**IEEE P802.15**

**Wireless Personal Area Networks**

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| Project | IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs) | |
| Title | May 2016 IEEE802.15.7r1 Minutes | |
| Date Submitted | May 2016 | |
| Source | Nikola Serafimovski (pureLiFi)  Yeong Min Jang (Kookmin University) | Voice: [ ] Fax: [ ] E-mail: [ ] |
| Re: | [If this is a proposed revision, cite the original document.]  [If this is a response to a Call for Contributions, cite the name and date of the Call for Contributions to which this document responds, as well as the relevant item number in the Call for Contributions.]  [Note: Contributions that are not responsive to this section of the template, and contributions which do not address the topic under which they are submitted, may be refused or consigned to the “General Contributions” area.] | |
| Abstract | [Minutes of May 2016 Plenary Session] | |
| Purpose | [Description of what the author wants P802.15 to do with the information in the document.] | |
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**Task group 802.15.7r1 met for 10 sessions during the May 2016 meeting.**

**Session 1 (16 May 2016)**

**AM 2 (10:30 – 12:30)**

Yeong Min Jang (Kookmin University) – Chair

Attendees:

* Prof. Oshima – Panasonic in Osaka,
* Yoshiho Goto – Panasonic
* Hideki Aoyama – Panasonic Japan
* Yeong Min Jang – Kookmin University
* Nam Tuan Le – Kookmin University
* Trang Nguyen – Kookmin University
* Rick Roberts – Intel
* Nikola Serafimovski – pureLiFi
* Dobroslav Tsonev – pureLiFi
* Prof. Soo Young Chang – California State University Sacramento
* Li Qiang – Huawei Technologies
* Volker Jungnickel – Fraunhofer HHI
* Shoichi Kitazawa – ATR
* Patrick Kinney – Kinney Consulting

Meeting called to order and the agenda for the meeting was discussed and agreed (**doc. 15-16-0350-r1**). The patent policy was briefly discussed.

Rick raised the issue about the quantity of added text that was added to the overall MAC description. Specifically:

* Huawei (**doc. 16-0360-r1**)
* pureLiFi (**doc. 16-0363-r0**)
* HHI (**doc. 16-0356-r0**)
* Intel (**doc**. **16-0380-r0**)

Rick suggested that duplication between the new and existing text in the original 15.7-2011 standard should be removed.

Rick requested that the proposers should present their contribution to the MAC. The presentations would be on Tuesday, AM2.

Nikola indicated that he has a presentation to the 802.11 WNG in Kona 4/5 during AM1 on Tuesday. The committee has agreed that it will convene there for the Tuesday, AM 1 session.

Nikola suggested that the High Speed PD and Image Sensor group can break away to discuss their input.

The committee has agreed and has separated into subgroups to allow the different sections to discuss the most pressing issues.

Meeting recessed until PM 1.

**PM 1 (13:30 – 15:30)**

Yeong Min Jang (Kookmin University) – Chair

Attendees:

* Prof. Oshima – Panasonic in Osaka,
* Yoshiho Goto – Panasonic
* Hideki Aoyama – Panasonic Japan
* Yeong Min Jang – Kookmin University
* Nam Tuan Le – Kookmin University
* Trang Nguyen – Kookmin University
* Rick Roberts – Intel
* Nikola Serafimovski – pureLiFi
* Dobroslav Tsonev – pureLiFi
* Prof. Soo Young Chang – California State University Sacramento
* Li Qiang – Huawei Technologies
* Volker Jungnickel – Fraunhofer HHI
* Shoichi Kitazawa – ATR
* Patrick Kinney – Kinney Consulting

Meeting called to order.

Nikola highlighted that the LiFi subgroup worked to make the High Speed PD, High Rate PHY coherent with respect to the two different unipolar schemes that were present and need to be merged/removed.

Rick specified that the presentations for Tuesday AM 2 would need to highlight:

* the general MAC frame and fields,
* the similarities with respect to the existing 802.15.7 MAC frames and structures,
* any MAC commands that need to be added to the standard and merge/remove any commands that may be duplicates,

Meeting recessed until PM2.

