INSTITUT LUXEMBOURGEOIS
DE RÉGULATION

RÉSULTAT

DE LA CONSULTATION PUBLIQUE DU 26 OCTOBRE 2022 AU 2 DÉCEMBRE 2022 RELATIVE AU PLAN D'ALLOTISSEMENT ET D'ATTRIBUTION DES ONDES RADIOÉLECTRIQUES (PLAN DES FRÉQUENCES)

LUXEMBOURG, LE 15 DÉCEMBRE 2022

SERVICE FRÉQUENCES

Le présent document reprend les contributions transmises à l'ILR dans le cadre de la consultation publique du 26 octobre 2022 au 2 décembre 2022 relative au plan d'allotissement et d'attribution des ondes radioélectriques (Plan des fréquences).

Deux contributions ont été retournées à l'Institut.

Il s'agit de celles :

- d'un groupe de parties intéressées (Broadcom, Cisco Systems, Hewlett Packard Enterprise (HPE), Meta Platforms Ireland Limited, Microsoft Corporation)
- de la Dynamic Spectrum Alliance (DSA)

Le projet du Plan des fréquences nécessite aucune modification.

Consultation Title	**Amendments to the radio wave allotment and allocation plan**
Deadline	2 December 2022
Geographical Scope	Luxemburg
Co-Signatories	Broadcom, Cisco Systems, Hewlett Packard Enterprise (HPE), Meta Platforms Ireland Limited, Microsoft Corporation
Date	1 December 2022

Dear Colleagues,

The undersigned companies, representing an important cross-section of the world's leading silicon vendors, system manufacturers, and application providers, welcome the opportunity to comment on ILR's amendments to the National Frequency Plan.

We are pleased to see that the amendments reflect the Commission Implementing Decision (EU) 2021/1067 of 17 June 2021 on the harmonised use of radio spectrum in the 5945-6425 MHz frequency band for the implementation of wireless access systems, including radio local area networks (WAS/RLANs) (notified under document C(2021) 4240)[1].

We believe that opening the 5945-6425 MHz (the lower 6 GHz band) will help Luxemburg to meet the growing demand for Wi-Fi, which has become essential to enable businesses and citizens to get online in urban, suburban and rural areas.

With a technical architecture that is device-centric and not centrally managed, Wi-Fi is now ubiquitous, enabling it to benefit from enormous global economies of scale. More than 18 billion Wi-Fi devices will be in use in 2022 (360 times as many Wi-Fi devices as were in use in 2003), with 4.4 billion new devices shipped every year, according to research firm IDC[2].

Given the important role that Wi-Fi plays for the broadband ecosystem and its continuing growth, there is a need to make the full 1180 MHz in the 5945-7125 MHz (6 GHz) band available on a licence-exempt basis to support the ever-increasing demand and enable Europe to meet its broadband goals and objectives for a digital society.

To realise the full potential of its fibre infrastructure and to take advantage of the ongoing public wireless programmes, Luxemburg needs to fully embrace Wi-Fi 6E (the version of Wi-Fi 6 that operates in the 6 GHz band), which is capable of delivering up to 9.6 Gbps and very low latency

[1] Available at: https://digital-strategy.ec.europa.eu/en/library/6ghz-harmonisation-decision-more-spectrum-available-better-and-faster-wi-fi (last visited 4 November 2022)
[2] Source: https://www.wi-fi.org/news-events/newsroom/wi-fi-alliance-2022-wi-fi-trends

connectivity. With Wi-Fi traffic doubling every three years and congestion increasing[3], it is vital to ensure that Wi-Fi has access to adequate mid-band spectrum.

Studies by Quotient, Qualcomm and ASSIA have each pointed to major spectrum shortfalls for licence-exempt technologies, with ASSIA highlighting how congestion in both the 2.4 GHz band and the 5 GHz band has been impacting quality of service. From these studies, it becomes obvious that the 5945-6425 MHz (the lower 6 GHz band) will not be sufficient to satisfy the mid- and long-term capacity needs.

