Prepared for the Federal Communications Commission

Application for Modification of Authority for

Earth Stations on Board Vessels

Harris-CapRock Communications, Inc.

January 20, 2012

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INTRODUCTION

Harris CapRock Communications, Inc. ("Harris-Caprock"), pursuant to 47 C.F.R. § 25.117 of the Rules and Regulations ("Regulations") of the Federal Communications Commission ("Commission"), respectfully requests the modification of an existing license to operate new C-Band Earth Station on Vessels ("ESVs") throughout US channels and waterways, the Gulf of Mexico, the Caribbean Sea, the Atlantic Ocean, and the Pacific Ocean. The proposed ESVs seek to operate in the 3700-4200 MHz and 5925-6425 MHz ("C-Band") frequencies. Furthermore, ESVs plan to communicate with a licensed hub station located in Houston, Texas and operated by Harris-CapRock. Harris-CapRock is proposing to use the following ESVs:

Orbit 7108 (2.4m) – C-Band	250 systems
Orbit 7109 (2.4m) – C-Band	250 systems

The Orbit C-Band antennas do not strictly comply with Section 25.209 of the Regulations. Consequently, Harris-CapRock will operate the antennas at reduced transmit power levels so as to decrease the off-axis Effective Isotropic Radiated Power (EIRP) density. At the proposed reduced power levels, the antennas meet the requirements of Section 25.221 of the Regulations as well as the underlying ESV Orders.[1] Harris-CapRock now proceeds to address each pertinent part of Section 25.221 of the Regulations.

§25.221 (a)(1)(i)(A-C) EIRP DENSITY CHARTS

"An ESV system shall not exceed the off-axis EIRP spectral-density limits and conditions defined in paragraphs (a)(1)(i)(A) through (a)(1)(i)(C) of this section.

The spectral density envelopes specified in §25.221(a)(1)(i)(A-C) are as follows:[2]

§25.221(a)(1)(i)(A) – Copole azimuth

• $26.3 - 25\log(\theta)$	dBW / 4KHz for	$1.5° \le \theta \le 7.0°$
• 5.3	dBW / 4KHz for	$7.0° \le \theta \le 9.2°$
• $29.3 - 25\log(\theta)$	dBW / 4KHz for	$9.2° \le \theta \le 48°$
• -12.7	dBW / 4KHz for	$48° \le \theta \le 180°$

Sidelobes

The peak eirp value of an individual sidelobe may not exceed the envelope for θ between 1.5° and 7.0°. For θ > 7°, the envelope may be exceeded by no more than 10% of the sidelobes, provided no individual sidelobe exceeds the envelope given above by more than 3dB.

§25.221(a)(1)(i)(B) – Copole in other directions

• $29.3 - 25\log(\theta)$	dBW / 4KHz for	$3.0° \le \theta \le 48°$
• -12.7	dBW / 4KHz for	$48° \le \theta \le 180°$

Sidelobes

The envelope may be exceeded by no more than 10% of the sidelobes provided no individual sidelobe exceeds the gain envelope given above by more than 6dB.

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[1] *In the Matter of Procedures to Govern the Use of Satellite Earth Stations on Board Vessels in the 5925-6425 MHz/3700-4200 MHz Bands and 14.0-14.5 Ghz/11.7-12.2 GHz Bands*, Report and Order, FCC 204-286, Adopted December 15, 2004, Released January 6, 2005. Order on Reconsideration, FCC 09-63, Adopted July 30, 2009, Released July 31, 2009.

[2] The actual formula in the statute includes a log(N) term which is subtracted from the spectral density. Since in this case, the system is TDMA and N=1 for TDMA, the log(1) terms goes to zero.

§25.221(a)(1)(i)(C) – Crosspole Azimuth

•	$16.3 - 25\log(\theta)$	dBW / 4KHz for	$1.8° \leq \theta \leq 7°$
•	-4.7	dBW / 4KHz for	$7° \leq \theta \leq 9.2°$

§25.221 (a)(1)(ii)(A) POINTING ERROR

"Each ESV transmitter shall maintain a pointing error of less than or equal to 0.2° between the orbital location of the target satellite and the axis of the main lobe of the ESV antenna." 47 C.F.R §25.221(a)(1)(ii)(A)

Please refer to manufacturer declaration of conformity provided as an exhibit to the underlying application.

