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DSA
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September 30, 2021

Communications and Information Technology Commission (CITC)
Al-Nakheel District
Prince Turki Bin Abdul Aziz I Street intersection with Imam Saud Bin Abdul Aziz Road
PO Box 75606, Riyadh 11588
Saudi Arabia

Spectrum.Strategy@citc.gov.sa

Re: DSA Comments to the Public Consultation on "Public Consultation on Spectrum Light Licensing".

Dear Sir/Madam,

The Dynamic Spectrum Alliance ("DSA"[1]) respectfully submits its comments in response to the *Public Consultation on Spectrum Light Licensing* ("Public Consultation").

The DSA commends the Communications and Information Technology Commission for its forward-looking approach to spectrum management, as evidenced by the release by the Public Consultation and its intent to move forward with light licensing in 2022. We believe a light licensing approach, together with the introduction of automated shared spectrum technology, will assist CITC to introduce new spectrum access options that will benefit competition, create conditions for innovation, and spur more rapid deployments of 5G networks and services.

We also congratulate CITC for making the 5925-7125 MHz ("6 GHz band") available for low power indoor ("LPI") and indoor/outdoor very low power ("VLP") devices throughout the Kingdom of Saudi Arabia ("KSA"). The proposed light licensing in the 6 GHz band for higher power ("standard power") WLAN devices that can operate both indoors and outdoors complements CITC's previous actions by establishing a new category of devices better suited for enterprises and industrial settings. More broadly, the CITC's proposal to introduce light licensing across a number of frequency bands not only will improve spectrum utilization but will more importantly stimulate innovation and economic growth across the KSA.

[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

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The DSA provides the follow responses to the questions contained in the Public Consultation:

Question 1: Are the proposed timetables for the introduction of the light licensing phases reasonable?

CITC's *Spectrum Outlook for Commercial and Innovative Use 2021- 2023* ("Spectrum Outlook") released earlier this year identified several spectrum bands where it intends to adopt a light licensing regime. These included all or parts of the 4000-4200 MHz band, the 10-10.5 GHz band, the 28 GHz band, the 71-76//81-86 GHz band, and the 5.925-7.125 GHz band. Table 2 of the Public Consultation lists additional frequency bands CITC proposes be subject to light licensing, including the 57-71 GHz band and the 92-94 GHz bands.

In Phase One, the Public Consultation states that lightly licensed spectrum users will be permitted access to spectrum which is not currently used by incumbent/existing users in the KSA.[2] In Table 2, the frequency bands identified for Phase One are: 27.5-27.9 // 28.5-28.9 GHz, 57-71 GHz, 74-76 // 84-86 GHz, and 92-94 GHz. Phase One users will be required to provide the information listed in Section 2.1.1 to CITC as part of the registration process, through a paper-based application form.[3] CITC will access this information in the event there is a bona fide complaint of harmful interference from an incumbent user in an adjacent band to help identify the source and remedy the situation, if required.

The DSA believes that the proposed timetable for Phase One is reasonable under the technical parameters listed for the light licensed bands in Table 3 (e.g., fixed point-to-point ("P2P"), point-to-multipoint ("P2MP") links in the 27.5-27.9 // 28.5-28.9 GHz and 57-71 GHz bands, and fixed point-to-point links in the 74-76 // 84-86 GHz and 92-94 GHz bands.

The DSA supports CITC initiating Phase Two in H2 2022 with the understanding that, "Not all of the potential bands will be released at the same time, as some may require a longer period to coordinate with existing users."[4] The DSA believes that a number of gating factors will impact the timing of database solutions for Phase 2, including the type of incumbent services requiring protection in the light licensed band and adjacent bands, whether the interference mechanism is single-entry or aggregate, the frequency with which lightly licensed devices need to check back with the database, the comprehensiveness (and accuracy) of CITC 's data sets on the current usage in the proposed light licensed bands, and the interface by which CITC make the information available to the database(s).

The DSA believes that CITC should place light licensing of the 5925-7125 MHz band at the top of its queue for H2 2022. As CITC noted in the Spectrum Outlook, there are limited fixed deployments in the 5925-7125 MHz band in the KSA.[5] Additionally, CITC's *Public Consultation of Radio Fixed Links* that closed earlier this year should provide sufficient information on current usage by fixed link operators to permit light licensing in the 6 GHz band

[2] *See* Public Consultation at Section 2.1.1.
[3] *See* Public Consultation at Section 2.4.
[4] *See* Public Consultation at Section 1.2
[5] *See* Spectrum Outlook at page 50.

