IEEE P802.11  
Wireless LANs

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| IEEE 802.11ba Task Group Meeting Minutes for July 2018 Meeting, San Diego, USA | | | | |
| Date: 13-07-2018 | | | | |
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Abstract

Meeting Minutes for the IEEE 802.11ba TG sessions held in San Diego, USA, July 8-13, 2018.

**Monday, July 9 2018, 8:00-10:00 am**

**PHY Ad-Hoc Meeting:**

Ad-hoc Group Chair: Eunsung Park (LGE)

Ad-hoc Secretary: Leif Wilhelmsson (Ericsson)

**PHY Ad-Hoc Meeting Agenda:**

The meeting agenda is shown below, and published in the agenda document:

<https://mentor.ieee.org/802.11/dcn/18/11-18-1235-00-00ba-tgba-july-2018-meeting-agenda-phy-adhoc.pptx>

* Call Meeting to order
* IEEE 802 and 802.11 IPR Policy and procedure
* Participation in IEEE 802 Meetings
* Presentations
* Adjourn

**Chair Eunsung Park (LGE) calls meeting to order at 8.10 am. (**13 persons in the room.)

Eunsung goes through slides 9-13 related to the IEEE 802 and 802.11 IPR Policy and procedure.

Eunsung goes through the presentations that need to be covered.

**Presentations:**

**11-18/1135r2, “Proposed spec text for 32.1 introduction”, Dongguk Lim (LGE):** Dongguk goes through the proposed spec text for 32.1. The text is updated based on some feedback and the revision 2 of the document is created.

**11-18/1136r0, “Proposed spec text for table 31-1 TXVECTOR/RXVECTOR”, Dongguk Lim (LGE): ):** Dongguk goes through the proposed spec text for 31.1

**11-18/1137r0, “Proposed spec text for WUR FDMA transmission”, Dongguk Lim (LGE): ):** Dongguk goes through the proposed spec text for WUR FDMA transmission.

**11-18/1156r1 “A comparison of BPSK-mark options”, Alphan Sahin (Interdigital):** Different options for the BPSK mark are discussed. The corresponding spec text is provided in document 11-18/1068r0.

**Question/Comment (Q):** I don’t believe the power saving for 802.11ax is so large.

**Answer (A):** I believe it may depend on how things are implemented.

**Q:** I believe I would be beneficial to have BSS color information in the BPSK-mark

**Q:** How do we make every device support BSS color, when it is introduced in 11ax?

**A:** I guess we need to designate one identifier that can be used for pre-11ax versions.

**Q:** I also agree that the power saving may be very small.

**Q:** Maybe one can identify that it is a WUR by identifying that the signal is 4 MHz wide after the signal field.

**Q:** I believe we can use Option 2 for this version of WUR, and for future WUR we can do something else, like Option 5.

**Straw Poll 1:**

How should 802.11ba BPSK-mark be constructed?

* Sequence-based BPSK-mark (e.g., Option 1, sequence is TBD):
* Encoded BPSK-mark (e.g., Option 2-5, all subfields are TBD):
* Abstain:

**Sequence-based BPSK-mark/Encoded BPSK-mark/Abstain: 0/12/5**

**Straw Poll 2:**

How should 802.11ba BPSK-mark be constructed in Slide 13?

* Option 2:
* Option 5:
* Option 3 or Option 4:
* Abstain:

**Option 2/Option 5/Option 3 or Option 4/Abstain: 7/9/0/4**

**11-18/1205r1,” Proposed Spec Text for clause 32.2.7”, Vinod Kristem (Intel):** Vinod goes through the proposed spec text for 32.2.7.

**The ad-hoc meeting is adjourned at 10.04 am.**

**Monday, July 9 2018, 8:00-10:00 am**

**MAC Ad-Hoc Meeting:**

Ad-hoc Group Chair: Yunsong Yang (Huawei)

Ad-hoc Secretary: James Lepp (Blackberry)

**Chair (Yunsong Yang) brings the meeting to order at 8am PDT**

Chair explains this is an Ad Hoc meeting. The chair reminds members to record their attendance in the IMAT system. There are 35 people in the room during this session.

Chair explains that Minyoung Park who usually chairs the 11ba MAC Ad-hoc is not here this week and he will chair the three MAC Ad-hoc sessions.

Chair explains he is usually the secretary of the 11ba MAC adhoc and asks for volunteer to take minutes for this session.

James Lepp volunteers to take minutes.

Chair reads the policy slides from the agenda (document [802.11-18/1042r2](https://mentor.ieee.org/802.11/dcn/18/11-18-1042-02-00ba-july-2018-tgba-agenda.pptx))

Chair calls for essential patents. No response.

Chair displays the agenda

Discussion on the agenda

Comment: There is a separate agenda for the PHY Ad-hoc, but we are using the main 11ba agenda for the MAC Ad-hoc.

Chair: No separate document. We have one goal for this MAC Ad-hoc which is to review technical specification submissions.

No objection to continue with this agenda and proceed with presentations in the order shown on slide 13.

**Presentations:**

**IEEE** [**802.11-18/1105r0**](https://mentor.ieee.org/802.11/dcn/18/11-18-1105-00-00ba-proposed-text-for-wur-mac-revision.docx) **– Po-Kai Huang**

Po-Kai presented MSWord document.

Removing proposed change to 31.7.1 to allow for further submissions and discussion on this section later this week. Presenter will upload an r1 with this change.

**Question:** what is the motivation for these changes, fixing TBDs etc?

**Response:** includes several concepts motioned at last meeting and fixes TBDs.

**Comment:** The abstract is incorrect.

**Response**: Presenter will update the abstract.

**Comment:** This seems more technical change than editorial, the Group ID behavior, and something is still missing.

**Response:** We can work on that

**Comment:** WUR mode element design

**Response:** Designed similar pattern to other 11ax features.

**Comment:** on 31.2 Channel access. Unified Channel access for all types of WUR frames. Was there ever a motion on this?

**Response:** No, never had a motion on this. Take this as a proposal. If the group isn’t ready to agree this, can pull it out into a separate document. Described the “any AC” concept.

**Comment:** Bottom of page 4, does the starting point of the on period mean the starting point of the duty cycle?

**Response:** Shows figure 31-1

**Comment:** suggest that definition of be clarified to be more consistent.

**Response:** Field name doesn’t change, just update the description.

Presenter will make several changes the document and discuss with commenters.

**IEEE** [**802.11-18/1082r1**](https://mentor.ieee.org/802.11/dcn/18/11-18-1082-01-00ba-spec-text-update-for-wur-discovery.docx) **– Rojan Chitrakar**

This is r1, presented r0 in the conference call 18 June 2018.

Presenter presented MSWord document.

