IEEE P802.15

**Wireless Personal Area Networks**

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| Project | Task Group 15.6ma |
| Title | **TG15.6ma Meeting Minutes for November 2022**  |
| Date Submitted | November 17th, 2022 |
| 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 0611E-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 and 15.14 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 TG15.4a and 14 and change to revision from amendment.  |
| Purpose | Minutes of Dependability Electronic Plenary Session on Webex, November 2022. |
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**TG15.6ma 1st Session**

**Tuesday, November 15th, 2022, AM 10:30- PM 12:30 Bangkok Local Time**

**Apartment 8 at 9th Floor: Bangkok Marriott Marquis with Webex Virtual Room #4**

* 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- 22-0557-02-06a

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- 22-0556-03-06a

Þ Approved.

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

Þ Upon no comments on the November meeting minutes, doc. #15-22-0523-00-06a 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

**[Presentation for Proposals of Channel Coding]**

* 1. Call for Proposals was recalled doc.#802.15-22-0488-01, *Ryuji Kohno (YNU / YRP-IAI),* doc.#22-0488-01-06ma
	2. QoS-aware Hybrid ARQ Scheme Utilizing Decomposable Error Correcting Codes for Wireless Body Area Networks, *Kento Takabayashi (Okayama Prefectural University)*, doc.# 22-561-00-06ma
		+ n 802.15.6 and 6ma, channel codes need different error-detecting and correcting capabilities of channel codes with common decoding algorithm according to QoS levels 0-7 of Packet Priority order and channel environment. How can you design channel code such a variable capability?*(Ryuji Kohno)*
			- A decomposable code has an appropriate structure to change the capability with additional redundant parity check of which a code rate changes but the same decoding algorithm can be used. *(Kento Takabayashi)*
		+ What is a criterion to optimize an error-correcting capability of such a hybrid ARQ? *(Marco Hernandez)*
			- Number of retransmission in ARQ, average total delay, and total redundancy should be taken into account in overall performance. *(Kento Takabayashi)*
	3. Evaluation of IEEE 802.15.6 Ultra-wideband Physical Layer Utilizing Super Orthogonal Convolutional Code, *Kento Takabayashi (Okayama Prefectural University)*, doc.# 22-562-00-06ma
	4. Harmonization with 4ab: data rates & FEC, *Marco Hernandez (YRP-IAI)*, doc.#22-0610-00-06ma
	5. Summanry of Channel Coding Proposals for Dependable BANs on TG15.6ma, *Marco Hernandez (YRP-IAI)*, doc.#22-0611-00-06ma

**[Updated Channel Models]**

* 1. Propagation Characteristics of UWB Communication Applications for BCI Use Case, *Daisuke Anzai, (Nagoya Institute of Tech.)* doc.# 22-0583-00-06ma
	2. Propagation Characteristics of UWB Communication Applications for Passengers Bus Use Case, *Daisuke Anzai, (Nagoya Institute of Tech.)* doc.# 22-0584-00-06ma

**[Summary]**

* 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
	2. Recessed at 12:29

**Attendees list**

Attendees 21

***Name Affiliation***

* Akifumi Kasamatsu NICT
* Daisuke Anzai Nagoya Institute of Technology
* Ersen Ekrem Apple
* Heung-Ryong OH TTA(Telecommunications Technology Association)
* Huan-Bang Li NICT
* Iwao Hosako NICT
* Juha Juntunen Meteorcomm
* Kento Takabayashi Okayama Prefectural University
* Kunho Ko TTA(Telecommunications Technology Association)
* Marco Hernandez YRP-IAI
* Masayuki Hirata Osaka University
* Mohammad Rahmani SPARK microsystems
* Norihiko Sekine NICT
* Run Chen NRT
* Ryuji Kohno YNU/YRP-IAI
* Seong-Soon Joo ETRI
* Sven Zeisberg HTW
* Takafumi Suzuki NICT
* Takumi Kobayashi YNU/YRP-IAI
* Vinod Kristem
* Yasuharu Amezawa Mobile Techno

**TG6ma 2nd Session**

**Wednesday, November 16th 2022, PM 1:30-3:30 Bangkok Local Time**

**Apartment 2 at 9th Floor: Bangkok Marriott Marquis with Webex Virtual Room #1**

* 1. Meeting called to order PM 1:30

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. Confirmation of Agenda, doc.#22-0556-04-06ma, *Ryuji Kohno*
	3. Review of the last session TG6ma, *Ryuji Kohno*

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

* 1. Definition of Coexistence Levels and How to Support Higher Levels, *Minsoo Kim (YRP-IAI)*,doc.#22-0631-00-06ma.