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to get underway through a database system that includes the functionality of the first two examples of 'database' implementation provided in Section 1.2. Equally important are the emerging WLAN standard power device ecosystem and the progress made in the development of commercial Automated Frequency Coordination ("AFC") systems in the United States required for standard power RLAN operations in the 5925-7125 MHz band.[6]

Concurrent with the deployment of a simpler database by H2 2022 for light licensing in the 6 GHz band, work could also progress on developing an AFC for the KSA. The AFC system would incorporate the functionality of the first three examples of 'database' implementation CITC provided in Section 1.2 and could be made to incorporate the fourth example listed ("dynamic database"), if needed. Depending on the timeline CITC establishes for completing the re-farming of the fixed links in the 6 GHz to another band, an AFC may not be required.

Question 2: Do you agree that a fully autonomous system should be introduced at a later date?

The DSA believes that any spectrum management system should be made as simple as possible to achieve the tasks at hand in the most cost-effective manner. As it noted in its report, *Automated Frequency Coordination: An Established Tool for Modern Spectrum Management,*[7] spectrum management systems run the gamut from the simple pen and paper method all the way to the cloud-based Spectrum Access System ("SAS") certified by the U.S. regulator for managing different tiers of user rights in the 3550-3700 MHz Citizen Broadband Radio Service ("CBRS") frequency band.

The partly-automated spectrum management system for TV white spaces ("TVWS") and fully-automated AFC for the 6 GHz band under development in the United States (and other countries) fall along this continuum, closer to the SAS in concept and operation than the pen and paper approach. The spectrum management systems for TVWS, CBRS, and 6 GHz are autonomous in that the technical and service rules for operations in each band are converted into algorithms and based on the device inputs provided as part of the database query, a list of available channels and the maximum power available on each available channel for that location is provided directly back to the device.

DSA's view is that regulators should automate spectrum management processes wherever possible and move toward autonomous database systems once weighing the costs and benefits for doing so. Once the decision is made to move forward with the autonomous system, the two first order questions are: (1) what entity should develop the database system and (2) what entity should operate it.

The regulatory agency can develop the database system in-house, pay a third party to develop the database system, or encourage the private sector to develop database systems. If the regulator develops the database

[6] *See* "FCC Requests 6 GHz Automated Frequency Coordination Proposals" released the 28th of September 2021, available at https://www.fcc.gov/document/fcc-requests-6-ghz-automated-frequency-coordination-proposals
[7] Automated Frequency Coordination (dynamicspectrumalliance.org)

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system itself, it is likely it intends to operate it. If the third party develops the database system, the regulatory agency may choose to operate it or have a third party operate it. If the private sector develops one or more database systems, it is highly likely the private sector will operate it and charge a fee to users. If necessary, the regulatory agency will have to identify whether any coordination mechanism among database operators is necessary.

These two first order decisions also have a significant impact on light licensing fees. If the regulatory agency develops or pays for the development of the database system, it will want to recoup the fixed cost over some period of time. If the regulatory agency operates the database system, it will want to recoup its operational costs. All things being equal, the participation of the regulatory agency in the development and operation of the database system will lead to a higher minimum light licensing fee than if the private sector is permitted to develop and operate the database system. Furthermore, allowing the commercial sector to develop and operate database systems will have the added benefit of creating incentives for ongoing innovation and cost reduction.

Based on CITC's statement that not all bands will be released for light licensing at the same time, the DSA proposes that it take a modular approach to the development of its database system rather than creating a single database tool to manage all the proposed light licensed bands. A modular approach will speed the process, as bands where incumbent protection is minimal can be made available for light licensing and not have to wait on bands where the incumbent protection is more complex. For example, based on the incumbent protection requirements, the DSA can envision an automated and autonomous database module that combines the 71-76 GHz, 81-86 GHz, 92-94 GHz, and possibly 57-71 GHz bands. CITC should consider grouping other light license bands in a combined database module where it makes sense.

Question 3: Do you have any comments on the proposed foundations and aims for the light licensing regime?

The DSA agrees that it is essential that the light licenses, regardless of the band, will be issued on a no interference / no protection basis. CITC's intent for the proposed light licensed Low Power 5G service in the 5925-7125 MHz range is 5G NR-U. Nevertheless, in Table 3 of the Consultation document, for the proposed 'Low Power 5G' services in the 5925-7125 MHz band, the proposed technical requirement is 3GPP TR38.104. The 3GPP standard is for 5G NR, which the DSA does not believe operates on a no interference / no protection basis. Incorporating by reference 3GPP TR38.104 into CITC's light licensing regulations for the 5925-7125 MHz band would be inconsistent with the intent of the regulation.