**Question:** Page 5, “WUR Scanning” should be lower case “WUR scanning” to match with other parts of the standard

Chair: Do people need more time to review this material?

Chair: suggest to upload revision and run strawpoll in future session.

**IEEE** [**802.11-18/1157r1**](https://mentor.ieee.org/802.11/dcn/18/11-18-1157-01-00ba-proposed-spec-text-for-bss-update-counter-indication.docx) **– Xiaofei Wang**

Presenter presented MSWord Document.

**Comment**: Regarding 31.7.3, follow procedure to receive PCR beacon, not necessary to specify that it needs to wake up the PCR to do that.

**Comment:** Is the action frame type described correctly “WUR Mode Setup Frame” vs “WUR Action frame”?

**Comment:** does the C in Counter need to be capitalized? (editorial)

**Comment:** (editor) suggests to name the field “BSS Update Counter” instead of just “Counter”.

**IEEE** [**802.11-18/1121r0**](https://mentor.ieee.org/802.11/dcn/18/11-18-1121-00-00ba-spec-text-clarification-for-fdma.pptx) **– Suhwook Kim**

Presenter presented PowerPoint Deck

**Comment:** Of the two proposed text changes, does the second change already cover the previous one? This might make the first change unnecessary.

**Comment:** Can clarify slide 7 by changing “does not” to “shall not”

**Response:** Still thinks the sentence (slide 6) is needed

Comment on need to specify channel switching

**IEEE** [**802.11-18/1082r2**](https://mentor.ieee.org/802.11/dcn/18/11-18-1082-02-00ba-spec-text-update-for-wur-discovery.docx) **– Rojan Chitrakar**

Presenter highlights changes to this documents from the r1 presented earlier today.

**Straw Poll:**

Do you agree to incorporate the proposed changes provided in document 18/1082r2 in the next draft of TGba?

**Y/N/A: 16/0/4**

**IEEE** [**802.11-18/1168r0**](https://mentor.ieee.org/802.11/dcn/18/11-18-1168-00-00ba-enabling-wur-protection.pptx) **– Rojan Chitrakar**

Presenter presents Powerpoint Deck

**Comment:** Definition of “attack” could be problematic. Focus on defining protection instead of defining attacks and attack threshold.

**Comment:** Is it really possible to initiate security half way. Does it require reassociation or something along those lines. Once you activate security, how can you go back to insecure? How can you detect that attack has ended and disable security.

Chair notes that we are out of time. This discussion can continue in the next MAC Ad-hoc session.

**Chair adjourns the Ad-Hoc meeting at 10:03am PDT**

**Monday, July 9 2018, 1:30-3:30 pm**

**Meeting Agenda:**

The meeting agenda is shown below, and published in the agenda document:

<https://mentor.ieee.org/802.11/dcn/18/11-18-1042-03-00ba-july-2018-tgba-agenda.pptx>

* + Call meeting to order, TGba introduction
  + Call for submissions
  + Review agenda and approval
  + IEEE 802 and 802.11 IPR Policy and procedure
  + Participation in IEEE 802 Meetings
  + Summary from May 2018 meeting
  + Motion: May 2018 meeting (doc: IEEE 802.11-18/999r0, 18/1006r0) and teleconference minutes (doc: IEEE 802.11-18/1011r1) approval
  + Motion: TGba D0.3 approval
  + Presentations, Recess

**Chair Yunsong Yang (Huawei) calls the meeting to order at 1.30 pm.** (about50 persons in the room.)

Yunsong present the slide **Main agenda items for the week**

* Approve TGba D0.3
* Review spec text documents for empty/incomplete subclauses and TBDs in TGba D0.3 to create D1.0 after this meeting – highest priority
* TGba/ARC joint session (Thursday PM2)
  + TGba architecture discussion
* Review TG timeline

Yunsong goes through the contributions and ask if there are any comments or questions. The authors of documents 11-18/1122 and 11-18/1130 request to withdraw these documents.

Yunsong goes through the agenda (slide 15) and asks if there are any questions. No questions or comments, so the agenda is approved.

Yunsong reminds about recording attendance.

Yunsong goes through the slides “Participants have a duty to inform the IEEE” (slide 17) and “Ways to inform IEEE” (slide 18).

Yunsong makes a Call for Potentially Essential Patents. No potentially essential patents reported and no questions asked.

Yunsong goes through “Other Guidelines for IEEE WG meetings” (slide 19) and “Patent-related information” (slide 20).

Yunsong reads through “Participation in IEEE 802 Meetings” (slide 21), and encourages people to read through the references on slides 22-24.

Yunsong goes through the slide **Summary from May 2018 Meeting and Teleconference Calls**

* Approved TGba SFD and TGba D0.2
* Closed TGba SFD (Final document is 11-18/575r11)
* Reviewed and approved spec text documents for TGba D0.3
* Reviewed technical presentations
* TGba/ARC joint session – TGba architecture discussion
* Reviewed TG timeline
* Agenda: doc:11-18/647r12

**Motion:** Approve TGba minutes of May 2018 meeting [doc: IEEE 802.11-18/999r0 and IEEE 802.11-18/1006r0] and teleconference calls [doc: IEEE 802.11-18/1011r1]

**Move:** Po-Kai Huang

**Second:** Xiaofei Wang

Motion passed by unanimous consent.

**Motion:** Move to approve [P802.11ba D0.3](http://www.ieee802.org/11/private/Draft_Standards/11ba/Draft%20P802.11ba%20D0.3.pdf) in IEEE 802.11 WG Members Area as the latest revised draft of TGba.

**Move:** Po-Kai Huang

**Second:** Lei Huang

**Y/N/A:** 29/0/1, motion passes

**Presentations:**

**11-18/1074r1 “Proposed text for mandatory and optional description” Po-Kai Huang:** The document clarifies which features are mandatory and which are optional.

**Straw Poll 1:**

Which option do you support?

* Option 1: For a WUR AP, “Transmit 20 MHz WUR PPDU with High Data Rate” is a mandatory feature
* Option 2: For a WUR AP, “Transmit 20 MHz WUR PPDU with High Data Rate” is an optional feature

**Option 1/Option 2/ Abstain:** 19/7/10

As a result, it is decided to adopt the text in the document such that it is mandatory for the AP to support the HDR.

**11-18/1201r0, “Concerns about Sync Detector False Alarms” Steve Shellhammer (Qualcomm):**

It has been found that if two wake-up packets are sent close to one another, a WUR may erroneously detect the first and because it has to process the packet for some time before identifying the mistake it may miss the second wake-up packet which was the intended one.

One way to counteract this and decrease the probability of false alarm is to increase the threshold. However, doing this will results in worse performance as the probability of miss is also increased. Simulations show a loss within the range of 2.3 and 5.6 dB for the HDR and LDR, respectively.

