IEEE P802.11  
Wireless LANs

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| 802.11ba  Teleconference Minutes February 2017 | | | | |
| Date: 01-14-2017 | | | | |
| Author(s): | | | | |
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Abstract

This document contains minutes from TG 802.11ba teleconferences in February 2017.

Rev 0: Minutes from TG 802.11ba teleconference on 6th of February, 2017.

Rev 1: Minutes from TG 802.11ba teleconference on 13th of February, 2017 added + some added names to the attendance list.

Rev 2: Minutes from TG 802.11ba teleconference on 27th of February added.

Rev3: Updated attendance list for 27th of February.

**Teleconference on Monday, February 6th , 2017, 10:00 – 11:30 (ET)**

**Agenda:**

### Call the meeting to order

1. IEEE 802 and 802.11 IPR policy and procedure
2. Attendance reminder. Please send an email to Leif Wilhelmsson ([leif.r.wilhelmsson@ericsson.com](mailto:leif.r.wilhelmsson@ericsson.com))
3. Remaining presentations from the January meeting and allocations:
   1. **Feb. 6th:**
      1. 11-17/0068, “AP Discovery Discussion,” Kaiying Lv
      2. [11-17/0070, “Initial Negotiation for WUR“ – Igor Kim (ETRI)](https://mentor.ieee.org/802.11/dcn/17/11-17-0070-00-00ba-initial-negotiation-for-wur.pptx)
      3. [11-17/0071, “High level MAC concept for WUR” – Po-Kai Huang (Intel)](https://mentor.ieee.org/802.11/dcn/17/11-17-0071-00-00ba-high-level-mac-concept-for-wur.pptx)
   2. **Feb. 13th:**
      1. [11-17/0043, “WUR power save mode “ – Tiannyu Wu (Mediatek)](https://mentor.ieee.org/802.11/dcn/17/11-17-0043-00-00ba-wur-power-save-mode-and-problem.pptx)
      2. [11-17/124, “WUR MAC and Wakeup Frame” – Liwen Chu (Marvell)](https://mentor.ieee.org/802.11/dcn/17/11-17-0124-00-00ba-wur-mac-and-wakeup-frame.pptx)
      3. [11-17/184, “Ultra low power strategies for selective wake-up from receiver prospect” - Joerg Robert (FAU Erlangen-Nuernberg)](https://mentor.ieee.org/802.11/dcn/17/11-17-0184-00-00ba-ultra-low-power-strategies-for-selective-wake-up-from-receiver-prospect.pptx)
   3. **Feb. 27th:** 
      1. [11-17/0039, “Proposed TGba Functional Requirements” Ming Gan (Huawei)](https://mentor.ieee.org/802.11/dcn/17/11-17-0039-00-00ba-proposed-tgba-functional-requirements.doc)

### Adjourn

Chair Minyoung Park (Intel) calls the meeting to order at 10:00 (ET).

Minyoung confirms that the Secretary is on the call.

Minyoung reviewes the IEEE 802 and 802.11 Policy and Procedure, and presents where to find the relevant documents. Chair asks if there is any potentially essential patent that people are aware of and if there are any questions.

No potentially essential patents reported and no questions asked.

Minyoung reminds about recording attendance by sending an email to the secretary.

Minyoung checks attendance of the potential presenters, and it is proposed to cover paper 11-17/0070, 11-17/0071, and 11-17/0184.

[**11-17/0070, “Initial Negotiation for WUR”- Igor Kim (ETRI)**](https://mentor.ieee.org/802.11/dcn/17/11-17-0070-00-00ba-initial-negotiation-for-wur.pptx)**:** The presentation discusses how the initial exchange of information concerning WUR capabilities may be performed. Examples of parameters that may be exchanged include operating channel, WUR mode, duty-cycled parameters, WUR ACK policy, and wake-up delay. Also WUR association establishment and association tear-down are discussed.

