P802.15.6

Type of Project: Revision to IEEE Standard 802.15.6-2012
Project Request Type: Initiation / Revision
PAR Request Date:
PAR Approval Date:
PAR Expiration Date:
PAR Status: Draft
Root Project: 802.15.6-2012

1.1 Project Number: P802.15.6
1.2 Type of Document: Standard
1.3 Life Cycle: Full Use

2.1 Project Title: Standard for Local and metropolitan area networks - Part 15.6: Wireless Body Area Networks
Change to Title: ~~IEEE~~ Standard for Local and metropolitan area networks - Part 15.6: Wireless Body Area Networks

3.1 Working Group: Wireless Specialty Networks (WSN) Working Group(C/LM/802.15 WG)
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4.1 Type of Ballot: Individual
4.2 Expected Date of submission of draft to the IEEE SA for Initial Standards Committee Ballot: Jul 2024
4.3 Projected Completion Date for Submittal to RevCom: Mar 2026

5.1 Approximate number of people expected to be actively involved in the development of this project: 12
5.2 Scope of proposed standard: This is a standard for short-range, wireless communication in the vicinity of, or inside, a human body (but not limited to humans). It uses existing industrial scientific medical (ISM) bands as well as frequency bands approved by national medical and/or regulatory authorities. Support for quality of service (QoS), extremely low power, and data rates up to 10 Mb/s is required while simultaneously complying with strict noninterference guidelines where needed. This standard considers effects on portable antennas due to the presence of a person (varying with male, female, skinny, heavy, etc.), radiation pattern shaping to minimize specific absorption rate (SAR) into the body, and changes in characteristics as a result of the user motions.

The standard improves the Ultra-Wideband (UWB) physical layer (PHY) and medium access control (MAC) to support enhanced dependability to human body area networks (HBAN). It incorporates support for vehicle body area networks (VBAN). VBAN consists of a coordinator in a vehicle with devices around the vehicle, operating under strict compliance to standards and limits for electromagnetic compatibility (EMC) and electromagnetic interference (EMI). Enhancements to dependability include coexistence of multiple piconets including inter-BAN interference and inter-piconets interference; simple and more reliable MAC protocol; sensing and feedback control loop delay; protection against interference in dense use cases with overlaid BANs and other piconets; support of higher performance requirement of reliability, security, coexistence, and efficiency in the operation and maintenance of HBAN and VBAN. The standard incorporates support for infrastructure protocols via an

access point. The amendment provides safeguards so that high throughput data use cases will not cause significant disruption to low duty-cycle ranging use cases.
Change to scope of proposed standard: This is a standard for short-range, wireless communication in the vicinity of, or inside, a human body (but not limited to humans). It uses existing industrial scientific medical (ISM) bands as well as frequency bands approved by national medical and/or regulatory authorities. Support for quality of service (QoS), extremely low power, and data rates up to 10 ~~Mbps~~ Mb/s is required while simultaneously complying with strict noninterference guidelines where needed. This standard considers effects on portable antennas due to the presence of a person (varying with male, female, skinny, heavy, etc.), radiation pattern shaping to minimize specific absorption rate (SAR) into the body, and changes in characteristics as a result of the user motions. The standard improves the Ultra-Wideband (UWB) physical layer (PHY) and medium access control (MAC) to support enhanced dependability to human body area networks (HBAN). It incorporates support for vehicle body area networks (VBAN). VBAN consists of a coordinator in a vehicle with devices around the vehicle, operating under strict compliance to standards and limits for electromagnetic compatibility (EMC) and electromagnetic interference (EMI). Enhancements to dependability include coexistence of multiple piconets including inter-BAN interference and inter-piconets interference; simple and more reliable MAC protocol; sensing and feedback control loop delay; protection against interference in dense use cases with overlaid BANs and other piconets; support of higher performance requirement of reliability, security, coexistence, and efficiency in the operation and maintenance of HBAN and VBAN. The standard incorporates support for infrastructure protocols via an access point. The amendment provides safeguards so that high throughput data use cases will not cause significant disruption to low duty-cycle ranging use cases.

