IEEE P802.15

**Wireless Personal Area Networks**

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| Project | Study Group 15.6a |
| Title | **Meeting Minutes for September 2021**  |
| Date Submitted | September 21st, 2021 |
| Source | [Ryuji Kohno1,2 Marco Hernandez1 Takumi Kobayashi2 Minsoo Kim1][1; YRP-IAI (YRP International Alliance Institute), Japan, 2; YNU (Yokohama National University), Japan] | Voice: +81 90 5408 0611E-mail: kohno@ynu.ac.jp marco.hernandez@ieee.org kobayashi-takumi-ch@ynu.ac.jp minsoo@minsookim.com |
| Re: | Meeting Minutes |
| Abstract | By the discussion in previous meetings, SG15.6a has been focusing on amendment of existing IEEE802.15.6-2012 for WBAN with enhanced dependability and has prepared draft PAR and CSD with detail technical requirement in cases of WBAN for medical use case for human body and for automotive use case for vehicle body with their connected use cases. Necessity and demand for amendment of std.15.6 WBAN with enhanced dependability; amendment in 15.6 MAC and PHY for contention and interference in case of overlaid same std. BANs and co-exiting different UWB and narrow band wireless networks and bi-directional traffic of packets between senso, actuator nodes and coordinator for sensing and controlling feedback loop etc. and additional functionality. Corresponding to questions and comments of EC meeting for our draft of PAR and CSD for the amendment of IEEE802.15.6-2012, we have discussed and finalized revision of PAR and CSD to prepare for motion in WG closing session this week. Major issues revised in PAR and CSD at four SG15.6a sessions include IEEE802.1 TSN for MAC, EMC/EMI in a vehicle body, human BAN(HBAN), vehicle BAN(VBAN) with and without their mutual interaction and interference etc. Preparation for motion to be approved for submission to the WG for its approval and that the EC be requested to forward the PAR to NesCom. |
| Purpose | Minutes of Dependability Electronic Plenary Session on Webex, September 2021 |
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**SG15.6a 1st Session**

**Wednesday, September 15th, 2021, AM, 9:00-11:00 EDT**

**Room: Webex Virtual Conference**

* 1. Meeting called to order AM 9:00

By Chair Ryuji Kohno (YNU / YRP-IAI)

* 1. Roll Call *Ryuji Kohno,* doc.# 802.15- 21-0445-03-06a

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

* 1. Opening Report *Ryuji Kohno (YNU / YRP-IAI)* doc.# 802.15- 21-0445-03-06a and # 802.15- 21-0444-00-06a

Chair showed IEEE Patent policy.

Chair issued Call for Potentially Essential Patents.

Þ No essential intellectual property in the scope of SG6a was declared.

Chair presented agenda of this meeting doc.# 802.15- 21-0444-00-06a

Þ Approved.

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

Þ Upon no comments on the May meeting minutes, doc. #15-21-0314-01-06a was approved.

**[Review]**

* 1. SG15.6a & IG DEP Activity for Amendment of IEEE802.15.6 Wireless BAN with Enhanced Dependability, *Ryuji Kohno (YNU / YRP-IAI)* doc. # 21-0023-03-06a
	2. Responses to Comments on PAR of IEEE802.15.6a from 802.1, 802.3 and 802.11, *Marco Hernandez, Ryuji Kohno,* doc. # 21-0391-04-06a, doc. # 21-0384-04-06a, doc. # 21-0392-06-06a
		+ What was a main issue of comments from 802.3? *(Ryuji Kohno)*
			- It was based on misunderstanding. Comments from 802.3 thought that two solutions for VBAN and HBAN but actually, this SG6a is making one solution. *(Marco Hernandez)*
	3. PAR and CSD of IEEE802.15.6a, Marco Hernandez, doc.# 21-0259-04-06a, doc.# 21-0260-03-06a => Merged with1.6.