**PM 2 (16:00 – 18:00)**

Yeong Min Jang (Kookmin University) – Chair

Attendees:

* Prof. Oshima – Panasonic in Osaka,
* Yoshiho Goto – Panasonic
* Hideki Aoyama – Panasonic Japan
* Yeong Min Jang – Kookmin University
* Nam Tuan Le – Kookmin University
* Trang Nguyen – Kookmin University
* Rick Roberts – Intel
* Nikola Serafimovski – pureLiFi
* Dobroslav Tsonev – pureLiFi
* Prof. Soo Young Chang – California State University Sacramento
* Li Qiang – Huawei Technologies
* Volker Jungnickel – Fraunhofer HHI
* Shoichi Kitazawa – ATR
* Prof. Jaesang Cha – Seoul National University of Science & Technology
* Patrick Kinney – Kinney Consulting

Meeting called to order.

The LiFi group of people need to continue the discussion on the MAC contribution.

Meeting recessed until 17 May 2016 session AM1.

**Session 2 (17 May 2016)**

**AM 1 (08:00 – 10:00)**

Yeong Min Jang (Kookmin University) – Chair

Attendees:

* Prof. Oshima – Panasonic in Osaka,
* Yoshiho Goto – Panasonic
* Hideki Aoyama – Panasonic Japan
* Yeong Min Jang – Kookmin University
* Nam Tuan Le – Kookmin University
* Trang Nguyen – Kookmin University
* Rick Roberts – Intel
* Nikola Serafimovski – pureLiFi
* Dobroslav Tsonev – pureLiFi
* Prof. Soo Young Chang – California State University Sacramento
* Li Qiang – Huawei Technologies
* Volker Jungnickel – Fraunhofer HHI
* Shoichi Kitazawa – ATR
* Prof. Jaesang Cha – Seoul National University of Science & Technology
* Patrick Kinney – Kinney Consulting

The committee attended the presentation of pureLiFi to the 802.11 Next Generation Wireless meeting.

Meeting recessed until AM2.

**AM 2 (10:30 – 12:30)**

Yeong Min Jang (Kookmin University) – Chair

Attendees:

* Prof. Oshima – Panasonic in Osaka,
* Yoshiho Goto – Panasonic
* Hideki Aoyama – Panasonic Japan
* Yeong Min Jang – Kookmin University
* Nam Tuan Le – Kookmin University
* Trang Nguyen – Kookmin University
* Rick Roberts – Intel
* Nikola Serafimovski – pureLiFi
* Dobroslav Tsonev – pureLiFi
* Prof. Soo Young Chang – California State University Sacramento
* Li Qiang – Huawei Technologies
* Volker Jungnickel – Fraunhofer HHI
* Shoichi Kitazawa – ATR
* Prof. Jaesang Cha – Seoul National University of Science & Technology
* Patrick Kinney – Kinney Consulting

Meeting called to order.

Volker presented the HHI contribution in response to the comments from Rick Roberts on 16 May 2016 to highlight the HHI view of moving forward with the MAC (**doc. 16-0396r0**).

Rick asked if there was a way to harmonize the G.hn focused proposal from HHI with the existing 802.15.7 MAC. Volker indicated that the HHI proposal would be in-line with the Huawei contribution highlighting the potential convergence.

Dobroslav presented the pureLiFi contribution to the MAC structure (**doc. 16-0397r0**).

Pat raised the question that the two frame structures are not similar. The 802.15 would look to have a single MAC and no Task Groups should have multiple MACs. The proposed frame format is not compatible with the existing 15.7 MAC.

Pat asked if the 15.7 MAC can we accommodate the new application? He suggested that having a completely different MAC frame format in the 802.15 would not be suitable/acceptable. The working group would likely reject having a parallel MAC frame format.

Pat said that the current structure would not be necessary and it might not be accepted if it does not work. In principle the version that are not compatible from the same MAC would still understand the basic MAC providing interoperability.

Pat said that if there is insufficient market penetration, then we can remove the existing MAC. If there are no units that are currently on the market, then it might be possible to completely remove the MAC.

Rick suggested that we might need to separate the two different aspects (high data rate and low data rate) into two different standards. This might be easier if we divide the work.

Pat agreed that it might be better to segregate the two systems because the application areas are not the same and perhaps a complete separation would be better.

Volker asked why the OCC focused group started with the 802.15.7-2011 MAC, if it is easier to work with a simple one?

Rick commented that the OCC contribution would be focused to turn-off the majority of the MAC functionality and therefore, it would be better to separate.

Nikola asked what would be the logistics of getting and executing a division.

Pat suggested that would need a new PAR for a justification of the new application space of LiFi to create a new Task Group, i.e., 802.15.**13**.

Rick and Pat have said that we should do it at the May meeting. The PAR would be quickly approved if we wrote it and if it went directly to the Working Group. Defining a new PAR and a CSD would be done during this week. This would then be a basis for the approval of a new Task Group at the July 2016 plenary session to create a “LiFi” Task Group.