Þ I have several concerns about scalability including co-existence of old and new standards. The frequency band of a mandatory and option is also a problem with different bandwidths. For the co-existence, we have to be careful about the subject channel or location maps as well (*Ryuji Kohno*)

* Some common channel or at least some common structure should be required. (*Minsoo Kim*)

* 1. MAC Protocol Proposal for Multiple BAN Environment (Level 1), *Minsoo Kim (YRP-IAI)*, doc.#22-639-00-06ma

Þ The presentation suggests the frame structure for data and control channels. Control Beacon contains control channel information. Does the interval of C-beacon vary in contention-based access? (*Seong Soon Joo*)

* The interval of C-Beacon is fixed, e.g., 0.5 and 0.6 sec. (*Minsoo Kim*)

Þ I have a question about higher quality care. Is higher data rate with more than two optional channels is considered? (*Ryuji Kohno*)

* It is an option to use more than two data channels. Simultaneously, of course there is some limitations, especially in hardware implementation. (*Kinsoo Kim*)

* 1. MAC proposal for coexisting dependable BANs, *Seong Soon Joo (Korea Platform Service Technology (KPST)),* doc.#22-594-00-06ma

Þ First of all about how we proceed one single standard based on different proposal to discuss what is the commonality and difference as well. In the standard of IEEE 802.15.6-2012, it was hard to merge multiple proposals. However, hopefully we will prepare single standard. It should be noted that different priority is set to each packet. (*Ryuji Kohno*)

Þ One question about the difference between the proposals. Indeed, the proposals are from one to five. What is the proposal that is the closest to main source proposal? (*Marco Hernandez*)

* The concept can be used in the data channel. Main design is very simple and one mandatory channel is tried to be used. (*Seong Soon Joo*)

**[Discussion]**

* 1. Preliminary harmonization with 4ab: MAC operation, *Marco Hernandez (YRP-IAI)*, doc.#22-634-00-06ma

Þ In the 4ab, communication and ranging are considered independently, but both communication and ranging are necessary to be jointly discussed. Including the MAC layer, we can constitute to discuss. *(Ryuji Kohno)*

* 1. Summary of MAC Protocol Proposals, *Minsoo Kim (YRP-IAI)*

**[Updated Channel Models]**

* 1. Propagation Characteristics of UWB Communication Applications for Passengers Bus Use Case, *Daisuke Anzai, (Nagoya Institute of Tech.)* doc.# 22-0584-00-06ma
	2. Recessed at PM3:29

Attendees 21

***Name Affiliation***

* Clark Palmer Meteorcomm
* Daisuke Anzai Nagoya Institute of Technology
* Hiroki Saito ARIS Inc.
* Huan-Bang Li NICT
* Libra Xiao NRT
* Lochan Verma
* Marco Hernandez YRP-IAI
* Masayuki Hirata Osaka Univ.
* Matthias Wendt Signify
* Minsoo Kim YRP-IAI
* Mohammad Rahmani SPARK Microsystems
* Ryuji Kohno YNU/YRP-IAI
* Seong-Soon Joo KPST
* Shimi Shilo Huawei
* Stefan Lemsitzer NXP
* Takafumi Suzuki NICT
* Takumi Kobayashi YNU
* Tetsushi Ikegami Meiji Univ
* Xiaohui Peng Huawei
* Yasuharu Amezawa Mobile Techno
* Zhenzhen Ye Redpoint Positioning

