IEEE P802.15

**Wireless Personal Area Networks**

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| Project | Study Group 15.6a |
| Title | **Meeting Minutes for May 2021**  |
| Date Submitted | May 19th, 2021 |
| Source | [Ryuji Kohno1,2,3 Marco Hernandez1][1; YRP International Alliance Institute, Japan, 2; YNU(Yokohama National University), Japan, 3; CWC University of Oulu, Finland] | Voice: +81 90 3061 7978E-mail: kohno@ynu.ac.jp Marco.hernandex@ieee.org |
| 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, May 2021 |
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**SG15.6a 1st Session**

**Wednesday, May 12th, 2021, AM, 9:00-11:00 EST**

**Room: Webex Virtual Conference**

* 1. Meeting called to order AM 9:00

By Chair Ryuji Kohno (YNU / CWC UofOulu)

* 1. Roll Call *Ryuji Kohno*

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

* 1. Opening Report doc.# 802. 15- 21-0239-00 *Ryuji Kohno (YNU / CWC UofOulu)*

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. 15-21-0238-05-06a

Þ Approved.

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

Þ Upon no comments on the March meeting minutes, doc. #15-21-0190-00-0dep was approved.

**[Review of previous meetings and current state]**

* 1. SG15.6a & IG DEP Activity for Amendment of IEEE802.15.6 Wireless BAN with Enhanced Dependability, *Ryuji Kohno (YNU / YRP-IAI )* *doc. #* *21-0023-01-06a*
* I have a similar experience using Zigbee. Though connecting something which is not attached to a vehicle such as human body or other mobile devices is valid, connecting stationary objects inside a vehicle in wireless was proven inefficient because they still need power, so you have to connect something. (*Max Turner*)
	+ In this cabin room side, audio and video still uses BT and the other wireless. For such applications no need to use UWB. As you mentioned, drivers and passengers wants to have health information. In such case, HBAN and VBAN using UWB should be new solution technology. *Ryuji Kohno*
* Ajeya Gupta (Ford): Questions about frequency regulations. Is there specific band for UWB-BAN? (*Ajeya Gupta*)
	+ Regulations are quite depending on each countries. IEEE 802.15.6 is separated from regulators, and regulation depends on regions or countries. Practically, UWB frequency band is divided low-band and high-band. We are focusing on 6-10 GHz high-band, which is same band to 802.15.4z smart key entry. (*Ryuji Kohno*)
* Regarding emission requirements, EMC group haven’t defined specific requirement for over 6 GHz. Especially more than 6GHz, EMC issues should be considered. *(Ajeya Gupta)*
	+ We have separated presentation regarding EMC issues. As same as radio regulation, EMC and EMI requirements are mandatory. We can also categorize what kind of EMC and EMI we have to take account to guarantee connectivity, thus dependability. Currently we are only covering impacts to wireless links, not to human. IEC and CISPR requirement and regulations are different with industrial standards. More focused on connectivity and wireless links. Human impact as well. *(Ryuji Kohno)*
* Are the node locations shown in the slide just examples or illustrating specific location inside a vehicle? (*Ajeya Gupta*)
	+ They are just examples. (*Ryuji Kohno*)

**[Presentation and discussion]**

* 1. Responses to EC’s comments in doc 15-21-0138, *Ryuji Kohno, Marco Hernandez,* doc.#21-0154-00
	2. Response to EC March Meeting ‘s comments for SG15.6a Meeting,
	*Marco Hernandez,* doc.#21-0269-00
	3. Introducing 802.1 TSN Concepts to SG 15.6a BAN with Enhanced Dependability, *Minsoo Kim*, doc.# 21-0245-00

=== Comment and Discssion for #21-0245-00===

* How does the signal from a node belonging to another network look? (*Ajeya Gupta*)
	+ The signal may be received by other coordinator, but if the two networks are closely located without special measures, frames may collide and both coordinators will not be able to receive the signal. (*Minsoo Kim*)
* 802.1D-2004 was superseded to 802.1Q. (Glenn Parsons)
	+ In current standard, the user priority depends on user. (*Ryuji Kohno*)
	+ Nine years have passed since the standard publication. The 802.1Q will be referred in the amendment. (*Minsoo Kim*)

* 1. SG15.6a Channel and Enviroment Models Including EMC/EMI Issues for Wireless Human and Vehiculer Body Area Networks(HBAN and VBAN), *Takumi Kobayashi*, doc.# 21-0244-01

