IEEE P802.11
Wireless LANs

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| Wake-Up Receiver (WUR) Study GroupTeleconference Minutes August, 2016 |
| Date: 07-28-2016 |
| Author(s): |
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Abstract

This document contains minutes of WUR SG teleconferences in August 2016.

Rev 0: Minutes from WUR SG teleconference on 15th of August, 2016.

Rev 1: Minutes from WUR SG teleconference on 23rd of August, 2016 + minor correction to Rev 0.

Rev 2: Minutes from WUR SG teleconference on 29th of August, 2016 + minor correction to Rev 1.

**Teleconference on Monday, August 15th , 2016, 14:00 – 15:00 (ET)**

**Meeting Agenda:**

* Call the meeting to order
* IEEE 802 and 802.11 IPR policy and procedure

        Announcements

* Attendance (Please send an email to Leif Wilhelmsson (leif.r.wilhelmsson@ERICSSON.COM) and/or Minyoung Park (minyoung.park@intel.com))
* Review the comments collected based on the call for comments (<http://www.ieee802.org/11/email/stds-802-11/msg02222.html>)

       Adjourn.

1. Meeting called to order by Chair Minyoung Park(Intel) @ 14:05 (ET).
2. Chair confirms that the Secretary is on the call.

Chair reviewed 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.

No potentially essential patents reported.

1. Chair explains that a call for comments was sent out and that the received comments have been uploaded to mentor. He also mentions that there will be an additional telco next week at a more Asian friendly time.
2. Chair goes though the agenda. No objection to the agenda.
3. Chair starts to go through received comments on the PAR, document <https://mentor.ieee.org/802.11/dcn/16/11-16-1095-00-0wur-comment-collection-on-par.xlsx>. The discussion of the comments and the proposed changes are found below
* CID 1: Suggested to not be explicit about this in the PAR. Although it is natural that the primary transmitter is used, there is no reason to mandate it and even less reason to mention it in the PAR.
* CID 2 + CID 4: These two comments are very similar and treated jointly. Agreed that we don’t need to explicitly mention user data, and remove this at this point.
* CID 3: Discussion that this was too specific. Agreed to rephrase along the lines that the “primary function of the WUR is to wake up the main radio”.
* CID 5: The proposal to have TBD in the PAR does not work. Suggested to have a straw poll in the f2f to try to find a better number than 1 mW. No one has a proposal at this time. Also mentioned that we may want to reference the numbers presented by Intel (a few hundred uW).
* CID 6: Unclear how we can obtain 100ms. Proposed to keep the discussion in the explanatory section rather than the scope section not to put extra burden on the group.
* CID 7: Suggested to move range discussion to the explanatory section and include more details.
* CID 8: Too specific. We can comment that it is OK to use another channel.
* CID 9: The purpose is to ensure that e.g. LAA does not grab the channel while the WUS is transmitted. Need to be discussed more at the f2f, as many felt unsure about how to deal with other standards in this respect.
* CID 10: No comment
* CID 11: Editorial – no comment.
* CID 12: Reza (Newracom) announced he wrote this comment, but for some reason it is no the excel-sheet. Question if this was different than RTS/CTS. Answer by Reza that the wake-up signal (WUS) potentially can be much longer.
* CID 13: This one is similar to CID 10. Question whether this would imply that we need to design multiple modes. Answer was that this was not the purpose but rather to allow for more flexibility.
* CID 14: Need to discuss this further at the f2f. Again, we cannot have TBDs in the PAR

We will continue in the next telco.

1. Meeting adjourned at 14:59 (ET).
2. List of Attendees

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|  | **Name** | **Affiliation** |
| 1 | Minyoung Park | Intel |
| 2 | Leif Wilhelmsson | Ericsson |
| 3 | Osama Aboul-Magd | Huawei |
| 4 | Henkka Rantala | Nokia |
| 5 | Mark Rison | Samsung |
| 6 | Sue Leicht | NSA |
| 7 | Kome Oteri | InterDigital |
| 8 | Minho Cheong | Newracom |
| 9 | Jae Seung Lee | ETRI |
| 10 | Edward Au | Huawei |
| 11 | Sungeun Lee | Cypress Semiconductor |
| 12 | Igor Kim | ETRI |
| 13 | Lei Wang | Marvell |
| 14 | Reza Hedayat | Newracom |
| 15 | Yonggang Fang | ZTE |
| 16 | Yunsong Yang | Huawei |