**TG6ma 3rd Session**

**Thursday, November 17th, 2022, AM 10:30- PM 12:30 Bangkok Local Time**

**Apartment 1 at 7th Floor: Bangkok Marriott Marquis 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. Confirmation of Agenda, doc.# 15-22-0556-01, *Ryuji Kohno* (YNU/YRP-IAI)
	3. 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 (YNU), Ryuji Kohno(YRP-IAI)*, doc.#802.15-22-0575-00-06a

Þ Two comments for the explanation of the presentation; a big advantage of Orthogonal Matched Filter(OMF) is no need of pre-knowledge of interfering signals while need of desired UWB signal because the filter bank can be designed to be orthogonal to the desired UWB signals and only undesired interfering signals can pass through the filter bank. Then regenerated replica of the interfering signals can be subtracted from the received signal, then only desired UWB signal can remain.

 So, This OMF in time and space domains can be applied to mitigate interference from other UWB systems like 4ab, 4z etc.(*Ryuji Kohno*)

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, *Honggang Zhang, Kamya Y. Yazdandoost, Keren Li, Ryuji Kohno,* doc.#22-0652-00 & 04-0253-00

Þ SSA can be useful to avoid mutual interference between 802.11 WLAN and 802.15 WPAN and WBAN..(*Ryuji Kohno*)

* 1. MAC Bridging for Time-Sensitive Networking of 802.15.6ma, *Minsoo Kim (YRP-IAI),* doc.# 22-0024-02
	2. MAC Protocol Using Negotiation among Coordinators in Coexistence of Multiple Wireless BANs, *Minsoo Kim, Shunya Ogawa, Ryuji Kohno,* doc.# 22-0633-00
		+ Does beacon period only contain Managed Access Period and is the beacon period lengths all the same in the simulation? (*Seong-Soon Joo*)
			- Yes, for the sake of simplicity. (*Minsoo Kim*)
		+ Is any plan to simulate more general cases such as different beacon period lengths and BANs using not only MAP but also RAP? (*Seong-Soon Joo*)
			- Yes. (*Minsoo Kim*)
		+ We need to cralify it to proposals and simulation (*Marco Hernandez*)
	3. Summary of Channel and Environmental Modeling Activities for BANs on TG15.6a, *Takumi Kobayashi (YNU)*, doc.#22-0519-00 & 22-0658-00
	4. Summary of Channel Coding Proposals for Dependable BANs on TG15.6ma, *Marco Hernandez(YRP-IAI)*, doc.#22-0611-00
	5. Overview of MAC proposals for 15.6ma, *Minsoo Kim (YRP-IAI),*doc.#22-0656-00-06ma
	6. Remained Issues in Determined All Specification of New Standard 802.15.6ma that is Revision of Std.IEEE802.15.6-2012, *Ryuji Kohno,* doc.#22-0663-00-06ma

**[TG Motion]**

* 1. Motion to approve TG6ma Call for Proposals to be postponed until March 2023, *Marco Hernandez*, doc.# 15-22-0657-01-06a
		+ Moved by Marco Hernandez YRP-IAI, Second by Seong-Soon Joo
		+ Unanimous consent. Motion carries.
	2. Motion to approve the addition of Daisuke Anzai of Nagoya Institute of Technology as secretary of 15.6ma, *Marco Hernandez*, doc.# 15-22-0657-01-06a
		+ Moved by Marco Hernandez YRP-IAI, Second by Seong-Soon Joo
		+ Unanimous consent. Motion carries.
	3. Timeline of TG15.6ma, *Marco Hernandez*(YRP-IAI), doc.#22-0423-01
		+ Approved
	4. Any other business?
		+ No.
	5. Adjourn at 12:30

Attendees 10

***Name Affiliation***

* Daisuke Anzai Nagoya Institute of Technology
* Hiroki Saito ARIS
* Marco Hernandez YRP-IAI
* Masayuki Hirata Osaka University
* Minsoo Kim YRP-IAI
* Ryuji Kohno YNU/YRP-IAI
* Seong-Soon Joo
* Takafumi Suzuki NICT
* Takumi Kobayashi YNU/YRP-IAI
* Yasuharu Amezawa Mobile Techno