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Communications, Space & Technology Commission
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Re: DSA Comments to CST on “Public Consultation on Light Licensing Regulations Annex for the 6 GHz Frequency Band”

The Dynamic Spectrum Alliance (DSA)¹ respectfully submits the following comments to the Kingdom of Saudi Arabia (KSA) Communications, Space & Technology Commission’s (CST) public consultation on “Public Consultation on Light Licensing Regulations Annex for the 6 GHz Frequency Band”.²

The DSA applauds CST for advancing light-licensing regulations for the 6 GHz Frequency Band, including the mechanism that the CST will rely on to enable high-power applications with ensuring coexistence with the incumbent uses in the band such as fixed Point to point and fixed-satellite services.

The DSA celebrates this important step to enable smart management of the frequency spectrum, leveraging databases to efficiently allocate spectrum resources. Enabling outdoor use of Standard Power devices under control of an Automated Frequency Coordination (AFC) System in the 6 GHz will enable point-to-multi-point Fixed Wireless Access (FWA) in the band, as well as multiple new applications, while ensuring the protection of incumbents in the band. This proposal builds upon CST’s actions in its first Spectrum Outlook for Commercial and Innovative Use in Saudi Arabia released in 2021 that led to the opening of the entire 6 GHz frequency band to low power indoor license-exempt operation.

¹ The Dynamic Spectrum Alliance is a global, cross-industry alliance focused on increasing dynamic access to unused radio frequencies. The membership spans multinational companies, small- and medium-sized enterprises, academic, research, and other organizations from around the world, all working to create innovative solutions that will increase the utilization of available spectrum to the benefit of consumers and businesses alike. A full list of the DSA members is available on the DSA’s website at www.dynamicspectrumalliance.org/members/.

² “Public Consultation on: Light Licensing Regulations Annex for the 6 GHz Frequency Band”, Kingdom of Saudi Arabia Communications, Space & Technology Commission, released October 2024. (Consultation), available at <https://regulations.citc.gov.sa/en/Pages/PublishedPublicConsultations.aspx#/PublishedPublicConsulationDetails/62>

The DSA is providing a response to some of the proposed questions using the established format in the annex of this document. We appreciate the opportunity to participate in this consultation and we are available to discuss these comments and provide any additional information to CST if requested.

Respectfully submitted,



Dr. Martha SUAREZ
President
Dynamic Spectrum Alliance

DSA COMMENTS

| Section # | Question # | Response & Comment |
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| 3 | 1 | <p>What are the similarities between these two use cases: Wi-Fi 6E and “Private 5G”? And please elaborate more if there are not any. CST has published a public consultation on light licensing in the (4 GHz) frequency band enabling “Private 5G” and CST believes there are common factors in the above use-cases.</p> <p>By far, license exempt Wi-Fi is the technology of choice for low- and medium-power private networks. Indoors, there is very little difference between 6 GHz Wi-Fi networks and low-power private 5G networks, for networks where the network operator is also the facility operator. Wi-Fi 6E and Wi-Fi 7 are much more deterministic than earlier Wi-Fi standards. Additionally, there are no legacy Wi-Fi systems in the 6 GHz band. This means that even though Wi-Fi networks have to accept interference, while licensed private networks are protected from receiving harmful interference, in a controlled environment it will be hard to tell the difference for most all uses.</p> <p>There is an obvious difference between low-power 6 GHz Wi-Fi networks operated by the facilities operator and private networks created by slicing a portion of a public network’s bandwidth. Network slicing requires a standalone 5G (core) network. In general, deployments of standalone 5G systems have been slower than anticipated. Even when standalone 5G networks are available, DSA’s understanding is that integration with the mobile network operator is more complicated.</p> <p>The EIRP limits that CST has proposed for private networks in the 4 GHz band are considerably higher the those for Standard Power Access Points operating under control of an AFC system in the 6 GHz band. Based on the EIRP limit (and corresponding coverage area), there are going to be use cases where 4 GHz private networks will be the preferred solution. Furthermore, in some cases, private 5G networks could be an extension of an enterprise Wi-Fi network to address outdoor coverage and mobility requirements.</p> |
| 4 | 2 | <p>Are there any other matters related to the Eligibility section that CST should consider?</p> <p>No</p> |
| 6 | 3 | <p>Are there any challenges in mandating the hosting of AFC system Data Base in the Kingdom?</p> |

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| | | It is the most efficient and most secure for AFC systems to be hosted in the cloud. |
| 6 | 4 | <p>Are there any challenges in the integration between AFC systems in the Kingdom? If so, please elaborate more and how to overcome it.</p> <p>In the United States and Canada, AFC systems do not need to synchronize. Each AFC system obtains the same current information on incumbent operations in the 6 GHz band by periodically contacting the relevant database(s) operated by the respective regulators. The DSA urges the Kingdom to adopt a similar approach.</p> |
| 6 | 5 | <p>What are the minimum and maximum AFC Providers can operate in the Kingdom? Please support your response.</p> <p>A minimum of one AFC Provider is required. The market will determine the maximum number of AFC Providers that is commercially viable. DSA’s understanding is that there are different AFC business models. It is hard to know beforehand which ones will be successful in the Kingdom.</p> |
| 6 | 6 | <p>What are the main challenges that could encounter “WLAN” device manufacturers upon working alongside AFC providers? And how could CST assist in this regard?</p> <p>Manufacturers of 6 GHz Standard Power Access Points (and Fixed Client devices) and AFC providers seeking to operating in the Kingdom will benefit from the learnings of similar Standard Power device deployments in the United States and Canada. The parties (WLAN device manufacturers and AFC providers) had to work through a series of practical / standardization issues to make AFC systems interoperable. For example, the Wi-Fi Alliance developed an AFC System-to-Device Interface protocol specification.</p> |
| 6 | 7 | <p>Are there any other matters related to the Eligibility to Operate an AFC System section that CST should consider?</p> <p>No</p> |
| 7 | 8 | <p>Are there any challenges to comply capabilities stated in section (7.1)? if so, please elaborate more with examples of the challenges.</p> <p>No, section 7.1 is clear.</p> |

