

October 30, 2021

Agence Nationale des Fréquences (ANF)
39, Rue Asdrubal. 1002 La Fayette.
Tunis
Tunisie

consultation.publique@anf.tn.

Re: DSA Comments to the ANF on the Public Consultation on the future utilization of Wi-Fi in the 6 GHz band in Tunisia


Dear Sir/Madam,

The Dynamic Spectrum Alliance (“DSA”¹) respectfully submits its comments to the *Agence Nationale des Fréquences* (“ANF”) in response to the Public Consultation on the future utilization of Wi-Fi in the 6 GHz band in Tunisia.

The DSA celebrates the Agency’s leadership opening this consultation about the future of the 6 GHz band for Wi-Fi 6E adoption in Tunisia and believes that the Agency should act to provide greater capacity for data transfer, bridge the digital gap and incentivize modern technologies. The decision of dedicating more spectrum to wireless radio local access systems under license exempt frameworks in the 6 GHz band will benefit Tunisian citizens immediately with better Wi-Fi services, and access to affordable license-exempt wireless devices.

The DSA is available to discuss these comments and any additional requirement the Agency might have.

Respectfully submitted,


Martha SUAREZ
President,
Dynamic Spectrum Alliance

¹ The Dynamic Spectrum Alliance (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. A full list of DSA members is available on the DSA’s [website](#).

DSA COMMENTS TO THE ANF ON THE PUBLIC CONSULTATION ON THE FUTURE UTILIZATION OF WI-FI IN THE 6 GHZ BAND IN TUNISIA

The Dynamic Spectrum Alliance strongly supports the use of the lower 6 GHz band (5925-6425 MHz) for Wi-Fi in Tunisia and commends *L'Agence Nationale des Fréquences* for the very important milestone of initiating this public consultation. In addition to taking this important first step, we strongly encourage ANF to extend the allocation of license-exempt spectrum to the entire 6 GHz band (5925-7125 MHz).

Access to the full 6 GHz band will be critical for state-of-the-art license-exempt Wireless Access Systems/Radio Local Area Networks (WAS/RLAN) systems and their evolution.² The entire 1200 MHz will be required to meet the projected demand for mid-band WAS/RLANs and other unlicensed uses. It would also support future Wi-Fi 7 devices feature 320 MHz wide channels. If only the lower 500 MHz is made available, only one 320 MHz channel is possible. On the other hand, three non-overlapping 320 MHz channels will be supported if the entire 1200 MHz of the 6 GHz band is made available for WAS/RLAN. Furthermore, unlicensed 6 GHz devices will offload traffic from cellular 5G networks (total data offload to unlicensed going from 74% to 79% in 2022),³ which will lower the costs of network deployment for mobile operators and for edge investment by neutral host and third-party providers. Importantly, it will also lower costs for consumers.

The DSA strongly recommends that ANF authorize three device classes: 1) Low Power Indoor (LPI), 2) Very low Power Portable (VLP), and 3) Standard Power (SP) with Automated Frequency Coordination (AFC) in the entire 6 GHz band. All three device classes are critical to maximizing the opportunity to deploy the 6 GHz band with Wi-Fi enabled devices and play a separate role in enabling next generation services in Tunisia.

These device classes have been carefully studied in Europe, the United States, Canada, Brazil, and globally. Based on the rigor of the technical studies to-date, ANF can be confident that incumbent services would be protected from harmful interference while providing more robust utilization of the 6 GHz band. A significant portion of the world's economy has designated the entire 6 GHz band for license-exempt use, and we would strongly encourage ANF to do the same. This would increase the economies of scale for 6 GHz license-exempt equipment, such as Wi-Fi, and reduce costs and complexities in equipment deployment in Tunisia.

² DSA notes that in a recent revision to a previously published Wi-Fi Alliance (WFA) economic assessment study on the value of Wi-Fi to economies the new value to the global economy is anticipated to be \$4.9 trillion by 2025.

³ See Cisco Systems, Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2017-2022.

Question n° 1. What do you think is the ideal use of the 5925 - 6425 MHz band in Tunisia? Give your reasoning and justify your answer.

