

OET Experimental License Request

Harris CapRock Communications, Inc. (“Harris CapRock”), by the present application, respectfully requests experimental authority to operate a total of up to three (3) earth stations at a facility located in Melbourne, Florida at 28°5’24” N, 80°38’20.4” W (“Melbourne 2”). Harris CapRock is developing and testing new earth stations to communicate with the Ka-band non-geostationary satellite orbit (“NGSO”) fixed-satellite service (“FSS”) system operated by O3b Limited (“O3b”), which has been previously authorized by the FCC to communicate with earth stations located in the United States.¹ In this filing, Harris CapRock seeks an experimental license for a period of two (2) years, commencing on April 15, 2015, to test terminal uplink transmissions in the 28.6-29.1 GHz band.

Harris CapRock will operate the 2.4m Ka-band terminals (Model ST5000-2.4) for non-commercial development, testing and demonstration purposes with the O3b system at the Melbourne 2 location. Harris CapRock will evaluate antenna performance, including tracking characteristics, throughput, link analyses and potential applications of the antenna with the O3b system, including interactive video teleconferencing, interactive access to complex web content from the Internet and very large file transfers.

Harris CapRock was recently granted an experimental STA to test Model ST5000-2.4 antennas at a nearby location in Melbourne, Florida at 28°1’51” N, 80°35’58” W (“Melbourne 1”).² Harris CapRock is proposing to conduct identical experimental operations at the Melbourne 2 facility. Accordingly, the Melbourne 1 application is attached hereto as Exhibit A and contains relevant information relating to the earth station technical parameters, antenna performance, link budgets, radiation hazard and general antenna specifications.

In addition, O3b has been granted an STA for nearly identical earth stations to communicate with the O3b system at the Melbourne 2 facility using similar emissions and the same 28.6-29.1 GHz frequency band.³ Thus, Harris CapRock’s proposed experimental earth station operations are

¹ For example, in September 2012, the Commission granted O3b a license to operate a gateway earth station in Haleiwa, Hawaii, to communicate with its NGSO FSS system (*see* FCC File No. SES-LIC-20100723-00952, granted September 25, 2012). In June 2013, the Commission granted O3b a license to operate a second gateway in the United States, located in Vernon, Texas (*see* FCC File No. SES-LIC-20130124-00089, granted June 20, 2013). In May 2014, the Commission granted O3b a blanket license to operate maritime earth stations (*see* FCC File No. SES-LIC-20130528-00455, granted May 13, 2014).

² *See* File No. 1105-EX-ST-2014, in effect until July 1, 2015.

³ *See* File No. SES-STA-20130620-00515. O3b was granted an extension of its STA through December 30, 2014 (*see* File No. SES-STA-20140430-00326). O3b currently has a pending STA extension request that was accepted for filing on January 14, 2015, and is currently with the Commission for review (*see* File No. SES-STA-20141212-00889).

consistent with ongoing earth station operations previously approved by the Commission at the same geographic location.

Grant of the requested authority will serve the public interest by allowing Harris CapRock to continue development of a new line of antennas that could greatly benefit government and commercial customers. Moreover, the proposed experimental operations raise no concern regarding potential interference to co-frequency systems and services, will be conducted on an unprotected, non-interference basis and will otherwise comply with Part 5 of the FCC Rules.

Proposed Site

As noted above, earth stations have been previously authorized to communicate with the O3b system at the subject location in the same frequency bands.⁴ In addition, as discussed in the following section, no coordination with other co-frequency systems or services is required. Nonetheless, given the experimental nature of the operations proposed herein, Harris CapRock agrees to accept all interference from other authorized spectrum users and will immediately suspend operations in the event of interference to other systems and services.

The 2.4m antenna terminals will be mounted on a temporary fixed platform in a controlled test area where general public access is prohibited. Although the pointing angle of the antennas will change as O3b's in-orbit satellites are tracked, the platform will remain stationary during the demonstration. Only trained operators and technicians will be permitted to access the terminals, and specific instruction will be provided with respect to radiofrequency hazard characteristics of the antenna.

Proposed Spectrum Use

Harris CapRock's proposed earth station operations in shared bands are consistent with the Commission's rules and policies. Harris CapRock first notes that O3b has completed all necessary coordination with U.S. government satellite networks operating in the Ka-band, including GSO and NGSO networks, as well as their associated specific earth stations filed under 9.7A and 9.7B of the ITU Radio Regulations through other administrations. O3b has also completed coordination, according to U.S. footnote 334 of the FCC Table of Frequency Allocations, with the U.S. government, and this US334 coordination agreement specifically provides for additional earth stations in U.S. territory operating with O3b's satellites.