**Q:** Maybe the phase randomization will help?

**A:** Maybe, I did not think about that.

**Q:** How long does it take to find out that it is a false alarm?

**A:** I don’t really know.

**Q:** I believe it is possible for a WUR to identify this fairly quickly using the fields following the syncword.

**Q:** I doubt that OBSS is a problem in a realistic deployment with proper channel planning.

**11-18/1131r0 “Proposed spec text for 32.2.4.7”, Eunsong Park (LGE):** Eunsong goes through the proposed spec text for 32.2.4.7.

**Straw Poll:**

Do you support to add the proposed text in 11-18/1131r0 into the next TGba Draft?

**Y/N/A:** 20/0/13

**11-18/1132r0 “Resolution for TBD in 32.2.9”, Eunsong Park (LGE):**

**Straw Poll:**

Do you support to incorporate the proposed changes text in 11-18/1132r0 to the next TGba Draft?

**Y/N/A:** 23/0/14

**Yunsong declares the meeting to be in recess at 3.26 pm**

**Monday, July 9 2018, 4:00-6:00 pm**

**Meeting Agenda:**

The meeting agenda is shown below, and published in the agenda document:

<https://mentor.ieee.org/802.11/dcn/18/11-18-1042-04-00ba-july-2018-tgba-agenda.pptx>

* **Call meeting to order**
* **IEEE 802 and 802.11 IPR Policy and procedure**
* **Presentations, Recess**

**Yunsong calls the meeting to order at 4.00pm** (about 70 persons in the room).

Yunsong ask if there are any objections to approve agenda? No objections, so the agenda will be used.

Yunsong makes a Call for Potentially Essential Patents. No potentially essential patents reported and no questions asked.

**Presentations:**

**11-18/1205r4, “Proposed Spec Text for clause 32.2.7”, Vinod Kristem (Intel):** This is the continuation of the presentation in AM1.

**Straw Poll 1:**

Do you support to incorporate the proposed changes in 11-18/1205r4 to the next TGba Draft?

**Y/N/A: 9/0/20**

**11-18/1069r0, “TGba Coexistence Assurance Document”, Yongho Seok (Mediatek)**

Yongho goes through the coexistence assurance document and the group is encouraged to review it.

**11-18/1162r0, “Proposed Spec Text for clause 32.2.12”, Shahrnaz Azizi (Intel):** Shahrnaz goes through specification text for the transmit procedure.

**Q:** Concerning the names of the primitive, do we want to specify that these are for the WUR?

**A:** I don’t think so, not for the primitives. In the TXVECTOR it is specific.

**11-18/1163r1, “Proposed Spec Text for Time of Departure accuracy and CCA sensitivity”, Shahrnaz Azizi (Intel):** Shahrnaz goes through specification text for time of departure and CCA sensitivity.

**Straw Poll**

Do you support the Spec Text in this document IEEE 802.11-18/1163r1?

**Y/N/A:** 9/0/17

11-18/1167r2, “Spec Text Revision on WUR Waveform Generation”, Junghoon Suh (Huawei): The spec text related to WUR waveform generation is presented.

**Q:** I don’t believe you need spatial mapping.

**Q:** I believe you should indicate that the data rate can be different on the different channels.

**11-18/1194r0, “Spec Text on MC-OOK Symbol Phase Randomization”, Steve Shellhammer (Qualcomm):**

**11-18/1195r0, “Spec Text on Recommended MC-OOK Symbols”, Steve Shellhammer (Qualcomm):**

Q: Why do we need to many examples in different places.

A: Basically because we have found that different sequences can give quite different performance and we wanted to provide examples of a few good ones.

**11-18/1196r0, “Spec Text on Recommended CSD”, Steve Shellhammer (Qualcomm):**

**11-18/1197r0, “Spec Text on DFS”, Steve Shellhammer (Qualcomm):**

**11-18/1198r0, “Simulations with recommended symbols and CSD”, Steve Shellhammer (Qualcomm):**

**Q:** You got very similar results independent of whether the DC sub-carrier is populated or not?

**A:** Yes. However, in both cases the sequences are optimized for low PAPR.

**Q:** Did you notice any difference in performance between linear CSD and binary tree CSD?

**A:** We had these results in an earlier presentation, and we could see some gain with the binary tree CSD. The reason is simply that for a small number of antennas the applied cyclic shift is larger.

**11-18/1199r0, “Comparison of 2us MC-OOK symbols”, Steve Shellhammer (Qualcomm):**

**Yunsong declares the meeting to be in recess at 6.04 pm.**

**Tuesday, July 10 2018, 8:00-10:00 am**

**Meeting Agenda:**

The meeting agenda is shown below, and published in the agenda document:

<https://mentor.ieee.org/802.11/dcn/18/11-18-1042-05-00ba-july-2018-tgba-agenda.pptx>

* Call meeting to order
* IEEE 802 and 802.11 IPR Policy and procedure
* Presentations, Recess

**Yunsong calls the meeting to order at 8.03am. (About 25 persons in the room.)**

Yunsong goes through the agenda and asks if there are any objections to approve agenda? No objections, so the agenda will be used.

Yunsong reminds about recording the attendance.

Yunsong makes a Call for Potentially Essential Patents. No potentially essential patents reported and no questions asked.

**Presentations:**

**11-18/1199r0, “Comparison of 2 us MC-OOK Symbols”, Steve Shellhammer (Qualcomm):** Steve presets a comparison of the simulated performance of some different 2us symbols that have been suggested by different persons.

**Q:** We did similar comparisons but did not get the same results. I don’t really see the issue with that the signal is zero at some time instants.

**Q:** Related to slide 11, since we typically will have a very small sampling error, I don’t think the worst case scenarios shown here are applicable.

**11-18/1200r0, “Comparison of symbol randomization techniques”, Steve Shellhammer (Qualcomm):** Steve compares the spectrum for phase randomization and CSD randomization and points out that some spectral lines are still seen in case of CSD randomization.

**Q:** When doing CSD randomization, the power of the spectral lines will depend on the CSD values used so one needs to be careful. There will be a presentation about this by Miguel Lopez (Ericsson).

**11-18/1068r3 “Proposed Spec Text on the construction of the BPSK Mark” Alphan Sahin (Interdigital):** Alphan goes through different alternatives for the BPSK mark to get feedback from the group. The contribution has already been presented in the PHY ad-hoc meeting.

**Q:** It is a specific sequence?

**A:** It is an encoded BPSK mark. The content is TBD.

**Straw Poll:**

Do you agree to include the proposed changes to the next revision of 802.11ba draft

**The straw poll is deferred.**

**11-18/1168r0, “Enabling WUR Protection” Rojan Chitrakar (Panasonic):** Options related to enabling WUR protected frame transmissions are discussed.