**[Review for Technical Report]**

* 1. Application Matrix: use cases for automotive industry, *Ryuji Kohno*, doc.# 17-0398-00-0dep
	2. Application Matrix: Use cases for dependable social services based on BAN/5G/AI platform, *Ryuji Kohno*, doc.#21-0484-00-06a
	3. Application Matrix: use cases for medical fields: Dependable High Capacity BAN for Brain-Machine Interface, Masayuki Hirata, doc.#19-0545-01-0dep
		+ Do as same manner as HBAN case is an idea of simplify the channel models. *(Ryuji Kohno)*
		+ We should include EMC issues. *(Marco Hernandez)*
	4. Channel Models of Human BAN => Merged to 1.10

**[Discussion]**

* 1. Channel and environment models including EMC&EMI for human and vehicle body Area networks(HBAN and VBAN), *Takumi Kobayashi*, doc.# 21-0244-05-06a
	2. Channel Models of Human BAN =>Merged to 1.12
	3. Recessed.

**Attendees list**

Attendees 38

* Ryuji Kohno (YNU/YRP-IAI)
* Marco Hernandez (YRP-IAI)
* Minsoo Kim (YRP-IAI)
* Takumi Kobayashi (YNU)
* Sven Zeisberg (HTW)
* Zhenzhen Ye (Red Point)
* Benjamin Rolfe (Blind Creek Associates)
* Friedbert Berens (FBConsulting)
* Jerome Henry (Cisco)
* Jeörg Robert (TU Ilmenau/Fraunhofer IIS)
* Seong-Soon Joo (ETRI)
* Shimi Shilo (Huawei)
* Stephan Sand (German Aerospace Center DLR)
* Jeng-Shiann Jiang (Vertexcom)
* Akifumi Kasamatsu (NICT)
* Billy Verso (Qorvo)
* Carl Murray (Qorvo)
* Clark Palmer (Meteorcomm LLC)
* Hiroki Saito (ARIS)
* Huan-Bang Li (NICT)
* Iwao Hosako (NICT)
* Jack Zou
* Juha Juntunen (Meteorcomm)
* Kiyoshi Tada (ARIS)
* Kai Lennert Bober (Fraunhofer HHI)
* Masatoshi Fukunaga
* Masayuki Hirata
* Norihiko Sekine (NICT)
* Phil Beecher
* Robert Muller
* Srivathsa (NXP)
* Stefan Lemsitzer (NXP)
* Stuart Kerry (OK-Brit; Self)
* T. Suzuki (NICT)
* Takashi Kuromachi (LAPIS)
* Tetsushi Ikegami (Meiji Univ.)
* Tetsushi Yamamoto
* Yasuharu Amezawa (MobileTechno)

**SG6a 2nd Session**

**Thursday, September 16th 2021, PM 7:00-9:00 EDT**

**Room: Webex Virtual Conference**

* 1. Meeting called to order PM 7:00

By Chair Ryuji Kohno (YNU / YRP-IAI)

* 1. Roll Call *Ryuji Kohno*Announcement to attendance by using IEEE Attendance Tool (IEEE IMAT).
	2. Review the Agenda in last meeting and today’s agenda, *Ryuji Kohno, doc.# 21-0444-02-06a*
		+ After joint sessions, it is better to report the result of joint session in SG6a session. *(Clint Powel)*
			- Added to the agenda.

**[Review of Last Meeting on September 16th]**

* 1. Application Matrix: Use cases for dependable social services based on BAN/5G/AI platform, *Ryuji Kohno*, doc.#21-0484-00-06a
	2. Channel and environment models including EMC&EMI for human and vehicle body Area networks (HBAN and VBAN), *Takumi Kobayashi*, doc.# 21-0244-05-06a
		+ Commonality of and difference of current standard and amendment. *(Ryuji Kohno)*
		+ Extension of Channel model and define environmental model. *(Takumi Kobayashi)*
		+ Coexistence with the other radio e.g.PAN. Inter-Network interference and Inter-Radio systems interference. *(Ryuji Kohno)*
		+ Interference issue is important. HBAN and VBAN co-existence is new viewpoint. *(Huang-Bang Lee)*

**[Harmonization with other standards]**

=> Report of joint session is moved on to next Monday.
It was agreed that start to discuss co-existence issues with the other standards.

