentiate.

No objection to the modified SP.

### SP Set #5

SP1: No discussion. No objection to the SP.

Q: Sync sequence needs more discussion. Don't like this gradual way to define the sequence. Let's go directly to the sequence.

A: Nobody has defined any other chip duration.

No objection to the SP.

SP2: No discussion. No objection to the SP.

SP3: No discussion. No objection to the SP.

### SP Set #6

SP1: No discussion. No objection to the SP.

### SP Set #7

SP1:

C: Suggest to add Sub-1GHz.

Q: CW is a single carrier waveform?

A: Yes. Change CW to single carrier.

No objection to the modified SP.

No objection to the modified SP.

SP2:

C: Suggest to add (MHz).

Q: Ask to delay to be able to present ideas for coexistence. While there is no 11ah in China, we should not preclude that there will be never 11ah in China.

A: Agree, coex with 11ah is a very important topic. But for China for these bands there won't be 11ah. Maximum bandwidth is 250KHz, with high tx power. Will not be extended in the future. No chance for 11ah.

Objection to the SP.

SP result: Y / N / A: 41 / 7 / 15

SP3: Deferred.

SP4:

Q: Some is Manchester, some is OOK? Is the intention to be the same as 2.4?

A: Yes.

No objection to the SP.

SP5:

Q: This is to meet the regulatory requirements for the 250kHz bandwidth for China?

A: Yes.

Q: Want ot make sure we meet the regulatory requirements.

A: Just considered manchester encoding, 1/4 of the bw. We will be able support this rate.

No objection to the SP.

SP6:

C: Change CW to single carrier.

No objection to the modified SP.

### SP Set #8

SP1: No discussion. No objection to the SP.

SP2:

Modified to bracket text to "AMP service period".

Q: Duty-cycle cycle configuration is that a mapping to the data rate?

A: No, this is MAC layer.

No objection to the modified SP.

SP3:

Modified to remove "duty cycle manner".

No objection to the modified SP.

SP4:

Q: Do you consider time slot duration fixed by the standard?

A: Yes.

No objection to the SP.

SP5:

Modified to replace "PPDU" by "frame".

Q: How is this different from the already agreed random & polled access phase?

A: It combines the two.

Q: Does this happen in one TXOP?

A: That depends on the implementation.

Modified to append "in a scheduled phase".

Q: In the second phase, why one or more transmissions?

A: To increase the efficiency. Based on the AP's implementation.

No objection to the modified SP.

SP6: No discussion. No objection to the SP.

SP7: Deferred.

### SP Set #9

SP1: No discussion. No objection to the SP.

SP2:

Modified to subbullet to "Based on the Random Access Parameters, the non-AP AMP STA may transmit an uplink AMP PPDU carrying the uplink response in one of the slots allocated by the AMP Trigger frame".

No discussion. No objection to the modified SP.

SP3:

Q: This is for active tx?

A: Yes.

Modified to add subbullet "More than one non-AP AMP STAs is limited to Active Tx communication".

Q: New bullet point does not make sense in the context of the sentence.

A: Change to a note at the end.

No objection to the modified SP.

SP4:

Q: Does it also include delayed response?

A: What is a delayed response?

Q: The AMP STA cannot reply in the allocated time.

A: Change to "may transmit".

C: Restrict multiple non-AP AMP STAs to active tx communication.

No objection to the modified SP.

SP5:

C: Suggest to replace may with shall.

SP is deferred.

SP6:

Q: Is this for encryption or error protection?

A: Add "(for security)" after protected.

Q: 16b might be too short for security protection.

A: This is what we have to 11be.

No objection to the modified SP.

SP7:

C: Suggest to modify to remove the first sub-bullet and delete everything after "AMP STA".

No objection to the modified SP.

SP8:

Q: It is possible to send UHF commands without any AMP fields attached.

A: Don't think it's possible.

SP is deferred.

SP9:

Q: Suggest to change to "may use".

A: Ok.

SP is deferred.

SP10:

Q: Is this for backscatter only?

A: Yes.

Q: The tag states in the RFID standard can be modified by other commands not supported here. We tie the STA to commands not supported.

A: Suggest to delete "and the corresponding tag states".

No objection to the modified SP.

## Motions

### Motion 1 (IEEE 802.11-25/0990r5, slide 84)

No discussion.

Motion approved with unanimous consent.

## TGbp Timeline Plan

Timeline is updated to move "D0.1 (ready for CC)" to September 2025.

## Teleconference Plan

Four planned teleconferences, see IEEE 802.11-25/0990r5, Slide 86.

## Adjourn

The chair announced the session adjourned at 16:30.

Next hybrid (face to face & online) session will be the IEEE 802 interim meeting in September.