⁴ See File No. SES-STA-20130620-00515; *see also* File No. SES-STA-20140430-00326.

Harris CapRock will limit terminal uplink transmission to the 28.6-29.1 GHz band. Under the Commission's Ka-band plan, this band may be used on a primary basis by NGSO FSS systems.⁵ Harris CapRock recognizes, however, that operations under the requested license will be on an unprotected, non-harmful interference basis. The experimental development, test and demonstration operations will adequately protect allocated services operating in this band.

The proposed demonstrations will not cause any interference into or require protection from any co-frequency GSO satellites, and no coordination will be required. As previously shown by O3b, there is an inherent angular separation between the O3b system orbit and the GSO arc from the perspective of earth stations located away from the equator.⁶ The Melbourne 2 site is located further north in latitude than the O3b Hawaii gateway, which results in an even greater angular separation between the O3b and geostationary orbits as viewed from the Earth. This means that the angular separation between the O3b satellites and GSO arc from these locations will be greater than the 7° separation accepted by the Commission when it approved O3b's Hawaii gateway. This ensures that GSO FSS systems will be adequately protected.

Potential interference from the proposed operations into U.S. terrestrial fixed service ("FS") receivers in the 28.6-29.1 GHz band is a non-issue because there is no allocation in the Commission's Ka-band plan for FS stations operating in this band in the United States.

With respect to sharing with other Ka-band NGSO systems, Harris CapRock notes that there are no planned NGSO systems contemplated for deployment throughout the duration of the proposed operations. Moreover, the O3b system is capable of sharing with future NGSO networks operating in the same frequency bands and, therefore, will not preclude additional entry by future NGSO licensees.⁷ Thus, the proposed experimental operations can be authorized on an unprotected, non-interference basis under Part 5 of the Rules.

⁵ See *In the Matter of Rulemaking to Amend Parts 1, 2, 21, and 25 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band, to Reallocate the 29.5-30.0 GHz Frequency Band, to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services*, 11 FCC Rcd. 19005, ¶¶ 59-62 and 79 (1996). See also *In the Matter of Redesignation of the 17.7-19.7 GHz Frequency Band, Blanket Licensing of Satellite Earth Stations in the 17.7-20.2 GHz and 27.5-30.0 GHz Frequency Bands, and the Allocation of Additional Spectrum in the 17.3-17.8 GHz and 24.75-25.25 GHz Frequency Bands for Broadcast Satellite-Service Use*, 15 FCC Rcd. 13430, ¶ 28 (2000).

⁶ See O3b Hawaii License Application, File No. SES-LIC-20100723-00952, Technical Attachment at A.10.1.

⁷ First, the entire O3b constellation will occupy a single circular orbit above the Earth's Equator, which enables an angular separation to be maintained between O3b communications links and the links of other NGSO systems using different orbits. Second, the O3b satellite system uses a combination of multiple tracking antennas and satellite diversity to avoid interference from its system into other NGSO systems and from other NGSO systems into O3b. This further enables the use of angular discrimination to facilitate spectrum sharing, while providing a mechanism for interference avoidance in the rare event that an O3b earth station is pointed at an O3b satellite that is in-line with a satellite of another NGSO system.

Expedited Processing

Finally, Harris CapRock respectfully requests expedited processing of this application. As discussed, earth stations have been previously reviewed and approved by the Commission to communicate with the O3b system at the Melbourne 2 facility in the same frequency bands.⁸ Furthermore, Harris CapRock was recently granted an experimental license to test three (3) Model ST5000-2.4 antennas in the 28.6-29.1 GHz band with the O3b system at the Melbourne 1 facility, which is very close in proximity to the Melbourne 2 location.⁹ Accordingly, the Commission has previously reviewed the technical and operational characteristics of the proposed operations, and may effectively review and approve identical operations at the new proposed site on an expedited basis.

Conclusion

The requested experimental license will allow Harris CapRock to continue development, testing and demonstration of its new 2.4m terminals with the O3b system, and will not result in harmful interference to or require protection from other authorized spectrum users. Accordingly, the proposed operations are consistent with Part 5 of the FCC's rules and within the public interest. Harris CapRock respectfully requests that the experimental STA be granted for a two year period commencing on April 15, 2015.

⁸ See File No. SES-STA-20130620-00515; *see also* File No. SES-STA-20140430-00326.

⁹ See File No. 1105-EX-ST-2014, in effect until July 1, 2015.