**[Drafting Technical Requirement]**

* 1. Previous Draft of Technical Requirement in IG-DEP, *Ryuji Kohno*, doc.# 21-0023-02-0dep
	2. Drafting Technical Requirement for Specified Use Cases and Corresponding to PAR and CSD of IEEE802.15.6a*, Ryuji Kohno*, doc.# 21-0493-01-006a
		+ We do not have implant UWB model. *(Kamran Sayrafian)*
			- We will check current channel model for implant UWB devises. *(Ryuji Kohno)*
		+ BCI, ECOG may supposed as implant but sometime its transmitter is on-body. *(Kamran Sayrafian)*
			- Transmitter is under the skin. Electrodes are under the skull bone. *(Masayuki Hirata)*
			- Bone and skin have different propagation characteristics. *(Ryuji Kohno)*
			- NIST can contribute with an implant channel model in the UWB band. *(Kamran Sayrafian).*

**[Presentation of Feasible Technologies for BAN to Satisfy the Technical Requirement]**

* 1. Review of IEEE Time-Sensing Networking Webinar Series (IEEE 802.1), Marco Hernandez, doc.#21-0499-00-6a
		+ In positioning purpose, we have to consider about privacy protection. *(Kamran Sayrafian)*
			- We will consider and harmonize with the other standards like TSN. *(Ryuji Kohno)*
		+ In wireless networks share the same medium. Signal can be corrupt even in the same network. MAC bridge concept is to achieving communication even two different kind of network like LAN and BAN and this can be applicable to our amendment. (*Minsoo Kim*)
	2. Considerations and countermeasure technology on radio environment surrounding BANs including EMC issues on PHY layer, *Takumi Kobayashi*, doc.# 21-0387-01-06a
	3. Recess

Attendees 32

* Benjamin Rolfe (Blind Creek Association)
* Bin Tian (Qualcomm)
* Clint Powell (Facebook)
* Carlos Aldana (Facebook)
* Clark Palmer (Meteorcomm LLC)
* Claudio da Silva (Facebook)
* Gary Stuebing
* Hiroki Saito
* Hiroshi Harada
* Huang-Bang Li (NICT)
* Hunseob OH (Samsung)
* Iwao Hosako (NICT)
* Jack Zou
* Jeng-Shiann Jiang (Vertexcom)
* Kamran Sayrafian
* Kanke Wu (Qualcomm)
* Kiyoshi Tada
* Marco Hernandez
* Masatoshi Fukunaga
* Masayuki Hirata
* Mingda Zhou (Redpoint Positioning)
* Minsoo Kim (YRP-IAI)
* Norihiko Sekine (NICT)
* Paul Kettle
* Robert Muller
* Ryuji Kohno (YNU/YRP-IAI)
* Seong-Soon Joo (ETRI)
* T. Suzuki
* Takumi Kobayashi (YNU)
* Tero Kivinen (Self)
* Tetsushi Ikegami (Meiji University)
* Yoshio Kashiwagi (Nissin Systems)

