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Radio Regulatory Technical Advisory Group (RR-TAG)

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Abstract

This document contains comments on the draft for the update to the IEEE Standards Association (SA) position statement “Intelligent Spectrum Allocation and Management”.

This document is based on the 18-22-0087-08 document.

IEEE Standards Association Position Statement

~~Intelligent~~ Spectrum Allocation and Management

**Introduction**

The IEEE Standards Association (IEEE-SA) supports the position that spectrum allocation and management is needed for both licensed and license-exempt technologies to meet the explosive growth in the demand for wireless communication and emerging new applications, such as wireless sensing.

The IEEE-SA, through its participants, is a major contributor to the standardization of leading wireless technologies. IEEE-SA participants develop wireless standards such as the IEEE 802.111 Wireless LAN (WLAN) family of standards (inclusive of technologies known as Wi-Fi,2 Wi-Fi HaLow2 and WiGig,3) and IEEE 802.15.44 Low-Rate Wireless Networks (inclusive of ISA1005, WiSUN6, Ultra-Wideband (UWB) and Zigbee7), which primarily use license-exempt spectrum.

**Spectrum Allocation and Management Priorities for IEEE 802 wireless technologies**

Spectrum policies, at both local, regional, and global levels, should permit a multiplicity of uses and users, in so far as possible. Allocation and management strategies should be oriented towards shared spectrum, where many users are encouraged to co-exist and provide socially and economically beneficial services. As spectrum is becoming increasingly scarce, policies towards flexible sharing and maximal efficient utilization of spectrum are not only critical but inevitable.

 License-exempt shared spectrum technologies are an important part of both industrial and citizen-oriented networking ecosystems world-wide today. To further increase socioeconomic benefits offered by license-exempt technologies, to expand and scale existing services and further enable innovative applications and use-cases of tomorrow, more spectrum resources should be allocated on a licence-exempt basis.

To protect fair sharing of scarce spectrum resources, technology neutrality principles, and, where applicable, the exclusive access rights of incumbent spectrum owners, three levels of coexistence management are necessary in license-exempt shared spectrum allocations:

1. To allow for multiple use of the same spectrum at a given location, spectrum resources are shared in a fair fashion enabled by channel access mechanisms such as contention-based protocols.
2. To enable various technologies to coexist in the same spectrum and to enable future evolution through new developments, license-exempt shared spectrum is shared through appropriate means by different technologies such as those based on IEEE 802.11 and 802.15 and technologies developed by other organizations, like 3GPP.
3. A license-exempt band might be allocated to an incumbent user. In these cases, the license-exempt regulatory requirements are designed in a way to protect the incumbent services from harmful interference. This provides a foundation for efficient spectrum utilization as it does not require re-farming of the spectrum and migration of incumbent services to other bands as spectrum is already scarce.

In terms of global spectrum management, availability of the full 6 GHz band (i.e., 5925-7125 MHz) for license-exempt shared use is critical to IEEE 802 technologies to expand existing applications and services in support of ever increasing demand and to enable development and deployment of new applications and services in the coming years, and hence contribute further to the societal benefits.

The increasing demands for wireless spectrum can also be met by introducing flexibility into the use of lightly used spectrum. This includes spectrum that is being used sparsely on a geographic basis (i.e., only used in certain specific locations) or temporally.

**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 deployed world-wide, with 4,4 billion device shipments annually[[1]](#footnote-1). The increasing use of IEEE 802.15 devices in the smartphone and consumer automotive spaces, forecasts that over 1 billion UWB-enabled devices will be shipped annually worldwide by 2025[[2]](#footnote-2).

Today, these technologies are integral part of network access and have changed the way the world operates, communicates, and conducts business, benefiting billions of people every day. Wi-Fi networks are an essential part of the connectivity deployed in residential, enterprise/office, airport/trains stations, venues, commercial and industrial and IoT domains. An array of industries including, e-health, education, automotive and transportation, gaming and sport, consumer electronic, municipal IoT, community Wi-Fi and initiatives to connect the unconnected relies on IEEE 802.11 and Wi-Fi technologies.

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The IEEE Std 802.15.4-2020[[3]](#footnote-3) standard supports operation in the 6425-7025 MHz and 7025-7125 MHz bands and is expanding the use of radio determination, position tracking and tracking and data collection. Ultra-wide band (UWB) technologies and IoT sensor networks are embedded in an increasing number of devices, from automotive vehicles to industrial equipment to body implants, to deal with challenges ranging from manufacturing efficiency and safety to human health. These technologies all use license-exempt spectrum to co-exist with pre-existing spectrum users.

**IEEE 802 wireless technologies are developed and designed for coexistence**

IEEE 802 wireless technologies are designed not to cause any harmful interference with other incumbent users in bands where they operate. The standards development process considers both regulatory minimum requirements for interference mitigation and actively works on improved co-existence mechanisms.

IEEE 802.19 Wireless Coexistence Working Group (WG) has completed work in sub-1GHz[[4]](#footnote-5) and for automotive use scenarios,[[5]](#footnote-6) as well as for individual standards amendments developed in the IEEE 802.11 and .15 Working Groups. Additional work is undertaken within the Working Groups, such as the Co-existence Standing Committee of IEEE 802.11 which follows co-existence studies at the ISO and ETSI levels.

**A vision for social and economic development through flexible spectrum management**

Technologies designed to use license-exempt or shared spectrum have made a tremendous positive impact on the world and will continue to benefit humanity profoundly in the years to come. In heavily regulated environments such as spectrum management, these benefits can only be realized with a vision from regulators and governments to include as many users and entities as possible in a technical environment that provides a maximal amount of flexibility for those users and entities.

The IEEE-SA has an important role to play in the development of intelligent spectrum allocation and management based upon transparent, standardized rules that also account for incumbent users.

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*This statement was developed by the IEEE Standards Association and represents the considered judgement of a group of IEEE standards participants with expertise in the subject field. The position taken by the IEEE Standards Association does not necessarily reflect the views of IEEE or its other Organizational Units.*

**ABOUT IEEE**

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There are more than 420,000 IEEE members in more than 160 countries. IEEE publishes a third of the world’s technical literature in electrical engineering, computer science, and electronics, and is a leading developer of international standards that underpin many of today’s telecommunications, information technology, and power generation products and services.

***ABOUT THE IEEE STANDARDS ASSOCIATION***

*The IEEE Standards Association, a globally recognized standards-setting body within IEEE, develops consensus standards through an open process that engages industry and brings together a broad stakeholder community. IEEE standards set specifications and best practices based on current scientific and technological knowledge. The IEEE-SA has a portfolio of over 1,250 active standards and over 650 standards under development. For more information visit <http://standards.ieee.org>.*

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4. "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. [↑](#footnote-ref-5)
5. Proceedings from Automotive Study Group in IEEE 802.19. [Available online](https://mentor.ieee.org/802.19/documents?is_group=Auto) [accessed: 2022-12-16] [↑](#footnote-ref-6)