

WBA Comments on Mexico IFT 6 GHz Consultation

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Wireless Broadband Alliance (WBA®) submits these comments in response to Mexico Federal Telecommunications Institute (“IFT”) consultation on license-exempt use of the 6 GHz Band.¹ WBA strongly applauds and supports IFT’s consideration of license-exempt use of the 6 GHz band (5925-7125MHz).

1. Introduction

WBA’s mission is to enable collaboration between service providers, technology companies and organizations to achieve broad technology adoption by showcasing user benefits and by supplementing with specifications to enable widespread technology adoption.² WBA’s membership is comprised of major operators and leading technology companies.³

WBA believes that the opening of the 6 GHz band for Wi-Fi 6E is a game changer for global Wi-Fi and will be a critical enabler for growth and delivery of advanced wireless services to consumers, enterprises, and carriers as well as creating new opportunities for innovation and new businesses.

Industry report 2021 on WiFi 6 E, when it comes to the 6 GHz band, which is being opened up for wireless broadband services in the USA and other regions, reports that about 72% say 6 GHz is critical or very important to their Wi-Fi business – similar to last year - and 40% say the new spectrum will expedite their overall roll-out and expansion of their networks.

¹ Mexico, Federal Telecommunications Institute regarding the frequency band 5925-7125 MHz, October 2020

² <https://wballiance.com/openroaming/>

³ [Complete list of WBA members](http://www.wballiance.com/join-us/current-members/): <http://www.wballiance.com/join-us/current-members/>

Some of these objectives will be met where the right regulatory decisions are made – 62% rated additional allocation of 6 GHz spectrum as a very important regulatory issue for their business, only outdone by one other regulatory concern, about security and privacy.⁴ ⁵ The report offers strong evidence that Wi-Fi, if not dominant, is the key component of the connectivity ecosystem. Adopting rules that unlock the full potential of the 6 GHz band and next-generation Wi-Fi will help complete this ecosystem.

Wi-Fi is indispensable, carrying more than half of the Internet's overall traffic today, and the recent pandemic has shown that Wi-Fi is more important than ever to ensuring that consumers are connected. In addition, more than 70% of the data traffic on our smartphones are offloaded to Wi-Fi.⁶ This offloading is expected to be extended with introduction of 5G. Cisco study expects this 5G adoption to speed up because of expansion of license-exempt band for Wi-Fi use. The next generation of Wi-Fi is a critical component to that. Wi-Fi 6E will enable even faster speeds and offer better performance for connected devices.

In a 2018 study conducted by Telecom Advisory Services,⁷ global economic value of Wi-Fi in 2018 is estimated at \$ 1.96 trillion. By 2023, global value of Wi-Fi should increase to \$ 3.47 trillion. At the same time, the study shows that global jobs attributable to Wi-Fi will increase by more than 50% to nearly one million by 2023.

⁴ WBA survey, section 7.1.6 for more on 6 GHz, <https://wballiance.com/resource/wba-annual-industry-report-2019>

⁵ WBA Annual Industry Report, <https://wballiance.com/resource/wba-annual-industry-report-2020/>

⁶ Cisco, <<http://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/mobile-white-paper-c11-520862.pdf>>, pp. 24–25 - April 2020

⁷ <https://www.wi-fi.org/value-of-wi-fi>

2. License-exempt Designation for the Entire 6GHz Band (5925-7125MHz)

Wi-Fi Alliance, in its spectrum need study conducted in 2017⁸ concluded that up to 1 GHz of new spectrum will be needed in 2025 to satisfy the anticipated busy hour, with between 1.3 and 1.7 GHz required if demand exceeds the busy hour prediction, due to novel un-anticipated applications, or due to further concentration of traffic into fewer busy hours. The study also emphasized on the importance of contiguous spectrum to be assigned with sufficient contiguity such that wide channels of 160 MHz, or perhaps even wider channels of 320MHz in near future as it is being already provisioned in IEEE 802.11be. Forward-thinking spectrum regulation that allocates contiguous spectrum to accommodate multiple 160MHz and 320MHz channels will enable growth of Wi-Fi and the economic benefits associated with that. The Wi-Fi alliance study assumes that new spectrum will be fully accessible by Wi-Fi.