§25.221 (a)(1)(iii)(A) AUTOMATIC SHUT OFF

"All emissions from the ESV shall automatically cease within 100 milliseconds if the angle between the orbital location of the target satellite and the axis of the main lobe of the ESV antenna exceeds 0.5°, and transmission will not resume until such angle is less than or equal to 0.2°." 47 C.F.R §25.221(a)(1)(iii)(A)

Please refer to manufacturer declaration of conformity provided as an exhibit to the underlying application.

§25.221 (a)(3) U.S. CONTACT INFORMATION

"There shall be a point of contact in the United States, with phone number and address, available 24 hours a day, seven days of week, with authority and ability to cease all emissions from the ESVs, either directly or through the facilities of a U.S. Hub or a Hub located in another country with which the U.S. has a bilateral agreement that enables such cessation of emissions." 47 C.F.R §25.221(a)(3)

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Houston, TX 77048
(832) 668-2300 Phone
Email: NOCHou@Harris.com

Harris-CapRock personnel, either via a network port or an out-of-band management system, have the authority and capability to remotely access equipment on the ESVs to terminate emissions in case of suspected harmful interference.

§ 25.221 (a)(4) VESSEL TRACKING

"For each ESV transmitter a record of the ship location (i.e. latitude/longitude), transmit frequency, channel bandwidth and satellite used shall be time annotated and maintained for a period of not less than 1 year. Records will be recorded at time intervals no greater than every 20 minutes while the ESV is transmitting. The ESV operator will make this data available upon request to a coordinator, fixed system operator, fixed-satellite system operator, NTIA, or the Commission within 24 hours of the request." 47 C.F.R. §25.221 (a)(4)

Functionality of Vessel Tracking System

Harris-CapRock has implemented a system to record the vessel's location, transmit frequency, channel bandwidth and satellite. The system records this information every 20 minutes. Harris-CapRock can make this data available within 24 hours of a request by a coordinator, fixed system operator, fixed-satellite system operator, NTIA, or the Commission.

1. An external Global Positioning System (GPS) is deployed with every one of Harris-CapRock's stabilized antennas. The GPS feeds position information to a Terminal Server that also performs a basic logging function. As the Terminal Server receives raw GPS data, it is spooled to a file.

2. The data received from the GPS is in NMEA-0183 standard (National Marine Electronics Association). NMEA-0183 is a voluntary industry standard that defines electrical signal requirements, data transmit

protocol, timing and specific sentence formats for a 4800 baud serial data bus. NMEA has become a standard protocol for interfacing navigational devices like a GPS. NMEA settings for RS232 interface are:

Baudrate:	4800
Data bits:	8
Stop bits:	1 or 2
Parity:	none
Handshake:	none

3. Also included in the daily file are the satellite name, frequency, channel bandwidth, time and date. The satellite name is manually entered at commissioning and would be updated if the satellite changes. This information is kept at a server located at the Harris-CapRock NOC. The transmit frequency and channel bandwidth are extracted from the satellite modem. The time and date are retrieved from the Terminal Server.

4. Once the file is received at the Harris-CapRock NOC via File Transfer Protocol (FTP), the date is formatted in a Structured Query Language (SQL) database. This database is backed up daily.