Wi-Fi 6E, and the forthcoming Wi-Fi 7 standard, need access to the full 1180 MHz to utilise the full extent of their capabilities and support evolving and emerging innovative use cases. Opening only 480 MHz of the 6 GHz band would mean that Wi-Fi networks in dense deployments would have to continue employing small channel bandwidths, as only one 320 MHz channel or three 160 MHz channels would be available. With access to the full band, a larger number of these wide channels could be accommodated, significantly improving the performance available to each user.

Wider channel bandwidths increase spectrum efficiency and deliver high-bandwidth applications and services while maintaining the ability to share spectrum with incumbents and other licence-exempt systems. A shortage of wider channels would have a detrimental impact on real-time video services and other immersive services. In the near future, Wi-Fi 7 will rely on access to 320 MHz channels to further improve latency, throughput, reliability and quality of service relative to Wi-Fi 6E.

In the enterprise market, the large number of channels and the diversity of channel widths made available by 1180 MHz of spectrum will be particularly important. Depending on capacity and QoS requirements, channels of different widths can be grouped and assigned to specific services, allowing a variety of services to run over one 6 GHz Wi-Fi network. A typical example would be a hospital network where high-bit rate, low latency, imaging applications are run over multiple 160 MHz channels, administrative and other data applications over 40 or 80 MHz wide channels, and voice services over multiple 20 MHz wide channels. In addition, data and voice services for guests could be run over the 5 GHz legacy network.

In the coming months, the Luxembourgish administration is set to make a number of decisions on several topics, including preparing for WRC-23, with a view to defining the positions that best defend national interests at both CEPT and ITU levels. The administration is set to weigh the various interests in the upper 6 GHz band (6425-7125 MHz) and to decide about the future use of this spectrum.

The undersigned companies respectfully ask ILR to support a European position of “No change” to the existing radio regulations for the 6425-7125 MHz band at WRC-23 and to consider making the 6425-7125 MHz band available for usage by WAS/RLAN on a licence-exempt basis. This position would

[3] Source: https://lp.assia-inc.com/hubfs/summit-v7.7.pdf

enable new services of the band in a technology-neutral way (including Wi-Fi, which can already utilise the lower part of the band and can operate across the full band) whilst ensuring the coexistence of current services operating in the band, such as fixed link and satellite services.

Respectfully submitted,

/s/

Signatories

Christopher Szymanski
Director, Product Marketing
Wireless Communications and Connectivity Division
Broadcom, Inc.
Email: chris.szymanski@broadcom.com

Scott Blue
Director, Global Wireless Policy
Cisco Systems, Inc.
Email: scblue@cisco.com

Detlef Fuehrer
Senior Manager, Spectrum Management and Regulatory Affairs, EMEA
Hewlett Packard Enterprise
Email: detlef.fuehrer@hpe.com

Guillaume Lebrun
Global Connectivity Policy
Meta Platforms Ireland Limited
Email: guillaumelebrun@fb.com

Michael Daum
Director of Technology Policy
Microsoft Corporation
Email: mdaum@microsoft.com

Dynamic Spectrum Alliance Limited
3855 SW 153rd Drive
Beaverton, OR 97003
United States
http://www.dynamicspectrumalliance.org

December 2, 2022

Institut Luxembourgeois de Régulation
L - 2922
Luxembourg

Re: Public Consultation Regarding Radio Wave Allotment and Allocation Plan

Dear Sir/Madam,

The Dynamic Spectrum Alliance (DSA)[1] respectfully submits these comments in response to the *Institut Luxembourgeois de Régulation* (ILR) public consultation regarding Radio Wave Allotment and Allocation Plan (the Consultation).

The DSA appreciates the opportunity to share our perspectives on this important topic. We support ILR's efforts to explore innovative and increasingly efficient techniques for enabling access to spectrum. The DSA believes that providing new spectrum access options through use of new spectrum management tools will benefit competition, create conditions for innovation, and spur more rapid deployments of new wireless broadband networks and services.

