IEEE P802.11
Wireless LANs

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| IEEE 802.11 TGbb Task Group on Light Communications March, 2019 Vancouver Meeting Minutes |
| Date: 2018-04-04 |
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Abstract

This document contains the Task Group on Light Communications (TGbb) meeting minutes from the IEEE 802.11 Vancouver meeting, March 2019.

**IEEE 802.11 Task Group TGbb**

**Monday, March 11, 2019, AM1 Session**

Attendance: around 25 people.

1. The IEEE 802.11 TGbb meeting was called to order at by the Temporary Chair, Volker Jungnickel (Fraunhofer HHI). Kai Lennert Bober (Fraunhofer HHI) recorded the minutes.

1. The Chair reviewed the IEEE-SA patent policy, logistics, and reminders, including meeting guidelines and attendance recording procedures.
	* It is reminded all to record their attendance.
2. The Chair introduced the overall agenda for the week
* Submissions to be discussed
* PHY evaluation metrics
* Evaluation Framework document
* Hear proposals
* Conference call schedule
1. The chair called the meeting to order
2. Chair introduced himself, the acting secretary and their affiliations
3. The chair presented the agenda in doc. 11-19/0235r2.
	1. The chair presented the code of ethics, task group operating rules and guidelines.
	2. The chair called for essential patents, no response.
	3. The chair reminds attendees that participation is on an individual basis.
	4. There is no objection against the temporary vice chair Athanasios Stavridis.
	5. The chair expects to release slots in the rest of the week.
	6. This session is an ad-hoc, no motions can be made.
	7. There is no objection against the agenda.
4. Doc 11-19/0388r0 was presented by Volker Jungnickel (approx.. 50 minutes).
	1. The role of the chair was handed over to Athanasios Stavridis for the duration of the presentation.
5. Discussion on the presentation of doc 11-19/0388r0:
	1. Q: is it foreseen to make modification in existing PHYs?
	2. A: It should work by just adjusting / allowing the band to lower frequencies. No other modifications needed.
6. The meeting is in recess.

The meeting is recessed until TUE AM2.

**Wednesday, March 13, 2019, AM1 Session**

Attendance = 25 people in the room

1. The IEEE 802.11 TGbb meeting was called to order at by the Chair, Volker Jungnickel (pureLiFi). Ryan Mennecke (JHU-APL) recorded the minutes.

1. The Chair reviewed the IEEE-SA patent policy, logistics, and reminders, including meeting guidelines and attendance recording procedures.
	* It is reminded all to record their attendance.
2. The Chair introduced the schedule for the meeting
* Approve minutes from Jan. 2019
* Approve minutes from the teleconferences
* Editor’s meeting feedback
* PHY evaluation metrics
* Evaluation methodology document
* Doc. 11-19/0272r1 and 11-19/0187r2
1. The Chair run a motion to approve the agenda.

**Approve the proposed agenda in doc. 11-19/0253r3 for this meeting.**

**Move: Vineyagam**

**Second: Max Riegel**

**Motion is approved with unanimous consent.**

1. The Chair run a motion to approve the minutes from January 2019.

**Approve the meeting minutes from January 2018 i9 doc. 11-19/0211r1 for this meeting.**

**Move: Vineyagam**

**Second: Kai Lennert Bobber**

**Motion is approved by unanimous consent.**

1. The Chair run a motion to approve the minutes from telcos between January and March 2019.

**Approve the minutes from telephone conference meetings held between the January and the March 2019 session.**

* + **doc. 11-19/0259r0**
	+ **doc. 11-19/0275r0**
	+ **doc. 11-19/0203r0**

**Moved: Athanasios Stavridis**

**Second: Max Riegel**

**Motion passes by unanimous consent.**

1. The Chair moved on to discuss the comments on evaluation methodology doc. 11-19/0187r1.
2. **MOTION**

**“Accept the updated changes to document 11-19/00187r1, Evaluation Methodology for PHY and MAC proposals (11-19/00272r1) to reflect changes to the Section 2.1 on the 802.11a system model and other changes that were discussed during the teleconference”**

