IEEE P802.11
Wireless LANs

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| 802.11ba Teleconference Minutes April 2017 |
| Date: 04-04-2017 |
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Abstract

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

Rev 0: Minutes from TG 802.11ba teleconference on 3rd of April, 2017.

**Teleconference on Monday, April 3rd, 2017, 10:00 – 12:00 (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)
4. Presentations:
* PHY, 11-17-0326, WUR phase noise model follow-up, Minyoung Park, Intel
* PHY, WUR link budget analysis, Rui Cao, Marvell
* PHY, Waveform Generation for Waveform Coding, Junghoon Suh, Huawei
* PHY, 11/17-0385 “Concurrent transmission of data and a wake-up signal in 802.11ax - Follow-up”, Leif Wilhelmsson, Ericsson
* PHY, 11/17-0386 “Impact of reciprocal mixing on WUR performance”, Leif Wilhelmsson, Ericsson
* Comments regarding the 802.11ba usage model (17/0029), email sent 2017-02-17, Mark Rison, Samsung

Adjourn

The conduct of this meeting is governed by IEEE, IEEE-SA and IEEE LMSC policies, which include:
- IEEE Patent Policy
- Ethics
- 802 LMSC P&P
- 802LMSC Operations Manual (OM)

Links to the documents or web-pages describing the policies may be found here: [http://www.ieee802.org/11/Rules/rules.shtml](https://www.google.com/url?q=http%3A%2F%2Fwww.ieee802.org%2F11%2FRules%2Frules.shtml&sa=D&ust=1485911358009000&usg=AFQjCNEReA4YoFBtGsVMTHHqaQ7RqnFI-Q).

The following documents provide additional information on the governing IEEE-SA policies:
- Patent FAQ ([http://standards.ieee.org/faqs/patents.pdf](https://www.google.com/url?q=http%3A%2F%2Fstandards.ieee.org%2Ffaqs%2Fpatents.pdf&sa=D&ust=1485911358009000&usg=AFQjCNHxk2o60zaB0vG017xCRjouRh2kNw))
- Affiliation FAQ ([http://standards.ieee.org/faqs/affiliation.html](https://www.google.com/url?q=http%3A%2F%2Fstandards.ieee.org%2Ffaqs%2Faffiliation.html&sa=D&ust=1485911358009000&usg=AFQjCNEc4Oqh7kqbEYCU2ETtbL9lYgWfKw))
- Anti-Trust FAQ ([http://standards.ieee.org/develop/policies/antitrust.pdf](https://www.google.com/url?q=http%3A%2F%2Fstandards.ieee.org%2Fdevelop%2Fpolicies%2Fantitrust.pdf&sa=D&ust=1485911358009000&usg=AFQjCNGKSQV0BTbcMs7UfJECydBzeH2_hw))

In addition, the conduct of this meeting is governed by IEEE 802.11 Operations Manual (OM), which is also linked from here: [http://www.ieee802.org/11/Rules/rules.shtml](https://www.google.com/url?q=http%3A%2F%2Fwww.ieee802.org%2F11%2FRules%2Frules.shtml&sa=D&ust=1485911358009000&usg=AFQjCNEReA4YoFBtGsVMTHHqaQ7RqnFI-Q)

**Chair Minyoung Park (Intel) calls the meeting to order at 10:02 (ET).**

Minyoung goes through the agenda and asks if there is anything that should be added to the agenda. No response.

The order of the presentations is updated to allow Mark Rison to present earlier.

Agenda is approved without objection.

Minyoung confirms that the Secretary is on the call and reminds about recording attendance by sending an email to the secretary.

Minyoung reviewes the IEEE 802 and 802.11 Policy and Procedure, and presents where to find the relevant documents. Minyoung 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.

**Presentations:**

**11/17-0399r1 “WUR link budget analysis,” Rui Cao, Marvell:** Based on link budget analysis, it is suggested that multiple data rates should be supported for the wake-up signal so that the robustness of the signal better can be matched to the requirements. To obtain higher data rates, either shorter OOK symbols or higher order modulation is mentioned as examples.

**Question/Comment (Q):** We have similar ideas and are in favor of this idea. What data rates do you have in mind?

**Answer (A):** We are open for proposal. 125kb/s, 250kb/s, and 500kb/s seem reasonable.

**Q:** If you only use 4 MHz for the transmitted signal, the totally used TX power will be reduced due to regulatory reasons.

