

## **GIGAEurope submission to the consultations on Draft CEPT Report 75 and draft ECC Decision (20)01**

4 September 2020

### **Introduction**

GIGAEurope<sup>1</sup> would like to thank you for the opportunity to provide comments with regard to the Draft CEPT Report 75 and Draft ECC Decision (20)01. The outcome of this proposed Decision should enable licence-exempt use of the lower part of the 6 GHz band (5925-6425 MHz), to allow more effective and efficient use of spectrum and significantly improve the user experience of Wi-Fi (see: <https://cept.org/ecc/tools- and-services/ecc-consultation>).

This submission focuses on the contribution of Wi-Fi, which is a Radio Local Area Network (RLAN) technology that could be used in the new proposed spectrum of 5945 to 6425 MHz. However, we recognise the proposed ECC Decision is technology neutral and other Wireless Access Systems (WAS)/RLAN technologies could be used. Wi-Fi, which is the most widely used “licence exempt” service, has a long track record of sharing spectrum with other technologies and services.

This contribution is an amended version of the paper titled ‘Key points for consideration in response to the consultation on draft CEPT report 75 and draft ECC Decision (20)01’ that was developed by the Wi-Fi Alliance.

### **Summary**

Wi-Fi plays a central role in connectivity in Europe, but Wi-Fi networks are growing increasingly congested as demand for connectivity rises exponentially. As Europe has not made any new licence-exempt mid-band frequencies available for Wi-Fi since 2004, new spectrum is urgently needed to improve the existing user experience of Wi-Fi.

For Europe to fully participate in the future Wi-Fi ecosystem and enjoy the benefits of a new generation of Wi-Fi applications and services, we urgently need the political leadership required to release the lower part of the 6 GHz band for licence-exempt use in Europe.

The Draft CEPT Report 75 and Draft ECC Decision (20)01 should adopt a fully harmonised approach which does not impose unnecessary, disproportionate or spectrum inefficient restrictions. It is essential that the conditions attached to the release of the concerned part of the 6 GHz band are harmonised across Europe. Lack of full harmonisation, by allowing some member states to deviate from the recommendation, sets a dangerous precedent for the future of the Digital Single Market and will as such prevent Europe enjoying the full benefits of future Wi-Fi applications and services.

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<sup>1</sup> GIGAEurope is an industry organisation that brings together private operators who build, operate and invest in the gigabit communications networks that enable Europe’s digital connectivity. Our members offer world-class products and services, including converged fixed and mobile communications. GIGAEurope’s members serve around 40 million fixed broadband customers and 130 million mobile customers spanning across Europe.

## Points for consideration

Wi-Fi plays a central role in connectivity in Europe, accounting for over half of total IP traffic (fixed and mobile)<sup>2</sup>. The COVID-19 global health crisis has further underlined the importance of Wi-Fi, which has kept businesses operating, while connecting children to schools and allowing citizens to access remote healthcare.

But Wi-Fi networks are growing increasingly congested as demand for connectivity rises exponentially. As Europe has not made any new licence-exempt mid-band frequencies available for Wi-Fi since 2004, new spectrum is urgently needed to improve the existing user experience of Wi-Fi.

On the basis of a European Commission mandate, European regulators and industry experts have been working meticulously for the past two and a half years to develop the harmonised technical conditions for opening up the lower part of the 6 GHz band (5925- 6425 MHz) for licence-exempt use so that Wi-Fi can co-exist with the band's incumbent users, notably urban railways, satellite, and fixed broadband operators.

Enabling this kind of shared use allows for effective and efficient use of spectrum. As the regulatory work has demonstrated, it can be done with the necessary safeguards to ensure there is no harmful interference to incumbent users. Precautions include limiting power levels and restricting operation of low power access points to indoor use only.

