IEEE P802.11  
Wireless LANs

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| IEEE 802.11ba Task Group Meeting Minutes for November 2017 Meeting, Orlando, FL, USA | | | | |
| Date: 03-16-2017 | | | | |
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Abstract

Meeting Minutes for the IEEE 802.11ba TG sessions held in Orlando, FL, USA, November 5-10, 2017.

**Monday, November 6, 2017, 8:00-10:00 am**

**Meeting Agenda:**

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

<https://mentor.ieee.org/802.11/dcn/17/11-17-1549-02-00ba-november-2017-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 8.03 am. (**About 110 persons in the room.)

Minyoung goes through the agenda document 11-17/01549r2.

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

* **TGba technical editor confirmation**
* **Review technical presentations**
  + Give higher priority to submissions that discuss the basic operation of WUR
    - WUR preamble design
    - WUR waveform design for 62.5 kbps data rate
    - WUR packet format
    - Unicast WUR packet transmission and reception
* **Identify subclauses that have enough details to start writing draft text based on TGba SFD (11-17/575r5)**
  + Call for volunteers to write draft text for the identified subclauses by end of Nov. F2F meeting
* **Work on TGba task group documents**
* **Review TG timeline**

There are close to 40 submissions for this meeting.

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

Minyoung goes through the slides “Participation, Patents, and Duty to Inform” (slide 20) and “Patent Related Links” (slide 21).

Minyoung makes a Call for Potentially Essential Patents (slide 22). No potentially essential patents reported and no questions asked.

Minyoung goes through Other Guidelines for IEEE WG meetings (slide 23), Participation in IEEE 802 Meetings (slides 24), and slides 25-27.

**Presentations:**

**11-17/1611r0 “WUR SYNC Preamble Design” Eunsung Park (LG):** The contribution proposes to use two sync sequences, one for each of the 62.5 kb/s and 250 kb/s mode. It is proposed that the two syncwords are the bit-wise complement to each other to allow for that only one correlator is needed in the receiver. The length of the syncwords is 32 bits, i.e., 128 us.

**Question/Comment (Q):** Good with complementary, but it is wasteful to have so long sequence for the higher data rate

**The Straw Polls are deferred.**

**11-17/1624 “11ba preamble structure based on analysis of power consumption, cost and complexity”, Jianhan Liu (Mediatek):** Proposes to indicate the data rate by using different sync sequence. The cost by using two correlators is considered to be negligible compared to the analog part.

**Straw Poll 1:**

* Do you agree that the narrow band portion of WUR PPDU is composed by a Synchronization (SYNC) field and a Data field?
  + The synchronization (SYNC) field is compose by pre-designed sequences.

**Y/N/A:** 19/0/29

**Straw Poll 2:**

* Do you agree to use the synchronization (SYNC) field to differentiate the two data rates?

**Y/N/A:** 22/0/25

**11-17/1614r0 “Discussion on Preamble Sequences For Indication of the WUR Rates”, Shahrnaz Azizi (Intel):** Presents two different proposal to generate syncwords for the two data rate modes when the length of the syncword for the higher rate is smaller and two proposals when the length is the same for the two data rates (16 or 32 bits). As a conclusion, it is proposed to have a structured preamble (S,S) for the low rate and complement(S) for the high date, S being 16 bits long, i.e., 64 us.

**Q:** For Option 4 you say that 16 bits is not enough for the high data rate, but the you propose it anyway?

**Answer (A):** It has to do with miss-classification, so this is only an issue for Option 4, but not for what we propose at the end.

**Q:** We also prefer Option 2

**11-17/1618r0 “WUR Dual Sync Design and Performance”, Sudhir Srinivasa (Marvell):** It is proposed to use a syncword structure where the low data uses a syncword [Z Z] and the high data rate uses a syncword [1-Z], where Z is a 32 bit sequence of length 64 us, i.e., 2us ON duration.

**Q:** The approach is similar as the one proposed by Shahrnaz, but with 2us ON period and correspondingly longer sequences to keep the total duration the same?

**A:** Yes.

**Q:** Just to clarify, there is only one correlator needed.

**Q:** Good with shorter sync sequence for the higher data rate.

**Q:** You have different symbol durations for the sync sequences?

**A:** No, it is 2us in both cases.

**The Straw Polls are deferred.**

**11-17/1636r0 “A Simple WUR Preamble Design”, Justin Jia Jia (Huawei):** This contribution also suggests to use complementary synchronization sequences for the two supported data rates.

**The ad-hoc meeting is adjourned at 9.57 am.**

**Monday, November 6, 2017, 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/17/11-17-1549-03-00ba-november-2017-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 September 2017 meeting
  + Motion: September 2017 meeting ([doc: IEEE 802.11-17/1522r2](https://mentor.ieee.org/802.11/dcn/17/11-17-1522-02-00ba-meeting-minutes-september-2017.docx)) and teleconference minutes (doc: IEEE 802.11-17/1594r1)
  + TGba Spec Framework Document review and approval
  + TGba technical editor confirmation
  + 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 document 11-17/1549r3. Minyoung asks if there are any questions on the agenda. No questions asked and the agenda is approved.

Minyoung makes a call for potentially essential patents (slide 23). No potentially essential patents reported and no questions asked.

Minyoung goes through the summary of the September 2017 Meeting and Teleconference calls (slide 29).

**Motion:**

Approve TGba minutes of September 2017 meeting [[doc: IEEE 802.11-17/1522r2](https://mentor.ieee.org/802.11/dcn/17/11-17-1522-02-00ba-meeting-minutes-september-2017.docx)] and teleconference calls [doc: IEEE 802.11-17/1594r1]

**Move:** John Notor

**Second:** Yunsong Yang

Motion passed by unanimous consent.

**11-17/0575r5 “Specification Framework for TGba”, Po-Kai Huang (Intel):** Po-Kai goes through the updates that have been made to the SFD since the last revision. The updates are based on the motions in the September f2f meeting.

**Q:** In Section 3.3.1, does the group believe the last requirement supersede the previous ones?

**A:** In principle, but I prefer to keep them for consistence.

**Q:** In 4.8.3B, it does not look as the motion I had.

**A:** It is slightly modified because we had a motion afterwards, which basically changed things slightly. Therefore the text captures the latest agreement.

Minyoung proposes to work offline to resolve the issues related to the above question and postpone the Motion on approving the TGba SFD.

**TGba technical editor confirmation:**

**Motion to approve Po-Kai Huang as the Technical Editor for TGba**

**Move:** Yunsong Yang

**Second:** John Notor

Motion passed by unanimous consent.

**Presentations:**

**11-17/1356r3 “Duty cycle mode STA’s PS follow-up”, Jeongki Kim (LGE)**: The document has already been presented and the intention is to run the two straw polls.

Q: I feel we keep extending the features of the WUR a bit too much in general.

Q: I believe you can already wake up a group of devices, so I don’t understand what new use case you are addressing.

