IEEE P802.11
Wireless LANs

|  |
| --- |
| IEEE 802.11ba Task GroupMeeting Minutes for March 2018 Meeting,Chicago, Il, USA |
| Date: 01-18-2018 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Leif Wilhelmsson | Ericsson AB | Mobilvägen 1, 22632 Lund, Sweden | +46-706-216956 | leif.r.wilhelmsson@ericsson.com |

Abstract

Meeting Minutes for the IEEE 802.11ba TG sessions held in Chicago, Il, USA, March 4-9, 2018.

**Monday, March 5, 2018, 8:00-10:00 am**

**Ad-hoc meeting Agenda:**

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

<https://mentor.ieee.org/802.11/dcn/18/11-18-0313-01-00ba-march-2018-tgba-agenda.pptx>

* Call Ad-hoc meeting to order
* TGba introduction
* Call for submissions
* Set Ad-hoc meeting agenda
* IEEE 802 and 802.11 IPR Policy and procedure
* Participation in IEEE 802 Meetings
* Presentations
* Adjourn

**Chair Minyoung Park (Samsung) calls meeting to order at 8.00 am. (**About 50 persons in the room.)

Minyoung reminds about the Meeting Protocol (slide 4).

Minyoung reminds about taking attendance.

Minyoung goes through the agenda document 11-17/0313r1.

**The Main agenda items for this week are (slide 8):**

* Review and approve TGba SFD and TGba D0.1
* Review spec text documents for TGba D0.2
* Review technical presentations
* Work on TGba task group documents
* Review TG timeline

There are 51 submissions for this meeting. These submissions are categorized and prioritized as shown on slide 9. Highest priority is given to contributions related to the creation of the specification text.

Since there are a relatively large number of contributions related to the PHY waveform, people are encouraged to talk off-line and try to merge proposals to save time.

Minyoung asks if any contribution is missing. No response.

Minyoung presents the agenda (page 23).

Minyoung asks if there are any questions on the agenda. No questions asked and the agenda is approved.

Minyoung goes through the slides “Participants have a duty to inform the IEEE” (slide 26) and “Ways to inform IEEE” (slide 27).

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

Minyoung goes through “Other Guidelines for IEEE WG meetings” (slide 28) and Patent-related information (slide 29).

Minyoung reads through “Participation in IEEE 802 Meetings” (slides 30), and encourage people to read through the references on slides 31-33.

**Summary from January 2018 Meeting and Teleconference Calls**

* Approved TGba Spec Framework Document (SFD)
	+ IEEE 802.11-17/575r8
* Approved PHY/MAC spec text documents to create TGba D0.1
* Reviewed technical presentations
* Reviewed the TG timeline
* Set goals for the March 2018 meeting
* Agenda: see doc.: IEEE 802.11-17/1862r8

**Presentations:**

**11-18/0408r0, “Spec Text for Channel Access, Duty Cycle Operation, and WUR Mode”, Po-Kai Huang (Intel):** Po-Kai goes through the updates that have been done since last time with respect to channel access, duty cycle operation, and WUR mode. The updates reflect the motions that have passed.

**Question/Comment (Q):** Is the association response the only way to indicate WUR support? I would prefer an alternative way as well to have the possibility to speed up the association.

**Answer (A):** It follows the TWT approach. Are you fine with the text and want to add something, or do you want delay the current text describing piggy-backing? If you see problems, I will just remove the corresponding parts of the document.

Minyoung comments that the specification needs to have a section about architecture, and it has been suggested to have this in place before the D1.0.

**11-18/0414r0,” Proposed spec text for D0.1” Alfred Asterjadhi (Qualcomm):** Alfred goes through the changes from D0.1, which basically are based on passed motions.

**11-18/0468r0, “Spec Text for Frame Body in WUR Wake Up Frame”, Jeongki Kim (LGE)**

**11-18/0472r0, “Discussion on Group ID Structure”, Lei Huang (Panasonic)**

**Straw Polls deferred.**

**11-18/0464r0, “Address field in WUR frame”, Jeongki Kim (LGE):**

**Q:** It seems you suggest that all APs should use the same special value. I believe the special value should be different for different APs, and randomly generated in order to reduce the risk waking up a WUR of a different BSS.

**Straw Poll deferred.**

**11-18/0170r3, “Wake Up Frame to Indicate Group Addressed Frames Transmission”, Jarkko Kneckt (Apple): page4, summary**

**Q:** Seems to me that one indication should suffice, but you propose 16?

**A:** We believe that having only one address to indicated a group address may wake up a WUR unnecessarily often.

**The ad-hoc meeting is adjourned at 10.00am.**

**Monday, March 5, 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/18/11-18-0313-03-00ba-march-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 January 2018 meeting
* Motion: January 2018 meeting (doc: IEEE 802.11-18/270r0) and teleconference minutes (doc: IEEE 802.11-18/322r2)
* TGba Spec Framework Document review and approval
* TGba D0.1 review and approval
* Presentations, Recess

**Chair Minyoung Park (Samsung) calls meeting to order at 4.00 pm. (**About 100 persons in the room.)

Minyoung reminds about attendance.

Minyoung goes through the agenda for the week and asks if there are any questions or comments. No response.

**Motion:** Move to approve the agenda

**Move: Yunsong Yang**

**Second: Po-Kai Huang**

Motion passed by unanimous consent.

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

Minyoung goes through “Other Guidelines for IEEE WG meetings” (slide 28) and Patent-related information (slide 29).

Minyoung reads through “Participation in IEEE 802 Meetings” (slides 30), and encourage people to read through the references on slides 31-33.

**Summary from January 2018 Meeting and Teleconference Calls** (Page 34)

* Approved TGba Spec Framework Document (SFD)
	+ IEEE 802.11-17/575r8
* Approved PHY/MAC spec text documents to create TGba D0.1
* Reviewed technical presentations
* Reviewed the TG timeline
* Set goals for the March 2018 meeting
* Agenda: see doc.: IEEE 802.11-17/1862r8

**Motion - Minutes:**

* Approve TGba minutes of January 2018 meeting [doc: IEEE 802.11-18/270r0] and teleconference calls [doc: IEEE 802.11-18/322r2]

**Move:** Yunsong Yang

**Second:** Eunsung Park

Motion passed by unanimous consent.

**TGba Documents Review and Approval**

* TGba Spec Framework Document (Po-Kai Huang)
* TGba D0.1 (Po-Kai Huang)

**11-18/0575r9, “Specification Framework for TGba” Po-Kai Huang (Intel) :** Po-Kai goes through the updates to SFD, which are based on the passed motions.

**Motion: Move to approve 11-18/0575r9 as the latest revision of the SFD.**

**Move: Po-Kai Huang**

**Second: Ming Gan**

Motion passed by unanimous consent.

**Motion: Move to approved P802.11ba D0.1 as the initial draft of TGba.**

**Move: Po-Kai Huang**

**Second: Ming Gan**

Motion passed by unanimous consent.

