

Re: Consultation “TDRA Regulations– Ultra Wide Band and Short Range Devices”

Dear Executive Director Spectrum Affairs,

IEEE 802 LAN/MAN Standards Committee (LMSC) thanks the Telecommunications and Digital Government Regulatory Authority (TDRA) of the United Arab Emirates (UAE) for issuing the consultation “TDRA Regulations– Ultra Wide Band and Short Range Devices v4.0” and for the opportunity to provide feedback on this topic.

IEEE 802 LMSC is a leading consensus-based industry standards body, producing standards for wireless networking devices, including wireless local area networks (“WLANs”), wireless specialty networks (“WSNs”), wireless metropolitan area networks (“Wireless MANs”), and wireless regional area networks (“WRANs”). We also produce standards for wired Ethernet networks, and technologies produced by implementers of our standards are critical for all networked applications today.

IEEE 802 LMSC is a committee of the IEEE Standards Association and Technical Activities, two of the Major Organizational Units of the Institute of Electrical and Electronics Engineers (IEEE). IEEE has about 400,000 members in over 160 countries. IEEE’s core purpose is to foster technological innovation and excellence for the benefit of humanity. In submitting this document, IEEE 802 LMSC acknowledges and respects that other components of IEEE Organizational Units may have perspectives that differ from, or compete with, those of IEEE 802 LMSC. Therefore, this submission should not be construed as representing the views of IEEE as a whole¹.

Current and future state of IEEE 802 wireless technology development

Significant economic value is provided by IEEE 802-based systems today. Wi-Fi technology, based on the IEEE 802.11 standard, has an estimated 18 billion devices in use worldwide, with over 4 billion devices added annually [1]. The current deployments of IEEE 802.15 devices are found in markets ranging from consumer devices to smart grid/smart city, large scale IoT, industrial plants, automobiles to buildings and agriculture to space. IEEE 802 wireless technologies are a critical part of the modern communications infrastructure, benefiting billions of people, governments, and businesses every day. Underserved communities stand to gain from IEEE 802 wireless technologies. They are used in community networks both to empower and provide an opportunity for education. IEEE 802 wireless technologies are in the forefront as an enabler of emerging applications such as the Internet of Things (IoT).

IEEE 802.11

Today, Wi-Fi networks based on IEEE 802.11 standards are found in residential, office, and industrial environments, in public and private settings. Users in an array of industries rely on these cost-effective, energy-efficient technologies. Each new generation of IEEE 802.11 technologies continues to improve efficiency, reliability, latency, throughput and determinism. IEEE 802.11 supports operation in several frequency bands [2], including the sub-1 GHz, 2.4 GHz, 5 GHz, and 6 GHz (5925 MHz to 7125 MHz) bands, with significant global deployments [3].

¹ This document solely represents the views of IEEE 802 LMSC and does not necessarily represent a position of either the IEEE or the IEEE Standards Association.

IEEE 802.15

Technologies based on IEEE 802.15 standards and projects are embedded in billions of devices worldwide and in particular IEEE Std 802.15.4z-2020 [4] is prevalent in consumer devices such as smart phones and accessories, vehicles, and is being added to an increasing number of devices. For some applications, such as cars or utilities, industry consortia exist to build on the standard(s) and provide the support ecosystem to enable very large scale deployments. For other applications, proprietary protocols are used in conjunction with IEEE 802 standards. IEEE Std 802.15.4 [5] support operation in many frequency ranges including sub-1 GHz bands and 3.1 GHz to 10.6 GHz bands for UWB [2], and it supports data communication, location discovery, and device ranging. Project P802.15.6ma is developing a standard specialized for short range communication in the vicinity of, or inside, a human body. For high-speed, low-latency media transfers, IEEE 802.15.3 provides a specialty solution. IEEE P802.15.16t is developing a standard to accommodate the needs of some utility networks.

Technologies and industry specifications based upon IEEE Std 802.15.4 operating in sub-1 GHz bands are widely used in industrial and metro-area IoT. These are the dominant wireless technologies for low data-rate IoT applications, including smart grid uses such as metering and monitoring, and in smart city applications such as environmental monitoring and street light controls.

