Dynamic Spectrum Alliance Limited
3855 SW 153rd Drive
Beaverton, OR 97003
United States
http://www.dynamicspectrumalliance.org

December 18, 2020

Irene Kaggwa Sewankambo
Ag. Executive Director
Uganda Communications Commission
Plot 42-44 Spring Road
Bugolobi, P.O. Box 7376
Kampala Uganda
registry@ucc.co.ug

Re: Consultation on the Opening and Licensing of the 71-76/81-86 GHz Band (E-Band)

Dear Ms. Executive Director:

The Dynamic Spectrum Alliance (DSA)[1] is pleased to submit these comments on the Uganda Communications Commission's (UCC or the Commission) Information Memorandum on the authorization and usage requirements of the E-Band. DSA applauds the Commission for taking this important step to authorize the use of E-Band in Uganda for terrestrial systems. The unique "pencil beam" nature of E-Band links coupled with a large amount of contiguous bandwidth make this band particularly attractive for high-capacity backhaul and support the use of innovative licensing models such as database-assisted and self-coordinated light-licensing. In order to maximize the efficiency and usefulness of E-Band today and well into the future, DSA respectfully offers the following comments on the Commission's proposed framework:

(1) Adopt a database-assisted, self-coordinated light-licensing approach for E-Band

DSA recommends that the UCC adopt a uniform database-assisted light-licensing model for the entire band, rather than adopt two separate channel blocks for license exempt and fully licensed channels. As the United States Federal Communications Commission noted when it adopted a self-coordinated light-licensing framework for E-Band, the highly-directional "pencil-

[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 DSA members is available on the DSA's website at www.dynamicspectrumalliance.org/members.

Dynamic Spectrum Alliance Limited
3855 SW 153rd Drive
Beaverton, OR 97003
United States
http://www.dynamicspectrumalliance.org

beam" signal characteristics of E-Band links "permit systems in those bands to be engineered in close proximity without causing harmful interference," obviating the need for the traditional point-to-point frequency coordination process.[2] This framework has inspired regulators around the world -- including Nigeria, India, the United Kingdom, Australia, and others -- to adopt similar self-coordinated approaches, many of which are (or will be) "supported by online databases that licensees use to upload licence applications and to obtain information on available link locations, as well as details of existing use that must be protected."[3]

DSA recommends that the Commission permit users to apply for a non-exclusive, nationwide E-Band license, and then register individual links in an online registration database on a first-come first-served basis. To register a link, a licensee would use an online portal to enter the latitude/longitude and other required parameters. The database manager -- which could be the UCC itself or one or more third-party database managers -- would then verify that the proposed link path will not interfere with other registered users (or violate other regulatory constraints), and if not, it would enter the link in the database. Licensing fees would be assessed on a reasonable, per-link basis.

Using the U.S. approach as a model, DSA recommends that the Commission permit users to apply for a non-exclusive, nationwide E-Band license, and then register individual links in a registration database on a first-come first-served basis. To register a link, a licensee would use an online portal to enter the latitude/longitude and other required parameters. The database manager would then verify that the proposed link path will not interfere with other registered users (or violate other regulatory constraints), and if not, it would enter the link in the database. Licensing fees would be assessed on a reasonable, per-link basis.

This approach has a number of advantages. By automating the link registration and coordination process, light-licensing will reduce administrative burden on the Commission. Moreover, a self-coordinated model can support multiple service types on a technology neutral basis, including both fixed point-to-point networks and emerging technologies such as stratospheric Internet platforms (e.g., HAPS).[4] In addition, an automated process with predictable

[2] *See* Dynamic Spectrum Alliance, *Automated Frequency Coordination: An Established Tool For Modern Spectrum Management*, White Paper, 18-20 (March 2019) (citing FCC, "Wireless Bureau Opens Filing Window for Proposals to Develop and Manage Independent Database of Site Registrations by Licensees in the 71-76 GHz, 81-86 GHz and 92-95 GHz Bands," Public Notice (rel. March 12, 2004)).