**Presentations:**

**11-18/0514, “Addressing in WUR frames”, Alfred Asterjadhi (Qualcomm):**

* + We propose rules on how to select the above identifiers to ensure that
		- The values selected by the AP for these identifiers are as random as possible
		- The management of identifiers is as simple as possible (and inline with existing PCR architecture)
		- The memory requirement for storing these identifiers is as low as possible

**Q:** What is the size of the BSSID and the Embedded BSSID? Can we improve by increasing the size of the Embedded BSSID?

**A:** BSSID is 48 bits. Embedded BSSID is 16 bits. The randomness is still limited by the length of the FCS.

**Straw Polls are deferred.**

**11-18/0507r0, “Discussion on WUR identifiers”, Woojin Ahn (WILUS):**

**Straw Polls are deferred.**

**11-18/0465r1, “Length/Misc. field in WUR frame”, Jeongki Kim (LGE):**

**Straw Poll:** (Note: the SP contains a figure to further explain the text. Please see the presentation if the text is found unclear.)

* Do you agree the following?
* If the Frame Body presence subfield of FC field in MAC header is 1, the 3 bits Length/Misc subfield indicates the length of the Frame Body. Otherwise, it indicates the Misc.

**Y/N/A: 10/3/26**

**11-18/0466r0, “Length field in WUR frame”, Jeongki Kim (LGE):**

**Straw Poll is deferred.**

**11-18/0515r1, “FCS size for WUR frames”, Alfred Asterjadhi (Qualomm):**

**Straw Poll 1:**

* Do you support to add the following to the TGba SFD:
	+ The FCS field of all WUR frames has the same size

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

**Straw Poll 2:**

* Which option do you support for the FCS field length?
	+ Option 1: 8 bits
	+ Option 2: 16 bits

**Option1/Option2: 7/27**

**Straw Poll 3:**

* **Do you support to amend the following text in the TGba SFD?**
	+ **The CRC of WUR frames shall use the 16-bit CRC engine from IEEE 802.11**

**Y/N/A: 27/0/7**

**Recess at 6.00 pm.**

**Monday, March 5, 2018, 7:30-9:30 pm**

**Meeting Agenda:**

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

<https://mentor.ieee.org/802.11/dcn/18/11-18-0313-04-00ba-march-2018-tgba-agenda.pptx>

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

**Chair Minyoung Park (Samsung) calls meeting to order at 7.30 pm. (**About 65 persons in the room.)

Minyoung reminds about attendance.

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

**Presentations:**

**11-18/0416r0, “Sync Bit Duration Text Motion” Steve Shellhammer (Qualcomm):** Steve presents the text that will be motioned on Thursday. No questions asked on the text.

**11-18/0436r1, “Proposed Changes to WUR PHY Specification”, Justin Jia (Huawei):** The document contains proposed changes towards the Section “32.3.6 Timing related parameters” and “32.4.2 TXTIME and PSDU length calculation” of “IEEE P802.1ba D0.1”.

**11-18/0435r1, “WUR Preamble Sequence Design and Performance Evaluation”, Justin Jia (Huawei):**

**Straw Poll:**

* Do you support to use S3 to construct the short preamble sequence $[\overbar{S}]$ and the long preamble sequence $[S S]$?
	+ S3 = [1 0 1 0 0 1 0 0 1 0 1 1 1 0 1 1 0 0 0 1 0 1 1 1 0 0 1 1 1 0 0 0];

where the bit duration is 2 us.

$- \overbar{S}$ is the complementary sequence of S.

**Y/N/A: 23/1/25**

**11-18/0504r1, “Evaluation of WUR sync sequence” Dongguk Lim (LGE):** Proposes that the SYNC field should start with alternating 1010 or 0101 patterns.

**Straw Poll is withdrawn.**

**11-18/0145r2, “Discussion of (how to specify) some TX and RX requirements for 802.11ba”, Leif Wilhelmsson (Ericsson):** The presentation discussed how to specify some TX and RX requirements.

**Straw Poll 1:**

* Do you believe the transmitter spectrum mask should be the same as today used for 20 MHz 802.11ac?

**Y/N/A: 20/1/9**

**Straw Poll 2:**

* Do you support the idea of specifying the transmitter accuracy by means of an eye-diagram? Exactly how is TBD, but a possibility would be to specify zero-crossings and max eye-opening as discussed in this presentation

**Y/N/A: 1/11/26**

**Straw Poll 3:**

* Do you believe only one sensitivity requirement should be specified for the lower rate, even if this means different relative ranges for the PCR and the WUR in different parts of the world?

**Y/N/A: 13/0/19**

**Straw Poll 4:**

* If only one sensitivity requirement is specified for the lower rate, what is the number you prefer?

**OP1: -82dBm/OP2: -86dBm/OP3: -89dBm/OP4: Something else/OP5: No opinion: 17/2/0/0/6**

**Straw Poll 5:**

* Assume that ACR is specified independent of what maximum TX power can be used. ACR is measured in the same way as for the PCR and the interfering signal is also the same as for the PCR. What do you believe the ACR for lower data rate should be?

**OP1: 16dB/OP2: 20dB/OP3: 23dB/OP4: Something else/OP5: No opinion: 25/0/0/0/5**

**Straw Poll 6:**

* Do you support that the maximum input level is the same as for the PCR?

**Y/N/A: 29/0/3**

**Recess at 9.30 pm.**

**Tuesday, March 6, 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/18/11-18-0313-04-00ba-march-2018-tgba-agenda.pptx>

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

**Chair Minyoung Park (Samsung) calls meeting to order at 1.30 pm. (**About 80 persons in the room.)

Minyoung reminds about attendance.

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

**Presentations:**

**11-18/0453r3, “Concluding Remarks P-OOK”, Dennis Sundman (Ericsson):** Dennis summarizes the results for P-OOK and also report results for a power detector rather than an envelope detector. What is also studied is the impact of using a larger receive window than the duration of the transmitted signal’s ON period.

Q: How to you define transmit window and receive window?

A: The duration of the pulse, and effectively how many samples are summed.

Q: Harder to decode because there are different samples for ON and OFF

A: No, the number of samples are exactly the same. This is essential, and this is also why the implementation complexity is the same.

**11-18/0460r1, “On OOK Waveform Specification”, Alphan Sahin (Interdigital):** It is suggested to specify a mask for the transmitted signal so that companies are free to use any waveform they want to generate the ON signal, provided the waveform fulfills the mask.

**Q:** How do you harmonize this with what we currently have in the spec, where we talk about populating 13 sub-carriers?

**A:** Basically, I just wanted to present an alternative way to specify the transmitter which would allow for more freedom for an implementation without sacrificing the performance.

**Q:** We spent a long time on specifying the waveform, and as I understand it you basically suggest to start over from scratch. I wonder how long time it would take to reach consensus using this approach.