=== Comment and Discssion for 21-0153-00===

* VBAN versus HBAN interference and VBAN or HBAN versus vehicle control or human body impact should be mandatory. (*Natalie Wienckowski*)
	+ We are taking opinions and suggestions from audiences. It can be modified. (*Ryuji Kohno* and *Takumi Kobayashi*)
* Potential interference with not only Wi-Fi but also DSRC applications should be also covered, as their frequency bands are 5 GHz too. There are different standards from different manufacturers. Ford has one too which is open to public. I will send you a link. (*Ajeya Gupta*)
	+ DSRC is out of the market for US. (*Marco Hernandez*)
	+ DSRC will be covered like Wi-Fi. As Minsoo Kim’s presentation showed, the MAC bridge concept can manage interference from different networks. (*Ryuji Kohno*)

* 1. Harmonization between SG 15.6a and SG 15.4ab: Technical Requirements, Marco Hernandez, Ryuji Kohno, doc.# 21-0153-00
	2. Recessed.

**Attendees list**

Attendees 64

* Ryuji Kohno (YNU/YRP-IAI)
* Marco Hernandez (YNU)
* Takumi Kobayashi (YNU/TCU)
* Minsoo Kim (YNU)
* Ajeya Gupta (Ford)
* Ann krieger (U.S. DoD)
* Aoki
* Ayman Naguib
* Benjamin Role (Blind Creek Associates)
* Bernhard Großwindhager (NXP)
* Billy Verso (Qorvo)
* Carl Murray (Qorvo)
* Chunyu Hu
* Clark Palmer (Meteorcomm)
* Dag T. Wisland (Novelda AS)
* Daoud Serang
* Dimitri Warnez (NXP)
* Dominik Doedlinger (NXP)
* Dries Neirynck (Novelda)
* Frank Leong (NXP)
* Ghiath Rias al-Kadi (NXP)
* Glenn Parsons (Ericsson)
* Hendrik Ahlendorf (NXP)
* Hiroki Saito
* Hiroshi Harada(UKyoto)
* Hitoshi Tanaka
* Huan-Bang Li (NICT)
* Hugues de Perthuis (NXP)
* Igor Dotlic (Qorvo)
* Iwao Hosako (NICT)
* Jack Zou
* Jeng-Shiann Jiang (Vertexcom)
* Joerg Robert (TU Ilmenau/Fraunhofer IIS)
* Juha Juntunen (Meteorcomm)
* Kai Lennert Bober (Fraunhofer HHI)
* Kamran Sayrafian
* Kenichi Mori
* Kiran Thimme Gowda (NXP)
* Kiyoshi Fukui (Oki)
* Kristian Granhaug (Novelda)
* Masayuki Hirata(UOsaka)
* Max Turner (Ethernovia)
* Natalie Wienckowski (GM)
* Phil Beecher
* Riku Pirhonen (NXP)
* Robert Golshan (Apple)
* Seiji Nakanishi
* Seong-Soon Joo (ETRI)
* Serkan Ayaz (Denso)
* Srivathsa (NXP)
* Stefan Lemsitzer (NXP)
* Stephan Sand (German Aerospace Center DLR)
* Kiyoshi Tada (IFT inc.)
* Taeyoung Ha (Samsung)
* Takamitsu Hafuka
* Takashi Kuramochi (Lapis)
* Tatsuo Imai (ARIS Co. Inc)
* Tero Kivinen
* Tetsushi Ikegami (Meiji University)
* Tetsushi Yamamoto
* Ueda(Ariis)
* Yasuharu Amezawa (Mobile Techno)
* Yong Liu (Apple)
* Yumi Mori (Yokohama City University)

**SG6a 2nd Session**

**Thursday, May 13th 2021, AM 9:00-11:00 EST**

**Room: Webex Virtual Conference**

* 1. Meeting called to order AM 9:00

By Chair Ryuji Kohno (YNU / CWC UofOulu)

* 1. Roll Call *Ryuji Kohno*Announcement to attendance by using IEEE Attendance Tool (IEEE IMAT).