With incumbent Fixed Services allocation covering the entire 6GHz band (5925-7125MHz), opening the full band for license-exempt operation will help with spreading the RLAN radio energy throughout the 6GHz band, which has the beneficial effect of aiding coexistence with the incumbent services.

In a study conducted recently by Telecom Advisory Services the economic benefit of Wi-Fi in 6GHz in Mexico is estimated to be more than \$162 Billion between year 2021 and 2030. The economic value comprised of \$93.05 billion impact to GDP, \$42.27 billion impact to Producer Surplus and \$26.85 billion impact to Consumer surplus. It is also recognized that the estimated cumulative impact on Mexico's Producer Surplus as the result of harmonization of the

⁸ Wi-Fi Alliance, Spectrum Needs Study (2017). <https://www.wi-fi.org/news-events/newsroom/additional-unlicensed-spectrum-needed-to-deliver-future-wi-fi-connectivity>

entire 1200MHz with other advanced economies such as that of USA is \$1.3 billion. Also, the economic impact of the increased WISP subscribers in the GDP is estimated to be more than \$4.62 billion.

On the equipment availability, US FCC has already issued draft KDB Guidance⁹ for testing of Wi-Fi 6GHz LPI devices (Phase 1) over the entire 1200 MHz band to be followed by testing of Automated Frequency Coordination (AFC) enabled devices (Phase 2). It is estimated that a few certifications be issued during the remainder of 2020 while majority of certifications are expected during 2021. Similarly, in Europe, with the 6GHz ruling expected to be finalized by EC in May 2021, the European certification process of products are expected to start in early 2021 when ETSI standardization is expected to be stable and Notified Body process can be implemented. The Wi-Fi Alliance reported that its member companies are demonstrating the readiness to move quickly into the band before the end of the year; an initial projection is that more than 300 million Wi-Fi 6E devices will enter the market in 2021.¹⁰

Based on the arguments listed in this section, WBA supports and strongly recommends opening the entire 6GHz (5925-7125MHz) band for license-exempt operation of Low Power Indoor (LPI) devices, Very Low Power (VLP) devices and Standard Power (SP) devices under control of AFC System. Speedy completion of the Mexico proceeding for license-exempt designation of the 6GHz band, will be key in deployment of Wi-Fi 6E in Mexico aligned with deployment of the technology in advanced countries in 2021.

⁹ FCC Publication Number: 987594

<https://apps.fcc.gov/oetcf/kdb/forms/FTSSearchResultPage.cfm?id=277034&switch=P>

¹⁰ <https://www.wi-fi.org/news-events/newsroom/wi-fi-alliance-delivers-more-value-from-wi-fi-in-6-ghz>

3. Target Use Cases and Modes of Operation for the 6GHz band

Full public benefit of 6GHz license-exempt band and Wi-Fi 6 can be achieved only when network and devices supporting all three modes LPI, VLP and SP are enabled. The three modes are complementary and essential. The Wi-Fi ecosystem supports a wide range of Wi-Fi products and end users with different and innovative use cases, diverse business models, and a wide range of price points. The viability of the 6 GHz license-exempt ecosystem therefore requires all three proposed device-classes/use-cases:

1. Low Power Indoor (LPI) devices address the bulk of the consumer segment, which are deployed singly or in groups, exclusively indoors. With more than 90% of all APs installed indoor, LPI is the single most important mode for early adoption in the band.
2. Very Low Power (VLP) devices address short-range, high-bandwidth scenarios like 5G gigabit mobile tethering (including automotive use cases), as well as new “last meter” applications such as AR/VR, IoT, and direct peer-to-peer communications. VLP devices with high bandwidth and low latency are ideal for enabling a vast array of applications. From education to home entertainment and from telemedicine with point-of-care equipment to augmented reality (AR) glasses to assist in a surgery, low power portable devices can be a significant source of data generation and consumption. This is even more true when portability is combined with high bandwidth and low latency.
3. Standard Power (SP) AFC controlled devices address enterprise and service-provider segments for both outdoor and indoor use cases, deployed with on-premise or cloud controllers.