**A:** I don’t think it will take much time, it is just a question of weeks.

**Straw Poll 1:**

* Do you agree that the time parameters of ideal Manchester coded OOK symbols for HDR in 802.11ba PHY specification should be defined with the following parameters:

$T\_{GI}^{HDR}$,$T\_{o}^{HDR}$,$T\_{data}^{HDR}$, and$ T\_{active}^{HDR}$ (as shown in page 12)

**Y/N/A: 4/12/19**

**11-18/0422r1, “Performance Investigation on Partial OOK Follow-up”, Eunsung Park (LGE)**

**Q:** Do you consider synchronization? Because I believe we are sync-limited.

**A:** Yes, we include synchronization.

**Q:** I don’t feel comfortable with less than 2 us, so I don’t like this for the high data rate.

**Straw Poll 1:**

Do you agree to add the following in the TGba SFD?

* Partial OOK which shortens the on-signal duration by a half length may be applied to the WUR Data field for the low data rate
	+ Power of the shortened on-signal duration can be boosted up to two times

**Y/N/A: 18/25/7**

**Straw Poll 2 is withdrawn.**

**11-18/0421r0, “OOK Waveform Generation Follow-up”, Eunsung Park (LGE):**

**Q:** On slide 6, do you have an explanation why the signal generated by 64-QAM and 256-QAM give the worst result.

**A:** I believe it is because the power is concentrated to a single sub-carrier.

**Q:** I don’t believe your conclusion is correct when you state that it is bad to use a higher modulation order to design the signal. It all depends on how you do it.

**Recess at 3.27 pm.**

**Wednesday, March 7, 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/18/11-18-0313-04-00ba-march-2018-tgba-agenda.pptx>

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

**Chair Minyoung Park (Samsung) calls meeting to order at 1.30 pm. (**About 60 persons in the room.)

Minyoung reminds about attendance.

Minyoung goes though the agenda. This session will be denoted to MAC and the intention is to go through the deferred straw polls.

Minyoung goes through the agenda and asks if there are any questions. No questions asked.

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

**Presentations:**

**11-18/0520r2, “Spec Text for Frame Body in WUR Wake Up Frame”, Guoqing Li (Apple):** Text is provided for the specification which reflects the motions that have passed. A few minor editorial comments on the text are received.

**11-18/0169r3, “Power Efficiency for Individually Addressed Frames Reception”, Jarkko Kneckt (Apple):**

**Straw Poll:**

Do you agree to add to the 802.11ba SFD a text as shown below:

R.4.7.2.C: A STA and an AP may reuse existing traffic filter sets to control the Wake Up frame transmission. The AP should not to send a Wake Up frame to a STA in WUR mode when the AP obtains a DL frame that matches one or more traffic filter sets that configure not to send a Wake Up frame.

**Y/N/A: 15/0/13**

**11-18/0244r3, “Advertising WUR Discovery Frame Related Info for Fast Scanning”, Kaiying Lv (ZTE).** The presentation has been given in one of the teleconferences.

**Straw Poll 1:** Not run.

**Straw Poll 2:**

Add to SFD:

* *R.4.8.B: Following information about APs’ WUR Discovery frames may be provided by the PCR:*
	+ *WUR Discovery Channel:*
		- *Should be selected from a fixed subset of all possible WUR channels*
	+ *Other information: TBD,*

**Y/N/A: 16/3/12**

**11-18/0356r2, “Compressed SSID for WUR Discovery Frame” Kiseon Ryu (LGE):**

**Straw Poll 1:**

Do you agree to re-use existing CRC in the baseline spec (which CRC is TBD) to generate compressed SSID?

**Y/N/A: 17/0/7**

**11-18/0472r1, “Discussion on Group ID Structure” Lei Huang (Panasonic):**

**Straw Poll 1:**

Do you support to add the following into 11ba SFD?

* The value range of Group ID is a subset of consecutive values of identifier’s space

**Y/N/A: 11/0/12**

**Straw Poll 2 withdrawn.**

**11-18/514r0, “Addressing in WUR frames”, Alfred Asterjadhi (Qualcomm):**

**Straw Poll 1:**

Do you support to add the following to the TGba SFD?

* + The Transmit ID is algorithmically obtained from the BSSID
	+ The Embedded BSSID is algorithmically obtained from the BSSID

**Y/N/A: 16/0/9**

**Straw Poll 2:**

Do you support to add the following to the TGba SFD?

* A STA that declares support of Group IDs is required to store at least one group ID and shall declare the Group ID bitmap size that it is capable of storing

**Y/N/A: 16/0/9**

**11-18/0464r1, “Address field in WUR frame” Jeongki Kim (LGE)**

**Straw Poll 1:**

Do you agree the following?

* + The Address field of WUR Wake Up frame is set to a value of TBD for indicating that the AP intends to transmit group addressed frames
		- Whether the TBD vale is fixed or randomized is TBD

**Y/N/A: 15/0/7**

**11-18/0507r2, “Discussion on WUR identifiers” Woojin Ahn (WILUS)**

**Straw Poll 1:**

Do you agree to add the following in the SFD?

* + Transmit ID is selected from a subset of 12-bit values
	+ The 12-bit values in the subset are not used for Wake-up ID and Group ID assignment

**Y/N/A: 4/9/11**

**Straw Poll 2 withdrawn**

**11-18/0412r1, “BSSID Information in FCS” Liwen Chu (Marvell):** The presentation is about that the concept with embedded SSID does work for frames outside of the BSS.

**Q:** If a frame is vendor specific, maybe the vendor can decide so you would not need this.

**Q:** You say that the frame type can be used to decide? It seems the vendor specific type is the only case where this work.

**Straw Poll 1:**

Do you agree that

* in Beacon, Wakeup frame, the embedded BSSID is used for the FCS calculation,
* in Discovery frame, the embedded BSSID is not used for the FCS calculation,
* In Vendor Specific frame, it is up to the vendor to decide how to define the FCS calculation rules

**Y/N/A: 23/0/6**

**11-18/0440r2, “TBD clarification for TGba D0.1 (WUR Beacon)”, Kiseon Ryu (LGE):**

**Q:** I don’t really see the benefit of using Option 1, except that you can save 1 byte.

**Q:** I agree the with the previous comment. I also believe Option 2 is preferred.

**Straw Poll 1:**

Do you agree to the followings?

* + WUR Beacon Period subfield indicates WUR beacon period directly with the unit of TU

**Y/N/A:** 15/0/1

**Straw Poll 2 is withdrawn.**

**11-18/0405r0, “Operation after Wake-up Frame Transmission and Reception”, Po-Kai Huang (Intel):** The presentation is concerned with the operation of the AP (resp. non-AP STA) after transmitting (resp. receiving) the wake-up frame. The suggestion is that one should reuse the PCR operation as much as possible, rather than defining new operation on top of different power save protocols.