**Q:** I have some question related to how to turn off the protected mode.

**A:** This is not addressed here, but could be in a future contribution if there is support for the discussion here.

**Q:** I don’t see how the STA can determine that it is still under attack once it has turned on the protected mode.

**Q:** What is the probability of false alarm?

**A:** Below 1% for the sync. But to wake up the PCR, the CRC also need to check and this would have very low probability.

**Straw Poll 1:**

Do you agree that WUR STAs may “inform” WUR AP of false wake-ups?

**Y/N/A:** 6/2/12

**11-18/1209r2, “Spec Text for TBD in 31.10”, Guoqing Li (Apple):** Guiqing goes through spec text for 31.10.

**Q:** Can you highlight exactly why these channels are selected?

**A:** Some of these channels are used in WFA for P2P, and then I added a few to reduce the risk for congestion.

**Q:** I wonder if one channel is enough in 2.4 GHz. Maybe start out with channel 6 and add e.g. channel 1 if channel 6 does not work.

**A:** I am open to that.

**Q:** It seems restrictive

**A:** It is not restrictive, it is a recommendation.

**Straw Poll:**

Do you agree to adopt the text in doc 18/1209r2 into 802.11ba draft spec.?

**Y/N/A:** 9/1/10

**11-18/1105r1, “Proposed Text for WUR MAC Revision”, Po-Kai Huang (Intel)**

**Straw Poll:**

Do you support to incorporate the proposed changes in document 18/1105r1 to the next revision of 11ba draft?

**Y/N/A:** 14/0/4

**11-18/1172r1, “Clarification of WUR frame related to group addressed frame”, Jeongki Kim (LGE)**

**Straw Poll:**

Which option do you prefer as a method for indicating a group addressed frame TX in PCR?

* + Option 1: Adding a bit in MAC header
  + Option 2: using new ID which is different from TXID
  + Abstain

**Option 1/ Option 2/A: 13/2/11**

**Yunsong declares the meeting to be in recess at 10.03 am.**

**Tuesday, July 10 2018, 1:30-3:30 pm**

**PHY Ad-Hoc Meeting**

Ad-hoc Group Chair: Steve Shallhammer (Qualcomm)

Ad-hoc Secretary: Leif Wilhelmsson (Ericsson)

**Ad-Hoc Chair Steve Shellhammer (Qualcomm) calls meeting to order at 1.38 pm** (12 persons in the room)

**Presentations:**

**11-18/1166r1, “Spec text for WUR receiver procedure” Vinod Kristem (Intel)**

**Straw Poll:**

Do you support to incorporate the proposed changes in 11-18/1166r1 to the next TGba draft

**Y/N/A:** 12/0/0

**11-18/1129r2, “Discussion on WUR FDMA padding issues”, Rui Cao (Marvell):**

**Straw Poll:**

Do you agree to change the FDMA padding as the following:

* Option 1: Pad all 20MHz subchannels to the same length
* Option 2: Limit FDMA to basic-mode-operating AP only, allow only equal rate across 20 MHz subchannels
* No
* Abstain

**Option1/Option2/No/Abstain:** 2/5/2/2

**11-18/1164r1, “Recommendations on OOK waveform and CSD settings”, Vinod Kristem (Intel):**

The presentation includes proposal for OOK waveforms and CSD settings to be included as examples in the specification. Since there are several related presentations, the straw polls are deferred.

**11-18/1165r1, “WUR PSD studies”,** **Vinod Kristem (Intel):** The presentation is concerned with how to avoid spectral lines in the TX spectrum. Since there are related presentations, the straw polls are deferred.

**The meeting is declared to be in recess at 3.31 pm.**

**Tuesday, July 10 2018, 1:30-3:30 pm**

**MAC Ad-Hoc Meeting**

Ad-hoc Group Chair: Yunsong YANG (Huawei)

Ad-hoc Secretary: Po-Kai Huang (Intel)

1. Called to order at 13:32 local time by Yunsong YANG.
2. Attendance: 32
3. Approval of agenda (11-18-1042r6 on the server and shown on the screen)

* No comments or questions.
* Agenda (r6) is approved unanimously.

1. Review patent policy and guidelines
   * No items identified.
2. Presentations

**11-18-1121-02-00ba-spec-text-clarification-for-fdma**

* + - Suhwook Kim (LG) presented the document.
    - Comment: It is not clear what the condition refers to.
    - Comment: The note only happens if AP accepts the request
    - Comment: clarify always on.

**Straw Poll:** Do you agree to following modification for TGba D0.3

* + Modify following text in sub-clause 31.9 WUR FDMA operation
    - When a WUR AP receives a WUR Capabilities element of which the WUR Channel Switching subfield of the WUR Capabilities Information field is equal to 1, the WUR AP shall set the WUR Channel Offset subfield of the WUR Parameters field of the WUR Mode element that it transmits to any value as defined in Table 9-262c (Subfields of WUR Parameters field from WUR AP), subject to the negotiated on duration of WUR duty cycle schedule does not overlap with the TWBTTs at which the WUR AP schedules for transmission WUR Beacon frames if the value of WUR Channel Offset subfield is not 0.
    - Note: When a WUR AP receives a WUR Mode element from a WUR non-AP STA that wants to have WURx always on WURx awake state until WUR Mode teardown and provided WUR Mode setup request is accepted, the WUR AP needs to set the WUR Channel Offset subfield of the WUR Parameters field of the WUR Mode element to 0, which is the only option to satisfy the condition that subject to the negotiated on duration of WUR duty cycle schedule does not overlap with the TWBTTs

**Y/N/A =** 11/0/2.

**11-18-1157-05-00ba-proposed-spec-text-for-bss-update-counter-indication**

* + - Xiaofei Wang (InterDigital) presented the document.

**Straw Poll:**

Do you agree to incorporate the changes proposed in 11-18/1157r5 in the next revision of TGba draft?

**Y/N/A = 17/0/0.**

**11-18-1158-00-00ba-group-delay-for-multicast-wake-up-frames**

* + - Xiaofei Wang (InterDigital) presented the document.
    - Comment: The sentence quoted in slide 4 is for the group addressed frame transmitted after DTIM

**11-18-1159-00-00ba-wake-up-procedure-after-receiving-broadcast-multicast-wake-up-packets**

* + - Xiaofei Wang (InterDigital) presented the document.
    - Comment: It seems that the proposal is already covered by the existing PCR operation behavior
    - Comment: To exit WUR mode, we need explicit signaling, and this is in the current spec.

**11-18-1120-01-00ba-wur-discovery-period-announcement**

* + - Taewon Song (LG) presented the document
    - Question: Why is the maximum length so long?
    - Answer: This is the same as WUR Beacon field encoding
    - Question: Should we have indication of starting time as well?
    - Answer: WUR Beacon has it, but it depends on how much information that we want to provide to

**Straw Poll:**

Do you agree to insert the WUR Discovery Period subfield into the WUR Discovery element and WUR Discovery Period Present subfield into the Bitmap Control?