Our comments herein will focus on use of the 6 GHz band for licence-exempt devices, including radio local area networks. We are available to discuss these comments and provide any additional information that might be needed.

Respectfully submitted,

Martha SUAREZ
President
Dynamic Spectrum Alliance

[1] The DSA is a global, cross-industry, not for profit organization advocating for laws, regulations, and economic best practices that will lead to more efficient utilization of spectrum, fostering innovation and affordable connectivity for all. Our membership spans multinationals, small-and medium-sized enterprises, as well as academic, research and other organizations from around the world all working to create innovative solutions that will benefit consumers and businesses alike by making spectrum abundant through dynamic spectrum sharing. A full list of DSA members is available on the DSA's website at www.dynamicspectrumalliance.org/members

Dynamic Spectrum Alliance Limited
3855 SW 153rd Drive
Beaverton, OR 97003
United States
http://www.dynamicspectrumalliance.org

DSA
DYNAMIC • SPECTRUM • ALLIANCE

DSA COMMENTS

Implementation of EU Decision 2021/1067

The DSA fully supports ILR's proposal to implement EU Decision 2021/1067 on the harmonized use of radio spectrum in the frequency band 5945- 6425 MHz for the implementation of wireless access systems, including radio local area networks (WAS/RLAN). A world-class digital infrastructure requires efficient and effective management of radio spectrum, including the final link that connects the user to access networks. This final link is increasingly realized by wireless connections, and specifically by Wi-Fi connections. According to the Wi-Fi Alliance, there are more than 16 billion Wi-Fi devices in use globally. Consumers and businesses in Luxembourg rely on Wi-Fi and they expect the performance of their Wi-Fi connections to evolve with that offered by access networks.

To ensure that Wi-Fi, or RLAN in general, functions as expected and users enjoy the possibilities brought about by future gigabit networks, a sufficient amount of licence-exempt spectrum must be made available. ILR's proposal to make the 5945- 6425 MHz band available for the latest generation of Wi-Fi technology is a critical first step to ensure that Luxembourg consumers and enterprises alike continue to have access to reliable, high-quality broadband connections.

Licence-Exempt Use of the Entire 6 GHz Band

In addition to implementing the EU Decision on the lower half of the 6 GHz band, the DSA respectfully suggests that ILR:

> (1) Dedicate the upper portion of the 6 GHz band (6425-7125 MHz) for license-exempt use, taking advantage of the full potential of this band; and
>
> (2) Authorize the three categories of license-exempt devices: Very Low Power (VLP), Low Power Indoor (LPI), and Standard Power (SP) devices under the management of an Automated Frequency Coordination (AFC) system.

Countries worldwide are actively deploying LPI and VLP devices on a licence-exempt, shared basis in the 6 GHz band, leveraging wider channel availability (up to 160 MHz with Wi-Fi 6E) to increase spectrum efficiency while maintaining the ability to share spectrum with incumbents and other licence-exempt deployments. In the future, Wi-Fi 7 will be able to accommodate 320 MHz channels, which will further improve latency, throughput, reliability, and quality of service.

For SP and outdoor operations, AFC systems have been designed to provide channel availability information to licence-exempt devices, while ensuring that incumbent systems, including fixed point-to-point microwave links, are protected from interference. When an authorized and authenticated device queries an AFC for spectrum availability, the AFC assesses which incumbent receivers have the potential to receive excess energy from the licence-exempt device based on its location and potential transmit power. The AFC calculates the maximum transmit power for that device's location on each 6 GHz channel and provides a list of options for the device to select. The device must check in with the AFC daily to

Dynamic Spectrum Alliance Limited
3855 SW 153rd Drive
Beaverton, OR 97003
United States
http://www.dynamicspectrumalliance.org

determine if any changes to incumbent use of the band have occurred that would alter the channel and transmit power options available to it.

