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

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Abstract

This document contains a less skeletal draft for the IEEE Standards Association (SA) position statement “Intelligent Spectrum Allocation and Management” for review.

New "clean" version:

**r0:** without track changes

**r1:** no figure, dramatically shortened (see track changes).

**r2:** incorporating final edits on draft r1

**r3:** approved text after reviewing outstanding edits in r2

Reference: Scope discussions outline on slide #12 in document 18-22-0084r2. From doc. 18-22-0087:

**r1: new text** added from https://mentor.ieee.org/802.18/dcn/22/18-22-0120-07-0000-contribution-for-nkom-consultation.pdf and https://mentor.ieee.org/802.18/dcn/22/18-22-0152-07-0000-2022-dec-802-lmsc-response-to-japan-mic.pdf with some modifications (changing sentences to make better flows). **footnotes are still messy**. pieces kept from old statement are still marked with yellow highlight, but they've been reduced compared with previous version. **new section** with recommendations added just before history-headline.

**r2: replaced** "unlicensed" with "license-exempt"

**r3:** organised footnotes.

**r4:** with notes from 16 December 2022 meeting.

**r5:** with formatted version of new recommendation 2.

**r6:** annex with industry consortiums

**r7:** changes in current and future applications section courtesy of Hassan Yaghoobi.

**r8:** changes in the annex (add .11ah and WBA). replace mock titles of headings with real headings

r9: changes in the introduction (marked as accepted after no objections were made in the .18 session on 17 Jan 2023), "real" headings marked as accepted, changes in text of recommendation 2 marked as accepted to avoid further clutter, yellow highlights in introduction and co-existence sections removed, other changes **not** marked as accepted, recommendation 4 proposed to be removed

r10: additions and revisions added/removed during the Wireless Interim Meeting in Baltimore, Maryland, January 2023. clean version (see also 18-23-0006, 18-23-0007, 18-23-0011, 18-23-0013 on mentor).

IEEE Standards Association Position Statement

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 demand for wireless communication and applications such as positioning, sensing and ranging.

The IEEE 802 Committee, through its volunteers, is a major contributor to the standardization of leading wireless technologies. Participation is open to any individual, without restrictions. The committee develops the IEEE 802.11 Wireless LAN family of standards (in many cases marketed as Wi-Fi) and IEEE 802.15 Wireless Speciality Networks (found built into other systems). The standards are primarily designed for use of shared and license-exempt frequencies, and enable an ecosystem where many entities can contribute to a larger whole.

IEEE 802 wireless standards are among the most widely adopted network standards globally. They are used wherever there is need for connectivity, be it between humans, humans and devices or devices and devices.

**Main priorities for IEEE 802 wireless technologies in spectrum policy**

1. Spectrum policies should encourage flexible and shared spectrum use, where multiple users can co-exist and provide social and economic benefits to communities.

 2. A core principle of IEEE 802 wireless standards is to enable spectrum sharing. To enable and protect sharing, technology neutrality, and, where necessary, priority access for incumbents, various levels of coexistence techniques are necessary. For example:

* Devices using the same standard need ways to fairly share spectrum resources when they are in close proximity.
* Devices using different standards (IEEE 802.11, 802.15 or technologies developed by other organizations (such as 3GPP)) must be able to fairly share spectrum resources.
* License-exempt use by devices has been allowed in bands primarily allocated to an incumbent user while protecting the incumbents from harmful interference. Such efficient spectrum utilization does not require re-farming of the spectrum or migration of incumbent services to other bands.

 3. The increasing demands for wireless spectrum can be met by introducing flexibility into the use of lightly used spectrum. This includes spectrum that is being used sparsely on a geographic basis or temporally.

4. Full global availability of the 6 GHz band (5925 MHz to 7250 MHz) for license-exempt shared use (indoor and outdoor) is critical to IEEE 802 wireless technologies. Accommodating multiple wide channels is key for the next generation IEEE 802.11 technologies to achieve the promised performance. In response to increasing demand for IEEE 802-based wireless networks, regulatory certainty is needed to further the benefits enjoyed by users of IEEE 802 wireless technologies around the world.