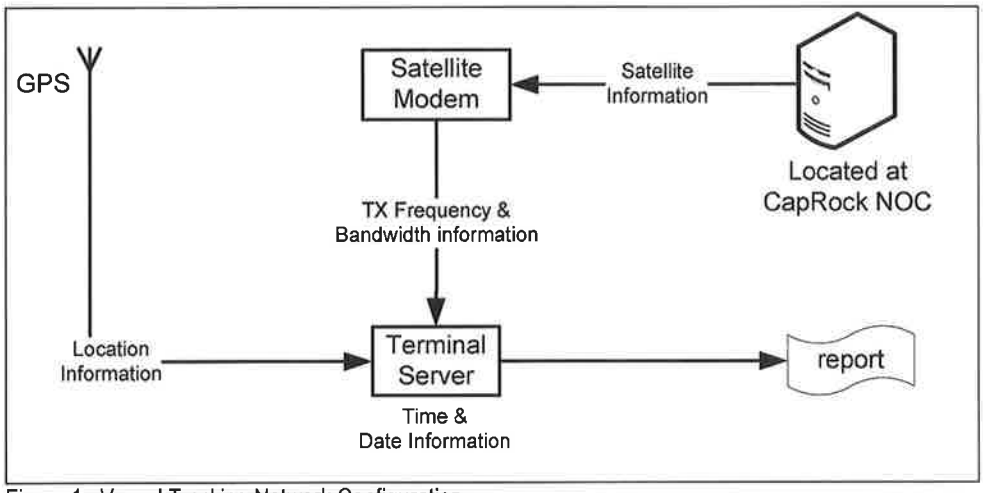

Figure 1. Vessel Tracking Network Configuration

§25.221 (a)(5) VESSELS OF FOREIGN REGISTRY

"ESV operators communicating with vessels of foreign registry must maintain detailed information on each vessel's country of registry and a point of contact for the relevant administration responsible for licensing ESVs." 47 C.F.R. §25.221 (a)(5)

In the event Harris-CapRock must operate foreign-registered ESVs, it will maintain detailed information on each vessel as well as a point of contact for the relevant administration responsible for licensing the ESV.

§25.221 (a)(6) U.S. CONTROL OF ESV HUB EARTH STATION

"ESV operators shall control all ESVs by a Hub earth station located in the United States, except that an ESV on U.S.-registered vessels may operate under control of a Hub earth station location outside the United States provided the ESV operator maintains a point of contact within the United States that will have the capability and authority to cause an ESV on a U.S.-registered vessel to cease transmitting if necessary." 47 C.F.R. §25.221 (a)(6)

The ESVs operated by Harris-CapRock will be controlled by the hub earth station listed below:

Callsign	Diameter	Location	Antenna ID
E030253	8.1m	Houston, TX	3

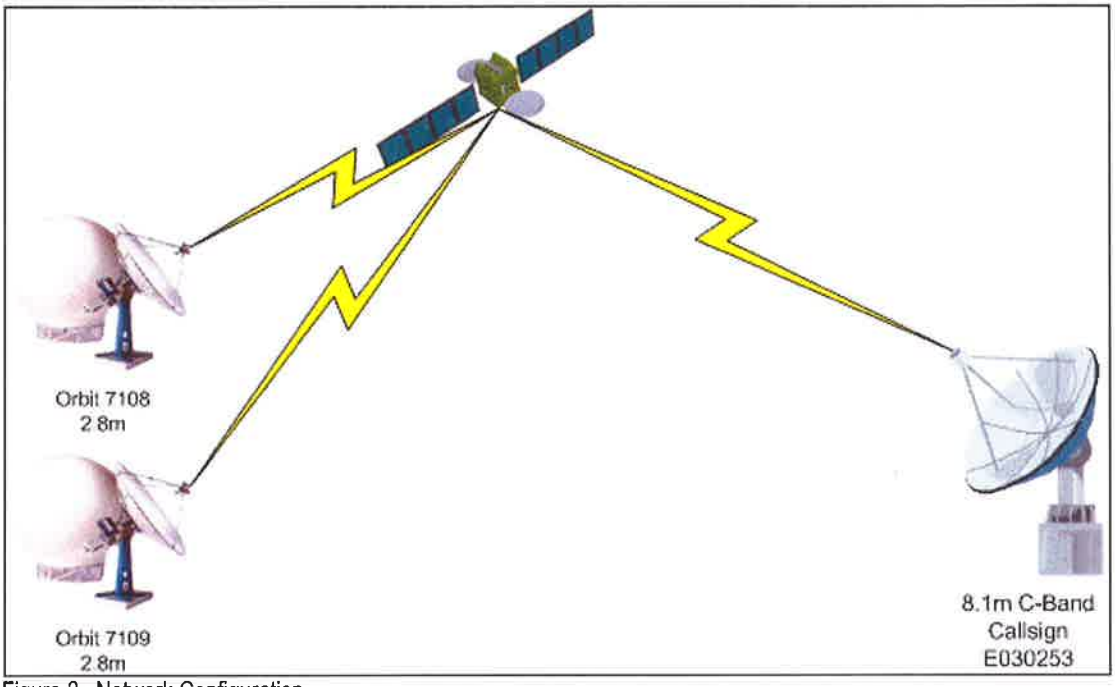

Figure 2. Network Configuration

§25.221 (a)(7) FREQUENCY COORDINATION

"ESV operators transmitting in the 5925-6425 MHz (Earth-to-Space) frequency bands to geostationary satellites in the fixed-satellite service (FSS) shall not seek to coordinate, in any geographic location, more than 36 MHz of uplink bandwidth on each of no more than two GSO FSS satellites." 47 C.F.R §25.221 (a)(7).