**Question(Q):** Can you explain what operating channel refers to? What is the granularity?

**Answer(A):** Channel 1,2 etc. refers to the 20 MHz channels, WUR channel is to be defined later.

**Q:** You assume that a completely different channel may be used for the wake-up signal?

**A:** Yes.

**Q:** How does the AP select what WUR channel to use? Is there any cooperation between the APs?

**A:** This is not really discussed here. The negotiation referred to here is between the AP and the STA.

[**11-17/0071, “High level MAC concept for WUR” – Po-Kai Huang (Intel)**](https://mentor.ieee.org/802.11/dcn/17/11-17-0071-00-00ba-high-level-mac-concept-for-wur.pptx)**:** The presentation discusses three high level MAC concepts essential for WUR operation

1. WUR mode requests/responses to enable WUR operation and negotiate parameters.
2. Integration with current power save protocols.
3. Basic operation including acknowledgement and retransmission.

**Q:** Do you suggest that the STA should reuse a specific bit?

**A:** No, my point is that the STA in some way has to indicate it is using a WUR.

**Q:** The AP may terminate the usage of the WUR?

**A:** I don’t propose anything in particular, just point out that some kind of signaling is needed.

[**11-17/184, “Ultra low power strategies for selective wake-up from receiver prospect” - Joerg Robert (FAU Erlangen-Nuernberg)**](https://mentor.ieee.org/802.11/dcn/17/11-17-0184-00-00ba-ultra-low-power-strategies-for-selective-wake-up-from-receiver-prospect.pptx)**:** The presentation proposes to use a super regenerative receiver architecture in combination with a sampling receiver to achieve very low power consumption. It is also illustrated how the use of a sampling receiver may increase the robustness to intermittent interference.

**Q:** What would be the length of the wake-up packet?

**A:** This is essentially a design parameter which is based on the trade-off with power consumption.

**Q:** Do you have a reference for the power consumption figures?

**A:** That would be reference [9].

**Q:** Is the power consumption based on the assumption of a architecture shown on page 6?

**A:** Yes, but with another architecture is still not more than 3-4 times higher.

**Q:** Have you looked into adjacent channel interference performance?

**A:** No, but the receiver should be frequency selective enough to give good performance.

Meeting is adjourned at 11:05 (ET).

**List of Attendees**

|  |  |  |
| --- | --- | --- |
|  | **Name** | **Affiliation** |
| 1 | Minyoung Park | Intel |
| 2 | Leif Wilhelmsson | Ericsson |
| 3 | Joerg Robert | Univeristy Erlangen-Nuernberg |
| 4 | John Notor | Notor Research/ARM Inc. |
| 5 | Fei Tong | Samsung |
| 6 | Peter Loc | Huawei |
| 7 | Kome Oteri | InterDigital |
| 8 | Xiaofei Wang | InterDigital |
| 9 | Dongguk Lim | LG |
| 10 | Yunbo Han | Huawei |
| 11 | Shahrnaz Azizi | Intel |
| 12 | Igor Kim | ETRI |
| 13 | Pierre Debergh | Orange |
| 14 | Sunghyun Hwang | ETRI |
| 15 | Jason Yuchen Guo | Huawei |
| 16 | Yong Cheng | Huawei |
| 17 | Jinsoo Choi | LG |
| 18 | Woojin Ahn | WILUS |
| 19 | Youngho Seok | Newracom |
| 20 | Jeongki Kim | LG |
| 21 | Po-Kai Huang | Intel |
| 22 | Eunsong Park | LG |
| 23 | Hanseul Hong | Yonsei Univ. |
| 24 | Lei Huang | Panasonic |
| 25 | Yunsong Yang | Huawei |

**Teleconference on Monday, February 13th , 2017, 5:00 – 6:30pm (ET)**

**Agenda:**

1. Call the meeting to order
2. IEEE 802 and 802.11 IPR policy and procedure
3. Attendance reminder. Please send an email to Leif Wilhelmsson ([leif.r.wilhelmsson@ericsson.com](mailto:leif.r.wilhelmsson@ericsson.com))
4. Presentations:

* 11-17/0068, “AP Discovery Discussion,” - Kaiying Lv
* [11-17/0043, “WUR power save mode”– Tiannyu Wu (Mediatek)](https://mentor.ieee.org/802.11/dcn/17/11-17-0043-00-00ba-wur-power-save-mode-and-problem.pptx)
* [11-17/124, “WUR MAC and Wakeup Frame” – Liwen Chu (Marvell)](https://mentor.ieee.org/802.11/dcn/17/11-17-0124-00-00ba-wur-mac-and-wakeup-frame.pptx)

Chair Minyoung Park (Intel) calls the meeting to order at 05:10pm (ET).