5. Global convergence on policies for the sub-1 GHz bands will enable wider deployment of technologies already developed by IEEE 802, increasing the benefit to societies and economies.

**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 world-wide, with over 4 billion devices added annually[[1]](#footnote-2). The current deployments of 802.15 devices are found in markets ranging from consumer devices to industrial plants, automobiles to buildings and agriculture to space.[[2]](#footnote-3) IEEE 802 wireless technologies are an integral part of human life, benefiting billions of people, governments and businesses every day.

*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, and connects machines and people. Users in an array of industries[[3]](#footnote-4) rely on these cost-effective, energy-efficient technologies. 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 augmented and virtual reality (AR/VR).

Each new generation of IEEE 802.11 technologies continues to improve efficiency, reliability, latency, through-put and determinism. IEEE 802.11 supports operation in the 6 GHz (5925 MHz to 7250 MHz) band, and thousands of 6 GHz enabled products (Wi-Fi 6E) are seeing significant adoption where regulations permit deployment.

*IEEE 802.15*

Networks based on 802.15 standards are embedded in an increasing number of devices. For some applications, such as cars or utilities, industry consortia exist to manage deployments. For other applications, single corporate entities depend on speciality solutions. IEEE 802.15.4 can operate between 6425 MHz to 7125 MHz and support data collection, location discovery and device ranging. IEEE 802.15.6 is specialised 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 speciality solution. IEEE 802.15.16 accommodates the needs of some utilities networks.

Many IEEE 802.15 standards, as well as the IEEE 802.11 standard, support operation on frequencies lower than 1 GHz. As incumbents have improved the efficiency of their use of these bands, the IEEE 802 wireless community has been able to provide solutions for underserved communities and IoT.

**IEEE 802 wireless technologies are developed and designed for co-existence**

IEEE 802 wireless technologies are designed not cause any harmful interference other users in bands where they operate, comply with regulatory requirements for interference mitigation and working on improved co-existence mechanisms.

The IEEE 802.19 Wireless Coexistence Working Group completed work in sub-1GHz[[4]](#footnote-5) and for automotive use scenarios. Task forces such as the Co-existence Standing Committee of IEEE 802.11 follow co-existence research at the ISO and ETSI levels.

As additional spectrum and bands are identified for new and expanded uses, IEEE 802 will continue its deliberate and determined efforts to enable robust coexistence and sharing with incumbent users.

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

Technologies which are 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. We encourage global regulators and administrations to adopt policies that encourage technology neutrality and flexible shared spectrum usage with maximum flexibility to create social and economic benefit advantages for all. The IEEE 802 wireless community provide the basic elements for such an ecosystem.

*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**

The IEEE is the world’s largest professional association advancing innovation and technological excellence for the benefit of humanity. IEEE and its members inspire a global community to innovate for a better tomorrow through its highly-cited publications, conferences, technology standards, and professional and educational activities. IEEE is the trusted “voice” for engineering, computing, and technology information around the globe.

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 tandards under development. For more information visit http://standards.ieee.org.*

1. Wi-Fi Alliance: Value of Wi-Fi. [Available online](https://www.wi-fi.org/discover-wi-fi/value-of-wi-fi) [accessed: 12 December 2022] [↑](#footnote-ref-2)
2. Some examples of devices which implement IEEE 802.15.4 technologies are TV remote controls, lighting, windows, door locks, heating and air conditioning systems, alarm systems and remote medical monitoring. The introduction of IEEE 802.15 UWB-enabled devices in smartphones and laptops puts forecasts at more than 1 billion devices shipped annually worldwide by 2025 (FiRA Consortium, August 2022). [↑](#footnote-ref-3)
3. Leisure (gaming, multimedia, browsing), education, health, transportation, and public services are just a few examples. [↑](#footnote-ref-4)
4. IEEE Std 802.19.3-2021 [↑](#footnote-ref-5)