**Recess 3.36 pm.**

**Wednesday, March 7, 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/18/11-18-0313-06-00ba-march-2018-tgba-agenda.pptx>

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

**Chair Minyoung Park (Samsung) calls meeting to order at 4.00 pm. (**About 40 persons in the room.)

Minyoung reminds about attendance.

Minyounggoes though the agenda.

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

**Presentations:**

**11-18/0405r0, “Operation after Wake-up Frame Transmission and Reception”, Po-Kai Huang (Intel):** This is acontinuation of the presentation from the previous session.

**Straw Poll 1:**

Do you support the following:

* A non-AP STA that receives a wake-up frame that satisfies condition 1 shall follow existing PCR operation to retrieve individually addressed buffered BU(s)
	+ (Condition 1) The wake-up frame is either an individual addressed wake-up frame that addresses the non-AP STA, or a wake-up frame that contains a group ID that identifies a group of non-AP STAs of which the non-AP STA is a member, or a wake-up frame with a list of WIDs in frame body where one of the WIDs identifies the non-AP STA
* A non-AP STA that receives a wake-up frame with an indication of buffered group addressed BU(s) shall follow existing PCR operation to receive group addressed BU(s)
* A non-AP STA that receives a wake-up frame with an indication to check PCR beacon shall follow existing PCR operation to attempt to receive the PCR Beacon information

**Y/N/A: 8/0/7**

**Straw Poll 2:**

Do you support the following:

* An AP that transmits a wake-up frame addressed to a non-AP STA and satisfying condition 1 shall follow existing PCR operation to deliver individually addressed buffered BU(s)
	+ (Condition 1) The wake-up frame is either an individual addressed wake-up frame that addresses the non-AP STA, or a wake-up frame that contains a group ID that identifies a group of non-AP STAs of which the non-AP STA is a member, or a wake-up frame with a list of WIDs in frame body where one of the WIDs identifies the non-AP STA
	+ AP shall schedule for transmission through PCR to the non-AP STA if one of the following conditions is met:
		- The PCR transition delay indicated by the non-AP STA in the WUR Capabilities elements following the most recent transmitted wake-up frame intended to the non-AP STA has expired
		- The non-AP STA has indicated it is in awake state after transmitting a frame through the PCR to the AP
		- Note that the transmission is not limited to the individually addressed buffered BU(s)

**Y/N/A: 11/0/5**

**Straw Poll 3:**

Do you support the following:

* An AP that transmits a wake-up frame indicating group addressed buffered BU(s) shall follow existing PCR operation to deliver group addressed buffered BU(s)
	+ AP shall schedule for transmission of group addressed buffered BU(s) through PCR if the following condition is met:
		- The maximum PCR transition delay indicated by all the non-AP STAs in the WUR Capabilities elements, that are not in awake state and have negotiated WUR service with AP, following the most recent transmitted wake-up frame indicating buffered group addressed BU(s) of PCR has expired

**Y/N/A: 10/0/5**

**11-18/0479r2, “MC-OOK Symbol Design”, Miguel Lopez (Ericsson):** A methodology is presented to generate a waveform with suitable properties which is not based on trial and error of different inputs at the IFFT.

**Q:** Does the difference in performance change at another operating point?

**A:** Not noticeably.

**Q:** No need to have better PAR than the legacy part.

**A:** It may be possible as discussed yesterday. I believe this really depends on your TX architecture.

**Q:** What detector do you have?

**A:** Envelope detector as agreed in the Simulation Evaluation document.

**Straw Poll:**

Do you support the specification of the frequency domain symbols corresponding to the MC-OOK waveforms?

**Y/N/A: 5/8/8**

**11-18/0418r0, “Simulation on the Effect of OFDM Symbol Design” Steve Shellhammer (Qualcomm):** Based on simulations it is found that which ones of the waveforms performs best depends on what the channel looks like. Since this makes it hard to agree on what it the optimum waveform, it is suggested to leave the waveform to be implementation specific.

**11-18/0492r2, “2 us OOK waveform generation”, Vinod Kristem (Intel):** The presentation compares two waveforms for the 2us OOK waveform, which are generated in two different ways. In the first case, time-masking of a 4us waveform is used, whereas in the second case the generation is based on using a 32-point FFT.

**11-18/0421r0, “OOK Waveform Generation Follow-up”, Eunsung Park (LGE)**

**Straw Poll 1:**

* Do you agree to add the following to the TGba SFD?
	+ The following process is applied to generate 2us on-signal for the high data rate
		- Apply a 7-length sequence to every other subcarrier in contiguous 13 subcarriers, i.e. 1st,3rd,5th,7th,9th,11th and 13th subcarriers and set the others to zero
			* The center coefficient of 7 length sequence is zero
		- Perform 64-point IFFT with the subcarrier spacing of 312.5KHz and choose either the first or second 1.6us signal in a 3.2us signal with 1.6us periodicity
		- Prepend 0.4us GI

**Y/N/A:** **5/6/14**

**11-18/0413r2: “Discussion on WUR Multi-Antenna Transmission”, Rui Cau (Marvell):** The contribution discusses the feasibility to adopt CSD in case multiple antennas are available at the transmitter. The performance is simulated for different CSD values.

**Recess 6.00 pm.**

**Thursday, March 8, 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/18/11-18-0313-07-00ba-march-2018-tgba-agenda.pptx>

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

**Chair Minyoung Park (Samsung) calls meeting to order at 10.36 am. (**About 110 persons in the room.)

Minyoung reminds about attendance.

Minyounggoes though the agenda. No discussion on the agenda.

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

**Presentations:**

**11-18/0413r2: “Discussion on WUR Multi-Antenna Transmission”, Rui Cau (Marvell):** The presentation was made in the previous session, and this is a continuation with time for Q&A.

**Q:** The channel that is knows from the PCR may probably have changed when you send wake-up signal, so beamforming may not be feasible.

**A:** I agree. It will depend on the environment, and if it is rather static it may still be useful.

**Q:** You have 1us of delay, which seems to be rather large as it corresponds to 4 samples at 4 MHz.

**A:** Which delay is optimal depends. It is not always this choice is the best delay to use for the CSD.

**Q:** I have heard people saying that a large shift may cause a synchronization problem. Do you believe this is the case?

**A:** It may have.

**Q:** We have also looked into this, and we did not really see any problems concerning synchronization.

**A:** I agree in principle, but there may be other effects relating to how you do the correlation and comparing to a threshold.

**Motions:**

**11-18/0416r1, “Sync Bit Duration Text Motion,” Steve Shellhammer (Qualcomm)**

**Motion:**

Move to make the following changes to Draft 0.1

**32.3.8.3.3 WUR-Sync field for Low Data Rate**

For LDR, the WUR-Sync field is constructed as a multicarrier on-off keying (MC-OOK) signal. The OOK signal is constructed by concatenating two copies of the ~~sequence TBD~~ 32-bit sequence W, where each bit in the sequence ~~is~~ has duration ~~TBD~~ 2 μs. ~~The bit sequence~~ , and W is defined in Equation (32-2).