5.3 Is the completion of this standard contingent upon the completion of another standard? No
5.4 Purpose: The purpose is to provide an international standard for a short range, low power and highly reliable wireless communication for use in proximity to, or inside, a human body and/or a vehicle body. Data rates can be offered to satisfy an evolutionary set of entertainment and healthcare services. Current piconets do not meet the medical (proximity to human tissue) and relevant communication regulations for some application environments. They also do not support the combination of reliability (QoS), low power, data rate and noninterference required to broadly address the breadth of body area network applications. Additionally, this standard provides enhanced dependability that is required for some medical use cases. This includes remote medical healthcare, therapy and other monitoring that can enhance quality of life (QoL) in various population segments.
Change to Purpose: The purpose is to provide an international standard for a short ~~-range (i.e., about human body~~ range ~~)~~, low power ~~,~~ and highly reliable wireless communication for use in ~~close~~ proximity to, or inside, a human body ~~. Data~~ and/or ~~rates,~~ a ~~typically~~ vehicle ~~up~~ body. ~~to~~ Data ~~10Mbps,~~ rates can be offered to satisfy an evolutionary set of entertainment and healthcare services. Current ~~personal area networks (PANs)~~ piconets do not meet the medical (proximity to human tissue) and relevant communication regulations for some application environments. They also do not support the combination of reliability ~~,~~ (QoS) , low power, data rate ~~,~~ and noninterference required to broadly address the breadth of body area network applications. Additionally, this standard provides enhanced dependability that is required for some medical use cases. This includes remote medical healthcare, therapy and other monitoring that can enhance quality of life (~~BAN~~ QoL) ~~applications~~ in various population segments .
5.5 Need for the Project: This project provides dependability against interference and contention in such critical use cases as overlaid with the same and/or different piconets. Focus use cases: multiple BANs, where user's devices cross each other among different BANs within range. Multiple piconets, where narrowband and wideband devices cross each other within the same coverage range. Interference management among BANs. This amendment for enhanced dependability supports automotive use (vehicular body area network) with primary medical use for a human body and additionally non-medical use with common enhanced dependability. This amendment helps remote medical healthcare monitoring and therapy to combat Covid-19 pandemic and to support QoL in aging population and people with medical conditions.
Change to Need for the Project: ~~There is a need for a standard optimized~~ This ~~for~~ project ~~ultra~~ provides ~~low~~ dependability ~~power~~ against ~~devices~~ interference and ~~operation on,~~ contention in ~~or around the human~~ such ~~body to~~ critical ~~serve~~ use ~~a~~ cases ~~variety~~ as ~~of~~ overlaid ~~applications~~ with ~~including~~ the ~~medical~~ same and /or ~~personal~~ different ~~entertainment~~ piconets . ~~Examples of the applications served by the~~ Focus ~~proposed~~ use ~~standard are~~ cases : ~~Electroencephalogram~~ multiple ~~(EEG)~~ BANs , ~~Electrocardiogram~~ where ~~(ECG),~~ user's ~~Electromyography~~ devices ~~(EMG),~~ cross ~~vital~~ each ~~signals~~ other ~~monitoring~~ among ~~(temperature (wearable thermometer),~~ different ~~respiratory,~~ BANs ~~wearable~~ within ~~heart~~ range. ~~rate~~ Multiple ~~monitor~~ piconets , ~~wearable~~ where ~~pulse~~ narrowband ~~oximeter,~~ and ~~wearable~~ wideband ~~blood~~ devices ~~pressure~~ cross ~~monitor,~~ each ~~oxygen,~~ other ~~pH~~ within ~~value~~ the ~~,~~ same ~~wearable~~ coverage ~~glucose~~ range. ~~sensor,~~ Interference ~~implanted glucose sensor, cardiac arrhythmia), wireless~~ management ~~capsule endoscope~~ among ~~(gastrointestinal),~~ BANs. ~~wireless~~ This ~~capsule~~ amendment for ~~drug~~ enhanced ~~delivery, deep~~ dependability ~~brain~~ supports ~~stimulator,~~ automotive ~~cortical stimulator~~ use (~~visual neuro-stimulator, audio neuro stimulator,~~ vehicular ~~Parkinson's~~ body ~~disease,~~ area ~~etc...~~ network) ~~,~~ ~~remote~~ with ~~control of~~ primary medical ~~devices such as pacemaker, actuators, insulin pump, hearing aid (wearable and implanted), retina implants, disability assistance, such~~ use ~~as~~ for ~~muscle~~ a ~~tension~~ human

~~sensing~~ body and ~~stimulation, wearable weighing~~ additionally ~~scale,~~ non-medical ~~fall~~ use ~~detection,~~ with ~~aiding~~ common ~~sport~~ enhanced ~~training~~ dependability . This ~~will~~ amendment ~~include~~ helps ~~body-centric~~ remote ~~solutions~~ medical ~~for~~ healthcare ~~future~~ monitoring ~~wearable~~ and ~~computers. In a similar vein, the same technology can provide effective solutions for personal entertainment as well. The existence of a body area network standard will provide opportunities~~ therapy to ~~expand these product~~ combat ~~features, better~~ Covid-19 ~~healthcare~~ pandemic and ~~well being~~ to ~~for~~ support ~~the users. It will therefore result~~ QoL in ~~economic~~ aging ~~opportunity~~ population ~~for~~ and ~~technology~~ people ~~component~~ with ~~suppliers~~ medical ~~and equipment manufacturers~~ conditions .

5.6 Stakeholders for the Standard: The stakeholders include silicon vendors, manufacturers and users of telecom, medical and automotive. Manufacturers and users of environmental sensors and actuators. Consumer electronics equipment manufacturers and users of equipment involving the use of wireless sensor and control networks.

Change to Stakeholders for the Standard: The stakeholders include ~~the~~ silicon ~~general~~ vendors, ~~population~~ manufacturers ~~who~~ and ~~will~~ users of ~~be~~ telecom, ~~served~~ medical ~~by~~ and ~~advanced~~ automotive. ~~medical~~ Manufacturers and ~~entertainment~~ users ~~options~~ of ~~enabled~~ environmental ~~by~~ sensors ~~this~~ and ~~standard~~ actuators . Consumer ~~Other~~ electronics ~~parties~~ equipment ~~having~~ manufacturers ~~interests~~ and ~~include~~ users ~~medical~~ of equipment ~~manufacturers~~ involving ~~and~~ the use of wireless sensor ~~consumer~~ and ~~electronics~~ control ~~manufacturers~~ networks .

6.1 Intellectual Property

6.1.1 Is the Standards Committee aware of any copyright permissions needed for this project?
No

6.1.2 Is the Standards Committee aware of possible registration activity related to this project?
No

7.1 Are there other standards or projects with a similar scope? No

7.2 Is it the intent to develop this document jointly with another organization? No

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8.1 Additional Explanatory Notes: