# IEEE P802.15

**Wireless Personal Area Networks**

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| Project | Task Group 15.6ma | |
| Title | **TG15.6ma Meeting Minutes for January 2023** | |
| Date Submitted | January 19th , 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, January 2023. | |
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**TG15.6ma 1st Session**

**Monday, January 15th, 2022, AM 10:30- PM 12:30 Baltimore Local Time**

**at the room Pickersgil in 2nd Floor, Hilton Inner Harbor: Baltimore, Maryland 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

* 1. Opening Report *Ryuji Kohno (YNU / YRP-IAI)* doc.# 802.15- 23-0005-02-06a

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- 23-0005-02-06a

Þ Approved.

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

Þ Upon no comments on the November meeting minutes, doc. #15-22-0670-00-06a 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 due to time restriction by Audio/Video trouble in the session room.
  2. ~~Call for Proposals was recalled doc.#802.15-22-0488-01,~~ *~~Ryuji Kohno (YNU / YRP-IAI),~~* ~~doc.#22-0488-01-06ma~~
     + Skipped due to time restriction by Audio/Video trouble in the session room.

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

* 1. Definition of Coexistence Levels and How to Support Higher Levels, *Minsoo Kim (YRP-IAI)*, doc.#802.15-22-0631-00-06a
  2. MAC Protocol Proposal for Multiple BAN Environment (Level 1), *Minsoo Kim(YRP-IAI),* doc.#802.15-22-0639-01-06a
     + Basically, in order to keep higher dependability, we are proposing to use 2 or more channels for data and control channel separately, while original IEEE802.15.6-2012 uses single channel. (*Ryuji Kohno*)
  3. MAC Protocol Using Negotiation among Coordinators in Coexistence of Multiple Wireless BANs, *Minsoo Kim(YRP-IAI),* doc.#802.15-22-0633-00-06a
     + How to identify the interfering nodes? *(Kamran Sayrafian)*
       - By using common C-channel, another nodes can identify the interferer. *(Ryuji Kohno)*
       - C-beacon sharing some information like number of nodes connected to coordinator. *(Minsoo Kim)*
       - Ranging is not quite helping in this case. If these are close each other, antenna pattern and the other phenomenon affect to interference so it is too complicated. *(Kamran Sayrafian)*
       - Yes, it is quite complicated in practice. Thank you very much and let us keep discuss on this issue. *(Ryuji Kohno)*
  4. ~~Preliminary MAC simulation results for the Nagoya Institute of Technology and YRP-IAI proposal,~~ *~~Daisuke Anzai (Nagoya Institute of Technology),~~* ~~#802.15-22-0594-00-06a~~

changed to present in the third session due to time ristrection by audio/video trouble at the beginning.

**[Discussion]**

* 1. Preliminary harmonization with 4ab: MAC operation, *Marco Hernandez (YRP-IAI),* doc.#802.15-22-634-02-06a
     + P.8, 3rd bullet should be “Level 1”. (Kamran Sayrafian)
       - Yes. This will be corrected later. (Marco Hernandez)
  2. ~~Summary of MAC Protocol Proposals,~~ *~~Minsoo Kim(YRP-IAI)~~*~~, doc.#802.15-22-0639-01-06a~~

changed to be presented in the 2nd session.

* 1. Recessed (12:25 PM)

**Attendees list**

Attendees 13

***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
* Sangsung Choi KMU
* Takafumi Suzuki NICT
* Takumi Kobayashi YNU/YRP-IAI
* Tetsushi Ikegami Meiji University
* Yasuharu Amezawa Mobile Techno

**TG6ma 2nd Session**

**Tuesday, January 17th 2023, AM 10:30- PM 12:30 Baltimore Local Time**

**at the room Pickersgil in 2nd Floor, Hilton Inner Harbor: Baltimore, Maryland 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.#23-0005-05-06ma, *Ryuji Kohno*
  4. Review of the last session TG6ma, *Ryuji Kohno*