**Teleconference on Tuesday, August 23, 2016, 20:00 – 21:00 (ET)**

**Meeting Agenda:**

* Call the meeting to order
* IEEE 802 and 802.11 IPR policy and procedure
* Announcements
	1. Attendance (Please send an email to Leif Wilhelmsson (leif.r.wilhelmsson@ERICSSON.COM) and/or Minyoung Park (minyoung.park@intel.com))
	2. September F2F meeting time slots for WUR SG
		1. 4 time slots: Monday PM1, Tuesday PM1/EV, Thursday AM1 (WG agenda: <https://mentor.ieee.org/802.11/dcn/16/11-16-0769-07-0000-july-2016-802-11-agenda.xlsx>)
	3. Comment resolution on the PAR document announced on 8/19 (link to the email: <http://www.ieee802.org/11/email/stds-802-11/msg02251.html>)
* PAR development guideline for an amendment
	+ 1. Email from Jon Rosdahl:
		“In general, the 5.2a is the main standard Scope, and you will in general not need to change that.
		5.2B is the scope of your project (amendment). This is the "what" of your project.
		5.4 Purpose is again about the main standard, and so you would not necessarily change it.
		Look here for more details: <https://mentor.ieee.org/etools_documentation/dcn/11/etools_documentation-11-0014-MYPR-myproject-user-guide.pdf>”
* Continue to review and discuss the PAR/CSD comments
	1. PAR: <https://mentor.ieee.org/802.11/dcn/16/11-16-1095-01-0wur-comment-collection-on-par.xlsx>
	2. CSD: <https://mentor.ieee.org/802.11/dcn/16/11-16-1096-00-0wur-comment-collection-on-csd.xlsx>
* Adjourn
1. Meeting called to order by Chair Minyoung Park(Intel) @ 8:00 (ET).
2. Chair confirms that the Secretary is on the call.
3. Chair goes through the agenda and asks whether there are any other topics. We will use r2 of the collected comments spreadsheet. No other topics suggested and no objections to the agenda.
4. Chair reviews 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. No potentially essential patents reported.
5. Chair will ask for one more time-slot (Tuesday AM1) in the f2f meeting to finalize the PAR before the midweek plenary, see <https://mentor.ieee.org/802.11/dcn/16/11-16-1065-00-0000-september-2016-802-11-agenda.xlsx>.
6. Chair goes through the remaining PAR comments, document <https://mentor.ieee.org/802.11/dcn/16/11-16-1095-02-0wur-comment-collection-on-par.xlsx>

In the new revision, the comments have been categorized into one of the categories “user data”, “different bands”, “operation”, “latency”, and “misc.” No comments with respect to this.

Remaining CIDs

* CID 15: Comment that for this CID it refers to the same band if operated in the same band.
* CID 16: This relates to when different bands are used, so this is different from CID 15.
* CID 16,1: The CID relates to that < 1GHz is mentioned, but e.g. 60 GHz is not.
	+ Q: There are no products on the market with 5 GHz only, why just not say 2.4 GHz only for the WUR?
	+ A: 2.4 and 5 GHz was discussed in the f2f meeting in July. This is the only reason why.
	+ Q: If one builds 60GHz only, then you can’t put the WUR at 60 GHz?
	+ A: No, not at it says. Also, note that there are certain requirements on the WUR that actually may be hard to meet for a 60 GHz implementation.
* CID 17: No objection.
* CID 4,1: Discussion about what term to use for the wake-up signal. Packet, signal, transmission, or even frame. Packet seems to be preferred, signal OK, transmission not liked by someone.
* CID 4,2: Comments that this depends on what layer you consider. Noted that CID 4 actually suggested to remove the corresponding sentence, so then this is not applicable. Discussed whether to have a straw poll in the f2f meeting. However, the purpose is to just make it clear, and that may not be achieved by running at straw poll.
* CID 4,3: CID related to what “normal mode” mean in contrast to “sleep mode”. To avoid the ambiguity, it is proposed to refer to this as “leave the sleep mode”.

All CIDs for the PAR discussed. Shahrnaz will continue to lead the discussion of the PAR via email. The different categories will be addressed in different email threads. Shahrnaz has invited people on the main 802.11 email reflector to announce their interest. When a topic is agreed on within this group, the results will be posted on the main reflector so all can review.