**Y/N/A = 4/0/13.**

**11-18-0895-02-00ba-addressing-in-vl-wake-up-frame**

* + - Woojin Ahn (WILUS) presented the document
    - Question: Does this frame have BSS parameter update counter?
    - Answer: We can verify later.

**Straw Poll:**

Do you agree the following change?

9.10.3.2 WUR Wake-up frame format

The Address field of the WUR Wake-up frame is set to

- ~~0~~the Transmit ID when multiple WIDs are included in the Frame Body field of the frame

**Y/N/A = 4/0/10.**

**11-18-1241-00-00ba-remaining-issues-on-individually-addressed-bu-delivery**

* + - Woojin Ahn (WILUS) presented the document
    - Comment: We prefer to reuse existing operation rather than creating exception.

**Recessed at 15:30 local time.**

**Wednesday, July 11 2018, 1:30-3:30 pm**

**Meeting Agenda:**

The meeting agenda is shown below, and published in the agenda document:

<https://mentor.ieee.org/802.11/dcn/18/11-18-1042-07-00ba-july-2018-tgba-agenda.pptx>

* Call meeting to order
* IEEE 802 and 802.11 IPR Policy and procedure
* Presentations, Recess

**Yunsong calls the meeting to order at 1.33pm. (About 70 persons in the room.)**

Yunsong goes through the agenda and asks if there is any question.

Authors request to withdraw doc. 11-18/1085 and 11-18/1169.

The agenda is updated based on these requests comments and the agenda is then approved.

Yunsong reminds about taking the attendance.

Yunsong makes a Call for Potentially Essential Patents. No potentially essential patents reported and no questions asked.

**Presentations:**

**11-18/1129r3, “Discussion on WUR FDMA padding issues”, Rui Cao (Marvell):**

This contribution was presented in an PHY ad-hoc, but since it also impacts the MAC, it is repeated in a joint session to collect feedback from the whole group.

**Q:** I believe Option 1 is the best and this is also similar to how things are done in 11ax.

**Q:** Does this also include the case with puncturing?

**A:** Puncturing is not a problem.

**Q:** The padding can be rather long, which means the spectrum usage is poor.

**Straw Poll:**

* Do you agree to change the FDMA padding as the following:
  + Option 1: Pad all 20MHz subchannels to the same length
  + Option 2: Limit FDMA to equal duration without padding on all 20MHz subchannels
  + Option 3: No change
  + Abstain

**Option 1/ Option 2/ Option 3/ Abstain: 30/9/14/3**

**11-18/1068r3, “Proposed spec text on the construction of BPSK Mark”, Alphan Sahin (Interdigital):**

**Straw Poll:**

Do you agree to include the proposed changes in 11-18/1068r3 to the next revision of the 802.11ba draft?

**Y/N/A: 22/0/11**

**11-18/1179r1, “Spectral-line suppression for MC-OOK”, Miguel Lopez (Ericsson)**

In order to avoid spectra lines or at least reduce the power of spectral line, it is proposed to use different cyclic shifts for different symbols. Essentially this is an alternative to just changing the sign as previously has been proposed, but with the advantage that the spectrum becomes more flat which in turn allows for a higher total power in regions were transmitted power will be limited by the PSD.

**11-18/1074r2, “ Proposed Text for Mandatory and Optional Description” Po-Kai Huang (Intel):**

This is an updated revision of the document Po-Kai presented earlier, taking into account the received feedback.

**Straw Poll:**

Do you support to incorporate the proposed changes in document 18/1074r2 to the next version of 11ba draft?

**Y/N/A:** 30/0/4

**11-18/1206r1, “Issues on channel usage in WUR FDMA transmission”, Hanseul Hong (Yonsei Univ.):** The presentation is concerned with that some of the channels used for the WUR may be congested, and therefore a switch to another channel should be performed.

**Q:** I don’t believe it is possible to make a distinction between whether the channel is busy all the time or the STA is out of range

**A:** The STA has to switch to the primary channel to listen to the beacon, and based on this is can determine whether it is in range or not.

**Q:** So the assumption is that one of the sub-channels is constantly busy?

**A:** Yes.

**Q:** This seems to be similar to BSS parameter update, so I believe we already have support for this in the specification.

**Straw Poll:**

Do you agree with the following?

* + An additional channel switch invocation method in case of continuous channel access failure in FDMA transmission is needed

**The straw poll is deferred.**

**11-18/1170r0, “Spec Text Update for WUR FDMA Channel Access” Rojan Chitrakar (Panasonic)**

**Straw Poll:**

Do you agree to incorporate the proposed changes provided in document 11-18/1170r0 in the next draft of TGba?

**Y/N/A: 23/0/7**

**11-18/1204r0, “EVM formulation for OOK Waveform”, Rui Yang (Interdigital):** The presentation discusses a means to test modulation accuracy for the transmitter.

**Q**: It is not clear to me what this brings in addition to an eye-diagram.

**The meeting is declared to be in recess at 3.31 pm.**

**Wednesday, July 11 2018, 4:00-6:00 pm**

**PHY Ad-Hoc Meeting**

Ad-hoc Group Chair: Steve Shallhammer (Qualcomm)

Ad-hoc Secretary: Leif Wilhelmsson (Ericsson)

**Ad-Hoc Chair Steve Shellhammer (Qualcomm) calls meeting to order at 4.05 pm** (about 15 persons in the room)

**11-18/1218r0, “Example OFDM symbols for the spec.”, Miguel Lopez (Ericsson)**

**Straw Poll 1:**

Do you agree that we should include 3 examples of ON-symbols for the 4 µs symbol and 3 examples of for the 2 µs symbol in the specification?

**Y/N/A: 9/1/3**

**Straw Poll 2:**

Do you agree we should include the 3 example symbols for the 2 µs OFDM symbol defined on Slide 3?

**Y/N/A**: 9/2/3

**Straw Poll 3:**

Do you agree we should include the 3 example symbols for the 4 µs OFDM symbol defined on Slide 4?

**Y/N/A:** 9/2/3

**11-18/1195r1, “Spec text Recommended MC-OOK Symbols”, Steve Shellhammer (Qualcomm):**

**Straw Poll:**

Do you support the Spec Text in this document IEEE 802.11-18/1195r1?

**Y/N/A:** **10/0/4**

**11-18/1163r3, “Proposed Spec Text for Time of Departure accuracy and CCA sensitivity”, Shahrnaz Azizi (Intel):** The presentation proposes that the spec text related to departure accuracy is removed and that the part related to CCA sensitivity refers to the PCR.

