



July 29, 2015

Dr. Jose P. Albuquerque
Chief, Satellite Division
International Bureau
Federal Communications Commission
Washington, DC 20554

Re: Spectrum Five LLC
IBFS File No.: SAT-LOI-20150416-00026
Call Sign: S2941

Dear Dr. Albuquerque:

Spectrum Five LLC ("Spectrum Five") respectfully responds to your June 29, 2015 request for additional information regarding Spectrum Five's Letter of Intent to provide service to the United States using a 17/24 GHz broadcasting-satellite service (BSS) space station authorized by the Netherlands, to be known as BSSNET2A-115W, from the 115° W.L. orbital location. The answers to your questions are as follows:

1. The maximum EIRP density value for transmitting beam CONTL is 46.1 dBW/MHz. The maximum EIRP density value for transmitting beam CONTR is also 46.1 dBW/MHz.
2. At the peak of the uplink receive beams, the maximum saturation flux density is $-104 \text{ dBW/m}^2 + 20 \text{ dB (max attenuator setting)} = -84 \text{ dBW/m}^2$ for both polarization uplink beams.
3. Consistent with Sections 25.114(d)(18) and 25.264(h)(2) of the Commission's rules, Spectrum Five will maintain the maximum orbital eccentricity to less than 3.1×10^{-4} .
4. After consultation with leading spacecraft manufacturers, Spectrum Five withdraws its statement that all TWTAs will be outgassed prior to post-mission disposal.
5. Spectrum Five has reviewed the current FCC-authorized satellite networks that potentially overlap the station keeping volume of the BSSNET2A-115W satellite at 115.0° W.L., as well as pending applications published by the FCC. In addition, networks for which a request for coordination has been published by the ITU within $\pm 0.15^\circ$ of 115.0° W.L. have also been reviewed. With respect to currently authorized

FCC networks, ViaSat-1¹ (S2747) has been authorized to operate at 115.1° W.L. with a $\pm 0.05^\circ$ station keeping requirement. XM Radio has been authorized to operate the satellites (XM-1 (S2118), XM-4 (S2616)² at the nominal 115.25° W.L. location in formation such that their E/W station-keeping volumes are bounded by 115.15° W.L. and 115.35° W.L. ($\pm 0.1^\circ$ station keeping requirement). This station keeping volume will not overlap the station keeping volume of the BSSNET2A-115W satellite at 115.0° W.L. SATMEX5 (S2589) - now called Eutelsat 115 West A - has been granted access the U.S. market³ from the 114.9° W.L. orbital location. Eutelsat 115 West A is in inclined orbit and is scheduled to be replaced before year end at the same orbital location with the recently launched Eutelsat 115 West B (Call Sign 2930)⁴ that has $\pm 0.05^\circ$ station keeping. Mexsat-3 was launched in December 2012 into the 114.9° W.L. orbital location, but was moved to the 114.8° W.L. location where it is now operating.⁵ The ITU has also published no requests for coordination for new satellites operating within $\pm 0.15^\circ$ of 115.0° W.L. There are three networks (AST-W2-115W, LUX-G7-38B, and RAGGIANA-20) listed for which an Advance Publication Notice (API) has been submitted. However, no further filings have been published for these networks and Spectrum Five can find no evidence that a satellite construction contract have been awarded for these networks.

6. Spectrum Five will establish a contact point for receiving Joint Space Operations Center conjunction notifications and describe any further measures with respect to collision avoidance procedures. Other additional measures to mitigate collision avoidance issues will begin once a spacecraft manufacturer has been selected. These will be detailed in the technical specification, statement of work and other program requirement documents.
7. When the satellite parameters are finalized, Spectrum Five will assess fuel gauging uncertainty and ensure that the budgeted propellant, taking into account such uncertainty, provides an adequate margin of fuel reserve so that the disposal orbit will be achieved.

¹ See IBFS File No. SAT- LOA-20110722000132, Conditions of Authorization (Call Sign 2747) for the operation Viasat-1 at 115.1° W.L. with E/W station- keeping tolerance of $\pm 0.05^\circ$.