**32.3.8.3.4 WUR-Sync field for High Data Rate**

For HDR, the WUR-Sync field is constructed as a multicarrier on-off keying (MC-OOK) signal. The OOK signal is constructed as the bit-wise complement of the ~~sequence TBD~~ 32-bit sequence W, where each bit in the sequence ~~is~~ has duration ~~TBD~~ 2 μs, and W is defined in Equation (32-2).

**Move: Steve Shellhammer**

**Second: Jia Jia**

Motion passed by unanimous consent.

**11-18/0145r3, “Discussion of (how to specify) some TX and RX requirements for 802.11ba”, Leif Wilhelmsson (Ericsson)**

**Motion 1:**

Move to add the following into the 11ba SFD:

The transmitter spectrum mask for the WUR transmitter should be the same as today used for 20 MHz 802.11ac.

**Move: Leif Wilhelmsson**

**Second: Rui Yang**

Motion passed by unanimous consent.

**Motion 2:**

Move to add the following into the 11ba SFD:

The sensitivity requirement for the lowest rate of the WUR is

-82dBm.

**Move: Leif Wilhelmsson**

**Second: Steve Shellhammer**

Motion passed by unanimous consent.

**Motion 3:**

Move to add the following into the 11ba SFD:

The adjacent channel rejection (ACR) is measured in the same way as for the PCR and the interfering signal is also the same as for the PCR.

The adjacent channel rejection (ACR) requirement for the lowest rate of the WUR is 16dB.

**Move: Leif Wilhelmsson**

**Second: Ming Gan**

Motion passed by unanimous consent.

**Motion 4:**

Move to add the following into the 11ba SFD:

The requirement on the received signals maximum input level is the same as for the PCR.

**Move: Leif Wilhelmsson**

**Second: Eduard Garcia**

Motion passed by unanimous consent.

**11-18/435r3, “WUR Preamble Sequence Design and Performance Evaluation”, Justin Jia Jia (Huawei)**

**Motion 2:**

Move to make the following changes in P802.11ba D0.2:

* 32.3.8.3.3 WUR-Sync field for Low Data Rate
	+ $W=\left\{TBD,TBD,…,TBD\right\}$ $W=[1 0 1 0 0 1 0 0 1 0 1 1 1 0 1 1 0 0 0 1 0 1 1 1 0 0 1 1 1 0 0 0] $ (32-2)
* 32.3.8.3.4 WUR-Sync field for High Data Rate
	+ $\overbar{W}=\left\{TBD,TBD,…,TBD\right\}$ $\overbar{W}=[0 1 0 1 1 0 1 1 0 1 0 0 0 1 0 0 1 1 1 0 1 0 0 0 1 1 0 0 0 1 1 1] $ (32-3)

**Move: Jia Jia**

**Second: Ming Gan**

Motion passed by unanimous consent.

**11-18/568r1, “Spec Text Motion”, Justin Jia Jia (Huawei)**

**Motion:**

Move to adopt the spec text changes in doc.: IEEE 802.11-18/00436r2 into the draft IEEE P802.1ba D0.1?

**Move: Jia Jia**

**Second: Ross Yu**

Motion passed by unanimous consent.

**Motion:**

Move to adopt spec text in 11-18/0520r5 into TGba D0.1

**Move: Guoqing Li**

**Second: Alfred Asterjadhi**

Motion passed by unanimous consent.

**Motion:**

Move to adopt the spec text in document 11-18/0408r1 into TGba D0.1.

**Move: Po-Kai Huang**

**Second: Peter Loc**

Motion passed by unanimous consent.

**11-18/405r2, “Operation after Wake-up Frame Transmission and Reception”, Po-Kai Huang (Intel)**

**Motion 1:**

Move to add the following into TGba SFD:

* A non-AP STA that receives a wake-up frame that satisfies condition 1 shall follow existing PCR operation to retrieve individually addressed buffered BU(s)
	+ (Condition 1) The wake-up frame is either an individual addressed wake-up frame that addresses the non-AP STA, or a wake-up frame that contains a group ID that identifies a group of non-AP STAs of which the non-AP STA is a member, or a wake-up frame with a list of WIDs in frame body where one of the WIDs identifies the non-AP STA
* A non-AP STA that receives a wake-up frame with an indication of buffered group addressed BU(s) shall follow existing PCR operation to receive group addressed BU(s)
* A non-AP STA that receives a wake-up frame with an indication to check PCR beacon shall follow existing PCR operation to attempt to receive the PCR Beacon information

**Move: Po-Kai Huang**

**Second. Peter Loc**

Motion passed by unanimous consent.

**Motion 2:**

Move to add the following into TGba SFD:

* An AP that transmits a wake-up frame addressed to a non-AP STA and satisfying condition 1 shall follow existing PCR operation to deliver individually addressed buffered BU(s)
	+ (Condition 1) The wake-up frame is either an individual addressed wake-up frame that addresses the non-AP STA, or a wake-up frame that contains a group ID that identifies a group of non-AP STAs of which the non-AP STA is a member, or a wake-up frame with a list of WIDs in frame body where one of the WIDs identifies the non-AP STA
	+ AP shall schedule for transmission through PCR to the non-AP STA if one of the following conditions is met:
		- The PCR transition delay indicated by the non-AP STA in the WUR Capabilities elements following the most recent transmitted wake-up frame intended to the non-AP STA has expired
		- The non-AP STA has indicated it is in awake state after transmitting a frame through the PCR to the AP
		- Note that the transmission is not limited to the individually addressed buffered BU(s)

**Move: Po-Kai Huang**

**Second: Alfred Asterjadhi**

Discussion on the motion and in particular if “one of the following conditions” should be changed to “any of the following conditions”

**Motion to table Motion 2:**

Move to table the Motion2 in document 11-18/405r2

**Move: Yongho Seok**

**Second: Kieson Ryu**

Y/N/A: 17/0/14, motion passes

Motion 2 is updated reflecting the discussion. New document number: 11-18/0405r4

**Motion 2:**

Move to add the following into TGba SFD:

* An AP that transmits a wake-up frame addressed to a non-AP STA and satisfying condition 1 shall follow existing PCR operation to deliver individually addressed buffered BU(s)
	+ (Condition 1) The wake-up frame is either an individual addressed wake-up frame that addresses the non-AP STA, or a wake-up frame that contains a group ID that identifies a group of non-AP STAs of which the non-AP STA is a member, or a wake-up frame with a list of WIDs in frame body where one of the WIDs identifies the non-AP STA
	+ If AP schedule a transmission to the non-AP STA, AP shall schedule the transmission through PCR to the non-AP STA if any of the following conditions is met:
		- The PCR transition delay indicated by the non-AP STA in the WUR Capabilities elements following the most recent transmitted wake-up frame intended to the non-AP STA has expired
		- The non-AP STA has indicated it is in awake state after transmitting a frame through the PCR to the AP
		- Note that the transmission is not limited to the individually addressed buffered BU(s)

**Move: Po-Kai Huang**

**Second Ming Gan**

Motion passed by unanimous consent.

