# IEEE P802.15

**Wireless Personal Area Networks**

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| Project | Task Group 15.6ma | |
| Title | **TG15.6ma Meeting Minutes for March 2023** | |
| Date Submitted | March 16th , 2023 | |
| Source | [Ryuji Kohno1,2 Marco Hernandez1 Takumi Kobayashi2 Minsoo Kim1, Daisuke Anzai3  [1; YRP-IAI (YRP International Alliance Institute), Japan,  2; YNU (Yokohama National University), Japan, 3; NIT(Nagoya Institute of Technology)] | Voice: +81 90 5408 0611  E-mail: kohno@ynu.ac.jp  marco.hernandez@ieee.org  kobayashi-takumi-ch@ynu.ac.jp  minsoo@minsookim.com  anzai@nitech.ac.jp |
| Re: | Meeting Minutes | |
| Abstract | Since PAR and CSD of SG15.6ma as amendment of existing IEEE802.15.6-2012 for WBAN with enhanced dependability was approved by NesCom in November, Task Group TG15.6ma has been drafting technical requirement in cases of WBAN for medical use case for human body(HBAN) and for automotive use case for vehicle body(VBAN) with their connected use cases. In November meeting, to summarize technical requirement TG15.6ma has reviewed focused uses cases necessary for enhanced dependability in which channel propagation and environment of HBAN and VBAN with their mixed use can be categorized and modeled. Particularly to perform enhanced dependability in dense environment coexisting multiple overlaid BANs and different UWB and narrow band WPAN, WSN, WLAN etc. necessary technical requirement has been summarized in PHY and MAC layers. Then technical requirement document(TRD) has been approved by TG motion. Possible solutions to ensure enhanced dependability in PHY and MAC have been presented and discussed. Latest status of ETSI Smart BAN standard has been presented to find a way to make interoperability with IEEE802.15.6 and 6ma. To harmonize activities of TG15.6ma, 15.4ab using UWB PHY, TRD and technical guidance document(TGD) have been reviewed in joint and individual sessions. Next step has been discussed including telco for harmonization with TG15.4ab and change to revision from amendment. | |
| Purpose | Minutes of Dependability Electronic Plenary Session on Webex, March 2023. | |
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**TG15.6ma 1st Session**

**Monday, March 13th, 2022, PM 4:00- PM 6:00 Atlanta Local Time**

**at the room 204 in 2nd Floor, Hilton Atlanta: Atlanta, Georgia with Webex Virtual Room #3**

* 1. Meeting called to order PM 6:00

By Chair Ryuji Kohno (YNU / YRP-IAI)

* 1. Roll Call *Ryuji Kohno*

Announcement to attendance by using IEEE Attendance Tool (IEEE IMAT).

Registration information.

By Chair Ryuji Kohno

* 1. Opening Report *Ryuji Kohno (YNU / YRP-IAI)* doc.# 802.15- 23-0107-02-06a

Chair showed IEEE Patent policy.

Chair issued Call for Potentially Essential Patents.

Þ No essential intellectual property in the scope of TG6a was declared.

Chair presented agenda of this meeting doc.# 802.15- 23-0106-03-06a

Þ Approved.

* 1. Approval of previous meeting minutes *Takumi Kobayashi (YNU / YRP-IAI)*

Þ Upon no comments on the November meeting minutes, doc. #15-23-0076-00-06a was approved.

**[Review]**

* 1. ~~Overview of IG-DEP, SG6a, TG6a and TG15.6ma for Revision of IEEE 802.15.6-2012 Wireless BAN with Enhanced Dependability, Ryuji Kohno (YRP-IAI/YNU), doc.# 22-0389-02-06ma~~
     + Skipped.
  2. Progress report of 802.15.6ma, #802.15-23-0056-00-06ma, *Marco Hernandez(YRP-IAI /University of Oulu)*