**[Review of Last Meeting on May 12th]**

* 1. SG15.6a Channel and Enviroment Models Including EMC/EMI Issues for Wireless Human and Vehiculer Body Area Networks(HBAN and VBAN), Takumi Kobayashi, doc.# 21-0244-02
	2. Introducing 802.1 TSN Concepts to SG 15.6a BAN with Enhanced Dependability, Minsoo Kim, doc.# 21-0245-00
	=>User oriented definitions of user priority. (Ryuji Kohno)
	3. Response to EC March Meeting ‘s comments for SG15.6a Meeting, *Marco Hernandez*, *Ryuji Kohno* doc.# 21-0269-01

**[Review of PAR and CSD]**

2.6 IEEE 802.15.6a CSD for Standard Development Draft for P802.15.6a Amendment – Body Area Networks, last draft, *Marco Hernandez*, doc.# 21-0088-00
[discussion]
Do we need some evidence how large market? *(Ryuji Kohno)*
=> I do not think so. Maybe discussed on PAR. *(Marco Hernandez)*

2.7 IEEE 802.15.6a PAR for Standards Development draft for P802.15.6a Amendment – Body Area Networks, last draft, *Marco Hernandez*, doc.# 21-0180-01
[discussion]
Purpose can scope on the changing to original standard 15.6. *(Benjamin Rolfe)*
Is VBAN concideration out of scope of original standard purposes? *(Kamran Sayrafian)*
Link between nodes should be considered to enhanced dependability. *(Marco Hernandez)*
Additional scope on the enhanced dependability on critical usage.  *(Ryuji Kohno)*
Original standard also considering about not limited only human body but also including something body like robots, is not it? *(Minsoo Kim)*
I think so. So main purpose is not changed. *(Ryuji Kohno)*
Why the VBAN discussed on the other standard. *(Kamran Sayrafian)*
Original PAR of original standard mainly focused on medical BAN. This amendment is focusing on VBAN and also focusing on health care or medical purposes for the vehicle driver and passengers. That is reason why we are focusing on this standard. *(Ryuji Kohno)*
Original standard also focusing beyond HBAN and medical purposes including like entertainment purposes. This amendment is not out of focus of original 15.6. *(Ryuji Kohno)*
Body sounds like some kind of bilogical things. *(Kamran Sayrafian)*
Original standard also includes covering beyond human body as BAN with consensus. *(Ryuji Kohno)*
We do not want to invade to the other vehicle communication standards. We are focusing on the extension on BAN to some of purposes like diagnostics of car health condition care. We will brush up and will finalize. Thank you. *(Ryuji Kohno)*

**[Presentation and Discussion]**

2.8 SG 15.6a updated draft PAR, *Ryuji Kohno, Marco Hernandez, Takumi Kobayashi, Minsoo Kim,* doc.# 21-0259-00

2.9 SG 15.6a updated draft CSD, *Ryuji Kohno, Marco Hernandez, Takumi Kobayashi, Minsoo Kim,* doc.# 21-0260-00

**[discussion]**

* Purpose can scope on the changing to original standard 15.6. *(Benjamin Rolfe)*
* Is VBAN concideration out of scope of original standard purposes? *(Kamran Sayrafian)*
* Link between nodes should be considered to enhanced dependability. *(Marco Hernandez)*
* Additional scope on the enhanced dependability on critical usage.  *(Ryuji Kohno)*
* Original standard also considering about not limited only human body but also including something body like robots, is not it? *(Minsoo Kim)*
* I think so. So main purpose is not changed. *(Ryuji Kohno)*
* Why the VBAN discussed on the other standard. *(Kamran Sayrafian)*
* Original PAR of original standard mainly focused on medical BAN. This amendment is focusing on VBAN and also focusing on health care or medical purposes for the vehicle driver and passengers. That is reason why we are focusing on this standard. *(Ryuji Kohno)*
* Original standard also focusing beyond HBAN and medical purposes including like entertainment purposes. This amendment is not out of focus of original 15.6. *(Ryuji Kohno)*
* Body sounds like some kind of bilogical things. *(Kamran Sayrafian)*
* Original standard also includes covering beyond human body as BAN with consensus. *(Ryuji Kohno)*
* We do not want to invade to the other vehicle communication standards. We are focusing on the extension on BAN to some of purposes like diagnostics of car health condition care. We will brush up and will finalize. Thank you. *(Ryuji Kohno)*
* Priority against dependability for ECoG and BMI application are very important to guarantee the Quality of Systems. *(Masayuki Hirata)*
* I never forget such applications. Thank you for your comments. *(Ryuji Kohno)*
* Also frequency efficiency is important and source coding and data compression technologies. *(Masayuki Hirata)*
	1. Recessed. (AM 11:00 EST)