**Straw Poll 1:**

* Do you agree the following?
  + A broadcast wake-up frame includes the information for indicating the group addressed frame transmission through PCR
    - The details indicating the group addressed frame transmission (e.g., using Group ID or additional bit) is TBD

**Y/N/A: 17/0/39**

**Straw Poll 2:**

* Do you agree the following?
  + If a STA receives a broadcast wake-up frame indicating a group addressed frame TX through the PCR, the STA may attempt to receive a group addressed frame through PCR

**Y/N/A: 21/0/29**

Q: With respect to Straw Poll 2, what does may attempt mean? In a specification you must either do something or not do something, It does not makes sense to specify that a STA should attempt to do something.

**11-17/1635r1 “Solving Status Mismatch”, Rojan Chitrakar (Panasonic):** As background to this presentation, a reference is made to 11-17/1015r2. Basically, there may be situations when the AP believes the WUR is ON when in fact the PCR is ON in the STA. If this is the case, it means that a wake-up packet will not be received. To address this issue, it is proposed to transmit a WUR Mark after the L-SIG field when a wake-up packet is transmitted. In this way, the PCR would be able to detect the wake-up packet. The WUR Mark would correspond to one OFDM symbol, using BPSK and rate ½ BCC. The WUR Mark field also includes additional information about the purpose of the wake-up packet.

**Q:** Normally the symbol is used for spoofing, so I wonder if it possible to load it with a lot of information? Maybe this is more for the PHY people?

**A:** I believe it will work as long as the modulation is BPSK.

**Q:** Can you explain more about the background and how often the problem will occur?

**A:** The unscheduled wake-up may happen when a STA wakes up for scanning for some data. Exactly how frequently we have not analyzed.

**Q:** I have some concern about the spoofing performance.

**A:** This is only intended for new devices, with a WUR. I agree that some minor modification of the main receiver is needed to decode the WUR Mark symbol.

**Q:** I am concerned with legacy devices.

**Q:** I don’t think there is need to have UL in the reasoning field.

**A:** I agree. This was just an example.

**Q:** I don’t think the STA can move in and out from WUR mode without informing the AP, so I don’t think there is a problem as you describe. Therefore, I believe we first need to agree on the assumptions.

**A:** I agree, we are making assumptions because there is nothing decided. I believe this is usually how you do.

**Q:** We have defined some rules for how to inform the AP when the STA enters doze mode, but not exactly how. I agree this is an important problem to address.

**Q:** I believe it is possible to have rules for the PCR to avoid this problem.

The Straw Polls are deferred based on the discussion related to the presentation.

**11-17/1626r0 “11ba PHY Frame Format—Length Discussions”, Hongyuan Zhang (Marvell):** The presentation is concerned with erroneously decoding the length of a wake-up packet as this may e.g. cause the WUR to miss intended wake-up packets. One solution to this problem is to use a fixed length for all wake-up packets.

**Q:** I don’t believe the SFD says anything of the WUR setting a NAV. Also, the problem that the PCR starts transmitting may not happen as the PCR will perform carrier sense first.

A: I don’t think energy detection will work very well for a wake-up packet.

**The meeting is in recess at 6.00 pm.**

**Tuesday, 7 November, 2017, 8:00-10:00 am**

**Meeting Agenda:**

The ad-hoc meeting agenda is shown below, and published in the agenda document: <https://mentor.ieee.org/802.11/dcn/17/11-17-1549-03-00ba-november-2017-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 8.00 pm. (**About 55 persons in the room.)

Minyoung remindes about the attendance.

Minyoung goes through the agenda document 11-17/1549r3. Minyoung asks if there is any question on the agenda or if the agenda can be approved. The agenda is approved.

Minyoung makes a call for potentially essential patents. No potentially essential patents reported and no questions asked.

**Presentations:**

**11-17/1626r0 “11ba PHY Frame Format—Length Discussions”, Hongyuan Zhang (Marvell):** The presentation was made in an earlier session, and this is a continuation of the Q&A for the presentation.

**Q:** What is the reason for the high probability of incorrect packet duration? I am thinking there may be ways to actually reduce this.

**A:** OK, maybe that could be the case. I encourage people to get back and look as this problem themselves.

**Q:** I believe the term NAV for the WUR is a bit unfortunate. This is not really something we have discussed for the WUR yet.

**Q:** I agree that we want to limit duration of a packet.

**Q:** I agree with the straw poll, but not with the description of the problem in the presentation.

**Straw Poll 1 is deferred.**

**Straw Poll 2:**

* Do you agree to define an upper limit on the duration of a WUR PPDU to a TBD value that is less than LSIG LENGTH field limitation?

**Y/N/A: 18/0/10**

**11-17/1617r0 “Dual Sync Designs”, Steve Shellhammer (Qualcomm):** The presentation describes and evaluates some different ways to design the synchwords for the two data rates, taking both performance and complexity in to account.

**Q:** In your complexity estimation, why do you scale it to additions per seconds? It is only a short packet.

**A:** In case it would run real time, this would be relevant, but I agree the figures may be viewed as conservative.

**Q:** You also have other parts than adders, like memory, shift registers, etc.

**A:** I agree.

**Q:** I believe you have higher complexity because of a longer sequence.

**A:** I don’t agree, the number of samples in the correlator is determined by the duration and the sampling rate, so this should be the same.

**Q:** You show 1 dB synchronization loss for Channel D, so the question is how much we can accept.

**A:** It is always a trade-off, but we believe using an even longer syncword results in too much overhead.

**Q:** What is your definition of ideal timing?

**A:** I run the simulation at very high SNR and the timing found in this way is declared as ideal.

**Q:** On slide 20, why do you add the two bits in P?

**A:** The reason is to orthogonalize the short and long sync sequences.

**The Straw Polls are deferred.**

**11-17/1665r3 “WUR 128 us Preamble Design”, Dennis Sundman (Ericsson):** The presentationshows some simulation results for some different syncwords of duration 128us. In particular it is shown that using “Partial-OOK”, i.e., blanking part of the signal can significantly improve the synchronization performance.

**Q:** I believe the definition of synchronization error is too loose.

**A:** I agree. But the main purpose here was to make a relative comparison.

**Q:** The gain does not seem to come from the reduction if ISI

**A:** That is what we think as well.

**Q:** If you boost the power you may have issues with the PA. Both concerning what power can be used and with respect to spectrum re-growth.

**A:** I agree. This is considered in the other presentation by Leif, i.e., 11-17/1672r1.

**Q:** I believe there will be different restriction in different parts of the world, in some the performance will be power limited in other the performance will be PSD limited.

**A:** I agree.

**11-17/1617r1 “Dual Sync Designs”, Steve Shellhammer (Qualcomm):** The presentation has already been done, and Steve runs the deferred Straw Polls.

**Straw Poll 1:**

* Do you support a Sync field duration of 128 µs for the low data rate?

**Y/N/A: 30/0/16**

**Straw Poll 2:**

* Do you support a Sync field duration less than 128 µs for the high data rate?

**Y/N/A: 23/6/17**

**Straw Poll 2b:**

* Do you support a Sync field duration less than or equal to 64µs for the high data rate?