Precedence for this split exists in 802.15.4 history.

The advantages of a new PAR and Task Group means that we have a “green field” to work on the MAC.

Meeting recessed until PM1.

**PM 1 (13:30 – 15:30)**

Yeong Min Jang (Kookmin University) – Chair

Attendees:

* Prof. Oshima – Panasonic in Osaka,
* Yoshiho Goto – Panasonic
* Hideki Aoyama – Panasonic Japan
* Yeong Min Jang – Kookmin University
* Nam Tuan Le – Kookmin University
* Trang Nguyen – Kookmin University
* Rick Roberts – Intel
* Nikola Serafimovski – pureLiFi
* Dobroslav Tsonev – pureLiFi
* Prof. Soo Young Chang – California State University Sacramento
* Li Qiang – Huawei Technologies
* Volker Jungnickel – Fraunhofer HHI
* Shoichi Kitazawa – ATR
* Prof. Jaesang Cha – Seoul National University of Science & Technology

Meeting called to order.

Li Qiang presented the Huawei contribution to the 802.15.7r1 MAC.

Rick raised the issue that providing uplink on RF and downlink on light would still require a complete RF capable radio to join the network.

Li Qiang specified that this requirement is just to add some primitives that would enable this solution to be handled at the higher layer.

Volker raised the issue that more information would be required regarding the potential split between OCC and LiFi groups.

Rick requested that the chair should contact Bob Heile to provide more information.

**TECHNICAL MOTION:**

Mover: Volker

Seconded: Nikola

The contribution submitted by University of Albany (**doc. 15-16-0356r1**) should be incorporated into the contribution for the high bandwidth section of the High Rate PD communication section (**doc. 15-16-0356r1**).

**YES: 11**

**NO: 0**

**ABSTAIN: 2**

Meeting recessed until PM2.

**PM 2 (16:00 – 18:00)**

Yeong Min Jang (Kookmin University) – Chair

Attendees:

* Prof. Oshima – Panasonic in Osaka,
* Yoshiho Goto – Panasonic
* Hideki Aoyama – Panasonic Japan
* Yeong Min Jang – Kookmin University
* Nam Tuan Le – Kookmin University
* Trang Nguyen – Kookmin University
* Rick Roberts – Intel
* Nikola Serafimovski – pureLiFi
* Dobroslav Tsonev – pureLiFi
* Prof. Soo Young Chang – California State University Sacramento
* Li Qiang – Huawei Technologies
* Volker Jungnickel – Fraunhofer HHI
* Shoichi Kitazawa – ATR
* Prof. Jaesang Cha – Seoul National University of Science & Technology

Meeting called to order.

Boob Heili explained that it might not be the best thing to do a split of the committee. Nonetheless, it would not be a problem to potentially split and create a separate group.

The Criteria Standards Document:

* Broad market potential
* Uniquencess
* Technical feasibility

The project committee looks at:

* One problem per question,
* What is the difference,
* Etc.

The PAR would need to reply to these ideas. The new CSD and the new PAR would need to run through the committee. In terms of the process, there are no rules that are being broken. However, the scope of the new Task Group would need to be clearly what the difference is. There is no hard rule on the number of participants, however, the group would need to represent at least 3 – 4 different commercial entities. If the group is smaller, then that would be challenged.

The Interest Group could be formed for LiFi within the working group and it would function as a Study Group. The Working Group would need to approve it and the most aggressive timeline would need result in an approved PAR by early 2017.

The PAR would need to capture the key idea. The two important are the scope and the need, while the purpose is relatively straight forward.

Any 802 project needs to be a bidirectional project, where both a transmitter and receiver are described in the same frequency.

A group can function for up to 6 months under the assumption that the PAR was approved.

The onus of getting a Letter of Assurance regarding any essential IP rests with a number of parties. Therefore, any IP that is submitted would need checked by the company implementing the concepts and the company needs to decide if they would like to incorporate the IP.

Jaesang suggested that we should not be separating the two groups because being joint brings a larger market and longer term future.

Yeong Min suggested that having multiple specifications for the same field would be a problematic from a customer perspective and the Brand of the standardization would be reduced. Therefore, the general momentum of the market would be smaller. In addition, the existing committee would provide a quicker standard development.

Rick disagreed that the separation would impact brand value.

Volker mentioned that the additional effort would be unnecessary and would prefer to stay in the existing committee and make sure that the standard is done quickly. Volker also mentioned the existing G.vlc and G.hn standardization activities on-going in the ITU-T.