**SG15.6a/4ab/14 Joint Session**

**Tuesday, July 20th, 2021, AM, 11:00-13:00 EDT**

**Room: Webex Virtual Conference**

* 1. Meeting called to order AM 11:00

By Chairs Clint Powell, Benjamin Rolfe & Ryuji Kohno

* 1. Roll Call *Clint Powell* (Facebook)
	Announcement to attendance by using IEEE Attendance Tool (IEEE IMAT).
	Chair showed IEEE Patent policy.
	Chair issued Call for Potentially Essential Patents.
		+ No essential intellectual property in the scope of SG6a was declared.
	2. Approval of agenda of this joint session. doc.# 802.15.-21-0503-00-0000, *Clint Powell* (Facebook)
	3. Consensus between 4ab, 6a and 14 in July meeting; doc.#15-21-0386-01, *Marco Hernandez* (YRP-IAI)*.*
		+ - We are focusing on Impulse radio type of UWB only. *(Ryuji Kohno)*
			- 15.6 and 15.6 have different MAC. *(Benjamin Rolfe)*
			- To resolve coexistence problem, we would like to ask 15.4ab and 15.14 to define minimum requirements like common length frame length to know and identify the characteristics of radio wave from the other system. Or we can define or so. *(Ryuji Kohno)*
			- 4a has quite good channel models. (*Benjamin Rolfe)*
			- If we have channel models for both 4 and 6, we can combine. (*Benjamin Rolfe)*
			- On body and in body is not same. (*Kamran Sayrafian*)
			- Uni channel models is better. (*Kamran Sayrafian*)
			- Dominant platform is one solution for near the body. (*Benjamin Rolfe)*
			- Near-body like bed side and in-body like under surface of skin should be considered. (*Kamran Sayrafian*)
			- 15.4a has a standard model similar as a 15.6 like in-vitro and in-vivo model. But 15.4 only define the models around human beings. 15.6 has channel models around human-body. *(Ryuji Kohno)*
			- Before the channel models, we have to check what should be focused as a use case mainly in this joint session. *(Ryuji Kohno)*
			- Also, we have to have opinion from the chip vendors from the viewpoint of implementation and markets. *(Ryuji Kohno)*
			- Can we see the channel models of 15.6? (*Carlos Aldana*)
			- Yes, IEEE P802.15-08-0780-12-0006 is. (*Marko Hernandez*)
			- In the amendment SG15.6a, we are discussing not only propagation channel model but also environmental models including co-existence issues. (*Ryuji Kohno*)
			- Propagation model between the Coordinator and the other coordinator outside of the system is different (*Kamran Sayrafian*)
			- We are going to keep current channel models of current 802.15.6 but to apply more wider applications, we are discussing the extension as environmental models to answer user’s needs. (*Ryuji Kohno*)
	4. COR1 draft changes to UWB PHY
		+ Reminder of COR sessions MON PM1 & TUES EV1
	5. Commonality and Difference among 4ab, 6a, 14
		+ Covering use cases
		+ Channel models
		+ MAC
		+ Others
	6. Opening and meeting preamble
		+ P&P, schedule, agenda
	7. Coexistence among UWB Systems
		+ Technical Requirement
		+ Feasible Technologies
	8. Any other Business
		+ No.
	9. Adjourn

**Attendees list**

Attendees 60

* Akifumi Kasamatsu (NICT)
* Aniruddh Rao (Samsung)
* A Rocha
* Akifumi Kasamatsu (NICT)
* Aniruddh Rao (Samsung)
* Benjamin Rolfe (Blind Creek Associates)
* Bernhaard Groβwindhager (NXP)
* Billy Verso , Qorvo
* Carl Murray , Qorvo
* Chunyu Hu (Facebook)
* Carlos Aldana , (Facebook)
* Claudio da Silva (Facebook)
* Clint Chaplin (SRA)
* Clint Powel (Facebook)
* Chunyu Hu (Facebook)
* Dag T. Wisland (Novelda AS)
* Daoud Serang (CML Microcircuits)
* David Barras (3db)
* Don Sturek (Itron)
* Dries Neirynck
* Ersen Ekrem
* Frank Leong (NXP)
* Frederic Nabiki
* Gary Stuebing
* Hiroshi Saito (ARIS)
* Hyunseob OH (Samsung)
* Ido Bettesh
* Iwao Hosako (NICT)
* Yongsen Ma (Redpoint Positioning)
* Jonghoe Koo (Samsung)
* Jack Zou
* James Pace (Wyde labs)
* Joerg Robert (TU Ilmenau/Fraunhofer IIS)
* Joerg Robert (TU Ilmenau/Fraunhofer IIS)
* Mingda Zhou (Redpoint Positioning)
* Kanke Wu (Qualcomm)
* Kamra Sayrafian (NIST)
* Kangjin Yoon (Facebook)
* Kiyoshi Tada (ARIS)
* Kristian Granhaug (Novelda)
* Kunal Shah
* Libra Xiao (NRT)
* Lisa Meilhac (Qorvo)
* Masatoshi Fukunaga
* Pat Kinney (Kinney Consulting)
* Paul Kettle
* Phil Beecher (Wi-SUN)
* Ryuji Kohno (YRP-IAI/YNU)
* Riku Pirhonen (NXP)
* Shinichi Kitazawa (Muroran IT)
* Shimi Shilo (Huawei)
* Shang-Te Yang
* Stefan Lemsitzer (NXP)
* Stuart Kerry (OK-Brit;Self)
* Seven Zeisberg (HTW)
* Srivatha (NXP)
* T. Suzuki (NICT)
* Takumi Kobayashi (YNU/YRP-IAI)
* Tetsushi Ikegami (Meiji Univ.)
* Zhenzhen Ye (Redpoint positioning)