Minyoung confirms that the Secretary is on the call.

Minyoung reviewes the IEEE 802 and 802.11 Policy and Procedure, and presents where to find the relevant documents. Chair asks if there is any potentially essential patent that people are aware of and if there are any questions.

No potentially essential patents reported and no questions asked.

Minyoung reminds about recording attendance by sending an email to the secretary.

**Presentations:**

**11-17/0068, “AP Discovery Discussion,” - Kaiying Lv:** The presentation is concerned with uses cases where the AP has a WUR and how unassociated STAs can associate with the AP. It is proposed that the wake-up frame should contain ID of the addressed AP, type of wake-up frame and designated channel for the AP to use for notification of its working channel.

**Q:** Do you assume that all APs have this capability or just some?

**A:** In this use case we assume that at least some have this capability

[**11-17/0043, “WUR power save mode” – Tianyu Wu (Mediatek)**](https://mentor.ieee.org/802.11/dcn/17/11-17-0043-00-00ba-wur-power-save-mode-and-problem.pptx)**:** The presentation discusses that duty-cycled WUR may be necessary to reach really low power consumption, since there may be WUR implementations that consume on the order of 1 mW when in ON state. In case of duty-cycled WUR, one need to address the time-drifting problem. Straw polls related the presentations are deferred to the f2f.

[**11-17/124, “WUR MAC and Wakeup Frame” – Liwen Chu (Marvell)**](https://mentor.ieee.org/802.11/dcn/17/11-17-0124-00-00ba-wur-mac-and-wakeup-frame.pptx): The presentation discussed different wake-up frames, and how to differentiate wake-up packets originating from different APs. Reuse of BSS color is suggested rather than MAC address to make the wake-up packet shorter.

**Q:** On slide 5, for Option 2 how can the AP know if the wake-up packet is correctly received?

**A:** It can’t. If the ACK packet for the data is not received, the wake-up packet has to be resent.

**Q:** I have similar concern in that this may be wasteful, possibly sending a data packet to a device that is not woken up.

**Q:** 6 bits are used for BSS color in ax, and this does not seem to suffice especially in case of soft and moving APs. I support that 12 bits seems to be a reasonable number. However, since BSS color may be closely related with having just 6 bits, maybe we should not use this term, but something like AP identifier?

**A:** I basically agree.

**Q:** We design this system for very low delay. On slide 5 what delay do you expect?

**A:** I believe the delay may be slightly larger SIFS. It may take some to activate the main transceiver.

**Q:** It would be good to understand with preparation period shown on slide 5.

**Q:** I am somewhat concerned with using the term TYPE, it seems it does here not really have the same meaning as in standard 802.11 terminology

**A:** OK.

**Q:** I agree that 6 bits for coloring is not enough, we need to also include mobility when deciding on how many bits are needed.

**A:** I agree.

Meeting is adjourned at 06:24pm (ET).

**List of Attendees**

|  |  |  |
| --- | --- | --- |
|  | **Name** | **Affiliation** |
| 1 | Minyoung Park | Intel |
| 2 | Leif Wilhelmsson | Ericsson |
| 3 | Young Hoon Kwon | Newracom |
| 4 | John Notor | Notor Research/ARM Inc. |
| 5 | Hongyuan Zhang | Marvell |
| 6 | Peter Loc | Huawei |
| 7 | Sue Leicht | NSA |
| 8 | Xiaofei Wang | InterDigital |
| 9 | Dongguk Lim | LG |
| 10 | Yunbo Han | Huawei |
| 11 | Junghoon Suh | Huawei |
| 12 | Igor Kim | ETRI |
| 13 | Rojan Chitrakar | Panasonic |
| 14 | Sunghyun Hwang | ETRI |
| 15 | Kaiying Lv | ZTE |
| 16 | Sung Eun Lee | Cypress |
| 17 | Jinsoo Choi | LG |
| 18 | Minho Cheong | Newracom |
| 19 | Youngho Seok | Newracom |
| 20 | Rui Cau | Marvell |
| 21 | Po-Kai Huang | Intel |
| 22 | Eunsong Park | LG |
| 23 | Tianyu Wu | Mediatek |
| 24 | Yunsong Yang | Huawei |

