

Experimental STA Request

Harris CapRock Communications, Inc. (“Harris CapRock”) respectfully requests experimental authority to test and demonstrate its innovative, new earth station onboard vessel (“ESV”) terminal (Model ST5000-2.4) at test locations in Melbourne, Florida, Miramar, Florida, Malabar, Florida and Houston, Texas. The requested authority enhances a current experimental STA granted to Harris CapRock to test the subject ESV terminal in Ka-band frequencies at the Melbourne and Houston locations and is required to support expanded testing of the new ESV terminal in additional frequency bands.

In this filing, Harris CapRock seeks expedited grant of an experimental STA for a period of six (6) months, commencing on or about July 21, 2015, to test terminal transmissions in portions of the 5.925-6.425 GHz band (“C-band”), the 14.0-14.5 GHz band (“Ku-band”) and the 27.6-28.4 GHz and 28.6-29.1 GHz bands (“Ka-band”). Harris CapRock will operate the Model ST5000-2.4 tri-band terminal for development, testing and demonstration purposes at the following locations: Melbourne, Florida at 28°01’51” N, 80°35’56” W; Melbourne, Florida at 28°5’15” N, 80°38’10” W; Miramar, Florida at 25°58’17.7” N, 80°18’3.7” W; Malabar, Florida at 27°58’47” N, 80°33’23” W; and Houston, Texas at 29°35’54” N, 95°20’50” W.

Background. As the Commission is aware, Harris CapRock is developing and testing a new ESV terminal to communicate with certain C- and Ku-band geostationary satellite orbit (“GSO”) fixed-satellite service (“FSS”) satellites and Ka-band non-geostationary satellite orbit (“NGSO”) FSS satellites operated by O3b. Harris CapRock was recently granted an STA to communicate with the O3b Ka-band NGSO FSS system at the two Melbourne, Florida locations and at Houston, Texas location.¹

Harris CapRock has previously tested C-band ESV transmissions at the Houston facility and in the Melbourne area, where the Commission authorized nearly identical experimental test and demonstration operations,² and Ka-band testing of the new terminal remains ongoing pursuant to the recently granted experimental STA noted above. Harris

¹ See File No. 0454-EX-ST-2015.

² See File No. 0363-EX-ST-2011.

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³ See File No. SES-LIC-20141221-00919 (Call Sign: E140128).

CapRock also has a commercial license to operate C- and Ku-band ESV gateway earth stations at the Miramar facility³ and there have been no reported cases of interference in connection with Harris CapRock's operations at any these locations.

Harris CapRock now seeks consolidated C-band, Ku-band and Ka-band test authority for the ST5000-2.4 terminal. Exhibit A contains relevant information relating to the earth station technical parameters, antenna performance, link budgets, radiation hazard and general antenna specifications for C- and Ku-band testing. In the interest of administrative convenience, Harris CapRock incorporates by reference the Ka-band technical information for the ST5000-2.4 terminal that was previously submitted to the Commission and certifies that it will comply with the approved antenna parameters.⁴ Grant of the requested authority will serve the public interest by allowing Harris CapRock to continue development of this new line of antennas that would greatly benefit government and commercial maritime customers. Moreover, the proposed experimental operations will be conducted on an unprotected non-interference basis, where applicable, and will otherwise comply with Part 5 of the FCC Rules.

Test Sites. As noted, Harris CapRock has been authorized to test Ka-band terminal uplink transmissions in the 27.6-28.4 GHz and 28.6-29.1 GHz bands at the Melbourne and Houston sites,⁵ and has completed coordination with other co-frequency systems and services. Harris CapRock will not commence Ka-band operations at the Miramar or Malabar locations until coordination with terrestrial licensees has been completed. During Ka-band testing at the Miramar and Malabar facilities, the ST5000-2.4 terminal will only communicate with O3b Ka-band NGSO FSS satellites.

Harris CapRock further seeks to test C- and Ku-band terminal uplink transmissions at the Melbourne, Miramar, Malabar and Houston facilities. Harris CapRock has previously tested C-band terminals at the Houston facility and in the Melbourne area, and the Commission has approved commercial C- and Ku-band gateway operations at the

³ See File No. SES-LIC-20141221-00919 (Call Sign: E140128).

⁴ See File No. 0454-EX-ST-2015.

⁵ *Id.* (in effect until November 12, 2015).

Miramar location.⁶ Harris CapRock will not commence new test operations in C-band shared spectrum at any of the test locations until coordination with terrestrial licensees has been completed, in compliance with the condition imposed in its prior C-band experimental license.⁷ The Ku-band is designated for primary use by FSS systems, so there is little risk of interference from test operations in this band. Nonetheless, Harris CapRock will comply with all FCC restrictions on Ku-band ESV uplink operations and take all other actions necessary to avoid interference to U.S. government and other users at each test location.⁸

C-band testing at the Melbourne, Miramar and Malabar locations will be conducted with the following U.S.-licensed GSO FSS satellites: IS-903 at the 34.5° W orbital location, IS-701 at the 29.5° W orbital location, Galaxy 28 at the 89° W orbital location and Galaxy 12 at the 129° W orbital location. At the Houston facility, C-band testing will be limited to the Galaxy 28 and Galaxy 12 satellites.