The DSA believes that the highest and best use of the entire 6 GHz band is for license exempt operations. This band is adjacent to the 5 GHz band, which will lead to ease of deployment (reducing equipment costs, providing for similar wireless propagation). In addition, if the entire 1200 MHz of spectrum is made available, then ANF will put Tunisians in a position to fully enjoy the benefits of Wi-Fi 6E and Wi-Fi 7, which perform best when larger channels can be used (e.g., 80 MHz, 160 MHz, and 320 MHz channels) and will not overlap with nearby networks using the same channels. Such a decision would put Tunisia solidly with most of the rest of the world that have already made a decision on making 6 GHz available for Wi-Fi. Countries representing nearly 43% of global GDP have either decided to open the entire 6 GHz band for license-exempt use or are contemplating it. This means that Tunisians would enjoy the benefits of the economies of scale created, which will reduce equipment costs.

The IEEE 802.11ax standard is mature, and Wi-Fi Alliance has released the Wi-Fi 6E certification to support Wi-Fi in the 6 GHz band.⁴ ETSI has produced a stable draft, which enables manufacturers to use with notified bodies to import products in Europe. Over fifty devices have been certified by the Wi-Fi Alliance for 6 GHz operations.⁵ Multiple devices have been released into the market.

Question n° 2. Do you consider that current uses of the 5925 - 6425 MHz band must be maintained without modifications? Indicate the reasons that justify your reply.

The DSA believes that incumbent services operating in the 6 GHz band – Fixed Services, Fixed Satellite Services (FSS) and Mobile Services – can continue to operate and grow in the band even if ANF designates the band for license-exempt operations.

As indicated previously, a significant number of technical studies undertaken in the United States, Europe, and elsewhere have demonstrated that administrations can make more fulsome use of the band without harmful effect on licensed services. As incumbent services in Tunisia are similar to those in other regions, we believe that the same co-existence scenarios are applicable, and ANF can take comfort that this body of technical work would substantiate its decision to open the band.

Question n° 3. Do you consider it feasible to operate local radio networks (WLAN), NR-U, 5G-U and any other technology in the band 5925 – 6425 MHz on a license-exemption basis? If yes, what is the amount of electromagnetic spectrum necessary for the implementation of

⁴ See <https://www.globenewswire.com/en/news-release/2021/01/07/2154890/0/en/Wi-Fi-Alliance-delivers-Wi-Fi-6E-certification-program.html>

⁵ See https://www.wi-fi.org/product-finder-results?sort_by=certified&sort_order=desc&capabilities=189&certifications=1335

WLAN in Tunisia? Provide the advantages of following your preferred action plan and the disadvantages and risks of not following it and the reasons that support your position.

Given the work being undertaken in ETSI, and between IEEE and 3GPP, the DSA is confident that WLAN technologies will be able to coexist with each other, while still protecting incumbent operations.

As mentioned above, the DSA recommends that ANF designate the entire 6 GHz band (5925-7125 MHz) for license-exempt use. The number of devices using license exempt spectrum has grown significantly from 2003 to 2021 – from 50 million to 13 billion - and spectrum designated for such devices must keep up with this growth. In addition, new applications are driving greater demand for more bandwidth to achieve low latency and high throughput. Applications such as Augmented, Virtual, and Mixed reality are becoming more popular and will strain existing network capacity. These applications are critical for quality of healthcare, education, manufacturing, transportation, and a variety of other aspects of life.

To support these applications, access points are deployed at a higher density, and they are operating at 80 MHz and 160 MHz channels. Once Wi-Fi 7 is deployed, we expect networks to operate on 320 MHz channels, which in reality can only be made possible in markets that enable the entire 6 GHz band. In short, spectrum demand is increasing and ANF must future proof the airwaves for Tunisians by designating a sufficient amount of license-exempt spectrum to support this growth. The only spectrum range identified by the WLAN industry to support this growth globally is the 5925-7125 MHz frequencies.

Question n° 4. What technical and operational restrictions would be necessary to ensure that the deployment of indoor WLANs, including devices with low power and Wi-Fi systems, in the band 5925 - 7125 MHz on a free basis license does not cause harmful interference to other systems operating in the band 5925 - 7125 MHz in Tunisia? Provide the reasons for your opinion and the technical evidence that supports your proposal.