1. Chair goes through the CSD comments. Only two editorial comments received. No discussion.
2. Meeting adjourned at 20.52(ET).
3. List of Attendees

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|  | **Name** | **Affiliation** |
| 1 | Minyoung Park | Intel |
| 2 | Leif Wilhelmsson | Ericsson |
| 3 | Osama Aboul-Magd | Huawei |
| 4 | Henkka Rantala | Nokia |
| 5 | Shahrnaz Azizi | Intel |
| 6 | Steve Stellhammer | Qualcomm |
| 7 | Kome Oteri | InterDigital |
| 8 | Eunsung Park | LG |
| 9 | Sunghyun Hwang | ETRI |
| 10 | Edward Au | Huawei |
| 11 | Junghoon Suh | Huawei |
| 12 | Igor Kim | ETRI |
| 13 | Jae Seung Lee | ETRI |
| 14 | Handeul Hong | Yonse Univ. |
| 15 | Eduard Garcia-Villegas | UPC |
| 16 | Reza Hedayat | Newracom |
| 17 | Yunsong Yang | Huawei |

**Teleconference on Monday, August 29, 2016, 20:00 – 21:00 (ET)**

**Meeting Agenda:**

* Call the meeting to order
* IEEE 802 and 802.11 IPR policy and procedure
* Announcements
	+ Attendance (Please send an email to Leif Wilhelmsson (leif.r.wilhelmsson@ERICSSON.COM) and/or Minyoung Park (minyoung.park@intel.com))
* Presentation
	+ Coexistence Mechanism for Wakeup Radio Signal (11-16/1114r0) – Yongho Seok (Newracom)
* PAR comment resolution update – Shahrnaz Azizi (Intel Corp.)
* Adjourn
1. Meeting called to order by Chair Minyoung Park(Intel) @ 14:00 (ET).
2. Chair confirms that the Secretary is on the call.
3. Chair goes through the agenda and asks whether there are any other topics. No other topics suggested and no objections to approve the agenda.
4. Chair reviews 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. No potentially essential patents reported.
5. Chair points out that only about half the people on the call last time actually sent an email confirming presence and asked them to please send an email if on the call.
6. Yongho Seok presents “Coexistence Mechanism for Wakeup Radio Signal (11-16/1114r0)”, which relates to CID 9.
	1. A main message is that coexistence with other standards should be considered, and LAA is mentioned in particular.
	2. High-lights that for a Wake-Up Signal (WUS) using on-off keying (OOK), there is a risk that another device may sense the channel as being idle in case of several consecutive “off” symbols. An example is provided where 7 “off” symbols could cause LAA to initiate a transmission as the channel then would be considered idle for more than 25us.

On comment made that it is agreed that the problem exists and that we should explain the issue, but there is no need to specifically mention LAA.

One comment made that this could be avoided by specific design.

Seems to be a common view that the group should pay attention to the problem, but there is also a concern about being too specific about the problem in the PAR document. Instead it may be better to discuss this later in the process.

One comment made that it is not a big deal to consider, but we should understand that this really is a problem before developing a (complicated) solution.

1. Shahrnaz gives an update of the comment resolution for the PAR.
	1. Category 1 - User Data

Discussion about the reference to “user data” and that the wake-up packet should not carry user data.

Q: What is control information?

A: Control of WUR, not control frames like RTS/CTS. Information to control the main radio can be signaled, like how the protocol will behave upon decoding the wake-up packet.

One comment related to CID 4 and that it in this CID was proposed to remove the reference to user or control data.

* 1. Category 2 - Different Bands

No discussion. Suggested to continue discussion by email.

* 1. Category 3 – Operation

One comment made that the word “may” is too vague in relation to “…the WUR may trigger a …”, and suggested to instead write “is intended to”.

* 1. Category 4 – Latency

Currently there are ongoing discussions by email. It is suggested to add some text in the explanatory section. Some concern expressed to be too restrictive when it comes to latency as there may be scenarios where latency is of little concern and then allowing a large latency should not be precluded.

* 1. Category 5 - Misc.

This category is still under discussion

Shahrnaz will update Straw Poll 1 based on the discussion above and upload a new revision of document <https://mentor.ieee.org/802.11/dcn/16/11-16-1119-00-0wur-discussion-on-par-comment-resolution.pptx>

1. Meeting adjourned at 15.00 (ET).
2. List of Attendees

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| --- | --- | --- |
|  | **Name** | **Affiliation** |
| 1 | Minyoung Park | Intel |
| 2 | Leif Wilhelmsson | Ericsson |
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| 5 | Shahrnaz Azizi | Intel |
| 6 | Steve Stellhammer | Qualcomm |
| 7 | Kome Oteri | InterDigital |
| 8 | Sungeun Lee | Cypress Semiconductor |
| 9 | John Son | WILUS |
| 10 | Yongho Seok | Newracom |
| 11 | Sue Leicht | NSA |
| 12 | Igor Kim | ETRI |
| 13 | Jason Lee | ETRI  |
| 14 | Eduard Garcia-Villegas | UPC |
| 15 | Reza Hedayat | Newracom |
| 16 | Carol Ansley | Arris |
| 17 | Lei Wang | Marvell |
| 18 | Kaushik Josiam | Samsung |
| 19 | Xiaofei Clement Wang | InterDigital |