**Y/N/A: 18/4/23**

**The meeting is in recess at 10.00.**

**Tuesday, 7 November, 2017, 1:30-3:30 pm**

**Meeting Agenda:**

The ad-hoc meeting agenda is shown below, and published in the agenda document: <https://mentor.ieee.org/802.11/dcn/17/11-17-1549-03-00ba-november-2017-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 1.33 pm. (**About 120 persons in the room.)

Minyoung remindes about the attendance.

Minyoung asks if there are any questions on the agenda. No questions on the agenda so the proposed agenda will be used.

Minyoung makes a call for potentially essential patents. No potentially essential patents reported and no questions asked.

**Presentations:**

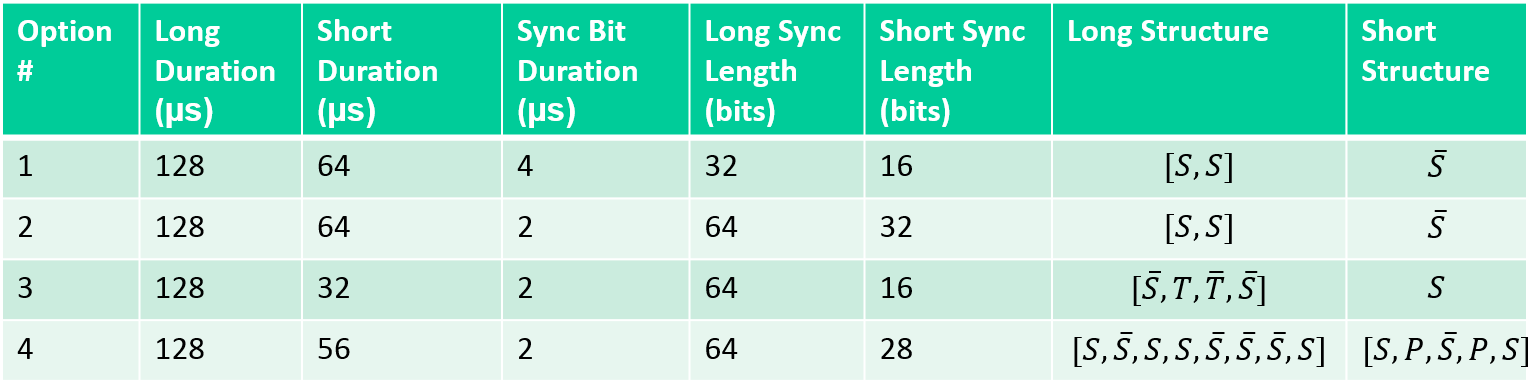
**11-17/1617r1 “Dual Sync Designs”, Steve Shellhammer (Qualcomm):** Continuation from an earlier session.

**Straw Poll 3:**

* Do you agree that the Long Sync Field design should be based on a hierarchal structured sequence to enable lower complexity implementation?
* Note, examples of this approach are:
  + Example 1: , as shown in Slide 11
  + Example 2: As shown in Slide 20
  + Example 3:
* The exact structure is TBD

**Y/N/A: 18/0/36**

**11-17/1761r1 “Sync Structure Straw Poll”, Steve Shellhammer (Qualcomm):** Summary of the sync structure options as follows:



, and are different sequences of bits. is the complementary sequence of

**Straw Poll 1:**

* Which of the options on the previous slide do you prefer? (One vote per person)
  + Option #1
  + Option #2
  + Option #3
  + Option #4
  + None of the Above
  + Abstain

**Op1/Op2/Op3/Op4/NotA/A: 16/27/13/2/4/15**

**Straw Poll 2:**

Which of the options on the previous slide do you prefer? (Multiple votes per person possible)

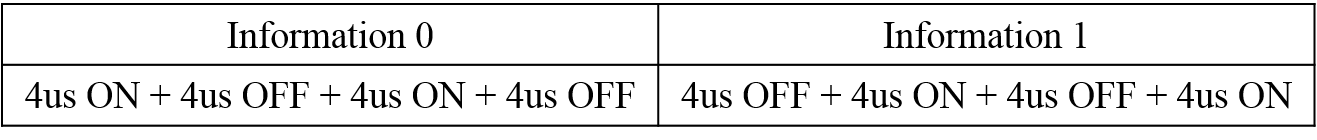
* + Option #1 or Option #2
  + Option #3
  + Option #4
  + None of the Above
  + Abstain

**Op1or Op2/Op3/Op4/NotA/A: 32/14/7/1/9**

**11-17/1612r0 “Symbol Structure Follow-up” Eunsung Park (LGE):**

**Straw Poll 1:**

* **Do you agree to add the following to the 11ba SFD?**
  + Symbol structure of the data rate of 62.5Kbps for each information is as follows



* + - 4us ON signal has always energy

**Y/N/A: 30/0/10**

**11-17/1634r0 “Optimizing OOK Waveform for High Data Rate WUS”, Alphan Sahin (Interdigital):** The contribution proposes a method to generate the Manchester coded sequence for the 250 kb/s mode. The sequence is designed targeting to minimize the fluctuations during the ON period at the same time as the “leakage” during OFF is minimized.

**Q:** On Slide 3, do you mean that the transmitted signal is not complete zero during the OFF periods?

**A:** It is not possible to make it identically zero without masking.

**Q:** Why don’t just to time domain masking?

**A:** It will be complex in case you want to multiplex several signals in the frequency domain.

**Q:** We have a contribution where we propose to use a 32-point FFT in which case we will have no leakage into the OFF part of the signal.

**A:** I agree, but this does not solve the problem with multiplexing signals.

**11-17/1613r0 “13-Length Sequence for OOK Waveform Generation”, Eunsung Park (LGE):**

**Straw Poll 1:**

* Do you agree to define the 13-length sequence which is applied to 13 subcarriers to generate the OOK waveform of the WUR PPDU in the 11ba spec?

**Y/N/A: 10/8/25**

**Straw Poll 2:**

* **Do you agree to modify the text in the 11ba SFD as follows?**
  + *R.3.3.C: When a single band is used for transmission of WUR PPDU, the OOK waveform of WUR PPDU is generated by using contiguous 13 subcarriers with the subcarrier spacing of 312.5 kHz:*
    - *The center subcarrier is ~~TBD~~ null.*

**Y/N/A: 19/0/15**

**11-17/1615r0 “Discussion on OOK Pulse Design for Higher Rate”, Shahrnaz Azizi (Intel):** The presentation investigates the performance for different waveforms in case of the 250kb/s mode.

Q: Do we really need to generate the waveform using the IFFT, you can get the same performance without using IFFT?

A: We have studied this and found that it was better to use an IFFT.

Q: Is this also used for the preamble?

A: No, this is just for the data.

**The meeting is in recess at 3.32 pm.**

**Tuesday, 7 November, 2017, 7:30-9:30 pm**

**Meeting Agenda:**

The ad-hoc meeting agenda is shown below, and published in the agenda document: <https://mentor.ieee.org/802.11/dcn/17/11-17-1549-04-00ba-november-2017-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 7.32 pm. (**About 65 persons in the room.)