[3] David Abecassis, Janette Stewart, and Alex Reichl, "Review of Spectrum Management Approaches for E-Band (70/80GHz) in Selected Markets," 4-7, Analysys Mason (Jan. 5, 2016).

[4] To accommodate stratospheric Internet platforms such as HAPS in a link registration database, the database manager could permit registration of a ground station antenna with a minimum elevation angle and azimuth range to reflect a ground-to-air link (creating an inverted cone around the ground station). This "3D" spectrum management approach is currently being proposed for E-Band in the United States. *See In the Matter of Modernizing and Expanding Access to the 70/80/90 GHz Bands, et al.*, WT Docket No. 20-133, et al., Comments of Loon LLC (Aug.

per-link fees can enable rapid deployment of backhaul spectrum to unserved and underserved areas by reducing turnaround time on license applications and access costs for backhaul spectrum. And by making available a database of links already in operation, the Commission can facilitate more efficient network planning and self-coordination for future networks.

Importantly, adopting a self-coordinated, database-driven framework today can set the foundation for dynamic management of the band in the future, which will be important as a diversity of systems are deployed in E-Band, including fixed, mobile, and satellite backhaul networks. For example, by making available real-time information about moving links (e.g., antenna locations, radiation patterns, ephemerides, and beam-pointing information) through an application programming interface (API), a dynamic spectrum management system for E-Band could enable more efficient self-coordination and coexistence of ground-based and aerospace backhaul networks (e.g., HAPS, NGSO satellites) in the same geographic region. DSA understands that systems have already been deployed in production that can orchestrate and facilitate coexistence between static point-to-point links and networks of moving antennas, whether they are on land, at sea, in the sky, or in space.[5]

(2) Lift the spectrum cap to ensure sufficient capacity for end users

E-Band fixed links hold tremendous promise for ultra-wide high capacity backhaul links, whether they are used for fixed wireless networks or to support mobile networks. However, in order to ensure that end users have sufficient capacity to meet demand, particularly for bandwidth intensive applications such as video and online learning, it is critical that licensees have the flexibility to leverage the entire band. Indeed, the ITU band plan in Recommendation ITU-R F.2006 permits aggregation of as many as 19 pairs of 2x250 MHz channels, and national regulators have taken a similarly flexible approach. For example, Nigeria's E-Band regulations permit the use of 2x2.875 GHz of spectrum in the 71-74 GHz/81-84 GHz bands for point-to-point applications using a light licensing model.

5, 2020); *See Modernizing and Expanding Access to the 70/80/90 GHz Bands, et al.*, WT Docket No. 20-133, et al., Notice of Proposed Rulemaking and Order, FCC 20-76 (rel. June 10, 2020) (NPRM). For more details on how 3D spectrum management would work, *see* Comsearch, Aeronet Aviation and Maritime Communications Systems; Compatibility with Incumbent E-band Fixed Services and Link Registration System, 25, 42-44 (May 2, 2019), *available at* https://ecfsapi.fcc.gov/file/105101488817057/Aeronet%20Comsearch%20Ex%20Parte%20(5-10-19).pdf.

[5] Brian Barritt and Vint Cerf, "Loon SDN: Applicability to NASA's Next-Generation Space Communications Architecture," 2018 IEEE Aerospace Conference, *available at* https://research.google/pubs/pub47138/.

Dynamic Spectrum Alliance Limited
3855 SW 153rd Drive
Beaverton, OR 97003
United States
http://www.dynamicspectrumalliance.org

For that reason, DSA recommends that the Commission permit aggregation of channels of at least 2000 MHz (4x(2x250) FDD pairs), but ideally with no spectrum cap at all. Enabling wider channels will not meaningfully impact interference risk due to the pencil-beam nature of E-Band links, while at the same time ensuring that providers can meet capacity demands today and into the future. And any additional risk of interference can be addressed through a self-coordination mechanism, which will ensure that links are placed with adequate physical and angular separation to prevent the boresight alignment necessary to cause interference.

DSA appreciates the opportunity to contribute and stands ready to assist the Commission as it develops this important proceeding.

Sincerely,

Martha Suarez
President
Dynamic Spectrum Alliance