**Motion 3:**

Move to add the following into TGba SFD:

* An AP that transmits a wake-up frame indicating group addressed buffered BU(s) shall follow existing PCR operation to deliver group addressed buffered BU(s)
	+ AP shall schedule for transmission of group addressed buffered BU(s) through PCR if the following condition is met:
		- The maximum PCR transition delay indicated by all the non-AP STAs in the WUR Capabilities elements, that are not in awake state and have negotiated WUR service with AP, following the most recent transmitted wake-up frame indicating buffered group addressed BU(s) of PCR has expired

**Move: Po-Kai Huang**

**Second: Alfred Asterjadhi**

Motion passed by unanimous consent.

**11-18/0412r3, “BSSID Information in FCS”, Liwen Chu (Marvell)**

**Motion:**

* Move to add the following text to 11ba SFD
	+ in Beacon, Wakeup frame, the embedded BSSID is used for the FCS calculation,
	+ in Discovery frame, the embedded BSSID is not used for the FCS calculation,
	+ In Vendor Specific frame, it is up to the vendor to decide whether to include or not the embedded BSSID in the FCS calculation

**Move: Liwen Chu**

**Second: Alfred Asterjadhi**

Motion passed by unanimous consent.

**11-18/0472r2, “Discussion on Group ID Structure”, Lei Huang (Panasonic)**

**Motion:**

* Move to add the following into 11ba SFD
	+ The value range of Group ID is a subset of consecutive values obtained from the identifier’s space

**Move: Lei Huang**

**Second: Alfred Asterjadhi**

Motion passed by unanimous consent.

**Motion:**

Move to incorporate the changes proposed in 11-18/0414r2 to the 802.11ba D0.1?

**Move: Alfred Asterjadhi**

**Second: Leif Wilhelmsson**

Motion passed by unanimous consent.

**11-18/0514r2, “Addressing in WUR frames”, Alfred Aterjadhi (Qualcomm)**

**Motion 1:**

* Move to add the following to the TGba SFD?
	+ The Transmit ID is algorithmically obtained from the BSSID
	+ The Embedded BSSID is algorithmically obtained from the BSSID

**Move: Alfred Asterjadhi**

**Second: Leif Wilhelmsson**

Motion passed by unanimous consent.

**Motion 2:**

* Move to add the following to the TGba SFD?
	+ A STA that declares support of Group IDs is required to store at least one group ID and shall declare the Group ID bitmap size that it is capable of storing

**Move: Alfred Asterjadhi**

**Second: Leif Wilhelmsson**

Motion passed by unanimous consent.

**11-18/0515r2, “FCS size for WUR frames”, Alfred Asterjadhi (Qualcomm)**

**Motion 1:**

* Move to add the following to the TGba SFD:
	+ The FCS field of all WUR frames has the same size.

**Move: Alfred Asterjadhi**

**Second: Leif Wilhelmsson**

Motion passed by unanimous consent.

**Motion 2:**

* Move to add to the TGba SFD:
	+ The FCS field size of all WUR frames is 16 bits.

**Move: Alfred Asterjadhi**

**Second: Leif Wilhelmsson**

Motion passed by unanimous consent.

**Motion 3:**

* Move to amend the following text in the TGba SFD?
	+ The CRC of all WUR frames shall use ~~one of the following~~ the 16-bit CRC engines from IEEE 802.11
		- ~~32-bit CRC, 16-bit CRC, 8-bit CRC~~

**Move: Alfred Asterjadhi**

**Second: Leif Wilhelmsson**

Motion passed by unanimous consent.

**11-18/0356r4, “Compressed SSID for WUR Discovery Frame”, Kiseon Ryu (LGE)**

**Motion:**

* Move to add the following text to the TGba SFD.
	+ Compressed SSID (C-SSID) is based on an existing CRC over the SSID in the baseline spec (which CRC is TBD).

**Move: Kiseon Ryu**

**Second: Jeongki Kim**

Motion passed by unanimous consent.

**18/440r2, “TBD clarification for TGba D0.1 (WUR Beacon)”, Kiseon Ryu (LGE)**

**Motion:**

* Move to add the following text to the TGba SFD
	+ WUR Beacon Period subfield indicates the WUR beacon period directly with the unit of TU.

**Move: Kiseon Ryu**

**Second: Jeongki Kim**

Motion passed by unanimous consent.

**11-18/0244r4, “Advertising WUR Discovery Frame Related Info for Fast Scanning”, Kaiying Lv (ZTE)**

**Motion:**

* Move to add the following text to the TGba SFD
* *R.4.8.B: Following information about APs’ WUR Discovery frames may be provided by the PCR :*
	+ *WUR Discovery Channel:*
		- *Should be selected from a fixed subset of all possible WUR channels*

**Move: Kaiying Lv**

**Second: Guoqing Li**

Motion passed by unanimous consent.

**Thursday, March 8, 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/18/11-18-0313-08-00ba-march-2018-tgba-agenda.pptx>

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

**Chair Minyoung Park (Samsung) calls meeting to order at 1.36 pm. (**About 30 persons in the room.)

Minyoung reminds about attendance.

Minyounggoes though the agenda. No discussion on the agenda.

**Motions:**

**11-18/0465r3, “Length/Misc. field in WUR frame”, Jeongki Kim (LGE)**

**Motion 1: (Note: there is a figure in the motion. See contribution for details)**

* Move to modify the following figure in TGba SFD as follows and add the following text to the TGba SFD
	+ If the Frame Body presence subfield is 1, the Length/Misc subfield indicates the length of the Frame Body. Otherwise, the Length/Misc subfield indicates the Misc.

**Move: Jeongki Kim**

**Second: Kiseon Ryu**

Motion passed by unanimous consent.

**11-18/0464r3, “Address field in WUR frame”, Jeongki Kim (LGE)**

**Motion 1:**

* Move to add the following to the TGba SFD
	+ The Address field of WUR Wake Up frame is set to a TBD value for indicating that the AP intends to transmit group addressed frames
		- Whether the value is fixed or randomized is TBD

**Move: Jeongki Kim**

**Second: Kiseon Ryu**

Motion passed by unanimous consent.

**Motion:**

Move to adopt the spec text in doc 11-18/0468r0 into 11ba draft D0.1

**Move: Jeongki Kim**

**Second: Kiseon Ryu**

Motion passed by unanimous consent.

**11-18/0169r3, “Power Efficiency for Individually Addressed Frames Reception”, Jarkko Kneckt (Apple)**

**Motion:**

Move to add the following to the TGba SFD:

R.4.7.2.C: A STA and an AP may reuse existing traffic filter sets to control the Wake Up frame transmission. The AP should not send a Wake Up frame to a STA in WUR mode when the AP obtains a DL frame that matches one or more traffic filter sets that configure not to send a Wake Up frame.