In US, FCC has already authorized operation of LPI and SP (AFC enabled) modes and has issued an FNPRM on adding VLP and Mobile AFC while considering improvements in Tx power for LPI mode. In Europe, UK and South Korea, both LPI and VLP modes are authorized while SP is being considered in a later stage.

In US, the LPI mode is authorized for the entire 1200MHz of spectrum while SP mode is authorized for 5925-6425 MHz (U-NII-5) and 6525-6875 MHz (U-NII-7). The SP mode for 6425-6525 MHz (U-NII-6) & 6875-7125 MHz (U-NII-8) was excluded from the initial ruling as the US mobile service allocation in 6GHz is limited to the U-NII-6 and U-NII-8 bands where implementation of Automated Frequency Coordination with incumbent mobile services may not be feasible or at least challenging.

WBA strongly recommends immediate authorization for LPI and VLP operation throughout the 6 GHz band. Enabling LPI and VLP operation throughout the 6 GHz band will enable up to seven 160 MHz and form the basis for many high density and high throughput applications.

Considering the Mexico incumbent allocations in 6GHz with no Mobile incumbent services in 5925-6700MHz, Standard Power outdoor operation under control of AFC System can be authorized for the lower 775MHz of spectrum as well as the upper segments of the 6GHz band, i.e. 6700-7075 MHz and 7075-7125 MHz where the stated frequency ranges are allocated to mobile services but none are known to be used to date. As detailed development of regulatory requirement for AFC mode and availability, compliance and testing of the AFC System require some time, AFC mode can be enabled in a later phase after LPI and VLP.

Note that, considering the total 1875 records in Comprehensive Radio Spectrum Management System – SIAER for 6GHz band, AFC enablement works, such as Wi-Fi Alliance Compliance specifications and AFC interface specifications, may be customized or otherwise adapted to cover Mexico 6GHz AFC assuming that a stable, complete and up to date database of incumbent Fixed Services is available.

4. Coexistence with Fixed Satellite Services and Fixed Service is possible with the right regulatory framework

Studies conducted in US, EU and other regions have already concluded that the co-existing of indoor and outdoor Wi-Fi services and devices with incumbent Fixed Services and Fixed Satellite Services can be achieved by limiting the Tx power of Wi-Fi devices and other co-existence mechanisms.

More specifically, studies conducted¹¹ in conjunction with the US FCC 6GHz proceeding concluded that the resulting aggregate interference into Earth to Space receivers at no higher than -20 dB I/N and as the result, the FCC Commission¹² concluded that there is no need for frequency coordination for co-existence fixed Earth to Space Satellite services and co-existence between indoor and outdoor Wi-Fi services can be achieved throughout the 5925-7125MHz band. The Commission noted that incumbent operations are limited to Earth to Space transmissions, and that the signal levels from Standard Power license-exempt devices at geosynchronous space station receivers would be so low as to have no or only a negligible effect

¹¹ RKF report (commissioned by 6USC, detailed report from 2018): <https://s3.amazonaws.com/rkfengineering-web/6USC+Report+Release+-+24Jan2018.pdf>

¹² FCC 20-51A1, Unlicensed Use of the 6 GHz Band, Report and Order and Further Notice of Proposed Rulemaking, ET Docket No. 18-295; GN Docket No. 17-183, April 24, 2020 <https://s3.amazonaws.com/public-inspection.federalregister.gov/2020-11236.pdf>

on them. Out of abundance of caution, FCC adopted a restriction on radiation mask for license-exempt Standard Power access point to prevent them from pointing toward the space station receivers. Mexico may adopt similar regulations.