**[Update of Channel Models]**

* 1. Propagation Channel Parameters of UWB Communication Applications for Human BAN(HBAN) Use Cases, *Daisuke Anzai (Nagoya Institute of Technology)*, doc.#802.15-23-0145-00-06a
     + What is frequency? (Kamran Sayrafian)
       - Averaged path-loss 3 to 10 GHz. (Daisuke Anzai)
     + Does P.20 show transmitting antenna or receiving antenna? (Kamran Sayrafian)
       - Transmitting antenna. (Daisuke Anzai)
     + How about receiving antenna? (Kamran Sayrafian)
       - This simulation does not care about receiving antenna. (Daisuke Anzai)
       - Low band characteristics is dominant in this application. (Daisuke Anzai)
     + Do you have actual small intestine in this human model? (Kamran Sayrafian)
       - This model constructed by the CT scan. (Daisuke Anzai)
       - Transmitting antenna is in intestine and receiver is on the surface of the body. (Daisuke Anzai)
     + How we can evaluate human impact such as SAR? (Ryuji Kohno)
       - Compared with FCC regulation, this use-case is not so strong impact. (Daisuke Anzai)
  2. Propagation Channel Parameters of UWB Communication Applications for Vehicle BAN(VBAN) Use Cases, *Daisuke Anzai (Nagoya Institute of Technology)*, doc.#802.15-23-0146-00-06a
     + Are you planning to measure or simulate some the other type of vehicles e.g. pick-up track or trailer type vehicle? (Ryuji Kohno)
       - We will consider more various models. (Daisuke Anzai)
     + I was surprised that zero path-loss in engine room. (Kamran Sayrafian)
       - PEC box without bottom. (Daisuke Anzai)
     + What material is used for the boxes? (Kamran Sayrafian)
       - 7 boxes made by metal. (Daisuke Anzai)
     + What kind of antennas was used (Kamran Sayrafian)
       - Same antenna used in HBAN. (Daisuke Anzai)
     + We will try to explain theoretically. (Daisuke Anzai)
  3. Propagation Simulations of UWB Communication Applications for HBAN and VBAN Use Cases, *Daisuke Anzai (Nagoya Institute of Technology)*, doc.#802.15-23-0020-02-06a
     + We have 2 set of parameters one is provided by me, and another one by Daisuke. (Kamran Sayrafian)
       - Let us discuss. (Daisuke Anzai)
  4. Summary of Channel and Environmental Modeling Activities for BANs on TG15.6ma, *Takumi Kobayashi (YRP-IAI / YNU)*, doc.#802.15-22-0269-04-06a & 22-0091-06-06a.
  5. Summary Table of Channel and Environmental Modeling Activities for BANs on TG15.6ma, *Takumi Kobayashi (YRP-IAI / YNU)*, doc.#802.15-22-0269-04-06a & 23-0045-02-06a.
     + Hopefully, we try to discuss more precise models including frequency dependency. (Ryuji Kohno)
       - Bandwidth is effect to PDP so we will try to do that with PDP simulations. (Daisuke Anzai)
     + SV model is very typical in UWB. (Ryuji Kohno)

**[Presentation and Discussion on Utilization of Channel Models]**

* 1. Utilization of Channel and Environmental Model for Design and Evaluation of PHY proposals for BANs on TG15.6ma, *Ryuji Kohno (YRP-IAI),* doc.#802.15-23-0152-00-06a
     + Open usable channel models should be very helpful for the other people wants to evaluate system performance as reference. Also co-existence is important to design. (Kamran Sayrafian)
     + From the view point of co-existence, spatial distribution is important. Do we need Matlab code for interference simulation? (Kamran Sayrafian)
       - At the moment, Matlab code is for the channel propagation. (Ryuji Kohno)
       - Let us discuss to speed-up to this standardization. (Ryuji Kohno)
       - We have a lot of experiences about medical application but not so many about vehicle applications. We need to propose to guarantee in worst case performance. (Ryuji Kohno)

* 1. Recessed (7:50 PM)

**Attendees list**

Attendees 12

***Name Affiliation***

* Akifumi Kasamatsu NICT
* Daisuke Anzai Nagoya Institute of Technology
* Hiroki Saito ARIS
* Kamran Sayrafian NIST
* Marco Hernandez YRP-IAI
* Masayuki Hirata Osaka University
* Minsoo Kim YRP-IAI
* Ryuji Kohno YNU/YRP-IAI
* Takumi Kobayashi YNU/YRP-IAI
* Yasuharu Amezawa Mobile Techno
* Stuart Kerry OK-Brit; Self
* Kamran Sayrafian NIST