**11-18/1162r2, “Proposed Spec Text for clause 32.2.12”, Shahrnaz Azizi (Intel):**

**Straw Poll:**

Do you support the Spec Text in this document 11-18/1162r2?

**Y/N/A:** **12/0/2**

**11-18/1135r3, “Proposed Spec Text for clause 32.1”, Dongguk Lim (LGE):**

**Straw Poll:**

Do you support to incorporate the proposed changes in document 18/1135r3?

**Y/N/A: 10/0/2**

**11-18/1136r2 “Proposed Spec Text for table 32-1 WUR\_TXVECTOR and WUR\_RXVECTOR parameters”, Dongguk Lim (LGE):**

**Straw Poll:**

Do you support to incorporate the proposed changes in document 18/1136r2 to the IEEE802.11ba D1.0?

Straw Poll supported by unanimous consent

**11-18/1137r2 “Proposed Spec Text for D1.0 on WUR FDMA transmission”, Dongguk Lim (LGE):**

**Straw Poll:**

Do you support to incorporate the proposed changes in document 18/1137r2 to next revision?

**Y/N/A: 6/2/6**

**11-18/1164r1, “Recommendations on OOK waveform and CSD setting”, Vinod Kristem (Intel):**

**Straw Poll 3:**

Do you support the following CSD that goes with 2 us OOK waveform, as one of the examples in the draft?

* Use linear CSD spacing, with max CSD of 1500 ns between first and last antenna

**Y/N/A: 10/0/4**

**The meeting is adjourned at 6.02 pm.**

**Wednesday, July 11 2018, 4:00-6:00 pm**

**MAC Ad-hoc PM2 Session**

Ad-hoc Group Chair: Yunsong Yang (Huawei)

Ad-hoc Secretary: James Lepp (Blackberry)

**Chair brings meeting to order at 4:02pm EDT**

There are approximately 35 members present during the session.

Chair is presenting agenda 1042r7

Chair makes call for updates to the agenda.

Several documents are updated or added. There are now 4 documents on the agenda.

Adhoc group adopts 1042r8 as shown on the screen as the agenda for this session.

Chair calls for potentially essential patents (Slide 18 802.11/18-1042r8)

No response to the call for potentially essential patents

802.11/18-1299r0 – Suhwook Kim

Presenter summarizes the document 802.11/18-1299r0.

Change made on screen to 31.9. This will be uploaded as r1.

Straw poll: Do you agree to modify WUR FDMA operation subclauses as follows

Y:11/N:0/A:7

802.11/18-1293r1 – Taewon Song

Presenter summarizes changes since 1293r0 which was presented yesterday.

Discussion about Discovery Period and requirement for transmitting Discovery Frames periodically

Comment about value of 0 for Discovery Period

Presenter requests to bring back a revision with a strawpoll for discussion.

802.11/18-1298r1 – Jeongki Kim

Presenter summarizes changes between R0 and R1 which are highlighted in green text.

Comment: Editorial suggestion to add “Otherwise, theGroup Addressed BU field is set to 0” to the paragraph below Figure 9-747x.

Comment: Figure format shown in 9-747x is specifically for the case where the Length Preset subfield is set to 0.

Presenter makes changes to 1298r1 on screen which will be uploaded as 1298r2.

Strawpoll: Do you agree to incorporate the following changes into the next version of TGba Draft?

Y:8/N:0/A:5

Chair calls for a 20-minute recess at 4:55pm PDT

Chair reconvenes at 5:15pm PDT

802.11/18-1298r2 – Jeongki Kim

Presenter displays R2 on the screen but it is different than the R2 strawpolled earlier.

Chair asks the presenter to upload R3 with the exact text that was strawpolled and an R4 with any additional changes such that the group has an opportunity to review the different versions

802.11/18-1293r2 – Taewon Song

Presenter summarizes changes between R1 and R2

Comment: Suggestion to delete some extra text hanging at the end of 31.10 paragraph

Comment: What does it mean if the discovery period is a value of 0. Suggest to add description about the case where the value is zero. One option is to disallow AP setting the value zero.

Comment: description is similar to existing text in the standard. Suggest no to change. AP will not set value to 0.

Comment: The spec should be clear. If the value can’t be 0, it should be clear in the spec.

Strawpoll: Do you agree to incorporate the proposed changes provided in document 11-18/1298r2 in the next draft of TGba?

Y:6/N:0/A:8

802.11/18-1298r3 – Jeongki Kim

Presenter displays the document and explains that this r3 is the exact document strawpolled earlier in the session.

Presenter suggest making 3 changes to the document which are now displayed on the screen.

Comment: By calling it the Misc field in several places it implies it is a WUR Wake-up frame with the length present field set to 0.

Comment: Do we need to be more explicit in 31.7.1 sentence displayed.

Comment: add “of the Misc field” to 31.7.1

Comment: add a note to 31.7.1

Presenter saved the changes made on screen as 1298r4 and uploaded to Mentor.

802.11/18-1298r4 – Jeongki Kim

Presenter now presenting R4

Presenter proposes a strawpoll with the understanding that it will supersede the strawpoll previously performed on the same text.

Strawpoll: Do you agree to incorporate the proposed change of 18/1298r4 into the next version of TGba Draft?

Y:8/N:0/A:5

Referring to the agenda, document 802.11/18-0895 is deferred until a future session.

Chair thanks all the contributors and presenters for their hard work.

Chair adjourns the TGba MAC Ad-hoc for the week at 5:45pm PDT.

**Thursday, July 12 2018, 10:30-12:30 am**

**Meeting Agenda:**

The meeting agenda is shown below, and published in the agenda document:

<https://mentor.ieee.org/802.11/dcn/18/11-18-1042-09-00ba-july-2018-tgba-agenda.pptx>

* Call meeting to order
* IEEE 802 and 802.11 IPR Policy and procedure
* Motions
* Presentations, Recess

**Yunsong calls the meeting to order at 10.30 am. (About 30 persons in the room.)**

Yunsong reminds about recording the attendance.

Yunsong goes through the agenda and asks if there is any question. There are no questions and the agenda is then approved.

Yunsong makes a Call for Potentially Essential Patents. No potentially essential patents reported and no questions asked.

**Motions:**

**11-18/1129r5**

**Motion 1:**

Motion to accept the concept in the document 11-18/1129r5

The FDMA packet shall pad all 20 MHz channels to the same length.