Minyoung remindes about taking attendance.

Minyoung asks if there are any questions on the agenda. No questions on the agenda so the proposed agenda will be used.

Minyoung makes a call for potentially essential patents. No potentially essential patents reported and no questions asked.

**Presentations:**

**11-17/1645r0 “WUR frame format – Follow up”, Alfred Asterjadhi (Qualcomm):** This presentation is concerned with finalizing some details regarding content and length of certain frames and its fields.

**The Straw Polls are deferred.**

**11-17/1638r2 “WUR frame format follow-up”, Jeongki Kim (LGE):** The presentation aims at specifying some more details of the WUR frame format.

**Q:** I believe we should only have one type for wake-up frame, and then differentiate between e.g. unicast and broadcast by other identifiers.

**The Straw Polls are deferred.**

**11-17/1302r5 “WUR Mode Operation Procedures”, Lei Huang (Panasonic):** The presentation was presented in the last teleconference and only the Straw Poll is run in this meeting.

**Straw Poll:**

* **Do you support to modify R.4.2.A in 11ba SFD as follows?**

R.4.2.A: Define WUR Action frame to enable WUR negotiation and WUR mode signaling

– Note that WUR Action frame is sent through primary connectivity radio

**Y/N/A: 15/0/19**

**11-17/1627r0 “WUR Action Frame Format Follow up”, Po-Kai Huang (Intel):** The presentation discusses the frame format and in particular proposes to introduce a suspend state in order to not have to negotiate parameters when re-entering the WUR mode.

Q: To me the Suspension state is confusing. To me the WUR is either on or off.

A: The WUR is off.

Q: Do you have any data regarding how much we save by introducing the Suspend mode?

A: It really depends on how often you will use it. Also, if you don’t think it is useful you don’t need to use it.

**The Straw Polls are deferred.**

**11-17/1657r1 “MAC operation of WUR” Suhwook Kim (LGE):** The presentation aims at clarifying some MAC procedures which are believed to be unclear.

**The meeting is in recess at 9.26pm.**

**Wednesday, November 8, 2017, 1:30-3:30 pm**

**Meeting Agenda:**

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

<https://mentor.ieee.org/802.11/dcn/17/11-17-1549-05-00ba-november-2017-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 1.35 pm. (**About 90 persons in the room.)

Minyoung remindes about taking attendance.

Minyoung updates the agenda with the added session in PM2 Wednesday.

Minyoung asks if there are any questions on the agenda. No questions on the agenda so the proposed agenda will be used.

Minyoung makes a call for potentially essential patents. No potentially essential patents reported and no questions asked.

**Presentations:**

**11-17/1645r2 “WUR frame format – Follow up”, Alfred Asterjadhi (Qualcomm):** The presentations was done in a previous session, but the Straw Polls were deferred. These are the deferred Straw Polls*. As the text related to the Straw Polls are rather extensive, also including figures, please refer to the document for the complete Straw Poll. Below only the core of the Straw Polls is given together with the results of the voting.*

**Straw Poll 1:**

* Option 1: Frame Control field [8 bits]
  + Type field identifies type and differentiates VL/CL WUR frames
  + Frame length is signaled in the Length/Misc. field
    - No Length field is present for CL WUR frames, instead these bits are used for other purposes
    - A Length subfield is present for VL WUR frames

**Y/N/A: 25/0/9**

**Straw Poll 2: Do you support that the Address field is 12 bits?**

**Y/N/A:** **25/0/6**

**Straw Poll 3: Do you support that Address field has contents as defined in this slide (for those frames that are approved)?**

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

**Straw Poll 4: Do you support that the TD Control field is 12 bits?**

**Y/N/A: 24/0/13**

**Straw Poll 5: Do you support the proposal in this slide?**

**Y/N/A: 21/0/19**

**Straw Poll 6: Do you agree to additionally embed BSSID information in the FCS?**

* + How to embed the BSSID information in the FCS is TBD
  + It is not applicable for pre-association WUR frames

**Y/N/A: 21/3/20**

**11-17/1638r3 “WUR frame format follow-up”, Jeongki Kim (LGE):** These are the deferred Straw Polls.

**Straw Poll 1:**

* Do you agree the following?
  + TBD bits Type field is included in the Frame control field of MAC header with the following mapping of the Type field:
    - 0 assigned to WUR Beacon
    - 1 assigned to Wake-Up frame
    - 2 assigned to Vendor specific frame

**Y/N/A: 25/0/14**

**Straw Poll 2:**

* Do you agree the following?
  + AP may negotiate one or more Group IDs to a STA through PCR
    - The assigned Group ID is used in a wake-up frame
    - The details for group ID (e.g., ID allocation procedure (e.g., WUR Action frame or others similar to 11ac procedure), ID structure, etc.) are TBD

**Y/N/A: 34/0/13**

**Straw Poll 3:**

* Do you agree the following?
  + A Wake Up frame with variable length may contain the information for the multiple STAs in the Frame Body
    - The detailed information of multiple STAs (e.g., bitmap, ID list) is TBD
    - Unicast wake-up frame does not carry the information of Multiple STAs

**Y/N/A: 21/0/26**

**11-17/1627r0 “WUR Action Frame Format Follow up”, Po-Kai Huang (Intel):** These are the deferred Straw Polls.

**Straw Poll 1:**

* + Do you support the following?
  + The frame body of WUR Action frame can include the following:
    - Category field that indicates WUR Action
    - WUR Action field that includes the following indications: WUR Mode Setup and WUR Mode Teardown
    - Dialog Token field
    - WUR Mode Element includes necessary WUR parameters

**Y/N/A: 35/0/9**

**Straw Poll 2:**

* + Do you support the following?
  + The WUR Mode element can include the following:
    - Element ID and Element ID Extension fields that indicate WUR Mode Element
    - Length field
    - Action Type field that includes the following indications: Enter WUR Mode Request, Enter WUR Mode Response
    - WUR Mode Response Status field that includes the following indications: Enter WUR Mode Accept and Denied
    - WUR parameters field that includes the indication for WUR parameters

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

**Straw Poll 3:**

* + Do you support the following?
  + Define WUR Mode Suspend, and if an non-AP STA is in WUR Mode Suspend, then
    - The negotiated WUR parameters between AP and non-AP STA is maintained
    - Non-AP STA may turn off the WURx
    - Note that negotiated PCR schedule (if any) is active and is not suspended

**Y/N/A: 16/2/23**

**Straw Poll 4:**

* Do you support to add the following signaling in WUR Mode element?
  + In Action type field of WUR Mode element, include the following indication:
    - Enter WUR Mode Suspend Request
    - Enter WUR Mode Suspend Response
    - Enter WUR Mode Suspend
    - Enter WUR Mode
  + In WUR Mode Response Status field of WUR Mode element, include the following indication: Enter WUR Mode Suspend Accept

**Y/N/A: 12/1/25**

**11-17/1657r2 “MAC operation of WUR” Suhwook Kim (LGE):** These are the deferred Straw Polls.

**Straw Poll 1:**

* Do you agree to add following text in SFD?
  + Define Information Element for WUR capability information
    - Supportability for WUR operation at AP side
    - Supported operating class for WUR channel
    - PCR transition delay from doze state to awake state after receiving wake-up packet at STA side
    - Nonzero-length Frame Body support
    - Other information is TBD

**Y/N/A: 26/0/14**

**Straw Poll 2:**

* Do you support the following?
  + WUR Parameter field of WUR mode element, if present, include following
    - Preferred duty cycle parameter (e.g. ON Duration, Period, etc...)