**Move:** Jarkko Kneckt

**Second:** Rojan Chitrakar

Motion passed by unanimous consent.

**Presentations:**

**11-18/0087r1, “Computation of TSF Update”, Po-Kai Huang (Intel)** The contribution is concerned with the computation of partial TSF when sending the WUR Beacon and computation of TSF when receiving the WUR Beacon. Specific text for this is proposed.

**Straw Poll 1:**

* Do you support the following?
* For the transmitter of WUR Beacon:
	+ *The Partial TSF field contains the bits X to X+11 of the transmitting STA’s TSF timer at the time that the start of the data symbol, containing the first bit of Partial TSF field, is transmitted by the PHY plus the transmitting STA’s delays through its local PHY from the MAC-PHY interface to its interface with the WM.*

**Y/N/A: 4/0/7**

**Motion 1:**

Move the following to 11ba SFD:

* For the transmitter of WUR Beacon:
	+ *The Partial TSF field contains the bits X to X+11 of the transmitting STA’s TSF timer at the time that the start of the data symbol, containing the first bit of Partial TSF field, is transmitted by the PHY plus the transmitting STA’s delays through its local PHY from the MAC-PHY interface to its interface with the WM.*

**Move: Po-Kai Huang**

**Second: Ming Gan**

**Y/N/A: 10/1/3, motion passed**

**Straw Poll 2:**

* Do you support the following?
* For a WUR non-AP STA that receives a WUR Beacon carrying partial TSF with bit position X to X+11 of the TSF, the received partial TSF is adjusted to consider STA’s delay as shown below
	+ Create temporal timestamp by concatenating received partial TSF with X bits containing an implementation specific value that represents the assumed value of bit position 0 to X-1 of temporal timestamp
	+ Add an amount equal to the receiving STA’s delay through its local PHY components plus the time since the first bit of the Partial TSF field was received at the MAC/PHY interface to the temporal timer
	+ The adjusted value of the received partial TSF is set as the value of bit position X to X+11 of the temporal timestamp

**Y/N/A: 11/0/1**

**Motion 2:**

Move the following to 11ba SFD

* For a WUR non-AP STA that receives a WUR Beacon carrying partial TSF with bit position X to X+11 of the TSF, the received partial TSF is adjusted to consider STA’s delay as shown below
	+ Create temporal timestamp by concatenating received partial TSF with X bits containing an implementation specific value that represents the assumed value of bit position 0 to X-1 of temporal timestamp
	+ Add an amount equal to the receiving STA’s delay through its local PHY components plus the time since the first bit of the Partial TSF field was received at the MAC/PHY interface to the temporal timer
	+ The adjusted value of the received partial TSF is set as the value of bit position X to X+11 of the temporal timestamp

**Move: Po-Kai Huang**

**Second: Ming Gan**

Motion passed by unanimous consent.

**Straw Poll 3:**

* Do you support the following?
* For a WUR non-AP STA that receives a WUR Beacon carrying partial TSF with bit position X to X+11 of the TSF,
	+ If the most significant bit (MSB) of the adjusted value of the received partial TSF is not equal to the bit Y of the local TSF timer then the value of bits X+12 to 63 of the local TSF timer shall be adjusted to account for roll over as follows:
		- The value shall be increased by one unit (modulo 2^(52-X)) if LT[X:X+11] > AT and LT[X:X+11] > AT + 2^(11)
		- The value shall be decreased by one unit (modulo 2^(52-X)) if LT[X:X+11] < AT and LT[X:X+11] < AT – 2^(11)

where AT is the adjusted value of the received partial TSF and LT[X:X+11] is the value of bits X to X+11 of the local TSF timer

* + The bits X to X+11 of the STA’s local TSF timer shall be set to the adjusted value of the received partial TSF.

**Y/N/A: 10/0/3**

**Motion 3:**

Move the following to 11ba SFD:

* For a WUR non-AP STA that receives a WUR Beacon carrying partial TSF with bit position X to X+11 of the TSF,
	+ If the most significant bit (MSB) of the adjusted value of the received partial TSF is not equal to the bit X+11 of the local TSF timer then the value of bits X+12 to 63 of the local TSF timer shall be adjusted to account for roll over as follows:
		- The value shall be increased by one unit (modulo 2^(52-X)) if LT[X:X+11] > AT and LT[X:X+11] > AT + 2^(11)
		- The value shall be decreased by one unit (modulo 2^(52-X)) if LT[X:X+11] < AT and LT[X:X+11] < AT – 2^(11)

where AT is the adjusted value of the received partial TSF and LT[X:X+11] is the value of bits X to X+11 of the local TSF timer

* + The bits X to X+11 of the STA’s local TSF timer shall be set to the adjusted value of the received partial TSF.

**Move: Po-Kai Huang**

**Second: John Notor**

Motion passed by unanimous consent.

**11-18/0101r1, “Discussion on TSF”, Ming Gan (Huawei):**

**Straw Poll**

* Do you agree to maintain the TSF timer accuracy in the MAC layer for WUR STA within ±100 ppm?

**Y/N/A: 7/0/3**

**Motion:**

Move to add the following to the 11ba SFD

* The TSF timer accuracy in the MAC layer for WUR STA within ±100 ppm

**Move: Ming Gan**

**Second: Po-Kai Huang**

Motion passed by unanimous consent.

**11-18/0176r0, “AP operation regarding PCR schedule” Woojin Ahn:** The contribution is concerned with the AP’s behaviour when a STA enters WUR mode.

**Straw Poll is withdrawn.**

**11-18/0335r1, “Discussion on Maximum WUR PPDU Duration” Lei Huang (Panasonic):**

**Straw Poll is withdrawn.**

**11-18/0437r1, “BSS parameters update notification follow up” Ming Gan (Huawei)**

**Straw Polls are withdrawn.**

**11-18/0407r0, “Starting Time Indication of WUR Beacon and Duty Cycle Operation”, Po-Kai Huang (Intel):** The two TBDs related to starting point indication are discussed.

**Recess 3.30pm**

**Thursday, March 8, 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/18/11-18-0313-08-00ba-march-2018-tgba-agenda.pptx>

* Call meeting to order
* IEEE 802 and 802.11 IPR Policy and procedure
* TG timeline discussion
* Goal for May 2018 F2F meeting
* Teleconference call schedule
* Motion assignments for TGba D0.2
* List of TBDs in D0.1
* Presentations
* Adjourn

**Chair Minyoung Park (Samsung) calls meeting to order at 4.03 pm. (**About 60 persons in the room.)

Minyoung reminds about attendance.

Minyounggoes though the agenda. After some discussion the agenda is agreed.

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

**TG timeline discussion**

It is proposed to delay the schedule by 2 months up until and including Draft 2.0 and keep the remaining targets. The updated timeline looks like shown below.