In its comments to the CITC Spectrum Outlook, the DSA emphasized that the light licensing is conducted through the registration process rather than through some form of spectrum assignment. The DSA takes this to mean that when the CITC issues light licenses (in increments of 20 MHz) for spectrum in the 5925-7125 MHz band, the 20 MHz (and increments) is for a non-exclusive license for any 20 MHz within the 5925-7125 MHz band. It would be up to the entities receiving the light licenses to self-coordinate within a common area. It is not evident from the Public Consultation whether the intended light licensing service area is nationwide or for service area tiers (e.g. Emirates of the Provinces, Governorates, Municipalities, etc.).

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The DSA agrees with CITC that light-licensing approaches are best suited for fixed P2P applications and those with local area P2MP use rather than for mobile stations.[8] Thus DSA was surprised that CITC proposed light licensing for mobile use both in the 4000-4200 MHz band and the 5925-7125 MHz band for Phase Two. Mobile operations are more complex to manage and require a more sophisticated autonomous spectrum management system such as an AFC or SAS (depending on the incumbent operations requiring protection).

Question 4: Do you agree with the frequency bands proposed to be lightly licensed by CITC

The DSA supports RLAN and P2MP lightly licensed operations in the 5925-7125 GHz band on a no-protection, no-interference basis as it will permit access points to operate at a higher EIRP level and power spectral density than LPI device operations.

The DSA believes that at the proposed technical limits P2P and P2MP fixed links operating in the 57-71 GHz frequency range can operate in the KSA on a license-exempt basis as in many other countries. For example, the U.S. rules license-exempt fixed P2P transmitters located outdoors, intended for applications such as backhaul, are limited to an average power of 82 dBm.[9] The DSA recognizes that the proposed power levels in Table 3 of the Public Consultation are based on ETSI EN 302 217, which provides for a significantly lower e.i.r.p. limit. The ETSI limits, when combined with the 10-meter height above ground level limit for the antenna height, raises concerns that light-licensing the band will be of limited commercial interest. In its response to Question 10, DSA suggests CITC adopt a higher e.i.r.p limit commensurate with the U.S. rules. Short of this, the DSA recommends that CITC not light license the 57-71 GHz band.

The DSA agrees with CITC in making the 4000-4200 MHz band available for light licenses. While dynamic database solutions can be developed to support mobile operations, a database system for fixed P2MP links would be easier to design and implement.

The DSA agrees with CITC with respect to light licensing the 71-76 GHz, 81-86 GHz, and 92-94 GHz bands.

Question 5: Are there any other bands which you would like to see light licensing applied to? If so, please specify them and provide a detailed approach to introducing light licensing in them.

At this time, there are no other frequency bands that the DSA would like to see light licensing applied to. The DSA proposes that CITC consider license-exempt operations in the TVWS in a separate proceeding.

Question 6: Do you accept that these requirements are reasonable for the first phase of light licensing?

It is important that Phase One requirements, such as the geographic co-ordinates and height of the transmitter and receiver(s)s, be determined (and provided manually) by the light license holder.

[8] *See* Public Consultation at Section 1.3.
[9] *See* United States Code of Federal Regulations, Title 47, Chapter 1, Subchapter A, Part 15, Section 255(c)(ii).

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Question 7: Do you have any additional comments on the approach proposed for access to spectrum in phase one?

No additional comments.

Question 8: Do you accept that these requirements are appropriate for the second phase of light licensing?

Yes.

Question 9: Do you have any additional comments on the approach proposed for access to spectrum in phase two?

No additional comments.

Question 10: Do you agree with the technical parameters proposed for each of the bands? If not, please provide your rationale in detail. Also, if you believe that other uses should be introduced, please specify them in detail

5925-7125 MHz Band

The DSA supports light licensing for high power WLAN, P2P fixed links, and P2MP links in the 5925-7125 MHz band. The DSA agrees that the maximum channel bandwidth should be 320 MHz to allow for the channel size envisioned under Wi-Fi 7. While the CITC proposed technical requirements cite ETSI EN 303 687, the DSA believes that the ETSI EN 303 678 is the wrong benchmark for CITC to use for light licensing the entire 6 GHz band given that the ETSI standard only covers the 5925-6425 MHz frequency ranges, includes only LPI and VLP device categories, and has an e.i.r.p limit of 30 dBm.