With regards to the Low Power Indoor operation of Wi-Fi, a number of studies conducted in US and EU¹³ concluded that, considering the attenuation of Wi-Fi signal due to Building Entry Loss, co-existence of indoor Wi-Fi devices is achieved through restriction on transmit power of the indoor devices. As the result, US FCC opened the entire 6 GHz band for license-exempt indoor use without the need for frequency coordination but adopted restrictions designed to prevent harmful interference to incumbent Fixed Services. The restrictions are: (1) limited to indoor operation; (2) subject to low power operation at maximum 30 dBm EIRP (5dBm/MHz PSD EIRP) for APs and 24 dB EIRP (-1dBm/MHz PSD EIRP) for Clients . Although FCC requirement limits the LPI transmit power at 5dBm/MHz, the Commission seeks comment in its Further Notice¹⁴ to allow low power indoor devices to operate at a higher power spectral density of 8 dBm/MHz with a maximum permissible EIRP of 33 dBm when a device uses a bandwidth of 320 megahertz in the entire band. CableLabs, Charter, and Comcast advocated permitting low-power license-exempt devices to operate using 8 dBm/MHz PSD EIRP as concluded in its study¹⁵ that harmful interference will not occur to fixed microwave links at this power level.

US FCC concluded that an interference protection criteria of -6 dB I/N shall be used by AFC Systems to calculate the frequency availability to protect incumbent Fixed Services against interference from indoor

¹³ RKF report (commissioned by 6USC, detailed report from 2018): <https://s3.amazonaws.com/rkfengineering-web/6USC+Report+Release+-+24Jan2018.pdf>

ECC report 302 (CEPT report with multiple studies developed by European administrations and industry):<https://www.ecodocdb.dk/download/cc03c766-35f8/ECC%20Report%20302.pdf>

ECC report 316 (CEPT report with multiple studies developed by European administrations and industry, focuses on VLP and short term criteria): <https://www.ecodocdb.dk/download/8951af9e-1932/ECC%20Report%20316.pdf>

6USC Group Fixed Link Interference

Testing:[https://ecfsapi.fcc.gov/file/108230735019254/6GHz%20FS%20coexistence%20study%20ex%20parte%20\(final\).pdf](https://ecfsapi.fcc.gov/file/108230735019254/6GHz%20FS%20coexistence%20study%20ex%20parte%20(final).pdf)

6USC Comments to NPRM (outdated but good

information):[https://ecfsapi.fcc.gov/file/10216633127609/6%20GHz%20RLAN%20Group%20Comments%20\(Feb%202015%202019\).pdf](https://ecfsapi.fcc.gov/file/10216633127609/6%20GHz%20RLAN%20Group%20Comments%20(Feb%202015%202019).pdf)

Summary of 6USC position (before

R&O):[https://ecfsapi.fcc.gov/file/1031999525288/AFC%20Ex%20Parte%20\(Mar%202019%202020\).pdf](https://ecfsapi.fcc.gov/file/1031999525288/AFC%20Ex%20Parte%20(Mar%202019%202020).pdf)

¹⁴ <https://s3.amazonaws.com/public-inspection.federalregister.gov/2020-11236.pdf>

¹⁵ <https://www.fcc.gov/ecfs/filing/1033043576413>

and outdoor devices operating with maximum transmit power at 36 dBm EIRP for APs and 30 dBm EIRP for Clients. As mobile services are not deployed in the allocated 6700-7125 MHz range in Mexico, WBA recommends authorizing Standard Power devices to operate in the entire 5925-7125MHz band under control of the AFC System. Operation of Very Low Power devices is a subject of US FCC FNPRM¹⁶ and is not finalized yet. Despite this, other regions including EU, UK and South Korea¹⁷ have already authorized operation of Very Low Power devices for indoor and outdoor operation at power level of 14 dBm EIRP. In addition, many contributions are submitted to US FCC in support of authorizing VLP operation in 6GHz¹⁸.