As indicated above, coexistence with incumbent operations has been studied extensively. It has been determined that LPI and VLP portable devices are unlikely to create harmful interference to incumbent operations.

Comprehensive studies of coexistence between WLAN and incumbent services in the 5925-7125 MHz band conducted in the United States and Europe have determined that LPI devices could operate at power levels up to 30 dBm and VLP devices could operate at power levels up to 14 dBm while protecting incumbent operations.⁶ The telecom regulator in Brazil, ANATEL, found

⁶ See CEPT Electronic Communications Committee. ECC Report 302, available at <https://docdb.cept.org/download/cc03c766-35f8/ECC%20Report%20302.docx>, ECC Report 316: Sharing studies assessing short-term interference from Wireless Access Systems including Radio Local Area Networks (WAS/RLAN) into Fixed Service in the frequency band 5925-6425 MHz, May 21, 2020, available at

that VLP devices can operate at power levels up to 17 dBm without the risk of harmful interference to incumbent operations.⁷

Based on these technical studies, the DSA recommends ANF adopt the following technical requirements:

Table 1. Proposed Technical Conditions for 6 GHz WLAN Device Types

Device category	Low-Power Access Point	Very Low Power mobile equipment	Standard Power
Operating location	Indoor only	Indoor & Outdoor	Indoor and Outdoor
Licensing scheme	License-exempt	License-exempt	License-Exempt with Frequency Coordination
Max. transmit power (e.i.r.p.)	30 dBm	17 dBm	36 dBm

If ANF authorizes these transmit power limits for these device types, it will maximize wireless broadband opportunities for Tunisians.

Question n° 5. Do you know of any other techniques for using Wi-Fi in the 5925 - 6425 MHz band? What is the value of the e.i.r.p. you are offering?

Please see the response to question 4 above.

<https://www.ecodocdb.dk/download/8951af9e-1932/ECC%20Report%20316.pdf>; and, *ECC Decision 20(01): On the harmonised use of the frequency band 5945-6425MHz for Wireless Access Systems including Radio Local Area Networks (WAS/RLAN)*, Annex 1, A1.2, Nov. 20, 2020, <https://docdb.cept.org/document/16737> (listing technical conditions for LPI and VLP in Europe) (*ECC Decision 20(01)*). Ofcom, *Statement: Improving spectrum access for Wi-Fi*, Statement, 4.51, (July 24, 2020), (<https://www.ofcom.org.uk/consultations-and-statements/category-2/improving-spectrum-access-for-wi-fi>) (confirming that radiated power limits of 25 mW for VLP are “sufficient to manage the risk of interference”). *Unlicensed Use of the 6 GHz Band*, Report and Order and Further Notice of Proposed Rulemaking, ET Docket No. 18-295 (Apr. 24, 2020) https://ecfsapi.fcc.gov/file/0424167164769/FCC-20-51A1_Rcd.pdf.

⁷ See <https://sistemas.anatel.gov.br/SACP/Contribuicoes/TextoConsulta.asp?CodProcesso=C2427&Tipo=1&Opcao=andamento>

Question n° 6. In your opinion, should we be satisfied only with the 5925 - 6425 MHz band? to use Wi-Fi 6 or to generalize this use over the entire 5925 - 7125 MHz band? Why ? The position of which sub-region will suit Tunisia the most?

As indicated above, the DSA strongly recommends that ANF designate the entire 5925-7125 MHz frequency range for license-exempt use. DSA has researched this topic extensively and has published a white paper entitled, “6 GHz License Exempt: Why the full 1200 MHz and why now?”⁸ In this white paper, we provide a complete answer to this question. The DSA would welcome the opportunity to discuss our findings in this white paper with ANF in greater detail.

Question n° 7. What technical and operational restrictions would be necessary to ensure that the deployment of outdoor WLANs and Wi-Fi systems, within the band 5925 - 6425 MHz on a license-exempt basis does not cause interference detrimental to other systems operating in the 6 GHz band in Tunisia? Provide the reasons for your opinion and the technical evidence that supports your proposal.