**Y/N/A: 27/0/10**

**Straw Poll 3:**

* Do you support the following?
  + WUR Parameter field of WUR mode element, if present, may include following
    - WUR ID information
      * Individual ID
    - Duty cycle information
    - WUR channel information
  + or include following
    - Preferred duty cycle parameter (e.g. ON Duration, Period, etc...)

**Y/N/A: 21/0/13**

**Straw Poll 4:**

* **Do you support the following?**
  + Define an unified rule for WUR mode operation regardless of existing power saving features

**Straw poll Deferred**

**11-17/1369r1, “Power save state transition”, Ming Gan (Huawei):**

**Q:** On slide 2, what is active state?

**A:** The PCR is on.

**Straw Poll:**

* Do you agree that the STA may turn off the WURx after a successful frame exchange with AP, which informs the AP that the STA is the awake state, through its PCR in WUR mode

**Y/N/A: 23/1/13**

**11-17/1607r1 “WUR Synchronization”, Lei Huang (Panasonic):** The presentation is concerned with configuring the WUR Beacon interval.

**Q:** I guess the accuracy is often specified in the specification. I am not sure if a STA can actually provide the exact value. Maybe it is better to specify something in the specification?

**A:** Yes, but if some WURs have better accuracy this may be used to improve the WUR beacon interval.

**Q:** How is the AP informed about the accuracy, and how often?

**A:** In the capability exchange, and it will be only once.

**Straw Poll:**

Do you support adding the following to 11ba SFD?

WUR STA shall report its WUR TSF timer accuracy to the AP using WUR capability element.

**Y/N/A:** 6/5/18

**11-17/1695r1 “Integration of WUR to Power Save Mode follow up”, Enrico-Henrik Rantala (Nokia):** The presentation recaps presentation 11-17/0936r0 and proposes text for the SFD.

Q: I believe we have discussed this already, and that this is going in another direction

**Straw Poll:**

* Do you agree to add to the 11ba SFD, under chapter “4.5 WUR mode” the following:
  + *WUR mode is a sub mode of PSM (power save mode)*

**The Straw Poll is deferred.**

**11-17/1671r1 “MAC considerations for the V2P use case”, James Lepp (Blackberry)**

Q: Does the Frame Body need to carry something that is out of scope of this?

A: It may be useful with a few bits, but it should work without. I have not thought very much about this.

Q: Is there any association?

A: No. Could be P2P and the necessary data is exchanged using the PCR.

**The meeting is in recess at 3.30 pm.**

**Wednesday, November 8, 2017, 4:00-6:00 pm**

**Meeting Agenda:**

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

<https://mentor.ieee.org/802.11/dcn/17/11-17-1549-05-00ba-november-2017-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 80 persons in the room.)

Minyoung remindes about taking attendance.

Minyoung asks if there are any questions on the agenda. No questions on the agenda so the proposed agenda will be used.

Minyoung makes a call for potentially essential patents. No potentially essential patents reported and no questions asked.

**Presentations:**

**11-17/1671r1 “MAC considerations for the V2P use case”, James Lepp (Blackberry):** Continuation of the Q&A from the previous session.

Q: Looking at the PAR, it is not clear to me that this use case is in the scope of the PAR.

Q: I agree with the previous comment that D2D is not in the scope, and we may then come back to the discussion of power save AP which we agreed was not in the scope of the project.

**Straw Poll 1:**

Do you support the following?

“For indication of 802.11ba OCB, a reserved value for the address/identity field(s) is used.

This reserved value may be limited to apply to only one of the 4 WUR Frame Types.”

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

**11-17/1673r1 “Partial OOK – Generalizing the Blank GI Idea”, Leif Wilhelmsson (Ericsson)** The presentation extends the idea of blanking the GI to blanking an arbitrary large part of the symbol interval and also addresses where the performance comes from and how large is may be in a practice.

One thing that is high-lighted is that just blanking the GI does will not give noticeable gain. Instead it is shown both theoretically and by means of simulations that about 75% of the symbol should be blanked, and then a gain of close to 2 dB gain be obtained.

It is also shown that the argument of having a long blank sequence will cause problem as other STAs doing ED will then not hear the Wake-Up Signal is flawed. The mistake in the reasoning comes from that even if there is a signal, the ED threshold is so much higher (about 30 dB) than the sensitivity for the WUR so about 99% of the potential interfering STAs will anyway find the channel to be idle.It is therefore proposed to select the waveform that gives the best performance and not take into account the 1% of the STAs that may experience a difference if carrier sense based on ED is used.

**Q:** Why do you only consider 62.5 kb/s and not 250 kb/s?

**A:** The reason is that shorting the ON time further in case of 250 kb/s is believed to make synchronization too challenging.

**Q:** I believe this is interesting, but we would like to investigate this more before making a decision.

**Straw Poll:**

* Do you believe that the idea of shortening the ON time, as discussed in this presentation, in order to allow for improved receiver implementations should be supported in 802.11ba?

**Y/N/A:16/0/22**

**11-17/1616r0 “WUR Performance Studies With Blank GI”, Shahrnaz Azizi (Intel):** The performance with and without Blank GI is simulated for both 62.5 kb/s and 250 kb/s. Very little difference is seen in general.

**11/171651r2 “WUR channel issue”, Suhwook Kim (LGE)**

**Q:** I believe this question is a little premature to discuss at this moment in time. I believe this may be market driven, and we should wait to decide.

**Straw Poll 1**

* Do you support following sentences?
  + 11ba spec shall define a mechanism to indicate channel switch information for WUR STA
    - Channel switch indication procedure reuses CSA element

**Y/N/A: 9/0/30**

**Straw Polls 2-6 are deferred.**

**11-17/1666r0 “False Radar Pulse Detection on WUR Signals in DFS Channel”, Bin Tian (Qualcomm):** The presentation proposes to avoid using DFS channels for sending the wake-up signal.

**Q:** If we don’t use DFS channels, there are very few channels left.

**A:** You can e.g. use 2.4 GHz, and get better range as well compared to 5 GHz.

**Straw Poll:**

* Do you support changing
  + *The operation in DFS channels is TBD*

to

* + *The operation in DFS channels is disallowed*

in R.3.3.A of the SFD?