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

* 1. Evaluation of IEEE 802.15.6 Ultra-wideband Physical Layer Utilizing Super Orthogonal Convolutional Code, *Kento Takabayashi* (Okayama Prefectural University), doc.# 22-0562-01-006a
     + In p.12, as we discussed before, please consider to use channel models of 15.6 and 15.6ma. (*Marco Hernandez*)
     + “in p.17, “Transmission power consumption” would better to be just “Transmission power”. (*Marco Hernandez*)
  2. QoS-aware Hybrid ARQ Scheme Utilizing Decomposable Error Correcting Codes for Wireless Body Area Networks, *Kento Takabayashi* (Okayama Prefectural University), doc.# 22-0561-01-006a
     + P.15, You have several scenarios. *Dj* in p.14 refrect to the result of the simulation? (*Marco Hernandez*)
       - Distance between objective BAN and the other BAN is averaged. (*Kento Takabayashi*)
     + Es/N0 is -1. That means that energy og noise is greater than energy of data transmission? Let us discuss later. (*Marco Hernandez*)
     + Are you assume some off body channel in 15.6? Channel model 3 might be approved in this situation. (*Kamran Sayrafian*)
       - We can consider to use more better channel model. (*Kento Takabayashi*)
  3. Harmonization with 4ab: data rates & FEC, *Marco Hernandez,* doc.#22-0610-01-06ma.
  4. Overview of FEC proposals for 15.6ma, *Marco Hernandez*, doc.#22-0611-01-06ma.
     + This is one of the proposals. Please cooperate with Kento and Kamran, please. (*Ryuji Kohno*)
     + In the last session, Minsoo presented 4 levels while you defined 7 categories. It is still quite complicated. (*Kamran Sayrafian*)
       - We will discuss with MAC proposal continuously. (*Marco Hernandez*)

**[Update of Channel models]**

* 1. Propagation Characteristics of UWB Communication Applications for Human BAN(HBAN) Use Cases, *Daisuke Anzai,* doc.#15-23-0018-01-006a
  2. Propagation Characteristics of UWB Communication Applications for Vehicle BAN(VBAN) Use Cases, *Daisuke Anzai,* doc.#15-23-0019-01-006a
  3. Propagation Simulations of UWB Communication Applications for HBAN and VBAN Use Cases, *Daisuke Anzai,* doc.#15-23-0020-01-006a
     + For the usa-case in BCI, a guest speaker surgent presented BCI device under the skull bone. (*Kamran Sayrafian*)
       - Actually, the devices is in between skin and brain. The device is located in the hole on skull bone after remove skull bone partially. (*Marco Hernandez*)
     + What is the material around the antenna? (Kamran Sayrafian)
       - Filled up by air. (*Daisuke Anzai*)
     + Skull bone thickness about 6mm in human case. So the simulation is looks similar to real environment. (*Masayuki Hirata*)
     + Antennas usually shielded Titanium, bio-compatible material and sphier grass. In between Titanium chassis and skin can be more thin. Grass material is easy to break by physical shock so thickness is required 1.5mm or more. (*Masayuki Hirata*)
     + Electric circuits in the space between skin and brain in p.5. (*Masayuki Hirata*)
     + As Kamran said, antenna characteristics are affected by the materials around antennas. We will consider about this issue. (*Daisuke Anzai*)
     + Electric circuit also affects to the characteristics as usually, electric circuit is located under the antennas. (*Masayuki Hirata*)
     + Let us discuss about this real environment. (*Daisuke Anzai*)
     + What kind of sensor did you use? (Kamran Sayrafian)
       - For the simulation, we did not use antenna but we calculated electric field. (*Daisuke Anzai*)
  4. Summary of Channel and Environmental Modeling Activities for BANs on TG15.6ma, *Takumi Kobayashi,* doc.#15-22-0091-05-006a
  5. ~~Summary Table of Channel and Environmental Modeling Activities for BANs on TG15.6ma,~~ *~~Takumi Kobayashi,~~* ~~doc.#15-23-0045-00-006a~~
  6. Changed to be presented in the 3rd session.
  7. Recessed (12:30PM)

Attendees 24

***Name Affiliation***

* Akifumi Kasamatsu NICT
* Ankur Bansal Samsung
* Daisuke Anzai Nagoya Institute of Technology
* Frederic Nabki SPARK Microsystems
* Hiroki Saito ARIS
* Iwao Hosako NICT
* Kamran Sayrafian NIST
* Kento Takabayashi Okayama Prefectural University
* Larry Zakaib Spark Microsystems
* Libra Xiao NRT
* Marco Hernandez YRP-IAI
* Masayuki Hirata Osaka University
* Minsoo Kim YRP-IAI
* Mohammad Rahmani SPARK microsystems
* Norihiko Sekine NICT
* Rojan Chitrakar Huawei
* Run Chen NRT
* Ryuji Kohno YNU/YRP-IAI
* Sven Zeisberg HTW
* Takafumi Suzuki NICT
* Takenori Sumi Mitsubishi Electric
* Takumi Kobayashi YNU/YRP-IAI
* Yasuharu Amezawa Mobile Techno
* Yongsen Ma Redpoint Positioning

**TG6ma 3rd Session**

**Thursday, January 19th 2023, AM 10:30- PM 12:30 Baltimore Local Time**

**at the room Pickersgil in 2nd Floor, Hilton Inner Harbor: Baltimore, Maryland 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.# 15-23-0005-08, *Ryuji Kohno* (YNU/YRP-IAI)
  4. Review of the last session TG6ma, *Ryuji Kohno* (YNU/YRP-IAI)