**TG6ma 2nd Session**

**Tuesday, March 14th 2023, AM 8:00- AM 10:00 Atlanta Local Time**

**at the room 204 in 2nd Floor, Hilton Atlanta: Atlanta, Georgia with Webex Virtual Room #2**

* 1. Meeting called to order AM 8:00

By Chair Ryuji Kohno (YNU / YRP-IAI)

* 1. Roll Call *Ryuji Kohno*Announcement to attendance by using IEEE Attendance Tool (IEEE IMAT).  
     Registration Information, By Chair *Ryuji Kohno*
  2. 802 Mtg. Non-Registration Consequences, by Chair *Ryuji Kohno*
  3. Confirmation of Agenda, doc.#23-0106-04-06ma, *Ryuji Kohno*
  4. Review of the last session TG6ma, *Ryuji Kohno*

**[Presentation and Discussion on MAC Proposals for Revision]**

* 1. Interference Avoidance in Coexisting UWB Networks, *Seong-Soon Joo*, doc.#15-23-0137-01-06ma
     + Slide 7 is quite key of original standard 15.6. Current 6ma considering coexistence. We need to discuss about preamble detection also with the other standards. (Ryuji Kohno)
     + In slide 8, 3rd bullet, sensing and feedback control is a typical use case of TG6ma. In this case, we need to discuss about permissible delay. (Ryuji Kohno)
     + In slide 9, there is summarized table we discussed and in slide 10, permissible range is mentioned however, we need to discuss more. Cross-layer optimization is very important as you mentioned. (Ryuji Kohno)
     + Slide 13, implicit and explicit interference avoidance is very important as you mentioned. In our current discussion, we are also considering backward compatibility. How to implement enough simply is also important. (Ryuji Kohno)
     + In slide 18, what “leaf hub” meaning? (Ryuji Kohno)
       - Hub is coordinator. Coordinator hub has higher priority. Leaf hub is not main hub which has higher rights in multiple hub situation. (Seong-Soon Joo)
       - This issue is quite relative with Minsoo’s presentation. Let us discuss later (Ryuji Kohno)
     + Collision avoidance is important for us. How can we evaluate and calculate its overhead effect to data communication performance? (Minsoo Kim)
       - We can measure and evaluate the time to avoid interference and number of packet loss. (Seong-Soon Joo)
       - Essentially, we have defined required performance such as delay. When new BAN coming in, the we need to detect and mitigate to interference. (Ryuji Kohno)
     + In slide 7, How to detect interference? We can detect UWB by using preamble effectively however, the other wireless is quite challenging. (Marco Hernandez)
       - We are thinking to detect by energy detection. (Seong-Soon Joo)
  2. Proposal on MAC features for coexisting dependable BANs, *Seong-Soon Joo*, doc.# 15-23-0108-01-06a
  3. Definition of Coexistence Levels and How to Support Higher Levels, *Minsoo Kim*, doc.# 15-22-0631-02-006a
     + Some parts of your proposals are quite common with Dr. Joo presented. Dr. Joo suggested to define with some group. (Ryuji Kohno)
       - Yes. My next presentation includes some common parts. (Minsoo Kim)
  4. MAC Protocol Proposal for Multiple BAN Environment (Level 1), *Minsoo Kim*, doc.#15-22-0639-02-06a
  5. Simulation results for Nagoya I. T. and YRP-IAI MAC proposal, *Daisuke Anzai*, doc.#15-23-0147-00-06ma.
  6. Preliminary harmonization with 4ab: MAC operation, *Marco Hernandez,* doc.#15-22-0634-02-006a
     + You almost integrate many ideas well. We would like to discuss about some kind of mixed mode with Dr. Joo later. (Ryuji Kohno)
  7. Qualitative approach to coexistence and QoS mechanisms, *Marco Hernandez,* doc.#15-23-0101-01-06ma.
  8. Recessed (10:00AM)