The proposed technical conditions provided in question 4 above, will enable coexistence with incumbent licensed operations in Tunisia. The United States and Canada are the first countries to authorize Standard Power outdoor operations, and they have done so requiring automated frequency coordination (AFC) with incumbent operations. AFC is a simple database protection approach that allows SP devices to transmit at higher powers in locations and on frequencies where such transmissions will not create harmful interference. The DSA has written a white paper on this topic entitled, “Automated Frequency Coordination: An Established Tool for Modern Spectrum Management.”⁹ This white paper outlines the basic concepts behind AFC and explains how AFC can enable higher spectrum density of use indoors and outdoors.

While not required based on technical studies, the United States required the implementation of an elevation-dependent transmit power mask (reduction from 36 dBm EIRP down to 21 dBm > 30 degree elevation) to protect Fixed Satellite Services (FSS) for Standard Power outdoor operations.

Question n° 8. What are, according to you, the technical and operational characteristics a Wi-Fi system used in the 5925 - 6425 MHz band which can be used by RLANS operating outdoors in order to protect the FSS systems operating in the Earth-to-Space direction in the band 5925 - 7075 MHz and in the Space-Earth direction in the band 6700 - 7075 MHz against harmful interference? Provide reasons techniques to support your answer.

Technical studies demonstrate that building attenuation for LPI devices, and severely constrained power levels of VLP devices, is more than sufficient to protect FSS operations. In an abundance

⁸ <http://dynamicspectrumalliance.org/wp-content/uploads/2021/08/6GHz-License-Exempt-Band-Why-1200-MHz-and-Why-Now.pdf>

⁹ http://dynamicspectrumalliance.org/wp-content/uploads/2019/03/DSA_DB-Report_Final_03122019.pdf

of caution, the U.S. FCC required a transmit power mask based on elevation to provide additional protection to FSS. The DSA sponsored a technical study for Mexico, which included a study on MSS feeder downlink, which was located outside of Mexico City.¹⁰ This study found the risk of harmful interference to this earth station was extremely limited based on its location. The topology and location of this earth station had a strong impact on the protection it would receive from WLAN. A similar analysis could be done with respect to earth stations in Tunisia if ANF made the locations and technical parameters of such stations available for analysis.

Question n° 9. What are, according to you, the technical and operational characteristics of a Wi-Fi system used in the 5925 - 6425 MHz band which can be used by RLANs operating outdoors in order to protect fixed point-to-point systems and fixed point-to-multipoint operating in the band 5925 - 6425 MHz against harmful interference? Provide technical reasons to support your answer.

Please see the response to Question 7 above.

Question n° 10. Do you consider viable operations of NR-U, 5G-U or any other technology in the 5925 - 6425 MHz band on a license-exempt basis? In case yes, what is the amount of electromagnetic spectrum needed to the establishment of license-exemption systems in Tunisia? Provide the advantages of following your preferred course of action and the disadvantages and risks of not following it as well as the reasons that support your position.

The DSA supports technology neutral regulations that would allow the industry to continue to develop and evolve. Co-existence can be addressed in standards bodies, such as ETSI, IEEE, and 3GPP as indicated above. As indicated before, Cisco projects that 59% of mobile data traffic will be offloaded to Wi-Fi by 2022. And cellular operators can improve their 5G mobile broadband services by using the 6 GHz band; 3GPP Release 16 includes a 5G New Radio specification for licensed exempt spectrum in the 6 GHz band, called 5G NR-U (n96). That is why from the DSA perspective, cellular and Wi-Fi spectrum are powerful complements, not rivals.

Question n° 11. What other comments or observations do you consider relevant as to the possibility of making the 5925 - 6425 MHz band available for use without a license? Give the reasons for your answer.

Please see DSA's answers to the questions above, which provide our rationale for designating the entire 6 GHz band for license exempt use.

¹⁰ <http://dynamicspectrumalliance.org/wp-content/uploads/2021/10/2021-08-RKF-Frequency-Sharing-for-RLAN-in-Mexico.pdf>