Hideki said that the main concern for Panasonic is keeping with the time-schedule. Therefore any decision to split should be taken sooner rather than later.

Meeting recessed until PM1 on Wednesday, 18 May 2016.

**Session 3 (18 May 2016)**

**PM 1 (13:30 – 15:30)**

Yeong Min Jang (Kookmin University) – Chair

Attendees:

* Prof. Oshima – Panasonic in Osaka,
* Yoshiho Goto – Panasonic
* Hideki Aoyama – Panasonic Japan
* Yeong Min Jang – Kookmin University
* Nam Tuan Le – Kookmin University
* Trang Nguyen – Kookmin University
* Rick Roberts – Intel
* Nikola Serafimovski – pureLiFi
* Dobroslav Tsonev – pureLiFi
* Prof. Soo Young Chang – California State University Sacramento
* Li Qiang – Huawei Technologies
* Volker Jungnickel – Fraunhofer HHI
* Shoichi Kitazawa – ATR
* Prof. Jaesang Cha – Seoul National University of Science & Technology

Meeting called to order.

Jaesang presented the SNUST contribution for the Draft D0 (**doc. 16-0411r0**).

Trang presented the Kookmin University contribution (**doc. 16-0412r0**).

Rick asked how the proposed scheme with the 2D sequential code is different from the Invisible Sequential Code scheme that was proposed by Jaesang.

Nikola indicated that the exact algorithms that are presented must be outlined in the text.

Rick indicated that the work between the two contributions may need to be included in the Draft D0 and then the Comment Resolution Process would be used to remove any redundancy.

Rick requested to move the discussion on the timelines and milestones (**doc. 15-0274r3**) as well as the discussion on (**doc. 16-0409r0**) should be postponed until the next available slot.

The committee has agreed that the 10th session at PM1 on Thursday, 19 May 2016 is not required and will be skipped.

Meeting recessed until PM2.

**PM 2 (16:00 – 18:00)**

Yeong Min Jang (Kookmin University) – Chair

Attendees:

* Prof. Oshima – Panasonic in Osaka,
* Yoshiho Goto – Panasonic
* Hideki Aoyama – Panasonic Japan
* Yeong Min Jang – Kookmin University
* Nam Tuan Le – Kookmin University
* Trang Nguyen – Kookmin University
* Rick Roberts – Intel
* Nikola Serafimovski – pureLiFi
* Dobroslav Tsonev – pureLiFi
* Prof. Soo Young Chang – California State University Sacramento
* Li Qiang – Huawei Technologies
* Volker Jungnickel – Fraunhofer HHI
* Shoichi Kitazawa – ATR
* Prof. Jaesang Cha – Seoul National University of Science & Technology

Meeting called to order.

Rick presented the draft D0 document that was uploaded on Mentor (email sent on 18 May 2016, **[STDS-802-15-7A] FW: Post "P802.15.7r1 Draft D0" to draft area)** as well as the comment resolution template (**doc. 16-0391r0**).

The pre-draft document is located at:

<http://grouper.ieee.org/groups/802/15/private/Draft/TG7r1/P802.15.7r1%20Draft%20D0.pdf>

The username and password required to access the draft document is:

Username: P802.15

Password: ilb8aicl

Rick mentioned that all members should submit comments on every aspect that might be problematic.

Rick also presented a joint contribution with Dobroslav Tsonev (**doc. 16-0409r0**) that outlined the necessary steps and suggested outlines to match the timelines outlined in the target schedule **doc. 15-0274r3**).

The committee has agreed that the deadline to submit comments on Draft D0 to the committee is **10 July 2016**.

The target date for the release of Draft D1 is 19 Aug. 2016.

The target deadline for submitting comments to D1 is 4 Sept. 2016.

Rick has suggested that the creation of the Draft D0 should be divided into a LiFi section and PHY-A-B-C sections.

Rick appointed Dobroslav Tsonev will be the Technical Editor for the LiFi section of the document.

No major changes can be made by the Technical Editors to the Draft documents that have not been approved by the committee and all proposed changes would need to be verified by the committee.

Conference calls that are dealing with any aspect of the document would need to be communicated to the committee over the email reflector for the group.

Conference calls should be avoided because it may be difficult to communicate clearly. However, if more time is necessary, then the committee might be able to organize ad-hoc meetings to complete the document.

Yeong Min suggested that the Technical Editors should look at the document and determine what exactly is required from each of the proposers and ask for the information.

Meeting in recess until July 2016.