Attendees 12

***Name Affiliation***

* Daisuke Anzai Nagoya Institute of Technology
* Hiroki Saito ARIS
* Iwao Hosako NICT
* Kamran Sayrafian NIST
* Marco Hernandez YRP-IAI
* Masayuki Hirata Osaka University
* Minsoo Kim YRP-IAI
* Ryuji Kohno YNU/YRP-IAI
* Seong-Soon Joo Korea Platform Service Technology (KPST)
* Takafumi Suzuki NICT
* Takumi Kobayashi YNU/YRP-IAI
* Yasuharu Amezawa Mobile Techno

**TG6ma 3rd Session**

**Tuesday, March 15th 2023, PM 16:00- PM 18:00 Atlanta Local Time**

**at the room 204 in 2nd Floor, Hilton Atlanta: Atlanta, Georgia with Webex Virtual Room #3**

* 1. Meeting called to order AM 10:30

By Chair Ryuji Kohno (YNU / YRP-IAI)

* 1. Roll Call *Ryuji Kohno*Announcement to attendance by using IEEE Attendance Tool (IEEE IMAT).  
     Registration Information, By Chair Ryuji Kohno
  2. 802 Mtg. Non-Registration Consequences, by Chair *Ryuji Kohno*
  3. Confirmation of Agenda, doc.#23-0106-05-06ma, *Ryuji Kohno* (YNU/YRP-IAI)
  4. Review of the last session TG6ma, *Ryuji Kohno* (YNU/YRP-IAI)

**[Presentation and Discussion on Channel Coding Proposals for Revision]**

* 1. Overview of FEC proposals for 15.6ma, *Marco Hernandez*, doc.#22-0611-02.
  2. Timeline of TG15.6ma, *Ryuji Kohno*, doc.#15**-**23-176-00-06ma.
     + Need to have 3~5 letter ballot, 2 at least with some recirculation. 2 weeks each. (Clint Powell)
     + Please update the timeline, Marco? (Ryuji Kohno)
       - Sure. I will make a table. (Marco Hernandez)
     + October or November, 1st recirculation on January. We can do sponsor ballot on March. We must submit 2 weeks before EC meeting. (Clint Powell)
  3. QoS-aware Hybrid ARQ Scheme Utilizing Decomposable Error Correcting Codes for Wireless Body Area Networks, *Ryuji Kohno,* doc.#15-22-561-02-06ma.
  4. Evaluation of IEEE 802.15.6 Ultra-wideband Physical Layer Utilizing Super Orthogonal Convolutional Code, *Ryuji Kohno,* doc.#15-22-562-02-06ma.
  5. Discussion on Harmonization in PHY with TG4ab, *Marco Hernandez*, doc.# 15-22-0610-02-06a

**[Presentation of PHY & MAC Proposals]**

* 1. TG6ma Channel Model Document for Enhanced Dependability, *Takumi Kobayashi,* doc.#15-22-0519-01-06a, 15-22-0045-03-06a
  2. MAC Bridging for Time-Sensitive Networking of 802.15.6ma, *Minsoo Kim*, doc.# 22-0024-03-06a
  3. Discussion on Harmonization with TG4ab, *Ryuji Kohno,* doc.#15-23-0117-01-06ma
  4. Progress report of 802.15.6ma, *Marco Hernandez*, doc.#15-23-0056-01-06a
  5. Any other business?
     + No.
  6. Adjourn (17:41PM)

Attendees 12

***Name Affiliation***

* Clint Powell Meta
* Hiroki Saito ARIS
* Iwao Hosako NICT
* Kamran Sayrafian NIST
* Marco Hernandez YRP-IAI
* Masayuki Hirata Osaka University
* Minsoo Kim YRP-IAI
* Ryuji Kohno YNU/YRP-IAI
* Seong-Soon Joo Korea Platform Service Technology (KPST)
* Takafumi Suzuki NICT
* Takumi Kobayashi YNU/YRP-IAI
* Yasuharu Amezawa Mobile Techno