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

**Recess at 6.03 pm**

**Thursday, November 9, 2017, 8:00-10:00 am**

**Meeting Agenda:**

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

<https://mentor.ieee.org/802.11/dcn/17/11-17-1549-06-00ba-november-2017-tgba-agenda.pptx>

* + Call meeting to order
  + IEEE 802 and 802.11 IPR Policy and procedure
  + Motions
  + Identify subclauses that have enough details to start writing draft text based on TGba SFD (11-17/575r5) and the motions passed
  + Call for volunteers
  + Presentations
  + Recess

**Chair Minyoung Park (Samsung) calls meeting to order at 8.02 am. (**About 100 persons in the room.)

Minyoung remindes about taking attendance.

Minyoung goes through the agenda for the two sessions today and asks if there are any questions on the agenda. No objections to the agenda so the proposed agenda will be used.

Minyoung makes a call for potentially essential patents. No potentially essential patents reported and no questions asked.

**Motions:**

**Motions (Thursday AM1):**

1. **TGba SFD 11-17/575r5, Po-Kai Huang**
2. **1624r2, Jianhan Liu (2)**
3. **1612r2, 1613r1, Eunsung Park (1)**
4. **1626r1, Hongyuan Zhang (1)**
5. **1781r0, Steve Shellhammer (2)**
6. **1666r1, Bin Tian (1)**
7. **1627r1, Po-Kai Huang (4)**
8. **1369r2, Ming Gan (1)**
9. **1356r4, 1638r5, Jeongki Kim**
10. **1302r6, Lei Huang (1)**
11. **1657r4, Suhwook Kim (2)**
12. **1645r2, Alfred Asterjadhi (4)**

Reviewed in the first session and the comments have been resolved off line.

1. **11-17/575r5 “Specification Framework for TGba”, Po-Kai Huang (Intel)**

The document has already been reviewed and the comments have been resolved off line. No changes to the original document (revision 5) have been made.

**Motion:**

Move to approve the document 11-17/0575r5 “Specification Framework for TGba” as the revised TGba Specification Framework document

**Mover: Po-Kai Huang**

**Second: Lei Huang**

**Y/N/A: 35/0/1. Motion Passes.**

1. **1624r3 “11ba preamble structure based on analysis of power consumption, cost and complexity”, Jianhan Liu (Mediatek)**

**Motion 1:**

* Move to add the following text to Section 3.2 in TGba SFD:
  + Following the 20 MHz non-HT preamble and the additional 20MHz BPSK OFDM symbol as defined in R.3.1.A, the narrow band portion of a WUR PPDU is composed by a Synchronization (SYNC) field and a Data field.

**Move: Jianhan Liu**

**Second: Hongyuan Zhang**

Motion passed by unanimous consent.

**Motion 2:**

* Move to add the following text to Section 3.2 in TGba SFD:
  + The SYNC field is composed only of pre-defined sequences to differentiate the two data rates.

**Move: Jianhan Liu**

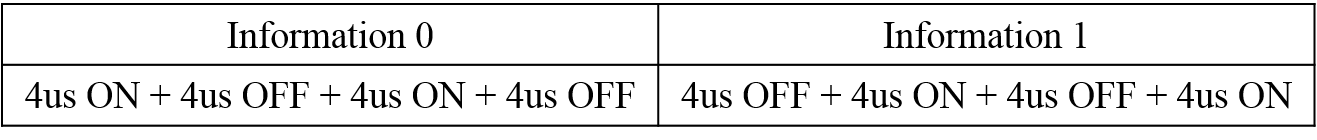
**Second Hongyuan Zhang**

Motion passed by unanimous consent.

1. **11-17/1612r3 “Symbol Structure Follow-up” Eunsung Park (LGE)**

**Motion:**

* Move to add the following to the 11ba SFD
  + Symbol structure of the data rate of 62.5Kbps for each information is as follows



* + - For 4us ON-signal, there is always energy

**Move:** Eunsong Park

**Second:** John Notor

**Y/N/A: 17/3/16. Motion passes.**

**11-17/1613r2 “13-Length Sequence for OOK Waveform Generation”. Eunsung Park (LGE)**

* Move to modify the text in the 11ba SFD as follows
  + *R.3.3.C: When a single band is used for transmission of WUR PPDU, the OOK waveform of WUR PPDU is generated by using contiguous 13 subcarriers with the subcarrier spacing of 312.5 kHz:*
    - *The center subcarrier is ~~TBD~~ null.*

**Move:** Eunsung Park

**Second:** Suhwook Kim

**Y/N/A: 22/0/10. Motion Passes.**

1. **11-17/1626r2 “11ba PHY Frame Format—Length Discussions”, Hongyuan Zhang (Marvell)**

**Motion:**

* Move to add the following to the SFD:
  + 11ba spec shall define an upper limit on the time duration of a WUR PPDU, to a TBD value that is less than the LSIG LENGTH field limitation.

**Move:** Hongyuan Zhang

**Second:** Jianhan Liu

**Y/N/A: 35/0/3. Motion Passes.**

1. **11-17/1781r1 “Sync Structure Motions”, Steve Shellhammer (Qualcomm)**

**Motion 1:**

Move to add the following text to the SFD:

* “The Sync field duration depends on the data rate of the Data Field. When the Data Field uses the low data rate the duration of the Sync field is 128 µs. When the Data Field uses the high data rate the duration of the Sync field is 64 µs.”

**Move:** Steve Shellhammer

**Second:** Shahrnaz Azizi

Motion passed by unanimous consent.

**Motion 2:**

Move to add the following text to the SFD:

* “The PHY Sync field structure depends on the data rate of the Data Field. When the Data Field uses the high data rate the structure of the Sync field is , where is a sequence of bits, and is the complementary sequence of . When the Data Field uses the low data rate the structure of the Sync field is . The duration of each bit in the Sync field is TBD (either 2 or 4) µs. The specific bit sequence of is TBD.”

**Move:** Steve Shellhammer

**Second:** Shahrnaz Azizi

**Y/N/A: 31/0/5. Motion Passes.**

1. **11-17/1666r2 “False Radar Pulse Detection on WUR Signals in DFS Channel”, Bin Tian (Qualcomm):**

* Move to make the following change to TGba SFD clause 3.3.A and 3.3.B

Change

* + *The operation in DFS channels is TBD*

to

* + *The operation in DFS channels is disallowed*

**Move:** Bin Tian

**Second:** Steve Shellhammer

**Y/N/A: 15/5/25. Motion Passes.**

1. **11-17/1627r2 “WUR Action Frame Format Follow up”, Po-Kai Huang (Intel)**

**Motion 1:**

* Move the following to the 11ba SFD:
  + The frame body of WUR Action frame can include the following:
    - Category field that indicates WUR Action
    - WUR Action field that includes the following indications: WUR Mode Setup and WUR Mode Teardown
    - Dialog Token field
    - WUR Mode Element includes necessary WUR parameters

**Move:** Po-Kai Huang

**Second:** Suhwook Kim

Motion passed by unanimous consent.