IEEE Std 802.15.4z-2020 is the only widely used industry standard for UWB and is currently, being the foundation of specifications from the Connected Car Consortium, FiRa, Omlox, and CSA. Use of UWB in location based services and secure access is widespread today. Use of UWB is rapidly growing with new applications such as sensing and presence detection, and very low latency moderate data rate communications such as high definition, low latency audio. Current projects in IEEE 802.15 [6] are addressing these rapidly growing areas of innovation.

IEEE 802.19

Many IEEE 802.15 standards, as well as the IEEE 802.11 standard, support operation on frequencies lower than 1 GHz. The IEEE 802.19 Wireless Coexistence Working Group published best practice coexistence mechanisms for sub-1 GHz technologies in 2021 [7].

Please find below the responses of IEEE 802 LMSC to selected questions of this consultation, namely Questions 3, 4, 5, 9, 11, 12, 13, 14, and 17.

IEEE 802 LMSC's response to Question 3 (Do you have any comments on the uses indicated above?)

IEEE 802 LMSC recommends TDRA maintaining the maximum transmit power EIRP at 250 mW. We recognize that the proposed change to 200 mW is to align with ECC/DEC/(20)01. But we would like to bring to the attention of TDRA that a number of countries including UK, Australia, Thailand, and New Zealand also adopted the 250mW (24 dBm) as the maximum transmit power for low power indoor (LPI) mode in the 6 GHz band. TDRA will benefit from the incremental coverage performance enhancement while there is minimal risk to incumbent operation at the current 250 mW level.

IEEE 802 LMSC's response to Question 4 (Do you agree with the above frequency bands? Do you have any proposed modifications/additions/suppressions to these frequency bands?)

For wideband non-specific short range devices (SRDs), we recommend that the TDRA adopt either Proposal 1 or Proposal 2 as shown below. Proposal 2 is preferred as it is likely to support a greater variety of IoT applications in the sub-1 GHz bands and supports a greater variety of wireless technologies.

Proposal 1: Adopt the latest recommendations for wideband short range devices in CEPT ERC Recommendation 70-03

In recognition of the growing demand for IoT applications in the sub-1 GHz bands, CEPT ERC Recommendation 70-03 [8] contains recommendations that allow wideband SRDs to operate in the 863 MHz - 868 MHz and 915.8 MHz - 919.4 MHz bands with maximum 1 MHz operating channels, transmit power of 25 mW EIRP, and duty cycle of 2.8% for stations and 10% for access points. See Table 3 in [8] for details. These recommendations reflect the decisions in the following documents:

- Commission Implementing Decision (EU) 2017/1483 of 8 August 2017 amending Decision 2006/771/EC on harmonization of the radio spectrum for use by short-range devices and repealing Decision 2006/804/EC (notified under document C(2017) 5464)
 - See Table 8, Band 84 for 863 MHz - 868 MHz in [9].
- Commission Implementing Decision (EU) 2018/1538 of 11 October 2018 on the harmonization of radio spectrum for use by short-range devices within the 874-876 and 915-921 MHz frequency bands
 - See Band 2 for 917.4 MHz - 919.4 MHz in [10]
 - Note that CEPT ERC Recommendation 70-03 recommends a wider band from 915.8 MHz to 919.4 MHz.

Proposal 2: Allow wideband short range devices to operate in the 915 MHz - 925 MHz band

The requirements for wideband SRDs in Europe mean that IoT applications are restricted to those that can work with a duty cycle, such as sensor and meter applications. It is difficult to support mesh topologies when duty cycles are required. To support a much wider range of current and future IoT applications, which may combine sensors with video for example, we recommend TDRA to consider allowing wideband SRDs to operate in the 915 MHz to 925 MHz band with higher transmit power, wider operating channels, and without duty cycle restrictions, while coexisting with other wireless technologies such as RFID and LoRaWAN.

IEEE 802 LMSC's response to Question 5 (Kindly propose any addition technical details (reference EN standard) if required for the above table. Please specify if any.)