Building on the experience and lessons learned from the use of SAS in the CBRS band, several DSA members have developed AFC systems for the 6 GHz Band and have applied to become AFC system operators in the United States. Just recently, the FCC granted conditional approval to these AFC system applicants. After the upcoming lab and public testing phases of the certification process, we expect the FCC will allow standard power licence-exempt devices to begin using the 6 GHz band in early 2023. DSA anticipates that many of these same AFC system developers will also seek to operate in countries, such as Canada, Brazil, Korea, and Saudi Arabia, that are in the process of finalizing their regulations for licence-exempt access to the 6 GHz Band, including use of an AFC to manage standard power devices.

Authorizing the entire 6 GHz band for licence-exempt use will allow Luxembourg residents and enterprises to benefit from all the Wi-Fi 6E devices commercially available today, and importantly, also allow them to benefit from Wi-Fi 7 products expected to be widely available in 2024. Without sufficient licence-exempt spectrum, there will be less interest in making these products available for the Luxembourg market for early adopters. Importantly, making the 6425-7125 MHz band available for licence-exempt device to share with incumbent users will continue to allow fixed service, fixed satellite service, and other incumbents thrive in the band.

Were the 6425-7125 MHz band to be identified for IMT at WRC-23 and licensed domestically for mobile operations, ILR would have to relocate fixed service links and other incumbent operations to other frequency bands. The clearing and relocation process would take years to complete and create economic disruption to the affected incumbents. The best guess today is that the 6425-7125 MHz band could be cleared and made available for mobile networks operators through auction around 2030. Realistically, the spectrum would not be put into widespread use until almost 10 years from now.

Alternatively, if ILR supports licence-exempt access across the entire 6 GHz band, the economic and societal benefits to Luxembourg can begin accruing as soon as ECC SE45 completes its work in 2024 and the homologation procedures are put in place, as there are currently many commercially Wi-Fi 6E products available today in North America and Asia. The DSA also encourages ILR to support a new work item in WG FM to study the regulatory aspects of making 6425-7125 MHz band available for licence-exempt use. To avoid unnecessary delay, this work item should start as soon as possible and run in parallel to the work item in SE45.

The DSA would like to direct ILR's attention a report produced by LS Telecom and Valdani Vicari & Associati (VVA) entitled "Socio-economic benefit of IMT versus RLAN in the 6425-7125 MHz band in Europe."[2] The study examined the following three scenarios that presents the technical and economic benefits of utilizing the 6 425 – 7 -125 MHz frequency range:

> (1) Licensed urban and suburban 5G use of the 6 425 – 7 125 MHz (within a national license but omitting macrocell use, which is unlikely to be permitted),

[2] LS Telecom and Vaidani Vicari & Associates, "Socio-economic benefits of IMT versus RLAN in the 6425-7125 MHz Band in Europe", released 1 August 2022, http://dynamicspectrumalliance.org/wp-content/uploads/2022/08/DSA-IMT-RLAN_64257125MHz-EU_Study-August-2022.pdf

Dynamic Spectrum Alliance Limited
3855 SW 153rd Drive
Beaverton, OR 97003
United States
http://www.dynamicspectrumalliance.org

(2) Local licensed 5G use of the 6 425 – 7 125 MHz band, and

(3) RLAN use of 5 925 – 6 425 MHz versus use of the entire 5 925 – 7 125 MHz band. The overall conclusions of this study have found that it is more beneficial to Europeans from both a technical and economic perspective to adopt RLAN for use in the 6 425 – 7 125 MHz band.

Conclusion

The DSA appreciates the opportunity to provide input on ILR's Consultation. We believe that the use of spectrum sharing and automated sharing technology can help ILR to reach its goals of ensuring spectrum is used efficiently and effectively, maximizing gains for users as well as for the Luxembourg economy, and facilitating spectrum access by a variety of entities and use cases, including next generation Wi-Fi technology solutions.