**Motion 2:**

* Move the following to the 11ba SFD:
  + The WUR Mode element can include the following:
    - Element ID and Element ID Extension fields that indicate WUR Mode Element
    - Length field
    - Action Type field that includes the following indications: Enter WUR Mode Request, Enter WUR Mode Response
    - WUR Mode Response Status field that includes the following indications: Enter WUR Mode Accept and Denied
    - WUR parameters field that includes the indication for WUR parameters

**Move:** Po-Kai Huang

**Second:** Suhwook Kim

Motion passed by unanimous consent.

**Motion 3:**

* Move the following to the 11ba SFD:
* Define WUR Mode Suspend, and if an non-AP STA is in WUR Mode Suspend, then
  + The negotiated WUR parameters between AP and non-AP STA is maintained
  + Non-AP STA may turn off the WURx
  + Note that negotiated PCR schedule (if any) is active and is not suspended

**Move:** Po-Kai Huang

**Second:** Suhwook Kim

Motion passed by unanimous consent.

**Motion 4:**

* Move the following to the 11ba SFD:
* Add the following signaling in WUR Mode element
  + In Action type field of WUR Mode element, include the following indication:
    - Enter WUR Mode Suspend Request
    - Enter WUR Mode Suspend Response
    - Enter WUR Mode Suspend
    - Enter WUR Mode
  + In WUR Mode Response Status field of WUR Mode element, include the following indication: Enter WUR Mode Suspend Accept

**Move:** Po-Kai Huang

**Second:** Suhwook Kim

Motion passed by unanimous consent.

1. **11-17/1369r3 “Power save state transition”, Ming Gan (Huawei)**

* Move the following text to add to the TGba SFD:
  + The STA may turn off the WURx after a successful frame exchange with AP, which informs the AP that the STA is the awake state, through its PCR in WUR mode

**Move:** Ming Gan

**Second:** Po-Kai Huang

Motion passed by unanimous consent.

1. **11-17/1356r5 “Duty cycle mode STA’s PS follow-up”, Jeongki Kim (LGE)**

**Motion 1:**

* Move to add the following to TGba SFD
  + A non-individually addressed wake-up frame may include the information for indicating the group addressed frame transmission through PCR
    - The details indicating the group addressed frame transmission (e.g., using Group ID or additional bit) is TBD

**Move:** Jeongki Kim

**Second:** Suhwook Kim

Motion passed by unanimous consent.

* Move to add the following to TGba SFD
  + If a STA receives a non-individually addressed wake-up frame indicating a group addressed frame through the PCR, the STA may attempt to receive a group addressed frame through PCR

**Move:** Jeongki Kim

**Second:** Suhwook Kim

Motion passed by unanimous consent.

**11-17/1638r6 “WUR frame format follow-up”, Jeongki Kim (LGE)**

**Motion 1:**

* Move to add the following to TGba SFD
  + TBD bits Type field is included in the Frame control field of MAC header with the following mapping of the Type field:
    - 0 assigned to WUR Beacon
    - 1 assigned to Wake-Up frame
    - 2 assigned to Vendor specific frame

**Move:** Jeongki Kim

**Second:** Suhwook Kim

Motion passed by unanimous consent.

**Motion 2:**

* Move to add the following to TGba SFD
  + AP may negotiate one or more Group IDs to a STA through PCR
    - The assigned Group ID is used in a wake-up frame
    - The details for group ID (e.g., ID allocation procedure (e.g., WUR Action frame or others similar to 11ac procedure), ID structure, etc.) are TBD

**Move:** Jeongki Kim

**Second:** Suhwook Kim

Motion passed by unanimous consent.

**Motion 3:**

* Move to add the following to TGba SFD
  + A Wake Up frame with variable length may contain the information for the multiple STAs in the Frame Body
    - The detailed information of multiple STAs (e.g., bitmap, ID list) is TBD
    - Unicast wake-up frame does not carry the information of multiple STAs

**Move:** Jeongki Kim

**Second:** Suhwook Kim

**Y/N/A: 18/0/3. Motion Passes.**

1. **11-17/1302r7 “WUR Mode Operation Procedures” Lei Huang (Panasonic)**

**Motion:**

Move to modify the following text in 11ba SFD

R.4.2.A: Define WUR Action frame to enable WUR negotiation and WUR mode signaling

– Note that WUR Action frame is sent through primary connectivity radio

**Move:** Lei Huang

**Second:** Po-Kai Huang

Motion passed by unanimous consent.

1. **11-17/1657r7 “MAC operation of WUR” Suhwook Kim (LGE)**

**Motion 1:**

* **Move to add following text in SFD**
  + IEEE 802.11ba spec shall define Information Element for WUR capability that include following information
    - Supported operating class for WUR channel
    - PCR transition delay from doze state to awake state after receiving wake-up packet at STA side
    - Nonzero-length Frame Body support

**Move:** Suhwook Kim

**Second:** Po-Kai Huang

Motion passed by unanimous consent.

**Motion 2:**

* Move to add following text in SFD
  + WUR Parameter field of WUR mode element, if present, may include followings
    - WUR ID information
      * Individual ID
    - Duty cycle information
    - WUR channel information
  + or include following
    - Preferred duty cycle parameter (e.g. ON Duration, Period, etc...)

**Move:** Suhwook Kim

**Second:** Po-Kai Huang

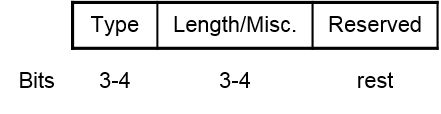
Motion passed by unanimous consent.

1. **11-17/1645r3 “WUR frame format – Follow up” Alfred Asterjadhi (Qualcomm)**

**Motion 1:**

Move to add to the 11ba SFD:

* The Frame Control field is 8 bits and contains:
  + A Type subfield that identifies the type and, together with the Length field differentiates between constant length (CL) and variable length (VL) WUR frames
  + A Length/Misc field which contains:
    - The length of the Frame Body field for a VL WUR frame
    - Bits that are expected to be used for other purposes for a CL WUR frames
      * No Length field is present in CL WUR frames



**Move:** Alfred Asterjadhi

**Second:** Po-Kai Huang

**Y/N/A: 24/0/9. Motion Passes**

**Motion 2:**

Move to add to the 11ba SFD:

* The Address field is 12 bits
* The TD Control field is 12 bits

**Move: Alfred Asterjadhi**

**Second: Po-Kai Huang**

Motion passed by unanimous consent.

**Motion 3:**

Move to add to the 11ba SFD:

* The contents of the Address field are as defined below:



* Where:
  + WID is the WUR ID provided by the AP and identifies one WUR STA
  + GID is the GROUP ID provided by the AP and identifies one or more WUR STAs
  + TXID is a transmitter identifier that is decided by the AP
    - Which bits, from where, and how they are selected is TBD
  + OUI1 is the 12 MSBs of the OUI

**Move:** Alfred Asterjadhi

**Second:** Po-Kai Huang

Motion passed by unanimous consent.