**[Presentations]**

* 1. ~~Interference reduction technique under Coexistence with other wireless and EMI for HBAN and VBAN on UWB using code and pulse orthogonality,~~ *~~Takumi Kobayashi~~*~~, doc.# 22-0575-01~~
     + Skipped due to time limitation.
  2. Soft Spectrum Adaptation(SSA) Based on Pulse Shaping for Interference Mitigation between UWB radio and Other Coexisting Radio SSA-UWB and Cognitive Radio: a suggestion for global harmonization and compromise in IEEE 802.15.3a WPAN a, *Ryuji Kohno*, doc.#22-0652-01, 04-0253-00.
  3. MAC Bridging for Time-Sensitive Networking of 802.15.6ma, *Minsoo Kim*, doc.# 22-0024-03-06a
     + Which portion of 802.1 TSN can be commonly discussed in TG6ma? (*Ryuji Kohno*)
       - Some of proposals to achieve low latency in TSN are quite common issue also discussed in TG6ma too. TSN is targeting for more entertainment use cases in contrast that we are focusing on different use cases which requires higher dependability such as medical and in vehicle use cases. (*Minsoo Kim*)
     + From the practical view point, when consider about coordinator to coordinator bridging, we need to carefully discuss to send private medical data from own BAN#2 to the other BAN#1. Need to consider and confirm regulations. (*Kamran Sayrafian*)
  4. Preliminary MAC simulation results for the Nagoya Institute of Technology and YRP-IAI proposal, *Daisuke Anzai,* doc.#23-0070-00-06a
     + In this simulation, are you assuming CAP slot length is greater than CFP. If these parameters are changed, performance also changed? (*Ryuji Kohno*)
       - Yes it is. We need to discuss about optimum balance of slot numbers of CAP and CFP. (*Daisuke Anzai*)
     + If packet loss occurred, the packet should interfere to the other BANs each other. (*Kamran Sayrafian*)
       - In the simulation, we are analyse as a preliminaly result. We are taking accounts. (*Marco Hernandez*)
  5. Summary of Channel and Environmental Modeling Activities for BANs on TG15.6a, *Takumi Kobayashi*, doc.# 22-0658-01, 22-0091-05, 23-0045-01-06a
     + TG6ma is mainly focus on UWB communication. Even in the spreadsheet of HBAN progress, 2.4 GHz channel models is defined but this is for the backward compatibility or scalability, so these are not necessary but optional part. (*Ryuji Kohno*)
  6. Summanry of Channel Coding Proposals for Dependable BANs on TG15.6ma, *Marco Hernandez*, doc.# 22-0611-01-06a
     + Do these coexistence levels mean inclusive? Like, does level 4 include level 3? (*Kamran Sayrafian*)
       - No, it does not mean inclusive. (*Marco Hernandez*)
     + Inclusive definition is easy to understand and good from the view point of implementation. (*Kamran Sayrafian*)
       - Let us discuss more detail about these issues. (*Marco Hernandes*)
  7. Summary of MAC Protocol Proposals, *Minsoo Kim,* doc.# 22-0656-01-06a
     + We have not discussd much about superframe interleaving issue. Can you explain more? Is this presented in Dr. Joo’s presentation? (*Ryuji Kohno*)
       - Yes, it is essentially presented in presentation by Dr. Joo. (*Minsoo Kim*)
  8. Discussion on Harmonization with TG4ab, *Ryuji Kohno,* 15-22-0517-00-04ab, 15-23-0078-00-04ab, 15-23-0067-00-04ab, 15-23-0058-00-04ab, 15-23-0010-00-04ab
  9. Discussion on Procedure in Making an Integrated Proposal: Progress report of 802.15.6ma, *Marco Hernandes,* doc.#15-23-0056-00-06ma
     + Can you add more detail progress like “20% done” for TBD items?
       - Yes, I can. (*Marco Hernandes*)
  10. Timeline of TG15.6ma, *Marco Hernandez,* doc.# 15-22-0522-01-06a, 0423-03-06a
      + Can you make more detail timeline? (*Ryuji Kohno*)
        - Yes, I can. (*Marco Hernandez*)
  11. Any other business?
      + No.
  12. Adjourn (12:27PM)

Attendees 16

***Name Affiliation***

* Daisuke Anzai Nagoya Institute of Technology
* Hiroki Saito ARIS
* Hiroshi Harada Ukyoto
* Kamran Sayrafian NIST
* Kento Takabayashi Okayama Prefectural University
* Larry Zakaib Spark Microsystems
* Libra Xiao NRT
* Marco Hernandez YRP-IAI
* Matthias Wendt Signify
* Minsoo Kim YRP-IAI
* Mohammad Rahmani SPARK microsystems
* Run Chen NRT
* Ryuji Kohno YNU/YRP-IAI
* Takafumi Suzuki NICT
* Takumi Kobayashi YNU/YRP-IAI
* Volker Jungnickel Fraunhofer HHI