**Attendees list**

Attendees 46

* Ryuji Kohno (YRP-IAI, YNU / UofOulu)
* Marco Hernandez(YNU)
* Minsoo Kim (YRP-IAI)
* Takumi Kobayashi (YRP-IAI, YNU)
* Kenichi Mori
* Benjamin Rolfe (Bind Creek Asso.)
* Joerg Robert (TU Ilmenau)
* Stephan Sand (German Aeroospace)
* Yong Liu (Apple)
* Yong Liu (Apple)
* Billy Verso (Qorvo)
* Carl Murray (Qorvo)
* Clark Palmer (Meteorcomm)
* Daoud Serang
* Dries Neirynck (Novelda)
* Gary Stuebing
* Hiroki Saito
* Hiroshi Harada(UKyoto)
* Hiroshi Ishigata
* Hiroyuki Toda
* Hitoshi Tanaka
* Huang-Bang Li (NICT)
* Igor Dotlic (Qorvo)
* Iwao Hosako (NICT)
* Jarek Niewczas (Qorvo)
* Juha Juntunen (Meteorcomm)
* Kamran Saryfian(NIST)
* Kiyoshi Fukui (OKI)
* Kiyoshi Tada (IFT. Inc)
* Masatoshi Fukunaga
* Masayuki Hirata(UOsaka)
* Naoki Hata
* Phil Beecher
* Raphael Guimond
* Seiji Nakanishi
* Stefan Lemsitzer (NXP)
* T. Suzuki (NICT)
* Taeyoung Ha (Samsung)
* Takamitsu Hafuka
* Takashi Kurimachi (LAPIS)
* Tatsuo Imai (ARIS)
* Tero Kivinen
* Tetsushi Yamato
* Ueda (ARIS)
* Yasuharu Amezawa (Mobile Techno)
* Yumi Mori (Seijo Univ.)

**SG6a 3rd Session**

**Tuesday, May 18th 2021, AM 9:00-11:00 EST**

**Room: Webex Virtual Conference**

* 1. Meeting called to order AM 9:00
	By Chair Ryuji Kohno (YNU / CWC UofOulu)
	Chair issued Call for Potentially Essential Patents
	=> No essential intellectual property in the scope of SG15.6a was declared.
	2. Roll Call *Ryuji Kohno*

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

**[Review of Last Meeting on May 12th and 13th ]**

* 1. Review of Previous Discussion in last meetings, *Ryuji Kohno,* doc.#15-21-0238-06-SG6a
	2. Additional information for PAR discussion at the last session on Thursday, *Marco Hernandez,* doc.#21-0293-00-06a

**[Discussions]**

* 1. Finalizing draft PAR, *Marco Hernandez*, doc.#21-0259-02-06a

	Too detail general requirements explanation is not needed. Channel models also should be removed from PAR. These should be discussed on Task Group. *(Pat Kinney)*
	=> Removed from the draft of PAR.
	=> One sentence explanation on EMC/EMI issue to answer to EC question. *(Ryuji Kohno)*
	=> PAR draft has been edited. “P802.15.6a amendment addresses EMC and EMI for both HBAN and VBAN.” *(Pat Kinney, Ryuji Kohno and Marco Hernandez)*

	Is this BAN considering BAN between human being and vehicle ? *(Kamran Sayrafian)*
	=> Yes. (Ryuji Kohno)
	Is the interference considered Inter and Intra-BAN and inter-vehicle interference?
	=> Yes. Like parking slot environment, we should consider inter and intra BAN environment. *(Ryuji Kohno)*

	“Purpose” should be kept as original. It is better to copy and paste from the original. Normally, no purpose amendment. *(Pat kinney)*
	=> Purpose of amendment has been copied as additional explanation and minimize changes on PAR. *(Ryuji Kohno)*
	*=>* Only one sentence is good to explanation of this amendment. *(Pat Kinney)*
	=> Removed statement should be moved to 8.1 as additional explanatory notes. *(Ryuji Kohno)*

	Specific COVID-19 word can be changed to more general. *(Tero Kivinen)*
	=> The word can be changed to like “pandemics”. *(Ryuji Kohno)*

	Coexisting issues also can be added to additional explanatory notes. *(Pat Kinney)*
	*=>*Added.

	In the “Purpose”, still much focused on HBAN. How about additional explanation about VBAN? *(Tero Kinney)*
	=> “human range” can be deleted. *(Pat Kinney)*
	=> added “and/or vehicle body” *(Pat Kinney)*
	*=>* should be edited carefully because “Purpose” should not be changed a lot. *(Ryuji Kohno)*

	Vehicular body => Vehicle body *(Ryuji Kohno)*
	=> edited

	=> Approved in SG6a

	◆ PAR Draft PDF has been uploaded to IEEE Mentor server as doc.# 15-21-259-02-SG6a ◆
	2. Finalizing draft CSD, Ryuji Kohno, doc.#15-21-0260-00-SG6a