* **Delaying the schedule by 2 months up until Draft 2.0, keeping the remaining targets.**
	+ **2018**
		- January: TGba Draft 0.1
		- July: TGba Draft 1.0
		- November: TGba Draft 2.0
	+ **2019:**
		- March: MDR (mandatory document review)
		- July: formation of sponsor ballot pool
		- September: Sponsor ballot
	+ **2020**
		- July: RevCom

**Motion:**

Have the timeline as you see on page 40 in 11-18/0313r9 and above

**Move: Alfred Asterjadhi**

**Second: Yunsong Yang**

Motion passed by unanimous consent.

**Goal for May 2018**

* Resolve TBDs in the PHY and MAC clauses of TGba D0.2
	+ Higher priority will be given to a presentation that resolves TBDs in TGba D0.2
* Prepare for creating TGba D1.0 in July 2018
* Review TG timeline

**Teleconference Call Schedule**

* Proposed schedule (Mondays, 1 hour each)
	+ March 19, 10:00 ET
	+ April 2, 17:00 ET
	+ April 16, 23:00 ET

**Motion:**

Move to approve the teleconference call schedule on page 42 in 11-18/0313r9, which also in shown above.

**Move: Eunsung Park**

**Second: Alfred Asterjadhi**

Motion passed by unanimous consent.

**11-18/0575r1, “Assignment for Draft 0.3”, Po-Kai Huang (Intel):** Po-Kai goes through the assignment for generating Draft 0.3. PHY motions are assigned to Steve Shellhammer, MAC motions are assigned to Guoqing Li, Alfred Asterjadi, and Po-Kai Huang, depending on subject.

Po-Kai suggests to close the SFD now and require that all motions should contain spec text. The rational for this is that it will help meeting the timeline for D1.0.

**Q:** I propose to not close it until May, but that it is required that if something is proposed for the SFD it should contain spec text in addition to the proposal for the SFD.

**Q:** I would suggest that we maintain the SFD until we have Draft 1.0.

**A:** I would prefer not to have it like this as I expect this will cause delay.

**Q:** I believe we should consider having PHY and MAC in parallel sessions.

**Straw Poll:**

Do you support the following?

* All the proposals with texts to be added to SFD in May meeting need to have corresponding spec texts.
* If the proposals with texts to be added to SFD in May meeting does not have corresponding spec texts, there is no guarantee that this proposal will be added in D1.0.

**Y/N/A: 22/0/14**

Po-Kai summarizes the TBDs for the PHY and MAC, as shown below. Po-Kai also emphasizes that an architecture description is needed both for PHY and MAC.

**TBD for WUR PHY**

* Multiple antennas consideration
* Wave form generation
* Coefficients of 13 subcarriers of WUR transmission
* BPSK subcarrier values for BPSK-Mark
* WUR Transmit procedure
* WUR Receive procedure

**TBD for WUR MAC**

* WUR parameters encoding in WUR Mode element, WUR Operation element, and WUR Capability element
* MAC header and FCS fields encoding in 4 WUR frames: wake-up frame, WUR Beacon, vendor specific frame, and WUR discovery frame
* Design of frame body for WUR frames
* Group ID negotiation
* Channel access for individual addressed WUR frame
* TWBTT determination (related to starting time indication)
* Duty cycle schedule determination (related to starting time indication)
* Timeout interval for Individual addressed wake-up frame

**Presentations:**

Minyoung explains his preferred order for the presentations for the remining time of this session.

Jianhan Liu requests to be moved up the que although the presentation does not relate to a basic feature needed for the WUR to function (this has been used as one criterion for prioritization).

Minyoung asks if the group is OK with letting Jianhan present first, and then continue with the original proposed presentation order. Jianhan will in that case get 20 minutes in total for the presentation, Q&A, Straw Poll, etc.

The group agrees to let Jianhan present first and Jianhan agrees to limit his time to 20 minutes.

**11-17/1625r5,** “**Efficient FDMA MU Transmission Schemes for WUR WLAN”, Jianhan Liu (Meditek):** The contribution proposes that when the channel bandwidth is more than 20 MHz, each 20 MHz channel can be used for sending a wake-up signal.

**Q:** Do we have time to generate the text for the specification?

**A:** I will write the text

**Q:** Do you consider this being one or two PPDU?

**A:** One PPDU.

**Q:** You don’t want to multiplex with data?

**A:** No.

**Q:** You require one radio to generate the all the signals?

**A:** Yes.

**Q:** In case we are PA limited, the power will be reduced

**Q:** Do all the WURs need to have same length? Same rate, etc? If not, how is an earlier CCA and uplink transmission avoided?

**A:** These are details that will be discussed later.

**Straw Poll:**

* Do you agree to add the FDMA transmission scheme shown in the slide 5 to the 11ba SFD?
	+ Note: FDMA transmission is only allowed in the BSS with wide bandwidth greater than 20MHz.

**Y/N/A: 30/0/13**

The 20 minutes agreed to be allocated for 11-17/1625r5 have been used. Jianhan asks if he can convert the straw poll to a motion. Minyoung explains that it was agreed to only allocate 20 minutes to each presentation in order to give all a fair chance to present, and thus Jianhan is not allowed to run a motion.

**11-18/0407r1, “Starting Time Indication of WUR Beacon and Duty Cycle Operation”, Po-Kai Huang (Intel):** Continuation from previous session, with chance for Q&A:

**Straw Poll 1:**

* Do you support to add the following to the SFD?
* AP indicates the offset of Target Wake-up radio Beacon Transmission Time (TWBTT) in WUR Operation element, which is the TSF time of the first TWBTT?

**Y/N/A: 20/1/15**

**Motion 1:**

* Move to add the following to the SFD:
* AP indicates the offset of Target Wake-up radio Beacon Transmission Time (TWBTT) in WUR Operation element, which is the TSF time of the first TWBTT

**Move: Po-Kai Huang**

**Second: Alfred Asterjadhi**

The motion is not run due to that the 20 minutes allocated for this presentation have been used. The motion resulted in a large number of questions from one of the persons in the room.

Some discussion and questions from people in the room if the motion related to 11-17/1625r5 could be run. It is explained that since the agenda and the format for the meeting was agreed by the group without any objections, they would in that case have to run a motion to change the agenda accordingly.

**Motion:**

Move to run the motion in 11-17/1625r6 by changing the adopted agenda.

**Move: Hongyuan Zhang**

**Second: Jianhan Liu**

**Y/N/A: 27/0/5, motion passes**

The agenda is changed so that the motion in 11-17/1625r6 can be run.

**11-17/1625r6, “Efficient FDMA MU Transmission Schemes for WUR WLAN”, Jianhan Liu (Mediatek)**

**Motion:**

* Do you agree to add the concept FDMA transmission scheme shown in the slide 5 to the 11ba SFD?
	+ Note: FDMA transmission is only allowed in the BSS with wide bandwidth greater than 20MHz.

**Move: Jianhan Liu**

**Second: Hongyuan Zhang**

**Y/N/A: 26/3/4, motion passes**

**Meeting is adjourned at 6.00pm**