² See IBFS File No. SAT-MOD-20121216-00262, March 8, 2011.

³ See IBFS File No. SAT- PPL-20121218-00217, Permitted Space Station List for Satmex5 at 114.9° W.L. dated May 31, 2013. SATMEX-5 requested and was granted a waiver to operate with a $\pm 0.10^\circ$ E/W station keeping so long as no other space station is located within the station keeping volume of SATMEX-5. Should such a space station (BSSNET2A-115W, for example) be launched or relocated into the station-keeping volume of SATMEX-5 with a $\pm 0.05^\circ$ E/W station keeping tolerance, SATMEX must either maintain a $\pm 0.05^\circ$ E/W station keeping tolerance or coordinate its operations with that of the other space station.

⁴ See IBFS SAT-PPL-2014227-0007, at 9.

⁵ See SAT-APL-20130308-00028 (Call Sign 2589), Amendment and Waiver, at 4.

8. The BSSNET2A-115W TT&C sub-system provides for communications during pre-launch / transfer orbit and spacecraft emergencies, and on-station operations. The TT&C sub-system will operate at the edges of the 17/24 GHz BSS frequency bands.

During transfer orbit and on-station emergencies, TT&C signals will be received and transmitted by the satellite using a combination of antennas on the satellite that create a near omni-directional gain pattern. During normal on-station operation, TT&C signals will be transmitted to and received from a primary TT&C center on the Netherlands island of Curacao. A large earth station will transmit a command link to the satellite. The satellite will receive this signal through a high gain spot beam (CBRR) receive antenna. Telemetry signals will be transmitted to the TT&C center through the same high gain spot beam antenna (CBRT). A second TT&C site in the Southwest U.S. will receive telemetry signals transmitted across the CONUS+ service area through the CONTR transmit antenna. Command signals to the satellite will be transmitted to the satellite from a large earth station antenna, and received by a second high gain transmit spot beam antenna (SWUR), pointed toward the southwest U.S. uplink. A summary of the TT&C subsystem characteristics is given in the following table.

Command Links	
Command Modulation	PCM/FSK
Command/Ranging Frequencies (On-Station)	24,753.0 MHz 24 / 2755.0 MHz
Uplink Flux Density	Between -80 and -60 dBW/m ² (LEOP). Between -93 and -83 dBW/m ² (on-station).
Satellite Receive Antenna Types	Pseudo-omni antenna during transfer orbit and onstation emergencies. High gain spot antenna during normal on-station mode (CBRR and SWUR beams) from Curacao and SW US TT&C Center.
Polarization of Satellite Receive Antennas	RHCP for all antennas
Peak Deviation (Command/Ranging)	± 400 kHz
Telemetry Links	
Telemetry/Ranging Frequencies (Launch and Early Operations Phase and On-Station)	17,303.0 MHz / 17,306.0 MHz
Satellite Transmit Antenna Types	Pseudo-omni antenna during transfer orbit and on-station emergencies. High gain spot antenna during on-normal onstation mode (CBRT beam) to Curacao TT&C Center. CONUS+ coverage antenna during on-normal on-station operations to SW US TT&C Center (CONTR beam).
Polarization of Satellite Transmit Antennas	RHCP for all antennas
Maximum Downlink EIRP	10 dBW (pseudo-omni antenna for LEOP). 16 dBW CONUS coverage antenna (CONTR) for TLM to SW US TT&C Center. 41 dBW (Spot antenna) for TLM to Curacao TT&C Center.

