IEEE P802.18
Radio Regulatory Technical Advisory Group (RR-TAG)

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| Draft Response Czech Spectrum Strategy Consultation |
| Date: 2023-08-15 |
| Author(s): |
| Name | Company | Address | Phone | email |
| Benjamin Rolfe | BCA |  |  | ben.rolfe@ieee.org |
| Dries Neirynck | Ultra-Radio |  |  | dries.neirynck@ultra-radio.com |
| Edward Au | Huawei |  |  | edward.ks.au@gmail.com |
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This contribution proposed a response to:

Czech Republic CTU Call for comments on the update of the Radio Spectrum Management Strategy consultation.

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Electronic filing August 16, 2023

Re: Czech Republic CTU Call for comments on the update of the Radio Spectrum Management Strategy update.

Dear Chairman,

IEEE 802 LAN/MAN Standards Committee (LMSC) thanks Czech Republic CTU for providing this opportunity to participate in the process of Radio Spectrum Management Strategy update.

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 whole[[1]](#footnote-1).

Please find below the responses of IEEE 802 LMSC to WRC-23 agenda item 1.2.

**Updates on UWB**

The application and deployment of UWB technology has changed dramatically since 2015. Today, UWB technology based on IEEE Std 802.15.4 UWB is part of mass market consumer devices, including smartphones, vehicles, and consumer accessories. UWB continues to be a key technology in indoor location tracking, material sensing and other industrial applications. Growth into consumer products, however, is a profound change.

While it may have appeared in 2015 that UWB had not lived up to original expectations, presently UWB deployments are numbering over a billion devices and are growing exponentially. If we examine the timeline in context of the larger view of wireless technology adoption, we see that adoption of UWB parallels, and is slightly ahead, of the time to mass market adoption for other popular technologies. From time rules first allowed UWB technology appearance in the mobile handset, for example, has traditionally been about 20 years. For UWB it was about 16 years.

Since 2015, a robust and diverse industry ecosystem has grown to support UWB. For example, the UWB Alliance supports members in many application areas; FiRa is focused on precise (fine) ranging applications and localization, OmLox is supports industrial localization, while the Car Connectivity Consortium has been focused on automotive uses. Other organizations are also building upon the IEEE 802.15.4 UWB standard. It is worth noting that there is tight cooperation between these organizations to support the broad needs of the industry in complimentary ways. The harmonization of the ecosystem supports health growth and overcomes some of the barriers that led to the limited adoption CTU may have observed in the (distant) past. Todays ecosystem is healthy, positive and expanding.

It can be noted that the uses which CTU identified in 2015 were, then and still today, critically important uses. UWB is still used for location tracking and material sensing in industrial environments extensively. The market has significantly expanded. Following completion of ECC Report 278 and IEEE 802.15.4z, UWB has become ubiquitous. For example, UWB is now used to secure passive keyless entry systems in many vehicles. Since 2019, mobile phone manufacturers are integrating ultra-wideband in their smart phones. The last 4 years have very active in UWB development and deployments. Some detail of the recent growth of the market can be found the FiRa whitepaper [https://www.firaconsortium.org/sites/default/files/2022-12/Unleashing-the-Potential-of-UWB-Regulatory-Considerations-December-2022.pdf] which includes references to more detailed market reports.

Sensing based upon UWB is another area of explosive growth. The ultra-low transmit power and very high dynamic response of IR-UWB enables precise, fast and accurate sensing for uses such as present detection of children left in vehicles.

As another example of current market trends, UWB is emerging as a leading technology for ultra-low power, ultra-low latency moderate data rate communications such as real time audio and real-time ultra-low latency human interface devices for gaming.

IEEE 802 is supporting such expand the capabilities of UWB consumer devices, beyond ranging and localisation, in task group 802.15.4ab, which is extending the current standard to better support uses such as sensing and low-latency data communications, as well as enhancing performance in current applications.

An important characteristic of IR-UWB technology is that, due to the ultra-low transmit power (at or below unintentional emissions limits), nature if impulse radio, and features of the standard defined protocols, UWB supports extremely high spectral reuse rate due to very small, usually undetectable, interference footprint. This in turn supports very high density of device deployments without adversely affecting other services sharing the band.

Given the increasing importance of UWB, we would like to encourage CTU to include a strategy for UWB developments in its spectrum management strategy.

Within CEPT, ECC Report 327 led to an update of ECC Decision (06)04 last year, removing the prohibition on fixed outdoor devices, simplifying the use of UWB in vehicular applications and enhancing the transmit power of indoor devices. We would like to encourage CTU to include these measures in the Czech national regulations. Harmonization of regulations has many benefits, both technical and economic.

In addition CEPT ECC SE24 is starting working to revisit the UWB regulations in 8.5 - 10.6 GHz. The UWB industry looks forward to cooperating with the CTU on these investigations.

Additional information that CTU may find helpful in updating spectrum strategy, including potential updates to current rules for UWB, can be found in the references.

There are currently IEEE 802 LMSC technologies based upon IEEE Std 802.15.4 UWB used in these bands that are widely deployed in high value applications (see “Ultra-Wideband (UWB) communication device (Generic and road/rail vehicles) in [13]).

*IEEE 802.15-based devices operating in the 6 GHz band*

IEEE 802.15 standards specify Ultra Wideband (UWB) technology operation, which is widely adopted for numerous short-range sensing and ranging applications. Adoption of UWB is growing rapidly, providing both economic growth and valuable new applications. IEEE Std 802.15.4-2020 [7] and IEEE Std 802.15.4z-2020 [8] are standards for communication and precision ranging that are already capable of using both the 6425 MHz to 7025 MHz and 7025 MHz to 7125 MHz bands and are increasingly used in many high value applications. IEEE Std 802.15.6-2012 [9], a standard for short range, wireless communication in the vicinity of, or inside, a human body (but not limited to humans) uses the same bands and channels and is approved by national medical and/or regulatory authorities for applications including medical wireless body area network (BAN).

It is expected that an increasing number of IEEE 802.15.4-2020, IEEE 802.15.4z-2020, and IEEE 802.15.6-2012 devices will continue to be operated in these bands. Notably, with the increasing use of IEEE 802.15 devices in the smartphone and consumer automotive spaces, it is forecasted that more than 1 billion UWB-enabled devices will be shipped annually worldwide by 2025 [10].

It is worth noting that operation of UWB devices based on IEEE 802 standards is currently permitted in Malaysia and worldwide, and it has proven to be compatible with existing licensed operations in the subject bands. Introduction of new, much higher-powered services such as IMT may be considerably more disruptive.

**Conclusion**

Respectfully submitted

By: /ss/.

Paul Nikolich

IEEE 802 LAN/MAN Standards Committee Chairman

em: p.nikolich@ieee.org

References:

[1] “Response to NTIA (USA): Request for Comments on the Development of a National Spectrum Strategy” [Available online](https://carconnectivity.org/wp-content/uploads/2022/12/UWB-Spectrum-Regulatory-Position_v2-1.pdf)

[2] “FiRaTM Consortium Spectrum Position Statement” [Available online](https://www.firaconsortium.org/sites/default/files/2023-07/spectrum-position-statement-july-2023.pdf)

[3] “Car Connectivity Consortium Digital Key UWB Spectrum Regulatory Position” [Available online](https://carconnectivity.org/wp-content/uploads/2022/12/UWB-Spectrum-Regulatory-Position_v2-1.pdf)

[7] “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.

[8] “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.

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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. [↑](#footnote-ref-1)