It is essential that the EC Decision does not include the overly restrictive requirements that have been tabled by one regulator. Running contrary to the findings of the robust technical studies supported by the large majority, these additional requirements would overprotect incumbent users and reduce spectrum efficiency, while undermining the EU's single market by introducing country-specific requirements. This would hinder the free movement of goods and the ability of European citizens and enterprises to reap the benefits of an enhanced Wi-Fi experience. Harmonized standards have in the past been effective at improving spectrum efficiency and at mitigating potential interference, without hampering the internal market by the setting of national requirement. It can be noted that the development of standards for WiFi6 is already in an advanced stage, so there is no need to delay the making available of spectrum.

The new generation of Wi-Fi, Wi-Fi 6, is already available, providing enhanced performance features, such as gigabit speeds and ultra-low latencies. Together, Wi-Fi 6 and 5G can deliver a European Gigabit Society – both technologies are critical infrastructure to shape Europe's digital future. The technology choice will depend on the use case, with Wi-Fi providing cost-effective indoor wireless access technology and capacity offload for mobile networks, thereby helping to reduce the costs of 5G rollout for mobile operators.

Wi-Fi 6, together with next-generation, fibre-rich networks and 5G mobile technology, will also be essential to drive the green transformation of the European economy envisioned by the EU's Green Deal.

In the US, the FCC recently (April 2020) adopted a decision to open up the entire 6 GHz band (5925-7125 MHz) to enable use of wider channels (160 MHz and 320 MHz channel bandwidth) and meet growing demand for licence-exempt spectrum. Ofcom in the UK also decided (July 2020) to make

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<sup>2</sup> Internet Protocol traffic. Source: Cisco 2017-2022 Visual Networking Index

the lower 6 GHz band (5925-6425 MHz) available for Wi-Fi and other RLAN devices on a licence-exempt basis, enabling indoor and very low power (VLP) outdoor use.

For Europe to fully participate in the future Wi-Fi ecosystem and enjoy the benefits of a new generation of Wi-Fi applications and services, we urgently need the political leadership required to release the lower part of the 6 GHz band for licence-exempt use in Europe.

The Draft CEPT Report 75 and Draft ECC Decision (20)01 should adopt a fully harmonised approach which does not impose unnecessary, disproportionate or spectrum inefficient restrictions. It is essential that the conditions attached to the release of the concerned part of the 6 GHz band are harmonised across Europe. Lack of full harmonisation would be detrimental to the development of the digital single market and will prevent Europe enjoying the full benefits of future Wi-Fi applications and services.

In line with the position supported by the majority of administrations, CEPT should remove constraints to spectrum efficiency, such as a database requirement or excessively restrictive power emission limits for LPI devices operating indoors, as well as the over-protection of CBTC legacy systems using a 90 MHz guard band that drastically reduces the spectrum available to the overall WAS/RLAN ecosystem. CEPT should also discard an EU approach based on the Country Determination Capability, since this directly formalises the introduction of WAS/RLAN services in a fragmented manner in the EU, undermining the digital single market.

## Specific comments

### The need for proportionate protection of communication based train control (CBTC) systems.

*The Draft CEPT Report 75 and Draft ECC Decision (20)01 contain proposals that overly protect legacy, non-harmonised CBTC systems in a way that is spectrum inefficient. While protection of incumbent users from interference from WAS/RLAN systems in the band should be guaranteed, CEPT should adopt a decision which would not impose unnecessary, disproportionate or spectrum- inefficient restrictions on WAS/RLAN LPI and VLP devices.*

- Opening up the 6 GHz band for WAS/RLANs won't interfere with well-designed CBTC systems deployed on the basis of harmonised standards.
- There are different variants of CBTC in different countries, some in different bands. In the UK, CBTC operates in the 2.4 GHz ISM band, seemingly with no problems.
- The issue raised about the potential for interference with CBTC appears to relate to a single example. The system in question does not appear to be well designed, as it requires a 90 MHz spectrum guard band, which is three times the size of its own total bandwidth.
- Such poorly designed CBTC systems run counter to the ECC's primary objective "to harmonise the efficient use of the radio spectrum" and CEPT's mission to "harmonise, telecommunication, radio spectrum– to improve the efficiency and co-ordination for the benefit of European society". One of the objectives of the Radio Spectrum Policy Programme (RSPP) is to ensure efficient and effective use of spectrum in support of EU policies.