 **Move: Athanasios Stavridis**

 **Second: Kai Lennert Bobber**

 **Discussion:**

* + Discussion on individual changes to 11-19/0187r1 in relation to simulator calibration for all CIRs or for selected CIRs. The simulator calibration was changed to use AWGN instead of all selected CIRs for simulator calibration. A discussion was had about why the group uses a calibration PHY in order to make sure proposals are similar before comparisons are made between proposals for different CIRs. It was stated that a baseline simulation must be used in order to have a baseline to normalize results and do proper comparisons.
	+ Discussion on a change to the Metrics section 2.2 in relation to preamble detection vs. SNR, Header BER and PER vs. SNR and Eb/No and Payload BER and PER vs. SNR and Eb/No over large packet traffic (1,000 packets).
		- QUESTION: How do you get the packet error rate?
			* Section 2.2.2 (Metrics, Header) addresses this question. More details should be added to define the different measurable rates. It was also stated that it should be stated Eb is the energy per bit for uncoded data going into the FEC in the Header section of 2.2. The point at which the SNR should be measured should be clearly defined.
		- QUESTION: Where should the SNR be measured at the receiver? What power is being discussed, electrical or optical energy?
			* A discussion ensued that ranged from optical noise measurement, shot noise measurement and why the antenna model isn’t added into the simulated baseline. It was emphasized the importance to being able to compare the results of proposals but not every detail can be modeled. We just need to make sure we measure data points in the same way.
	+ QUESTION: How do we measure the change in SNR, by changing the noise power and does that make sense? Is the BER needed, should just packet error rate be used?
		- * The PHY layer needs additional information, BER etc, and that just the throughput and PER will not suffice in a proposal. It was decided to take the SNR measurement after the RX model Shot + thermal noise addition.
			* Including the optical channel noise vs. not including the optical channel model for optical communications. The discussion came to a close without precise decision on where to measure the SNR in the model proposed.

The meeting is in recess.

**Wednesday, March 13, 2019, PM2 Session**

Attendance = 25-30 people in the room

1. The IEEE 802.11 TGbb meeting was called to order at by the Chair, Volker Jungnickel (Fraunhofer HHI). Ryan Mennecke (JHU-APL) recorded the minutes.

1. The Chair reviewed the IEEE-SA patent policy, logistics, and reminders, including meeting guidelines and attendance recording procedures.
	* It is reminded all to record their attendance.
2. The Chair introduced the schedule for this meeting slot.
	* Agenda items for the week
	* Still working on updating the evaluation framework doc 11-19/0187r3
	* Move deadlines for CFP
3. **Motion**

**“Amend the proposed agenda in doc. 11-19/0235r2 for the week as shown in doc. 11-19/0235r3.”**

**Move: Arturo Campos**

**Second: Kai Lennert Bobber**

**Approved with unanimous consent, motion passes**

1. Continuation of discussion on the evaluation methodology for PHY and MAC proposals 11-19/0187r3. The discussion is revolving around BER vs PER and SNR measurement points from the simulation system baseband model. A new system evaluation method was produced by 802.15.13 that shows where the PER is to be measured.
2. QUESTION/COMMENT: An ongoing discussion was also being had over including the TX/RX frontend into the evaluation model or to use the CIR from TX DSP to the RX DSP.
	* This included optical power vs electrical power domain conversation with respect to linear relationship. It was stated that non-linear attributes of the system models have not been modeled or included in the models proposed and accepted.
	* A conversation should be had to discuss what it is that we want to get out of the channel modeling.
	* It was stated that there is an electrical to optical conversion details produced in the 11-19/0087r1, Optical frontend model for PHY simulation documentation.
3. Discussion then shifted into why a bias is being used in the document 11-19/0187r1 section 2.2.
	* Answer, it is needed to move the OFDM signal to operating point. The discussion continued back and forth discussing the electrical to optical conversions in relation to SNR to account for a non-linear component in the conversion.
	* To bring this discussion to an end, it was decided that the SNR measurement should be conducted after PHY TX DSP and before PHY RX DSP in Figure 1 (Link Level simulation overview and frontend model integration) in document 11-19/0087r1 Optical Frontend Model For PHY Simulation.
	* A statement was included in 11-19/0187r3, Section 2.2 (Header) reflecting change.
4. QUESTION/COMMENT: There was a suggestion to amendment the document to define the Eb/No and SNR calculation.
	* It was shown that in doc. 15-18-0339-00-0013 slide 28, “Evaluation of PM PHY with frequency domain equalization” has a good SNR to Eb/No relation. The relation equation and figure has been included as a reference into the 11-19/0187r3 in order to move forward with a common definition of the relation of SNR to Eb/No.
5. QUESTION/COMMENT: Should it be BER or PER since the SNR measurement is after the TX DSP and before RX DSP since the data is in bits?
	* It was discussed that the BER or PER can be converted/derived since the packet size is known. Also discussed was the difference between synchronization and header detection BER and the payload detection BER and FEC.
6. It was discussed that the energy per bit for uncoded data will be incorrect since it is being decided to use PER, so are these bits to be averaged across the packet?
	* The SNR for this calculation depends on the bits per symbol and that the average power would be used. This is a known measurement and the conversation will be taken offline.
7. The discussion moved into the Payload section of 2.2 discussing SNR, and PER vs Eb/No measurements. Modifications to grammar and punctuation were made.
	* COMMENT: Considering the Eb/No in digital and SNR for analog measurement, so we should be measuring both.
	* STRAW POLL: Do you think simulation results should be plotted as PER vs SNR?
		+ Y / N / A – 7 / 1 / 6
	* STRAW POLL: Do you think simulation results should be plotted as PER vs Eb/No?
		+ Y N / A – 8 / 0 / 6
	* It was decided to do both so the document doesn’t change.
8. **Motion**