**SG6a 3rd Session**

**Tuesday, September 21st 2021, AM 9:00-11:00 EDT**

**Room: Webex Virtual Conference**

* 1. Meeting called to order AM 9:00

By Chair Ryuji Kohno (YNU / YRP-IAI)

* 1. Roll Call *Ryuji Kohno*Announcement to attendance by using IEEE Attendance Tool (IEEE IMAT).
	2. Review the Agenda in last meeting and today’s agenda, *Ryuji Kohno,* doc.# 21-444-05-06a
		+ Approved

**[Review of Last Meeting on Sept. 16th]**

* 1. SG15.6a & IG DEP Activity for Amendment of IEEE802.15.6 Wireless BAN with Enhanced Dependability => Skipped
	2. Solution for Harmonization among SG15.6a, SG15.4ab, and TG15.14 Using UWB PHY, *Marco Hernandez,* doc.#21-497-00-6a and doc.#21-0510-00-6a

**[Feasible Solution for Coexistence]**

* 1. Webinar Report for TSN by 802.1, Marco Hernandez, doc.# 21-0499-00-06a
	2. MAC Solution for Coexisting BANs and Other Networks with MAC-Bridge and Integrated Terminal, *Minsoo Kim,* doc.# 21-0245-01-06a and doc.# 21-0028-00-0dep

**[Drafting Technical Requirement]**

* 1. Drafting Technical Requirement for Specified Use Cases and Corresponding to PAR and CSD of IEEE802.15.6a, *Ryuji Kohno,* doc.# 21-0493-01
	2. Channel and environment models incliding EMC&EMI for human and vehicle boday Area networks(HBAN and VBAN), *Takumi Kobayashi,* doc.# 21-0244-06
	3. Summarizing Technical Requirement, *Ryuji Kohno, Minsoo Kim, Marco Hernandez*, doc.#21-0023-02-0dep
		+ Does throughput mean Maximum data rate of a device? *(Kamran Sayrafian)*
			- Yes, but Radio link is more correct. *(Marco Hernandez)*
			- Cleary explained as “Maximum data-rate per each radio link” and “Mbps / link”*(Minsoo Kim)*
		+ Technical requirements of throughput and transmission range was edited in doc.#15-21-0803.
		+ Updated Technical Requirements is uploaded as a revision of doc.#21-0803.
		+ After this meeting, we will receive any opinions via email. Then, we will be drafting to discuss in November meeting. (*Ryuji Kohno*)
	4. Other businesses?
		+ No.
	5. Adjourn

Attendees 37

* Akifumi Kasamatsu (NICT)
* Aniruddh Rao (Samsung)
* Bernhaard Groβwindhager (NXP)
* Dag T. Wisland (Novelda AS)
* David Barras (3db)
* Daoud Serang (CML Microcircuits)
* Gary Stuebing
* Hiroki Saito (ARIS)
* Huan-Bang Li (NICT)
* HYUNSEOB OH
* Iwao Hosako (NICT)
* Jack Zou
* Jeng-Shiann Jiang (Vertexcom)
* Jonghoe Koo (Samsung)
* Juha Juntunen (Meteorcomm)
* Kai Lennert Bober (Fraunhofer HHI)
* Kamran Sayrafian (NIST)
* Kangjin Yoon (Facebook)
* KIYOSHI FUKUI (OKI)
* Kiyoshi Tada (ARIS)
* Marco Hernandez (YRP-IAI)
* Masatoshi Fukunaga
* Masayuki Hirata (OsakaU)
* Mingyu Lee (Samsung)
* Minsoo Kim (YRP-IAI)
* Norihiko Sekine (NICT)
* Oded Redlich (Huawei)
* Ryuji Kohno (YNU/YRP-IAI)
* Sang-Kyu Lim (ETRI)
* Sven Zeisberg
* Takumi Kobayashi (YNU/YRP-IAI)
* Taeyoung (Samsung)
* Takashi Kuromachi (LAPIS)
* Tetsushi Ikegami (Meiji University)
* Thomas Kurner (TU Braunschweig)
* Yoshio Kashiwagi (Nissin Systems)
* Yongsen Ma (Redpoint Positioning)