If over time Europe adopts a new work item for the upper 6 GHz band that leads to new regulations, ETSI EN 303 687 would be amended accordingly. But today, ETSI EN 303 678, is not a good fit for the device category and operational limits envisioned for light licensing. Accordingly, the DSA strongly recommends that the higher power standard power access points permitted under light licensing has an e.i.r.p. limit of 36 dBm and a power spectral density ("psd") limit of 23 dBm/MHz. These limits have been adopted in both the United States and Canada. CITC should also consider permitting standard power access points used in fixed point-to-point WLANs to operate at power levels above 36 dBm e.i.r.p. to provide greater coverage.

Additionally, the DSA recommends that CITC not establish a height above ground limit for standard power WLANs so long as they operate under control of a database or an AFC system. The database or AFC will determine the list of available channels and maximum e.i.r.p. on each available channel based on the WLAN co-ordinates and height above average terrain. If the height above ground level is capped at 10 meters, these higher power access points could not be use above the third floor in apartment and office buildings.

Similarly, the DSA believes that CITC should not use 3GPP TR38.104 'local area' base stations as the benchmark for Local Power 5G services (NR-U). 3GPP TR38.104 is the standard for 5G NR, not 5G NR-U. That is, 3GPP

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TR38.104 is associated with licensed spectrum, not license-exempt spectrum. The accompanying Note for 5925-7125 MHz cites 3GPP Band n96, which corresponds to License Assisted Access, and in the future will correspond to NR-U. The channel bandwidth limit in Band n96, though, is 80 MHz, not 100 MHz as included in the proposed technical requirements.

57-71 GHz Band

The DSA agrees that low power and predominantly indoor use cases in the 57-71 GHz band, such as Multi Gigabit Wireless Systems, WiGig, and Field Distance Sensors (e.g., low power radars incorporated into mobile phones), should not be light licensed. The most likely light licensed use case is for wireless backhaul. To support the wireless backhaul use case, the DSA proposes that CITC increases the e.i.r.p. limit for fixed P2P link to 82 dBm as permitted in the regulations of the United States. The DSA also suggests that CITC increases the height above ground limit to a value greater than 10 meters, especially as this frequency range will be licensed in Phase One, where there are no incumbent users within the KSA. Without such an increase, given all the other license-exempt uses in the band, the DSA suggests that CITC consider not permitting light licensing in the frequency range.

Question 11: Do you have any comments concerning the eligibility criteria? Would you like to have less restrictive eligibility rules? Please explain how you would see this functioning.

The DSA recommends that CITC permit private entities to obtain a light license for spectrum in the 5925-7125 MHz band for WLAN, P2P, and P2MP use. In particular, permitting private users to obtain licenses will be helpful for enterprises that operate their own IT systems and want to add higher power WLAN operations at their facility. Additionally, CITC should also permit vendors to obtain light licenses on a nationwide basis. In this way, private entities (vendors) can provide the lightly licensed spectrum as part of their combined product / service offering and the light licensing process will become transparent to their customers.

Question 12: Do you have any comments concerning the application process?

The DSA suggests that the first light licensing period is for two years, and each succeeding period is for one year. The rationale for having a longer first light licensing period is based on DSA's experience that, despite everyone's best intentions and efforts, new programs often take longer to get underway than anticipated.

Question 13: Do you have any comments concerning the proposed fees for the light licenses?

Under CITC's proposed fee structure for the 5925-7125 MHz band, the suggested range for the annual light licensing fee is SAR 1000-3000 for a bandwidth of 20 MHz. The suggested range corresponds to $267-$800 USD per 20 MHz of bandwidth. The DSA understands the reasons for CITC proposing the bandwidth unit for light licensing be 20 MHz. However, the DSA is concerned that this fee structure is too high. Imagine an industrial facility or some other large enterprise that wants to light license the entire band to meet its needs for indoor and outdoor standard power operations. Light licensing all 1200 MHz would cost up to $48,000 USD per year

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(SAR 180,000). The counter example is a business park, mall, or some other venue where there are many users that would share the available bandwidth.

Optimizing the fee structure in terms of both unit of bandwidth and SAR per unit of bandwidth is challenging and requires additional consideration. Ultimately, the market will determine whether the fee structure for the light licensed spectrum CITC establishes is correct. If the annual light license fee per unit of bandwidth set too high, private users will substitute LPI for standard power WLAN devices wherever possible indoors and may choose to focus more on the 5 GHz band outdoors.

The DSA appreciates the opportunity to participate in the consultation and to present our views and comments. We are available to discuss these comments and provide any additional information.

Respectfully submitted,

Martha SUAREZ
President
Dynamic Spectrum Alliance