Harris-CapRock is seeking to operate ESVs in the 5925-6425 MHz to geostationary satellites in the FSS. However, Harris-CapRock will not be operating ESVs using these frequencies within 200 Km of the U.S. coastline or within 200 Km of any already coordinated Fixed Service (FS). Therefore, Harris-CapRock did not perform any frequency coordination for purposes of this application. If operations change in the future, requiring C-Band operations within 200 Km of the U.S. coastline or within 200 Km of any already coordinated Fixed Service, Harris-CapRock will pursue a license modification at that time.

§25.221 (a)(8) VESSEL WEIGHT

"ESVs shall not operate in the 5925-6425 MHz (Earth-to-Space) and 3700-4200 MHz (space-to-Earth) frequency bands on vessels smaller than 300 gross tons." 47 C.F.R §25.221 (a)(8).

Harris-CapRock will not operate ESVs in the C-Band on vessels smaller than 300 gross tons.

§25.221 (a)(9) OPERATIONS WHILE DOCKED

"ESVs, operating while docked, that complete coordination with terrestrial stations in the 3700-4200 MHz band in accordance with §25.251, shall receive protection from such terrestrial stations in accordance with the coordination agreements, for 180 days, renewable for 180 days. 47 C.F.R §25.221 (a)(9).

Harris-CapRock does not currently contemplate any coordination with terrestrial stations in the 3700-4200MHz band.

§25.221 (a)(10) PRETECTION FROM INTERFERENCE

"ESVs in motion shall not claim protection from harmful interference from any authorized terrestrial stations or lawfully operating satellites to which frequencies are either already assigned, or may be assigned in the future in the 3700-4200 MHz (space-to-earth) frequency band." 47 C.F.R. §25.221 (a)(10).

Harris-CapRock will not claim protection from interference from harmful interference from authorized terrestrial stations or lawfully operating satellites to which frequencies are already assigned or may be assigned in the future in the 3700-4200 MHz band.

§25.221 (a)(11) COORDINATION WITHN 200KM

"ESVs operating within 200 km from the baseline of the United States, or within 200 km from a fixed service offshore installation, shall complete coordination prior to operation. The coordination method and the interference criteria objective shall be determined by the frequency coordinator. The details of the coordination shall be maintained and available at the frequency coordinator, and shall be filed with the Commission to be placed on Public Notice. Operation of each individual ESV may commence immediately after the Public Notice is released that identifies the notification sent to the Commission. Continuance of operation of that ESV for the duration of the coordination term shall be dependent upon successful completion of the normal public notice process. If, prior to the end of the 30-day comment period of the public notice, any objections are received from U.S. licensed fixed service operators that have been excluded from coordination, the ESV licensee shall immediately cease operation of that particular station on frequencies used by the affected U.S.-licensed fixed service station until the coordination dispute is resolved and the ESV licensee informs the Commission of the resolution." 47 C.F.R. §25.221 (a)(11).

Harris-CapRock will not operate within 200Km from the baseline of the United States, or within 200 Km from a fixed service offshore installation. Therefore, no coordination is required at this time. If in the future, Harris-CapRock plans to operate within these areas, it will undergo the proper coordination and submit an application for modification of ESV authority.

§25.221 (a)(12) AUTOMATIC CEASE OF TRANSMISSIONS

"ESV operators must automatically cease transmission if the ESV operates in violation of the terms of its coordination, including, but not limited to, conditions related to speed of the vessel or if the ESV travels outside the coordinated area, if within 200 km from the baseline of the United States, or within 200 km from a fixed service offshore installation. Transmissions may be controlled by the ESV network. The frequency coordinator may decide whether ESV operators should automatically cease transmissions if the vessel falls below a prescribed speed within a prescribed geographic area." 47 C.F.R. §25.221 (a)(12).