For Proposal 1 as presented in our response to Question 4, there are two relevant EN standards:

- EN 304 220-1 Wideband data transmission SRD operating in the frequency range 25 MHz to 1 000 MHz; Harmonised Standard for access to radio spectrum; Part 1: Wideband data transmission devices: network access points operating in designated bands [11]
- EN 304 220-2 Wideband data transmission SRD operating in the frequency range 25 MHz to 1 000 MHz; Harmonised Standard for access to radio spectrum; Part 2: Wideband data transmission devices: terminal node operating in designated bands [12]

For the preferred alternate Proposal 2 in our response to Question 4, there are no relevant EN standards but the FCC Part 15.249 [13] and IEEE/ANSI C63.10-2020 standard [14] are the two relevant documents for TDRA to consider.

IEEE 802 LMSC's response to Question 9 (Do you have any proposal to update the format and the information related to UWB in the above table?)

We would like to suggest that, similar to the level probing radar (LPR) devices, the relevant ECC Decision ECC/DEC/(06)04 [15] is mentioned together with the ETSI harmonised standard EN 302 065-1.

IEEE 802 LMSC's response to Question 11 (Do you have any proposal to update the format and the information related to UWB in the above table?)

EN 302 500-1 is no longer maintained by ETSI nor the applicable harmonised standard at the European level. We would suggest replacing it with the EN 302 065 family of standards [16].

IEEE 802 LMSC's response to Question 12 (Do you have any proposal to update the format and the information related to UWB in the above table?)

We suggest to remove the minus sign before the zero in the rows " $6.0 < f \leq 8.5$ " and " $6.0 < f \leq 8.5$ ".

We also suggest to remove the proposed requirement in the paragraph 4.3.3. Since the -65 dBm/MHz limit is not a mean EIRP spectral density value, the proposed requirement will be automatically fulfilled by applications meeting the requirements in the paragraph 4.3.1.

IEEE 802 LMSC's response to Question 13 (Do you have any proposal to update the format and the information related to UWB in the above table?)

EN 302 435-1 is no longer maintained by ETSI nor the applicable harmonised standard at the European level. We would suggest replacing it with EN 302 065-4 [17].

Since EN 302 065 family of standards refer to EN 303 883 [18] for the actual measurement techniques, and similar texts described in both NOTE 1 and NOTE 2 can be found in clause 5.8 of [18], we suggest to remove both notes to minimize redundancy.

IEEE 802 LMSC's response to Question 14 (Do you have any proposal to update the format and the information related to UWB in the above table?)

The first row of the table in 4.5.1 suggests that the specification applies to all frequency ranges below 230 MHz. This is not consistent with EN 302 066, where the first row is for 30 MHz to 230 MHz. We would suggest modifying the first row to be consistent with EN 302 066.

IEEE 802 LMSC's response to Question 17 (Do you believe that the current regulations covers all regulatory framework in the UAE?)

We would like to inform TDRA that ECC updated its decision on UWB in November 2022 [15], which added the following three categories of applications, namely A1.2.3 “other vehicular applications, including applications involving infrastructure to vehicle and vehicle to vehicle communications in 6-8.5 GHz”, A1.3.1 “Specific applications involving fixed outdoor installations”, and A1.3.2 “Specific applications involving enhanced indoor devices”. ETSI ERM TGUWB [19] is developing harmonised standards for these applications as part of its effort to update the EN 302 065 family of standards. We would like to encourage TDRA to expand the regulatory framework to include those applications.

Conclusion

IEEE 802 LMSC thanks TDRA for the opportunity to provide this submission and kindly requests TDRA to consider our responses in its future decisions.

Respectfully submitted

By: /ss/.