**Teleconference on Monday, February 27th , 2017, 11:00 – 12:30pm (ET)**

**Agenda:**

1. Call the meeting to order
2. IEEE 802 and 802.11 IPR policy and procedure
3. Attendance reminder. Please send an email to Leif Wilhelmsson ([leif.r.wilhelmsson@ericsson.com](mailto:leif.r.wilhelmsson@ericsson.com))
4. Presentations:
   1. [11-17/0039, “Proposed TGba Functional Requirements” Ming Gan (Huawei)](https://mentor.ieee.org/802.11/dcn/17/11-17-0039-00-00ba-proposed-tgba-functional-requirements.doc)

Chair Minyoung Park (Intel) calls the meeting to order at 11:00pm (ET).

Minyoung confirms that the Secretary is on the call.

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

Minyoung reviewes the IEEE 802 and 802.11 Policy and Procedure, and presents where to find the relevant documents. Chair asks if there is any potentially essential patent that people are aware of and if there are any questions.

No potentially essential patents reported and no questions asked.

Minyoung reminds about recording attendance by sending an email to the secretary.

**Presentation:**

**11-17/0039, “Proposed TGba Functional Requirements” Ming Gan (Huawei):** Ming Gan presents the Functional Requirements document.

**Q:** Requirements R2 and R3 (related to latency and legacy performance, respectively) seem to be relatively vague comparted to some of the other requirements in the document. When you refer to degradation to you refer to network performance or a specific link?

**A:** It refers to network performance, e.g. network throughput.

**Q:** I have similar concerns regarding R2 and R3. Would it be possible to include some specific number in a similar way as for R1?

**Q:** Similar concern with respect to R2 and R3. I also have some editorial comments, which I also have sent by email. When it comes to legacy operation of devices operating in the proximity, I believe it should be added that they are in the same network.

**A:** I have received the comments and will consider them. I believe I agree with most of them.

**Q:** In some case it is possible to do much better than 1 mW when it comes to power consumption, maybe that should be included.

**A:** Since 1 mW is in the PAR, it does not make sense to have another number here I believe.

**Q:** Is there a possibility or change the PAR? I don’t suggest is, just ask of curiosity.

**A:** There is a process for it, but we spent quite some time developing the PAR… Also, if we have a lower number in the Functional Requirement document than in the PAR, there is a potential issue in that one may claim compliance with the PAR even if not meeting the number in the Functional Requirement document.

**Q:** What is the plan regarding the Functional Requirement document and the Use Case document? Do you plan to align these two documents?

**A:** We should consider them together, although they are two independent documents.

**Q:** Will the main PHY and MAC operation eventually be written in Section 2.2?

**A:** This is a Functional Requirement document, not the SFD, so I am not sure exactly you have in mind?

**Q:** What is meant with legacy performance in Section 2.3?

**A:** STAs without WUR capability.

**Q:** I believe R2 should be rephrased such that “maintain” is replaced by “provide”.

**A:** OK.

**Q:** I believe there must be some degradation when it comes to legacy devices, what do you mean?

**A:** I mean that it should not be significant.

Meeting is adjourned at 11:53pm (ET).

**List of Attendees**

|  |  |  |
| --- | --- | --- |
|  | **Name** | **Affiliation** |
| 1 | Minyoung Park | Intel |
| 2 | Leif Wilhelmsson | Ericsson |
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| 5 | Woojin Ahn | WILUS |
| 6 | John Son | WILUS |
| 7 | Kome Oteri | InterDigital |
| 8 | Xiaofei Wang | InterDigital |
| 9 | Dongguk Lim | LG |
| 10 | Junghoon Suh | Huawei |
| 11 | Igor Kim | ETRI |
| 12 | Rojan Chitrakar | Panasonic |
| 13 | Sung Eun Lee | Cypress |
| 14 | Suhwook Kim | LG |
| 15 | Jeongki Kim | LG |
| 16 | Rui Yang | InterDigital |
| 17 | Shahrnaz Azizi | Intel |
| 18 | Eunsong Park | LG |
| 19 | Yunsong Yang | Huawei |
| 20 | Bill Carney | Sony |