Harris-CapRock will automatically cease transmissions if the ESV travels within 200Km from the baseline of the United States or within 200Km from a fixed service offshore installation. The system to automatically cease transmissions is based on a GPS reading and a comparison to a database with pre-programmed coordinates for the US coastline as well as fixed microwave sites. When the absolute value of the difference in coordinates reaches 200Km, the satellite modem turns off transmissions.

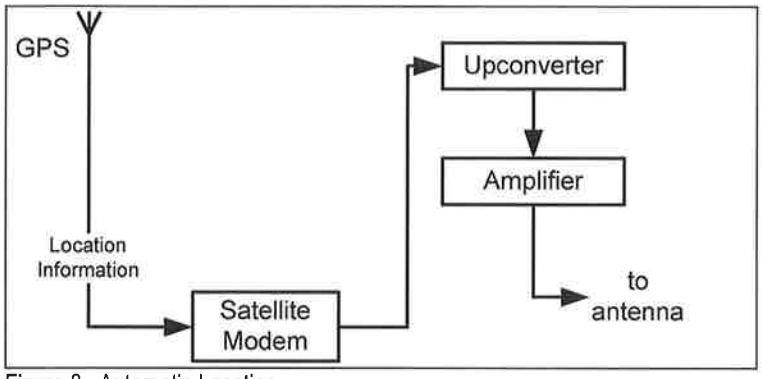

Figure 3. Automatic Location

§25.221 (b)(1)(i) SPECTRAL DENSITY TABLES

"Any ESV applicant filing an application pursuant to paragraph (a)(1) of this section must file three tables showing the off-axis EIRP level of the proposed earth station antenna in the direction of the plane of the GSO; the co-polarized EIRP in the elevation plane, that is, the plane perpendicular to the plane of the GSO; and cross polarized EIRP. In

each table, the EIRP level must be provided at increments of 0.1° for angles between 0° and 10° off-axis, and at increments of 5° for angles between 10° and 180° off-axis." 47 C.F.R §25.221(b)(1)(i)

The manufacturer has produced these three tables which are attached to the underlying application.

§25.221 (b)(3) ESV GEOGRAPHIC AREA OF OPERATION

"There shall be an exhibit included with the application describing the geographic area(s) in which the ESVs will operate." 47 C.F.R §25.221(b)(3)

The geographic area where the ESVs will operate is in U.S. channels and waterways, the Gulf of Mexico, Caribbean Sea, Atlantic Ocean, and Pacific Ocean.

Figure 4. U.S. channels and waterways, the Gulf of Mexico, Caribbean Sea, Atlantic Ocean, and Pacific Ocean

§25.221 (b)(4) POINT OF CONTACT

"The point of contact information referred to in paragraph (a)(3) of this section and, if applicable, paragraph (a)(6) of this section, must be included in the application." 47 C.F.R §25.221(b)(4)

Noted.

§25.221 (b)(5) ANTENNA RADIATION GUIDELINES

"ESVs that exceed the radiation guidelines of §1.1310 of this chapter, Radiofrequency radiation exposure limits, must provide, with their environmental assessment, a plan for mitigation exposure to the extent required to meet those guidelines." 47 C.F.R. §25.221 (b)(5)

A radiation hazard study for the Orbit antennas is attached to the underlying application.

APPENDIX A – USE OF NON-U.S. SATELLITES

Harris-CapRock specifies, pursuant to § 25.137(a) of the Commission's Rules, that the only non-U.S. licensed satellites to be accessed by the earth station proposed in the instant application are those included on the FCC's Permitted List and eligible for ALSAT designation.

APPENDIX B – FAA NOTIFICATION

Pursuant to 47 C.F.R. § 17.14 (b) of the Regulations, Federal Aviation Administration (FAA) notification is not required because all the antenna structures in this application will be less than 6.1m in height.

APPENDIX C– DECLARATION OF HARRIS-CAPROCK

"My name is Steve Wheelis, Chief Engineer for Harris-CapRock Communications, Inc. I certify that the engineering calculations described in this report are true and correct and satisfactory in light of the Regulations specified in 47 C.F.R. 25.221."

Steve Wheelis

1/18/2012
Date