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References:

- [1] Wi-Fi Alliance: Value of Wi-Fi. [Available online](#) [accessed: 21 June 2023]
- [2] IEEE 802.18 Wireless Standards Table of Frequency Ranges, 27 Sep 2022. [Available online](#) [accessed: 21 June 2023]
- [3] Wi-Fi NOW: Momentum builds: 19.5 billion Wi-Fi devices will be in use this year, IDC says. [Available online](#) [accessed: 21 June 2023]
- [4] “IEEE Standard for Low-Rate Wireless Networks—Amendment 1: Enhanced Ultra Wideband (UWB) Physical Layers (PHYs) and Associated Ranging Techniques,” in IEEE Std 802.15.4z-2020 (Amendment to IEEE Std 802.15.4-2020), vol., no., pp.1-174, 25 Aug. 2020, doi: 10.1109/IEEESTD.2020.9179124.
- [5] “IEEE Standard for Low-Rate Wireless Networks,” in IEEE Std 802.15.4-2020 (Revision of IEEE Std 802.15.4-2015), vol., no., pp.1-800, 23 July 2020, doi: 10.1109/IEEESTD.2020.9144691.
- [6] IEEE P802.15.4ab. [Available online](#) [accessed: 21 June 2023]
- [7] “IEEE Recommended Practice for Local and Metropolitan Area Networks—Part 19: Coexistence Methods for IEEE 802.11 and IEEE 802.15.4 Based Systems Operating in the Sub-1 GHz Frequency Bands,” in IEEE Std 802.19.3-2021, vol., no., pp.1-79, 26 April 2021, doi: 10.1109/IEEESTD.2021.9416944.
- [8] CEPT ERC Recommendation 70-03: Relating to the use of Short Range Devices (SRD). [Available online](#) [accessed: 21 June 2023]
- [9] Commission Implementing Decision (EU) 2017/1483 of 8 August 2017 amending Decision 2006/771/EC on harmonisation of the radio spectrum for use by short-range devices and repealing Decision 2006/804/EC (notified under document C(2017) 5464) (Text with EEA relevance.), C/2017/5464, 18 August 2017. [Available online](#) [accessed: 21 June 2023]

- [10] Commission Implementing Decision (EU) 2018/1538 of 11 October 2018 on the harmonisation of radio spectrum for use by short-range devices within the 874-876 and 915-921 MHz frequency bands (notified under document C(2018) 6535) (Text with EEA relevance.), C/2018/6535, 15 October 2018. [Available online](#) [accessed: 21 June 2023]
- [11] Draft ETSI EN 304 220-1 V1.1.0 (2022-09): Wideband data transmission SRD operating in the frequency range 25 MHz to 1 000 MHz; Harmonised Standard for access to radio spectrum; Part 1: Wideband data transmission devices: network access points operating in designated bands. [Available online](#) [accessed: 21 June 2023]
- [12] Draft ETSI EN 304 220-2 V1.1.0 (2022-09): Wideband data transmission SRD operating in the frequency range 25 MHz to 1 000 MHz; Harmonised Standard for access to radio spectrum; Part 2: Wideband data transmission devices: terminal node operating in designated bands. [Available online](#) [accessed: 21 June 2023]
- [13] United States Federal Communications Commission: 47 CFR § 15.249 - Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24.0-24.25 GHz.
- [14] “American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices,” in ANSI C63.10-2020, vol., no., pp.1-268, 29 Jan. 2021, doi: 10.1109/IEEESTD.2021.9340083.
- [15] ECC Decision (06)04: The harmonised use, exemption from individual licensing and free circulation of devices using Ultra-Wideband (UWB) technology in bands below 10.6 GHz, 18 November 2022. [Available online](#) [accessed: 21 June 2023]
- [16] ETSI EN 302 065 family of standards. [Available online](#) [accessed: 21 June 2023]
- [17] ETSI EN 302 065-4 V1.1.1 (2016-11): Short Range Devices (SRD) using Ultra Wide Band technology (UWB); Harmonised Standard covering the essential requirements of article 3.2 of the Directive 2014/53/EU; Part 4: Material Sensing devices using UWB technology below 10,6 GHz. [Available online](#) [accessed: 21 June 2023]
- [18] Draft 303 883 V1.1.0 (2016-02): Short Range Devices (SRD) using Ultra Wide Band (UWB); Measurement Techniques. [Available online](#) [accessed: 21 June 2023]
- [19] ETSI ERM TGUWB. [Available online](#) [accessed: 21 June 2023]