- In the interests of spectrum efficiency, there needs to be a consideration of the performance of the CBTC victim receiver, as well as the potential interference source, particularly in this instance.
- CBTC systems can co-exist with other technologies, such as short - range devices (SRDs) and intelligent transport systems (ITS) similar to WAS/RLAN LPI and VLP below 5915 MHz, so they should also be able to coexist with WAS/RLAN above 5945 MHz.
- ECC Decision (08)01 on safety-related ITS states *“Urban Rail ITS devices should be robust against adjacent WAS/RLAN emissions in 5925 - 6425 MHz”*. In other words, well-designed CBTC, meeting basic spectrum efficiency requirements, should be able to co-exist with adjacent WAS/RLAN systems, particularly given the minimum guard band of 10 MHz (more in some cases provided by Draft CEPT Report 75 and Draft ECC Decision (20)01).
- ECC Report 127 on the impact of receiver performance on spectrum management states *“the study has revealed sufficient cases to suggest that the role of receiver parameters in standards and their related consideration in spectrum engineering should receive greater prominence in order to promote more efficient use of the spectrum, including maximising economic and social welfare.”*
- ECC Report 310 on the evaluation of receiver parameters for spectrum management and sharing studies also notes the importance of victim receiver performance. It states that ETSI harmonised standards, ITU-R Recommendations, or other CEPT information should be used to determine receiver performance.
- Given this context, the CBTC analysis in ECC Report 302, which led to the draft CEPT Report 75, has not used appropriate victim receiver characteristics.
- It is also not clear which relevant specification the submitted CBTC results comply with.
- The conclusion of ECC Report 310 – *“Going forward, CEPT/ECC should consider the feasibility of stipulating improved receiver performance, where it is found to be a limiting factor in sharing and compatibility studies”* – is especially true in the absence of a relevant harmonised CBTC specification, and the ECC ITS Decision requiring “robust” CBTC performance.

### **Unnecessarily large guard bands would jeopardise spectrum efficiency.**

*The proposal in Draft CEPT Report 75 and Draft ECC Decision (20)01 forcing VLP to operate only above 6025 MHz (VLP category A) in order to protect CBTC systems, resulting in a 90 MHz guard band, runs counter to the ECC and ITU-R’s objectives and reduces spectrum efficiency and should be discarded.*

- Existing CBTC systems normally use a channel bandwidth of 5 MHz in 5905-5935 MHz to deliver at least 1.5 Mbps. The safety related data delivered by CBTC systems only requires about 100 kbps. That is less than 10% of the data capacity of a CBTC channel - using its most robust modulation scheme.
- Forcing VLP above 6025 MHz to protect CBTC in some circumstances would result in a 90 MHz guard band to protect a 30 MHz system. This would be completely disproportionate.

- The 10 MHz minimum guard band already built-in to CBTC/WAS/RLAN coexistence (as proposed in the draft CEPT Report 75 and Draft ECC Decision (20)01) is more than sufficient to protect 5 MHz carriers WAS/ RLAN LPI and VLP. The proposal to increase this to 90 MHz for VLP in some countries calls into question the receiver performance and design of the CBTC system.
- A 90 MHz guard band proposal runs counter to the ECC's primary objective of efficient use of the radio spectrum, as well as the ITU-R's objective to "*ensure rational, equitable, efficient and economical use of the radio-frequency spectrum*".