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| 7 | 9 | <p>Are there any other matters selected to the Technical Requirements for Standard Power Access Points and Client Devices section that CST should consider?</p> <p>No</p> |
| 8 | 10 | <p>Does the AFC have the necessary capabilities to collect the required data mentioned in section (8.1)?</p> <p>An AFC system has the necessary capabilities to collect the required data described in section 8.1.3.</p> |
| 8 | 11 | <p>Are there any other matters related to the communication between an AFC and Standard Power Access Points and Fixed Client Devices section that CST should consider?</p> <p>No</p> |
| 9 | 12 | <p>What are the main datasets required from CST to provide in order to enable AFC system to work efficiently?</p> <p>The main datasets are those listed in the Appendix for the protection of fixed point-to-point service.</p> |
| 9 | 13 | <p>Is the requirement to retrieve incumbent data in the 6 GHz band referred to in section (9-2) sufficient to ensure protect incumbent users alongside keeping AFC system running?</p> <p>Yes, the requirement that an AFC retrieves incumbent data provided by CST once a day will ensure that incumbents operating in the band will be protected from receiving harmful interference. The actions that an AFC system Administrator must take if it is unable to access the CST database(s) containing incumbent data after one full day since the previous contact seems reasonable.</p> |
| 9 | 14 | <p>Are there any other matters related to the AFC System Determination of Available Frequencies and Associated Maximum Power Levels section that CST should consider?</p> <p>No comments</p> |
| 10 | 15 | <p>In the event that CST decides to impose Spectrum fees in the future, what are the suggested models for that?</p> |

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| | | No comments |
| 10 | 16 | <p>Are there any other matters related to Spectrum Fees section that CST should consider?</p> <p>No comments</p> |
| 11 | 17 | <p>Are there any other matters related to AFC System Data Retention and Sharing that CST should consider?</p> <p>CST should consider adding a paragraph regarding the length of time an AFC operator needs to retain AFC data for a given Standard Power Access Point.</p> |
| 12 | 18 | <p>Are there any other matters related to AFC System Security section that CST should consider?</p> |
| 13 | 19 | <p>Are there any other matters related to Discontinuance or Modification of Operations section that CST should consider?</p> |
| 13 | 20 | <p>Does the AFC System have the technical capability to operate on different frequency band in the future to enable more radio services?</p> <p>The AFC for Standard Power Access Points (and Fixed Client devices) operating in the 6 GHz band implements the technical rules for the 6 GHz band. The AFC is a mathematical representation of the technical rules and models. The AFC takes information regarding incumbent operations in the 6 GHz band and information about the Standard Power Access Points (and Fixed Client devices) and plugs it into the models to determine the channel availability and the maximum EIRP for each available channel.</p> <p>In theory, with different algorithms (to represent different rules) and different inputs (to reflect different incumbents), a 6 GHz AFC can be expanded to a different band, or a new AFC covering the different spectrum band created. There is a question of whether there would be a commercial interest to either expand existing 6 GHz AFC or to create a new AFC for a different band.</p> |
| 13 | 21 | <p>Does the AFC system have the technical capability to enable both “WLAN” and “IMT” services in the 6 GHz frequency band. If not, we would appreciate further details on the feasibility of operating both services within the 6 GHz frequency band. This inquiry arises from recent discussions regarding the utilization of part of the band for IMT services by certain countries in region [1].</p> |

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| | | <p>The idea of WLAN and IMT sharing a band is politically appealing. Studies conducted by CEPT have shown that if IMT operates outdoors at reduced EIRP levels in the range of 50 dBm (in a 100 MHz bandwidth), then the possibility for some form of sharing exists. If on the other hand, the IMT system is operating at EIRP levels of more than 80 dBm, which is what the mobile industry is advocating for, unfortunately IMT will not be able to share the band with WLAN in any configuration.</p> |
| 13 | 22 | <p>Is there a demand to enable Fixed Wireless Access (FWA) services in the 6 GHz frequency band? If yes, please elaborate.</p> <p>The DSA does not see IMT FWA in the 6 GHz band as a practical commercial offering. The building entry losses at 6 GHz are significant, especially for highly energy efficient buildings. In theory, if the base station’s EIRP limit is made high enough it can reach indoor user devices. This is the reason why the IMT community is now pursuing an EIRP limit for the upper 6 GHz band substantially higher than the EIRP limit used at the basis for the WRC-23 decision for ITU Region [1]. The practical challenge is getting the uplink from the user equipment back to the base station, overcoming significant building entry loss.</p> <p>On the other hand, FWA using outdoor SP license-exempt access in a Point to Point or Point to Multipoint configuration is an application that could be enabled once CST enables standard power devices to operate in the 6 GHz band.</p> |
| 13 | 23 | <p>What alternative frequency bands are available to meet the demand for Fixed Wireless Access (FWA) services, aside from the 6 GHz band?</p> <p>In the United States, mobile operators using their spectrum holdings in the 2.5 GHz and mid-3 GHz band to provide FWA. In general, the lower the frequency, the greater the coverage area. CST should examine frequency band below 4 GHz for FWA.</p> |