**Motion 4:**

Move to add to the 11ba SFD:

* When the Frame Body field is present in a WUR frame then:
  + The length of the Frame Body field is indicated by the Length subfield in the Frame Control field
  + The length is in units of *TBD* octets, and is up to 8 or 16 (*TBD*) octets.

**Move:** Alfred Asterjadhi

**Second:** Po-Kai Huang

**Y/N/A: 20/0/3. Motion Passes.**

**Motion 5:**

Move to add to the 11ba SFD:

* The FCS additionally embeds BSSID information:
  + How to embed the BSSID information in the FCS is *TBD*
  + It is not applicable for pre-association WUR frames

**Move:** Alfred Asterjadhi

**Second:** Po-Kai Huang

**Y/N/A:** 16/1/16. Motion Passes.

**11-17/1546r6 “November 2017 TGba Agenda” Minyoung Park (Samsung):** Minyoung goes through page 35 in the document, which is related to the D0.1 development process.

**Q:** Based on experience, we need to find a single person who is overall responsible for PHY.

**Q:** I believe we can wait with PHY. I believe it is not very complicated, and I believe it is better to wait to avoid that we need to rewrite a lot.

**Q:** I believe we have sufficient material for PHY to at least start some drafting.

**Q:** What is the current time-line for D0.1?

**A:** January 2018

**Straw Poll:**

* Do you agree that certain sections of the current TGba SFD and the motions passed this week have enough technical details to start writing draft text for TGba D0.1 (initial draft)?

**Y/N/A: 46/0/2**

**The meeting is in recess at 10.07 am.**

**Thursday, November 9, 2017, 13:30-15:30 pm**

**Meeting Agenda:**

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

<https://mentor.ieee.org/802.11/dcn/17/11-17-1549-07-00ba-november-2017-tgba-agenda.pptx>

* + Call meeting to order
  + IEEE 802 and 802.11 IPR Policy and procedure
  + TGba D0.1 development process
  + TG timeline discussion
  + Goal for January 2018 F2F meeting
  + Teleconference call schedule
  + Presentations
  + Adjourn

**Chair Minyoung Park (Samsung) calls meeting to order at 13.33 pm. (**About 70 persons in the room.)

Minyoung remindes about taking attendance.

Minyoung goes through the agenda and asks if there are any questions on the agenda. There is a proposal to prioritize the presentations related to Smart Scanning, and start with at least one presentation related to this subject. No further discussion on the agenda so the proposed updated agenda will be used.

Minyoung makes a call for potentially essential patents. No potentially essential patents reported and no questions asked.

**TGba D0.1 development process:**

**11-17/1787r0 “Mature Topics for Draft 0.1”, Po-Kai Huang (Intel):** Po-Kai proposes the following procedure for drafting the text:

* Identify mature topic with related motions
* Produce SFD r6 based on the minute
* Chair sends email to call for Volunteer
  + The email will include the reference of motions in SFD r6 for spec writing
* Volunteer prepares spec texts for the assigned motions based on the template in [3]
  + Assigned motion will be included in the document

**PHY:** Two big blocks:

* WUR Preamble
* WUR Payload

**MAC:** More progress, also here divided into two blocks:

* WUR Negotiation
* WUR Mode and WUR Frame formats

**Q:** I believe we also should add “Normative Behavior” as part of the MAC.

**Q:** For PHY, I believe we should start by defining different parameters so that we use the same notation, terminology etc. Examples are mathematical description of the signal, timing related parameters, etc.

**TG Timeline Discussion:** The timeline, which has not been updated since the last meeting, is shown below:

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

**Goal for January 2018 F2F meeting**

* Review technical presentations
* Review draft text for TGba D0.1
* Work on TGba task group documents
* Review TG timeline

**Teleconference call schedule:**

* Proposed schedule (Mondays, 1 hour each)
  + November 27, 10:00 ET
  + December 11, 17:00 ET
  + December 18, 23:00 ET

The proposed schedule is agreed.

**Presentations:**

**11-17/1608r7 “Follow-Up on WUR Discovery Frame and Discovery Channel”, Guoqing Li (Apple): The** Propose to define a WUR Discovery frame to carry the essential information for unassociated STAs to perform smart scanning. In addition, the concept or Discovery Channel(s) is proposed so that less channels need to be searched.

**Q:** The main assumption you make is that all APs support this. If an AP does not support this, that AP will not be on the list and you still need to do the full scanning.

**A:** You can as you say not offload all the APs, but you may be able to offload some of the APs. Exactly how much can be gained may depend on things like scanning policy etc.

**Q:** You plan to scan over several seconds, it seems to be complicated to achieve in practice to keep e.g. oscillators running stable for such a long time. Maybe we need to increase the allowed power consumption in order to allow the scanning.

**A:** I don’t believe this is a problem.

**Q:** Do you recommend these to be dedicated channels?

**A:** No.

**Q:** How many Bytes of information is needed to be sent?

**A:** 7-8 Bytes. We will of course have to follow the restrictions on maximum packet duration.

**Q:** On slide 10, you propose a limited number of scanning channels?

**A:** Yes.

**Q:** These needs to be known by the WUR?

**A:** Yes.

**Q:** Do you envision that the WUR is scanning all the time in the background?

**A:** I believe we can leave this to implementation.

**Q:** Unless we have a “shall” when it comes to what channel to use, I feel this will not be useful. On the other hand, if you do have a “shall”, the AP loses all its flexibility.

**A:** I agree we need to look at this more, but I would like to allow for some flexibility in the AP.

**Q:** The delay problem may be approached using different approaches. If case of handover, I believe there are more efficient ways than using the WUR.

**Q:** Do we require the AP to always send WUR beacons? I don’t think this will be the case.

**A:** I believe this can be a question for WFA. Some profiles may support it some others may not.

**Q:** The number of channels the AP needs to transmit on will increase a lot as it seems.

**A:** No, the AP sends on one, but the STA needs to search among the possible ones.

**Q:** I don’t think it is necessary that every AP supports this feature in order for it to be useful.

**Straw Poll 1:**

* Do you agree to define a type of WUR frame as WUR Discovery frame to assist the STAs to discover the BSS?

**Y/N/A:** 51/0/10

**Motion:**

* Move to define in TGba SFD a type of WUR frame as WUR Discovery frame to assist the STAs to discover the BSS

Move: Guoqing Li

Second: Alfred Asterjadhi

Motion passed by unanimous consent.

**11-17/1684r2 “WUR Guard Time follow-up”, Woojin Ahn (WILUS)**

**Q:** You talk about the waste in power, but I wonder how much the gain really is since the power consumption is, say, 1% of the PCR.

**Q:** I would prefer that we don’t try to specify e.g. the APs behavior as you do on page 8.

**Q:** Why do you assume that it takes so long to turn on the WUR? I believe it is much faster.

**A:** We saw this in some reference.

**Q:** Why do we not just start the warm-up ahead of time, then there is no need for a Guard time?

**Q:** I believe the warm-up time is actually lower than for the PCR, and I believe we should first validate that there really is a problem that needs to be solved.

**The Straw Poll is deferred.**

**The meeting is adjourned at 3.30 pm.**