### **Unnecessary and disproportionate out-of-band limits should be avoided.**

*The proposal in Draft CEPT Report 75 and Draft ECC Decision (20)01 to impose out-of-band (OOB) emission limits to protect local, non-harmonised, proprietary and legacy CBTC systems is unnecessary, disproportionate and runs counter to the ECC and ITU-R's objectives and reduces spectrum efficiency. It risks preventing Europe from participating in the global Wi-Fi market.*

The draft decision also considers the use of out-of-band (OOB) emission limits to protect CBTC systems, but overly restrictive OOB limits will impact how WAS/ RLANs are able to use the spectrum.

- Overly restrictive limits mean WAS/RLAN devices need to significantly reduce their transmit power and/or not use channels adjacent to CBTC.
- The limits being proposed for LPI are -15 or -36 dBm/ MHz, which, for a mass-market technology such as Wi-Fi, would likely result in losing a 160 MHz channel. This would be a major impact given that the latest version of Wi-Fi (Wi-Fi 6) supports 160 MHz channels and there are only three 160 MHz channels to start with in the lower 6GHz band.
- Similarly, with VLP the OOB levels proposed are -30 or -49 dBm/MHz, which is a reduction by a factor of about 100.
- Levels of -15 dBm/MHz for LPI and -30 dBm/MHz for VLP would be consistent with those imposed on the devices sharing the ITS band with CBTC and SRDs. These two values are also suggested by ECC Report 290 (assuming LPI has extra building penetration loss because it is indoors).
- By contrast, extremely onerous OOB limits of -36 (LPI) or -49 dBm/MHz (VLP) are not proportionate and could lead to very inefficient spectrum use by sterilising a large part of the 6GHz band.
- The net result could conceivably be two separate markets for Wi-Fi, one based on the US/FCC rules (which much of the world would likely follow) and one for Europe. If that were to happen, the extra costs and delays would directly impact European consumers and businesses, while only protecting an antiquated/ inefficient version of CBTC in a handful of European cities.

## **The proposed country determination capability runs counter to harmonisation.**

*The proposal in Draft CEPT Report 75 and Draft ECC Decision (20)01 CEPT to introduce a country determination capability (CDC) system to protect CBTC systems formalises fragmentation in the 6GHz band. This undermines the realisation of the digital single market and prevents EU citizens from benefitting from the same Wi-Fi innovation regardless of their country of residence.*

- The country determination capability (CDC) solution has been introduced to allow national solutions to promote national spectrum management database solutions and protect legacy CBTC systems. But the protection of these services can be guaranteed through other means, which ensure that sufficient spectrum resources are made available on a harmonised basis.
- The proposal sets out a fragmented approach, which threatens to undermine the realisation of the EU single digital market. European citizens would not benefit from the same access to spectrum and device functionality regardless of their country of residence.
- To keep costs down, LPI and VLP devices need to be fully harmonised. This means adopting a single category for each mode of operation:
  - LPI single category which removes geolocation capabilities
    - Precluding operation in 5925-5945 MHz
    - Allowing only indoor operation
  - Limiting the maximum power density
    - Requesting unwanted emissions of -15dBm/MHz below 5935 MHz
  - VLP single category
    - Precluding operation in 5925-5945 MHz
    - Limiting the maximum e.i.r.p.
    - Requesting unwanted emissions of -30dBm/MHz below 5935 MHz
  - The CDC runs counter to the harmonisation principle and should be discarded.

## **Learning from past experience of 5 GHz interference problems from illegal devices.**

*The proposal in Draft CEPT Report 75 and Draft ECC Decision (20)01 CEPT to introduce a database solution for LPI devices is unnecessary, disproportionate and will not prevent illegal operation of LPI outdoors.*

Previous interference issues in the 5 GHz band in the ECC have been caused by relatively high-power outdoor use of Wi-Fi (1 watt). Administrations indicate that these cases of interference were all likely due to the illegal modification of outdoor Wi-Fi - to act as fixed links with high gain antennas. Furthermore, some devices were also modified to reduce inherent protection for certain bands (through dynamic frequency selection) used for radar.

- The industry has taken further steps to prevent illegal modification and eventual use of equipment, such as employing integral antennas (to prevent higher gain ones being added).