**Move:** Rui Cao

**Second:** Dungguk Lim

Y/N/A: 15/0/3, motion passes

**11-18/1292r1**

**Motion 1:**

Move to incorporate the proposed change in 11-18/1131r0 into the next TGba Draft

**Move:** Eunsung Park

**Second:** Suhwook Kim

Motion passed by unanimous consent

**Motion 2:**

Move to incorporate the proposed changes in 11-18/1132r0 into the next TGba Draft

**Move:** Eunsung Park

**Second:** Suhwook Kim

Motion passed by unanimous consent

**11-18/1268r7**

**Motion**

Move to incorporate the proposed changes in 11-18/1068r7 into the next revision of TGba draft

**Move:** Alphan Sahin

**Second:** Xiaofei Wang

Motion passed by unanimous consent

**11-18/1297r2**

**Motion:**

Move to adopt the spec text changes in doc.: IEEE 802.11-18/1167r4 into the next revision of draft P802.11ba

**Move:** Jia Jia (Justing)

**Second:** Peter Loc

Y/N/A:11/0/8, motion passes

**11-18/1195r2**

**Motion:**

Move to adopt the text in IEEE 802.11-18/1195r2 into Draft 0.4

**Move:** Steve Shellhammer

**Second:** Dongguk Lim

Y/N/A:15/0/4, motion passes

**11-18/1304r3**

**Motion 1:**

Move to adopt the spec. text changes in Doc. IEEE 802.11-18/1135r5 into the next IEEE 802.11ba Draft?

**Move:** Dongguk Lim

**Second:** Suhwook Kim

Y/N/A:16/0/1, motion passes

**Motion 2:**

Move to adopt the spec. text changes in Doc. IEEE 802.11-18/1136r2 into the next IEEE 802.11ba Draft?

**Move:** Dongguk Lim

**Second:** Suhwook Kim

Y/N/A:15/0/3, motion passes

**Motion 3:**

Move to adopt the spec. text changes in Doc. IEEE 802.11-18/1137r4 into the next IEEE 802.11ba Draft?

**Motion deferred.**

**11-18/1310r5**

**Motion 1**

Move to incorporate the proposed changes in 11-18/1205r6 to the next TGba Draft

**Move:** Vinod Kristem

**Second:** Shahrnaz Azizi

Y/N/A:11/0/6, motion passes

**Motion 2**

Move to incorporate the proposed changes in 11-18/1166r1 to the next TGba Draft

**Move:** Vinod Kristem

**Second:** Shahrnaz Azizi

Y/N/A:14/0/0, motion passes

**Motion 3**

Move to incorporate the proposed changes in 11-18/1162r2 to the next TGba Draft

**Move:** Vinod Kristem

**Second:** Shahrnaz Azizi

Y/N/A:13/0/2, motion passes

**Motion 4**

Move to incorporate the proposed changes in 11-18/1163r4 to the next TGba Draft

**Move:** Vinod Kristem

**Second:** Shahrnaz Azizi

Y/N/A:12/0/3, motion passes

**Motion 5**

Move to incorporate the proposed changes in 11-18/1315r1 to the next TGba Draft

**Move:** Vinod Kristem

**Second:** Shahrnaz Azizi

Y/N/A:11/5/5, motion fails

11-18/1157r10

**Motion:**

Move to incorporate the proposed changes in 11-18/1157r10 into the next revision of TGba draft.

**Move:** Xiaofei Wang

**Second:** Rui Yang

Motion passed by unanimous consent

11-18/1301r1

**Motion:**

Move to incorporate the proposed text in 18/1105r1 into next revision of 802.11 ba Draft

**Move:** Po-Kai Huang

**Second:** Suhwook Kim

Motion passed by unanimous consent

**Motion:**

Move to incorporate the proposed text in 18/1074r2 into next revision of 802.11 ba Draft

**Move:** Po-Kai Huang

**Second**: Suhwook Kim

Motion passed by unanimous consent

**Yunsong declares the meeting to be in recess at 12.32 pm.**

**Thursday, July 12 2018, 1:30-3:30 pm**

**Meeting Agenda:**

The meeting agenda is published in the agenda document:

<https://mentor.ieee.org/802.11/dcn/18/11-18-1042-10-00ba-july-2018-tgba-agenda.pptx>

**Yunsong calls the meeting to order at 1.30 pm. (About 40 persons in the room.)**

Yunsong reminds about recording the attendance.

The author requests to withdraw doc. 11-18-1207.

Yunsong goes through the agenda and asks if there is any question. There are no questions and the agenda is then approved.

Yunsong makes a Call for Potentially Essential Patents. No potentially essential patents reported and no questions asked.

**Motions:**

11-18/1299r1

**Motion:**

Move to incorporate the proposed changes in 11-18/1299r1 into the next revisio1n of TGba draft.

**Move:** Suhwook Kim

**Second:** Jeongki Kim

**Y/N/A:** 10/0/3, motion passes

**11-18/1293r4**

**Motion:**

Move to incorporate the proposed changes in 11-18/1293r4 into the next revision of TGba draft.

**Move:** Taewon Song

**Second:** Suhwook Kim

**Motion to table the motion in document 11-18/1293r4**

**Move:** Po-Kai Huang

**Second:** Xaiofei Wang

**Y/N/A:** 17/0/2, motion passes

**11-18/1082r4**

**Motion:**

Motion: Move to incorporate the proposed changes provided in document 11-18/1082r4 in the next draft of TGba.

**Move:** Rojan Chitrakar

**Second:** Xiaofei Wang

**Y/N/A:** 17/0/6, motion passes

**11-18/1170r1**

**Motion:**

Move to incorporate the proposed changes provided in document 11-18/1170r1 in the next draft of TGba.

**Move:** Rojan Chitrakar

**Second:** Alfred Asterjadhi

Motion passed by unanimous consent

**Motion to take the motion related to 11-18/1293r4 out of the table**

**Move:** Po-Kai

**Second:** Xaiofei

**Y/N/A: 18/0/0**

**11-18/1293r5**

**Motion:**

Move to incorporate the proposed changes in 11-18/1293r5 into the next revision of TGba draft.

**Move:** Taewon Song

**Second:** Suhwook Kim

**Y/N/A:** 15/0/4, motion passes

**11-18/1298r7**

**Motion:**

Move to incorporate the proposed change of 18/1298r7 into the next version of TGba Draft

**Move: Jeongki Kim**

**Second: Suhwook Kim**

**Y/N/A: 16/0/3**

**11-18/1317r1**

**Straw Poll:**

Do you support the Spec Text in this document 802.11-18/1317r1?

**Y/N/A: 16/0/8**

**11-18/1197r2**

**Straw Poll:**

Do you support the Spec Text in this document 802.11-18/1197r2?

**Y/N/A: 28/0/1**

**11-18/1197r3**

**Motion:**

Move to adopt the text in IEEE 802.11-18/1197r3 into the next 802.11ba Draft.

**Move: Steve Shellhammer**

**Second: John Notor**

Motion passed by unanimous consent

11-18/1317r2

**Motion:**

Move to incorporate the Spec Text in this document 802.11-18/1317r2 into the next TGba draft?