On January 11, 2021, FCC issues a public notice¹⁹ seeking additional information regarding Client-to-Client communications in the 6GHz band. Due to VLP restrictions on maximum transmit power, the throughput and range performance requirements of a number of portable applications cannot be met, and therefore enablement of the Client-to-Client communications is critical in addressing all Wi-Fi use cases.

WBA recommends authorization of the following license-exempt operation modes using channel bandwidth of up to 320MHz:

¹⁶ FCC 20-51A1, Unlicensed Use of the 6 GHz Band, Report and Order and Further Notice of Proposed Rulemaking, ET Docket No. 18-295; GN Docket No. 17-183, April 24, 2020 <https://s3.amazonaws.com/public-inspection.federalregister.gov/2020-11236.pdf>

¹⁷ ECC report 302 (CEPT report with multiple studies developed by European administrations and industry):<https://www.ecodocdb.dk/download/cc03c766-35f8/ECC%20Report%20302.pdf>

ECC report 316 (CEPT report with multiple studies developed by European administrations and industry, focuses on VLP and short term criteria): <https://www.ecodocdb.dk/download/8951af9e-1932/ECC%20Report%20316.pdf>
Improving spectrum access for Wi-Fi, Spectrum use in the 5 GHz and 6 GHz bands, Ofcom, July 24, 2020

¹⁸ RKF report (commissioned by 6USC, studies VLP): [https://rkfengineering-web.s3.amazonaws.com/RKF+VLP+Report+\(final\).pdf](https://rkfengineering-web.s3.amazonaws.com/RKF+VLP+Report+(final).pdf)

6USC VLP Sharing Study: https://ecfsapi.fcc.gov/file/10702302769261/VLP%20Ex%20Parte_28June2019.pdf

6USC Comments to

NPRM:[https://ecfsapi.fcc.gov/file/10216633127609/6%20GHz%20RLAN%20Group%20Comments%20\(Feb%2015%202019\).pdf](https://ecfsapi.fcc.gov/file/10216633127609/6%20GHz%20RLAN%20Group%20Comments%20(Feb%2015%202019).pdf)

¹⁹ <https://docs.fcc.gov/public/attachments/DA-21-7A1.pdf>

1. Low Power Indoor over 5925-7125 MHz with
 - a. 33 dBm Max Tx Power (EIRP) & 8dBm/MHz PSD (EIRP) for Access Points
and
 - b. 27 dBm Max Tx Power (EIRP) & 2dBm/MHz PSD (EIRP) for Clients
2. Very Low Power over 5925-7125 MHz with 14 dBm Max Tx Power (EIRP)
3. Standard Power under AFC control (using Mexico SIAER database) over 5925-7125 MHz with
 - a. 36 dBm Max Tx Power (EIRP) & 23dBm/MHz PSD (EIRP) for Access Points
and
 - b. 30 dBm Max Tx Power (EIRP) & 17dBm/MHz PSD (EIRP) for Clients
4. Direct Client to Client operation

5. Conclusion and Summary Recommendation

WBA strongly recommends immediate authorization for LPI and VLP operation throughout the 6 GHz band (5925-7125MHz). WBA also recommends authorization of Standard Power mode throughout the 6GHz band (5925-7125MHz) under the control of both a centralized or decentralized AFC System. WBA also recommends to IFT to authorize direct Client to Client operation throughout the 6GHz band.

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Useful Definitions

Term	Definition
6USC	6 GHz Unlicensed Coalition -- also called the RLAN Group (Radio LAN Group), is a coalition of organizations working towards a common goal of advocating for license-exempt use of the 6 GHz band