It has also ensured casings/power supplies of routers are not waterproof, so cannot be used outdoors easily; with devices to be clearly marked “indoors only”, thereby making it harder to illegally modify them.

- Illegal operation of any wireless devices is an enforcement issue that will not be solved by additional regulatory conditions, such as a geolocation database, since illegal users would simply not connect to the database.
- Any requirement to impose a database to prevent illegal outdoor operation of LPI therefore is disproportionate and goes beyond what is necessary to achieve that goal.
- If adopted, it will introduce a significant delay in product availability; increase the price of EU certified products; and degrade the performance of EU certified products compared to products operating in other markets.
- The CDC requirement for LPI, aimed at allowing national databases, should be discarded in favour of a single harmonised category for LPI.

## Supporting information and data

In 2023, the aggregate economic benefit of Wi-Fi could be about €235 billion for France, Germany, and the U.K., up from €169 billion in 2018, according to a report by Telecom Advisory Services.<sup>3</sup> As the combined population of these three countries is about half of the EU population (noting the UK status will change shortly), the value to the EU of Wi-Fi could be around €500 billion in 2023.

### **Without more mid-band spectrum, the economic and social benefits of Wi-Fi will be significantly reduced.**

- Realising the potential economic value of Wi-Fi will depend on the EU opening up the lower part of the 6 GHz band (5945-6425 MHz). Such a move is crucial to alleviate increasing congestion of current Wi-Fi bands. Internet traffic is growing exponentially while half of total IP traffic (fixed and mobile)<sup>4</sup> is Wi-Fi.
- Whilst other high frequency bands are available, such as 60 GHz, they offer extremely limited range, compared to mid-band spectrum.
- The opening up of the 6 GHz band would be the first new mid-band spectrum for Wi-Fi since WRC 03 and the ECC Decision of 2004 (04)08 that harmonised the use of the 5 GHz spectrum.
- In April 2020, the FCC in the US issued a Report and Order that authorises indoor low-power operations over the full 1200 MHz in the 5925-7125 MHz band.
- The sharing studies undertaken by CEPT and expressed in Draft CEPT Report 75 and Draft ECC(20)01 found that sharing the lower 6 GHz band with fixed links and radio astronomy, as well as fixed- satellite, is feasible, assuming low power indoors (LPI, 200 mW) and very low power (VLP, 25 mW) portable.

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<sup>3</sup> Telecom Advisory Services 2018

<sup>4</sup> Internet Protocol traffic. Source: Cisco 2017-2022 Visual Networking Index 4 EC Digital Economy and Society Index Report 2020 - Connectivity

### **Wi-Fi is an integral part of broadband connectivity.**

- Wi-Fi is crucial for the EU to build “a European Gigabit Society”. To meet the strategic EU connectivity targets for 2025 (which include gigabit connectivity for main socioeconomic drivers and households), fixed Gigabit network connections need to be supported by high quality Wi-Fi.
- Wi-Fi 6, will complement the evolution of existing networks and deployment of new ones, which will be key in enabling the green transformation of the European economy through the adoption of energy efficient technologies and the digitalisation required for other sectors to go green.
- Wi-Fi supports 4G/5G by enabling mobile operators to offload traffic, as well as distributing broadband connectivity around a home or office efficiently.
- According to European Commission figures, 78% of EU households had a fixed broadband subscription in 2019. Of these at least 26% are of 100 Mbps plus – up 5-fold in five years.
- But this positive trend may not continue if there is not enough spectrum for a good quality Wi-Fi service that can distribute ultra-fast broadband around people’s homes.
- Consumers are unlikely to find fixed broadband so attractive if they are forced to use an ethernet cable to connect devices reliably.
- A Wi-Fi bottleneck could be a serious obstacle to the creation of a digital single market in the EU because it could restrict the uptake of broadband.

We remain at your disposal should you have any questions.

Sincerely yours,

Irina Varlan  
Managing Director  
GIGAEurope