9. The Kingdom of the Netherlands made ITU filings on behalf of Spectrum Five to use the nominal 115° W.L. orbital location and associated frequencies in the 17/24 GHz BSS band and is the responsible Administration for coordination. The Netherlands Antilles had been a part of the Kingdom of the Netherlands, and all of its former territory remained part of the Kingdom after it dissolved, with some territory (the islands of Bonaire, Saba, and Sint Eustatius) joining the pre-existing country of the Netherlands and some territory (the islands of Curacao and Sint Maarten) acquiring

separate status within the Kingdom. Dutch authorities have informed Spectrum Five that its authorization remains effective as granted by the Kingdom of the Netherlands. Similarly, although the Netherlands Antilles previously agreed to provide all necessary licenses for Spectrum Five's telemetry, tracking, and command operations, Dutch authorities have informed Spectrum Five that the Kingdom of the Netherlands (which, as noted above, includes all of the territories that were part of the Netherlands Antilles) will provide such licenses.

The FCC previously found that Spectrum Five's use of a Netherlands-authorized satellite to provide DTH services to the U.S. satisfies the ECO-Sat test.⁶ Grant of this Petition also satisfies the Commission's ECO-Sat test, under which the agency examines opportunities for U.S.-licensed satellites to serve the home market of the non-U.S. satellite seeking access to the United States. In particular, the Commission examines whether there are any *de jure* or *de facto* barriers to entry for the provision of analogous services in the non-U.S. satellite's home market.⁷ The relevant foreign markets are (1) the market of the authority licensing the satellite and (2) the markets in which communications with the U.S. earth stations will originate or terminate.⁸

As the FCC concluded in 2006, there are no *de jure* or *de facto* barriers to entry for an entity proposing to use a U.S.-licensed satellite to deliver DTH services to the Netherlands, including Bonaire, Saba, and Sint Eustatius, which are now part of the State of the Netherlands. Several foreign satellite operators already provide DTH services in the Netherlands. The only Dutch regulation applicable to the provision of satellite services requires that a license be obtained from the Radiocommunications Agency Netherlands for the use of frequencies for a satellite earth station.⁹ There are no restrictions regarding the nationality of the applicant for a license, and in practice, licenses are generally issued within eight weeks, for a (renewable) period of five years. U.S. operators would receive the same treatment as any other operator in this respect.

Although Curacao and Sint Maarten are now members of the Kingdom on their own behalf — as the Netherlands Antilles had been — Spectrum Five is not aware of any *de jure* or *de facto* barriers to entry for an entity proposing to use a U.S.-licensed satellite to deliver DTH services to those islands. Indeed, DIRECTV appears to offer DTH services in both islands using the U.S.-licensed satellite Intelsat 30 (call sign S2887).¹⁰ Moreover, as recently as 2012, the Commission recognized that these

⁶ Spectrum Five 2006 Authorization at 14030-31 (¶¶ 10-13).

⁷ *DISCO II Order*, 12 FCC Rcd at 24137 (¶ 99).

⁸ *Id.* at 24129-133 (¶¶ 76-88).

⁹ No license is required for receive-only terminals.

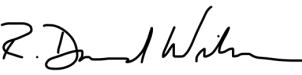
¹⁰ See <http://www.directvcaribbean.com/about-directv> (last visited July 27, 2015) (offering service in Curacao and Saint Martin, which includes Sint Maarten); Press Release, *DIRECTV Latin America Continues to Extend Entertainment Leadership with Successful Satellite Launch* (Oct. 16, 2014), available at <http://investor.directv.com/press-releases/press->

territories remained open to entry from U.S.-licensed satellites seeking to provide fixed-satellite service.¹¹

Please let us know if you have any additional questions.

Respectfully submitted,

Spectrum Five LLC

By: 

David Wilson
President
SPECTRUM FIVE LLC

release-details/2014/DIRECTV-Latin-America-Continues-to-Extend-Entertainment-Leadership-with-Successful-Satellite-Launch/default.aspx (last visited July 27, 2015) (noting Caribbean service to be delivered via Intelsat 30); *Policy Branch Info. Actions Taken*, 29 FCC Rcd 9710 (2014) (announcing grant of authority to launch Intelsat 30).

¹¹ See IBFS File No. SAT-MPL-20120215-00017 (Dec. 10, 2012) (granting, with conditions, petition of New Skies Satellites, B.V. to provide between the United States and, among other places, “the Netherlands Antilles”).