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

IEEE Position Statement on Spectrum Allocation and Management Document Draft			
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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
r4: clean version with no track changes.
r5: with editorial changes introduced during the IEEE 802.18 weekly teleconference call 2 Feb 2018.
r6: clean version with no track changes.
r7: with additional changes following EC telecon on 7 Feb 2023 and IEEE 802.18 reflector comments.
r8: with additional changes following .18 reflector comments on 8-9 Feb 2023.
r9: with additional changes following .18 reflector comments on 9 Feb 2023. added discussion comments.
r10: with changes from the 9 Feb 2023 RR-TAG weekly teleconference.
r11: removed comments from the track changes.
r12: with resolution of final outstanding issue from 9 Feb 2023 RR-TAG teleconference.
r13: title change proposed by WCSC
r14: clean version
r15: PDF version of r14

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.
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 Standards 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 (built into other systems). The standards are primarily designed for use of shared and license-exempt frequencies and enable an ecosystem in which many independent entities can contribute and enable an ever expanding communications infrastructure.

IEEE 802 wireless standards are among the most widely adopted network standards globally.

Main priorities for IEEE 802 wireless technologies in spectrum policy

A core principle of IEEE 802 wireless standards is to enable spectrum sharing by using appropriate co-existence techniques. The co-existence technique or mechanism might change depending on the standards in use and the regulatory requirements.

Devices in proximity using the same standard use mechanisms defined in the standard to share spectrum.

Devices using different standards (IEEE 802.11, 802.15 or technologies developed by other organizations) must be able to share spectrum. Additionally, license-exempt use by devices has been allowed in bands primarily allocated to an incumbent user while protecting the incumbents from interference. Such efficient spectrum utilization does not require re-farming of the spectrum or migration of incumbent services to other bands.

The main priorities for IEEE 802 wireless technologies in spectrum policy are listed below:

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

2. Expanded 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. Regulatory certainty is needed to further the benefits enjoyed by users of IEEE 802 wireless technologies around the world.

3. Global convergence on policies for the sub-1 GHz bands is needed to enable wider deployment of technologies already developed by IEEE 802. Standards-based systems operating in these bands make efficient and effective use of the spectrum. Allowing expanded use would further increase the economic and social value of sub-1 GHz spectrum.

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]. 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] IEEE 802 wireless technologies are a critical 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. Users in an array of industries[3] 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 several bands,[4] including recently the 6 GHz (5925 MHz to 7250 MHz) band with significant deployments underway.[5]

IEEE 802.15

Technologies 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, proprietary protocols are used in conjunction with 802 standards. IEEE 802.15.4 can operate in many frequency ranges[6] and supports data communication, 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 utility 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 applications. For example, the IEEE 802.19 Wireless Coexistence Working Group published best practice co-existence mechanisms for sub-1 GHz technologies in 2021.[7]

A vision for social and economic development through flexible spectrum management

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 incumbents.

Technologies which are designed to use license-exempt and 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.

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[1] Wi-Fi Alliance: Value of Wi-Fi. Available online [accessed: 12 December 2022]
[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).
[3] Leisure (gaming, multimedia, browsing), education, health, transportation, and public services are just a few examples.
[4] IEEE 802.18 Wireless Standards Table of Frequency Ranges, 27 Sep 2022. Available online [accessed 9 February 2023]
[5] Wi-Fi Alliance: Wi-Fi 6E momentum underscores need for entire 6 GHz band Available online [accessed: 3 February 2023]
[6] IEEE 802.18 Wireless Standards Table of Frequency Ranges.
[7] IEEE Std 802.19.3-2021

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.

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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.