**Move:** Shahrnaz Azizi

**Second:** Po-Kai Huang

**Y/N/A:** 20/0/5, motion passes

Chair Yunsong asks about a status update for the MAC and PHY parts in order to determine whether it is reasonable to target Draft 1.0.

Po-Kai: Regarding MAC, the only one optional feature left relates to security (key negotiation).

Steve: Regarding PHY, cyclic shift is missing. We have now based on the pass motions removed the empty sections related to TX requirements. To conclude: Only minor things are missing.

Yunsong asks for opinions from the group.

**Q:** I believe it is good to move to 1.0 since it forces people to focus. I speak in favor for Draft 1.0

**Q:** I don’t think we are ready for Letter Ballot based on the PHY part. I don’t think there is anything to lose by having an internal review.

**Q:** I don’t think it makes a big difference, only that the comments are more or less visible for the outside of this group.

**Q:** I speak in favor of Draft 1.0.

**Q:** I like the comment collection. Although it gives a perception of delay, but at the end I don’t think the delay will be larger.

To collect and document the groups view, Yunsong decides to run some straw polls.

**TGba Draft Spec Status Review**

**Straw Poll 1:**

Do you support that TGba

* + instructs the Editor to generate TGba draft D1.0, and
  + requests the WG to initiate a WG LB on D1.0?

**Y/N/A:** 20/5/10

**Straw Poll 2:**

Do you support that TGba

* + instructs the Editor to generate TGba draft D0.4, and
  + requests the WG to initiate a WG Comment Collection on D0.4?

**Y/N/A:** 13/0/22

**Straw Poll 3:**

Do you support that TGba

* instructs the Editor to generate TGba draft D0.4, and
* revise TGba Timeline to have WG LB initiated after September meeting as a result of the September meeting

**Y/N/A:** 38/0/3

**Motion:**

**Move to**

* + instruct the Editor to generate TGba draft D0.4, and
  + revise TGba Timeline to have WG LB initiated after September meeting as a result of the September meeting

**Move:** John Notor

**Second:** Xiaofei Wang

**Y/N/A:** 33/0/0, motion passes

Based on the motion above, Yunsong proposes to update the TGba timeline as shown below. This is supported unanimously by the group. The updated timeline looks as shown below.

* **2017**
  + **January**: TGba formation meeting
* **2018**
  + **January**: TGba Draft 0.1
  + **September**: TGba Draft 1.0
* **2019:**
  + **January**: TGba Draft 2.0
  + **May**: MDR (mandatory document review)
  + **September**: formation of sponsor ballot pool
  + **November**: Sponsor ballot
* **2020**
  + **September**: RevCom

**Goal for September 2018:**

* Review and approve TGba D0.4
* Review technical presentations
* Review spec text documents for TGba D1.0
* Motion to initiate WG LB
* Review TG timeline

After a brief discussion regarding the need for parallel session in the September meeting, it is agreed that the group should request rooms for 5 TGba sessions + 4 PHY/MAC parallel sessions.

**Teleconference schedule:**

After a brief discussion, three 1 hour teleconferences were proposed at the following times:

* **July 30 (10:00 ET)**
* **August 13 (17:00ET)**
* **August 27 (23:00ET)**

**Motion:**

Move to approve the telco schedule

**Move:** Alfred Asterjadhi

**Second:** John Notor

Motion passed by unanimous consent

**Yunsong declares the meeting to be in recess at 3.28 pm.**

**Thursday, July 12 2018, 4:00-6:00 pm**

**Meeting Agenda:**

The meeting agenda is shown below, and published in the agenda document:

<https://mentor.ieee.org/802.11/dcn/18/11-18-1042-11-00ba-july-2018-tgba-agenda.pptx>

* Call meeting to order
* IEEE 802 and 802.11 IPR Policy and procedure
* Presentations:
  + 11-18-1020r4
  + 11-18-1017r1
* Next step
* Adjourn

**Yunsong calls the meeting to order at 4.00 pm. (About 35 persons in the room.)**

Yunsong reminds about recording the attendance.

Yunsong explains that this is a joint session with ARC SC and that ARC SC is represented by Mark Hamilton (Chair) and Joseph Levy (Vice-Chair) introduce themselves.

Yunsong ask Mark and Joseph if it is OK if the minutes of this session is taken by 802.11ba’s secretary. Mark and Joseph agree with this arrangement.

Yunsong goes through agenda and asks if there is any objection to approve the agenda? There is no objection and the agenda is approved.

Yunsong makes a Call for Potentially Essential Patents. No potentially essential patents reported and no questions asked.

**Presentations:**

**11-18/1020r4, “Discussion on WUR (802.11ba) States”, Joseph Levy (Interdigital):** The purpose with the joint session is to get a common view on how 11ba should be viewed from an architectural point of view. With this presentation, Joseph is asking for feedback on the current view of ARC SC.

The assumptions are detailed on Slide 3, especially how the AP and non-AP should behave when PS mode/WUR mode configurations are agreed.

**Q:** Onpage 3, I don’t feel the description is really accurate and I don’t like the term WUR PS mode.

**A:** We wanted to make a distinction of when the radio is operating in power save or if it is used for discovery.

**A:** If it is not aligned with the current thinking in 11ba, we need to align. This is not a proposal, but an attempt to align our views.

**Q:** On page 3, bullet 3 is not correct with respect to PS-poll.

**Q:** I don’t view it as we have two PS modes, but I believe we describe the same functionality in different ways.

**Q:** On page 5, I don’t like the terms Legacy PS Awake and Legacy PS Doze. It is better to explicitly say that the WUR is on or off.

**Q:** On page 5, do you say that the AP needs to keep track of which state?

**A:** Yes, when the non-AP STA is associated the AP keeps track of the non-AP STA’s state as agreed in the WUR setup and/or PS mode.

**Q:** In discovery, there are two states where both PCR and WUR can receive.

**A:** This is what we mean.

**Q:** I cannot really think of Legacy PS Awake, Doze, WURx Awake, Doze as four different states. I don’t understand why the AP needs to differentiate between these.

**A:** The thinking here is that it will be different in the sense that the AP needs to behave differently depending on which state the non-AP STA is in.

Joseph points out that it would be very helpful if people can review the state diagram on page 9 and see if they agree or if there is anything that seems to be incorrect.

**11-18/1017r1, “WUR Multi-AP reference model”, Mark Hamilton (Ruckus):**

Mark just wants to share some initial ideas about reference models and only little time is allocated to this presentation.

Discussion about next steps regarding 11ba and ARC SC information exchange.

It is suggested that 11ba review 18/1020, but given that 11ba is busy with preparing D0.4, we will not schedule any telco and will not have a joint meeting in September meeting.

**The meeting is adjourned at 6.03 pm.**