**A:** I agree. This is also mentioned on page 8.

**Q:** You mention higher order modulation as one possible way to increase the data rate. This does not seem as straight forward as increasing the data rate by reducing the bit duration for OOK. Any suggestions for how to achieve this?

**A:** For instance PPM. It should still be possible to receive by non-coherent reception.

**Q:** How many different rates do you have in mind?

**A:** We are open for suggestions, perhaps 2 would be reasonable.

**Comments regarding the 802.11ba usage model (17/0029), email sent 2017-02-17, Mark Rison, Samsung:**

Comments with respect to usage model 1 related to that much more energy is needed for the curtain than for the main transceiver, and then the usage of a WUR is of limited interest.

Comments with respect to usage model 3 related to that there does not seems to be anything that time-critical that is relevant to a cattle farm, so the discussed usage model does not call for this low delay obtained by using a WUR.

**Q:** You don’t see the need for the reduced delay for the incoming call?

**A:** I believe what is possible to achieve with the standard today suffice. In general I believe we should start with what is achievable with what we have today. Basically we should not bend the use case to fit the need for a WUR.

Minyoung proposes Mark to work with Ross on the usage models offline.

**11-17/0376r0, “Waveform Generation for Waveform Coding,” Junghoon Suh, Huawei:**

**Q:** Did you compensate for the group delay of the filter in your simulations?

**A:** No.

**11/17-0385 “Concurrent transmission of data and a wake-up signal in 802.11ax - Follow-up,” Leif Wilhelmsson, Ericsson:**

**Q:** How do you apply Manchester coding using OFDMA?

**A:** The Manchester coding consists of two OFDM symbols.

**Q:** If you use vary the number of RUs allocated to the wake-up signal, how is the receive impacted?

**A:** In my case, not at all since I assume a 20 MHz BPF in front of the envelope detector. If you would assume that you in fact could have a narrower filter, you can adjust the filter bandwidth based on the bandwidth used for the wake-up signal to improve performance.

**11/17-0386 “Impact of reciprocal mixing on WUR performance,” Leif Wilhelmsson, Ericsson:**

**Q:** It may be that we want to use another phase noise model, with a higher phase noise level in which case reciprocal mixing may be a problem.

**A:** I agree. However, the phase noise needs to be increased significantly before it becomes a problem.

**Q:** With this very high phase noise, -6dBc integrated in-band, has anyone considered edge-jitter?

**A:** I have not.

**11-17-0326, “WUR phase noise model follow-up,” Minyoung Park, Intel:** To simulate the proposed phase noise model, this presentation proposes how this can be done and also gives a reference to Matlab code that can be used.

**Q:** You are suggesting an additive model. We have modelled it as multiplicative.

**A:** It is multiplicative. The phase noise is added in the phase used in the down-mixing.

Next meeting 17th of April.

**Meeting is adjourned at 11:58 (ET).**

**List of Attendees:**

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| --- | --- | --- |
|  | Name | Affiliation |
| 1 | Minyoung Park | Intel |
| 2 | Leif Wilhelmsson | Ericsson |
| 3 | Joerg Robert | Univeristy Erlangen-Nuernberg |
| 4 | John Notor | Notor Research/ARM Inc. |
| 5 | Mark Rison | Samsung |
| 6 | Yunsong Yang | Huawei |
| 7 | Kome Oteri | InterDigital |
| 8 | Xiaofei Wang | InterDigital |
| 9 | Bo Sun | ZTE |
| 10 | Junghoon Suh | Huawei |
| 11 | Alphan Sahin | InterDigital |
| 12 | Dongguk Lim | LGE |
| 13 | Steve Shellhammer | Qualcomm |
| 14 | Osama Aboul-Magd | Huawei |
| 15 | Carl Kain | ? |
| 16 | Jinsoo Choi | LG |
| 17 | James Lepp | Blackberry |
| 18 | Reza Hedayat | Newracom |
| 19 | Lei Huang  | Panasonic |
| 20 | Po-Kai Huang | Intel |
| 21 | Eunsong Park | LGE |
| 22 | Sungeun Lee | Cypress Semiconductor |