Ku-band testing at the Melbourne, Miramar and Malabar locations will utilize the following GSO FSS satellites: Telstar 11N at the 37.5° W orbital location, IS-701 at the 29.5° W orbital location, Telstar 12 at the 15° W orbital location, Galaxy 25 at the 93.1° W orbital location and Eutelsat 115WB at the 115° W orbital location. Ku-band testing at the Houston facility will be limited to the Eutelsat 115WB and Galaxy 25 satellites. The only non U.S.-licensed satellite that will be used for Ku-band testing is the Mexico-licensed Eutelsat 115WB, which was recently added to the Commission's Permitted Space Station List.⁹

In all bands, consistent with the Commission's Part 5 rules, 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. In addition, Harris CapRock acknowledges and accepts the conditions of operation set forth in its

⁶ See File No. SES-LIC-20141221-00919 (Call Sign: E140128).

⁷ See File No. 0363-EX-ST-2011 ("Operations must be prior coordinated with existing microwave licensees in accordance with Part 25.203 of the FCC's rules.")

⁸ See, e.g., 47 C.F.R. §25.222.

⁹ See File No. SAT-PPL-20150227-00008 (Call Sign: S2938).

prior C-band ESV experimental authority, similar Ku-band ESV authority and its existing Ka-band test authority.

Spectrum Use. Under the Commission's Ka-band plan, the 28.6-29.1 GHz band is designated for primary NGSO FSS operations and the 27.6-28.4 GHz band may be used by NGSO FSS systems subject to coordination with terrestrial services.¹⁰ Limited experimental operations in both band segments are permitted by Harris CapRock's existing Ka-band experimental STA. Harris CapRock will not operate in the shared spectrum prior to coordination, and recognizes that operations in shared spectrum under the requested STA will be on an unprotected, non-harmful interference basis. The limited, temporary and intermittent nature of Harris CapRock's proposed experimental operations, including additional fixed testing at the Miramar location, will ensure that co-frequency services will not be adversely affected.

In addition, as established in Harris CapRock's prior STA application, the proposed Ka-band operations will not cause any interference into or require protection from any co-frequency GSO satellites. 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.¹¹ The Melbourne, Miramar, Malabar and Houston test sites are all 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.

Stop Buzzer Contact and Other Information. The Harris CapRock point of contact with the authority to suspend immediately the proposed ST5000-2.4 terminal operations is:

¹⁰ 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).

¹¹ See O3b Hawaii License Application, FCC File No. SES-LIC-20100723-00952, Technical Attachment at A.10.1.

Mike Horn
Harris CapRock Communications
1025 West NASA Blvd.
Melbourne, FL USA 32919
Phone: 321-724-3384
Mobile: 321-258-4414
Text: [3212584414@text.att.net](tel:3212584414)
E-mail: mhorn01@harris.com

The secondary point of contact for the proposed experimental operations is:

Harris CapRock Network Control Center
Managed Network Services 24x7 support
4400 S. Sam Houston Pkwy, E.
Houston, Texas 77046
Office: (832) 668-2775
Fax: (713) 987-2894
Email Address: hcc-hou-csc@harris.com

The following exhibit contain additional technical information relating to the proposed experimental operations:

- ST5000-2.4 Description and Technical Characteristics;
- Annex 1 – Antenna Performance Plots (demonstrating compliance with the FCC’s off-axis EIRP spectral density masks, including co-pol and cross-pol);
- Annex 2 - Link Budgets for the ST5000-2.4 terminal; and
- Annex 3 - Radiation Hazard Studies (establishing near-field and far-field region distances). Harris CapRock will follow standard industry procedures to mitigate potential radiation hazards to personnel in controlled environments. (The terminals do not transmit in uncontrolled areas at Harris CapRock test facilities.)

Expedited Processing. Harris CapRock respectfully requests expedited processing of this experimental STA application. As discussed, experimental operation of the ST5000-2.4 terminal has been previously reviewed and approved by the Commission for testing and demonstration in the Ka-band at the Melbourne and Houston sites, C-band experimental operations for similar ESV terminals have been approved subject to appropriate coordination, and Ku-band experimental operations do not raise issues associated with spectrum sharing/coordination with terrestrial services. Harris CapRock will commence test operations in bands shared with the terrestrial fixed service only after it has completed coordination at the relevant locations.

Harris CapRock respectfully requests that the experimental STA be granted for an approximately six (6) month period commencing on or about July 21, 2015. Expedited processing is requested to support an intense test schedule for this novel tri-band terminal in various satellite frequency bands. Because the Commission has previously reviewed and approved experimental operation of the ST5000-2.4 terminal, and because it may condition authority to operate in the C-band and shared Ka-band on completion of coordination, it may effectively review and approve the proposed operations in all bands on an expedited basis.

Conclusion. The requested experimental STA will allow Harris CapRock to continue development, testing and demonstration of its new ST5000-2.4 terminal. Moreover, grant of the requested authority 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 expedited grant would strongly serve the public interest.