	In 1.2.2, additional text explanation may needed to answer for EC questions. *(Tero Kivinen)*.
	=> Another meeting slot is needed for this discussion*.(Ryuji Kohno)*
	=> Extra session will be held on PM1 slot on 18th. .
	3. Recessed. (AM 11:00 EST)

**Attendees list**

Attendees 33

* Ryuji Kohno (YRP-IAI, YNU / UofOulu)
* Marco Hernandez(YNU)
* Minsoo Kim (YRP-IAI)
* Takumi Kobayashi (YRP-IAI, YNU)
* Pat Kinney
* Yoshio Kashiwagi (Nissin Systems)
* Kenichi Mori
* Tetsushi Ikegami (Meiji Univ.)
* Dag T. Wisland (Novelda AS)
* Daoud Serang
* Hiroki Saito(Aris)
* Hitoshi Tanaka
* Hiroyuki Toda
* Huan-Bang Li (NICT)
* Jack Zou
* Kamran Sayrafian(NIST)
* Kiran Thimme Gowda (NXP)
* Larry Zakaib (Spark Microsystems)
* Masayuki Hirata
* Nicolas Paillusseau (SPARK Microsystems)
* Raphael Guimond
* Sang-Kyu Lim (ETRI)
* Seiji Nakanishi
* Srivathsa (NXP)
* T. Suzuki(NICT)
* Kiyoshi Tada (IFT)
* Taeyoung Ha (Samsung)
* Takamitsu Hafuka
* Tero Kivinen
* Tetsushi Yamamoto
* Y. Ueda (ARIS)
* Yasuharu Amezawa
* Yumi Mori

**SG6a 3rd Session**

**Tuesday, May 18th 2021, PM 1:00-3:00 EST**

**Room: Webex Virtual Conference**

* 1. Meeting called to order PM 1:00
	By Chair Ryuji Kohno (YRP-IAI / YNU / CWC UofOulu)
	Chair issued Call for Potentially Essential Patents
	=> No essential intellectual property in the scope of SG15.6a was declared.
	2. Roll Call *Ryuji Kohno*Announcement to attendance by using IEEE Attendance Tool (IEEE IMAT).
	3. Finalizing draft CSD, *Marco Hernandez*, doc.#15-21-0260-02-SG6a,

	=> In 1.2.1, example use case is deleted. *(Ryuji Kohno)*
	=> 1.2.2 => YES
	=> In 1.2.3, “This amendment unique and focus on enhanced dependability in HBAN and VBAN.” is added. *(Pat Kinney Ryuji Kohno and Marco Hernandez)*
	=> We are focusing on an extension of 802.15.6 BAN to vehicle BAN rather than the vehicle network like LIN or CAN. *(Ryuji Kohno)*
	=> Primary we are focusing on medical purpose but also extended to non-medical purposes. Now we are focusing the other BAN like VBAN as well. *(Ryuji Kohno)*
	=> In 1.2.3, “and extension of the” is added *(Pat Kinney)*

	Strike out part will be deleted. *(Marco Hernandez)*
	=> Approved

	b) explanations is approved *(all)*

	In 1.2.5, Economic Feasibility => approved

	◆CSD Draft has been approved in SG15.6a◆
	◆CSD Draft has been uploaded to IEEE Mentor as 15-21-0260-02-6a◆
	4. Discussion on PAR #21-0259-02-SG6a
	In 5.6 Steakholders, who is “environmental”? *(Tero Kivinen)*
	=> Suppliers of environmental sensors like temperature, vehicle sheet sensors etc. *(Ryuji Kohno)
	=*> Words are replaced to “Environmental sensors.” (All)
	=> In 5.6, “and automotive” is added *(Tero Kivinen)*=> In 5.6, “Including energy harvesting” is added *(All)*=> Minor correction, edited and approved *(All)*

	◆PAR Draft has been approved in SG15.6a◆
	◆PAR Draft PDF file has been uploaded to IEEE Mentor as 15-21-0259-03-6a◆
	5. Study Group Motion, Ryuji Kohno, doc.# 15-21-0307-00-SG6a
	=> Updated document numbers and uploaded as doc.#15-21-0307-01-SG6a
	6. Adjourn

**Attendees list**

Attendees 11

* Ryuji Kohno (YRP-IAI, YNU / UofOulu)
* Marco Hernandez(YNU)
* Minsoo Kim (YRP-IAI)
* Takumi Kobayashi (YRP-IAI, YNU)
* Pat Kinney
* Hiroki Saito(Aris)
* Jim Schuessler (Samsung)
* Kamran Sayrafian(NIST)
* Masayuki Hirata
* T. Suzuki(NICT)
* Tero Kivinen