**“Accept the discussed changes on doc. 11-19/0187r2 to create doc. 11-19/0187r3 as the new Evaluation methodology for PHY and MAC proposals in TGbb.”**

**Move: Max Riegel**

**Second: Kai Bobber Lennert**

**Approved with unanimous consent, motion passes**

1. Discussion: A comment about the SNR in relation to packet size and the duration of the MCS over a packet size. Will the channel remain stable over the transmission of a packet if so then PER is fine. A discussion ensued over the front end SNR measurement in relation the channel model. The point made is that there is no one to one relation from PER to BER.

Straw poll:

* + Discussing changing MCS per packet (ACM) and whether it is important for 11bb
		- Y / N / A – 7 / 0 / 2
1. It was proposed to extend the CfP for a minimum of two months. It was agreed to extend the submission deadline.
2. **Motion**

**“Change the Call for Proposal submission deadline by two months in doc. 11-18/2039r3 to create doc. 11-182039r4.”**

**Move: Max Riegel**

**Second: Matthias Wendt**

**Y / N / A – 10 / 0 / 0**

The meeting is in recess.

**Thursday, March 14, 2019, AM2 Session**

Attendance = 25-30 people in the room

1. The IEEE 802.11 TGbb meeting was called to order at by the Temproary Chair, Volker Jungnickel (Fraunhofer HHI). Ryan Mennecke (JHU-APL) recorded the minutes.

1. The Chair reviewed the IEEE-SA patent policy, logistics, and reminders, including meeting guidelines and attendance recording procedures.
	* It is reminded all to record their attendance.
2. There was a misunderstanding about an upload of a document to mentor and the ability to present contribution material during meeting. The Chair advise that if contributions are to be presented then they must notify the TG Chair to have contributions put on the agenda.
3. The Chair asked if anyone wanted to add anything to the agenda to present to the group. Jaesong Kim stated that he would not like to present the material and that it isn’t a new proposal but a comment on a document. No new agenda items were added to the schedule.
4. TOPIC: What to Propose (PHY)
	* The Chair presented a slide titled “What to propose for PHY” (slide 28 document 11-19/0235r3) that describes what a PHY layer frame proposal should look like. Basic frame structure example was given with the statement that all fields for proposed PHY should be defined. Evaluation results should be submitted with proposals. This is just an example of a proposal to let everyone know what a proposal should look like.
5. TOPIC: Timeline Discussion and update (Doc 11-19/1290r3)
	* Document 11-19/1290r2 was represented as the point of topic discussion. The “PHY Proposals simulation results submitted/review, Hear initial MAC proposals review” was changed to May/July and the “Hear initial MAC proposals review” was removed from the May/July and pushed to July. A PHY resolution timeline item was added (July 2019) to give time for the TG to decide which PHY(s) to add to the draft. The September timeline item for the first draft proposal was pushed back and replaced by “Review incoming text proposals”. Comment collection and resolution on D0.1 was set for November.
	* QUESTION/COMMENT: A question was raised about the deadline for Call for Proposal (CfP) and if it should be added. There is current clear deadline for CfP for the PHY but is assumed to end when the PHY(s) are chosen.
		+ No further discussion was made on the timeline and the update to the timeline document 11-19/1290r3 was uploaded to mentor.
	* QUESTION/COMMENT: There was a question about changing the timeline and whether we needed to pass a motion to accept the timeline change.
6. **Motion**

**“Accept the changes to the timeline in doc. 11-18/1290r2 to create doc. 11-18/1290r3.”**

**Move: Jerome Arokkiam**

**Second: Matthias Wendt**

* + Discussion: A question was asked if the overall tasks have all been pushed back since the PHY CfP was pushed back. The answer is no, not all tasks have been pushed back, just the PHY CfP. The timeline can be adjusted in the future to account for delays that can be foreseen but for now it is believed that the timeline is sufficient.
	+ **Y / N / A – 10 / 0 / 0**
	+ Status: The motion passed
1. TOPIC: Set up a teleconference schedule TGbb Chair recommended a biweekly Tuesday meeting to last no more than one hour at 09:00 EDT on:
	* 27 Mar., 9 Apr., 23 Apr., 7 May.
2. **Motion**

**“Set a 1-hour conference call at 09:00 EDT for TGbb on 27 Mar., 9 Apr., 23 Apr., and 7 May.”**

**Move: Athanasios Stavridis**

**Second: Jerome Arokkiam**

**Approved with unanimous consent**

Meeting adjourned until the May 2019 Interim session in Atlanta.