Experimental STA Application

1.0 Introduction

Raysat Antenna Systems, LLC ("RAS"), pursuant to Section 5.61 of the Commission's rules, 47 C.F.R. § 5.61, hereby requests an experimental special temporary authorization ("STA") to operate up to five (5) Land Mobile-Satellite Service ("LMSS") earth stations in the 14.0-14.5 GHz and 11.7-12.2 GHz frequency bands with the AMC-5 and AMC-6 satellites at 79° W.L. and 72° W.L., respectively. The satellites will communicate with the Spacenet hub earth station in McLean, Virginia (Call sign E860326).

On January 5, 2010, RAS was granted an STA (Call Sign WE9XDH) for these operations, which expired on June 1, 2010.[1] Given the ongoing operational requirements, RAS seeks a new STA subject to the same terms and conditions included in its prior authority. Specifically, RAS seeks to continue testing and demonstrating the SR70 earth terminal in connection with a Department of Defense/Logistics Innovation Agency (DOD/LIA) satellite communications program (prime contract # W31P4Q-05-A-0031/TO#0021).

RAS hereby incorporates by reference all technical and public interest information submitted in the context of obtaining its prior experimental STA Call Sign WE9XDH. RAS also includes the basic description of the previously authorized operations in this application for ease of reference by the Commission, and expressly acknowledges and accepts the conditions included in its prior STA.

Finally, RAS notes that Call Sign WE9XDH is subject to a pending transfer of control application filed by Spacenet Integrated Government Solutions, Inc. ("SIGS") on April 30, 2010.[2] RAS also holds FCC earth station licenses and an application for transfer of control of the earth stations to SIGS has been granted by the International Bureau in IBFS File No. SES-T/ C-20100412-00439. RAS respectfully requests that new STA authority be granted for Call Sign WE9XDH prior to final action on the transfer of control of RAS experimental authority to SIGS.

Grant of the experimental STA would strongly serve the public interest by enhancing satcom-on-the-move service and equipment options for the U.S. Government. Moreover, because the operational requirements under the above referenced DOD/LIA contract remain ongoing, RAS requests expeditious processing of this application.

[1] *See* ELS File No. 0529-EX-ST-2009, Call Sign WE9XDH.

[2] *See* ELS File No. 0002-EX-TU-2010.

2.0 Antenna

The SR-70 antenna technology builds upon RAS's proven antenna technology for mobile applications. The major enhancement is in the antenna panel which is capable of simultaneous Ku-band transmission and reception within the 14.0-14.5 GHz and 11.7-12.7 GHz bands, respectively. The antenna allows tracking in three axes, azimuth, elevation and polarization.

The antenna consists of a single 6 inch by 6 inch panel array which is mounted on a rotatable platform. The platform rotates in azimuth to orient the panel towards the satellite. The panel also tilts to set the elevation angle. Finally, the antenna has a polarization control mechanism which sets the correct polarization angle for both transmit and receive.[3]

A drawing of the antenna panel and the antenna assembly is shown in Figures 1 and 2, respectively.

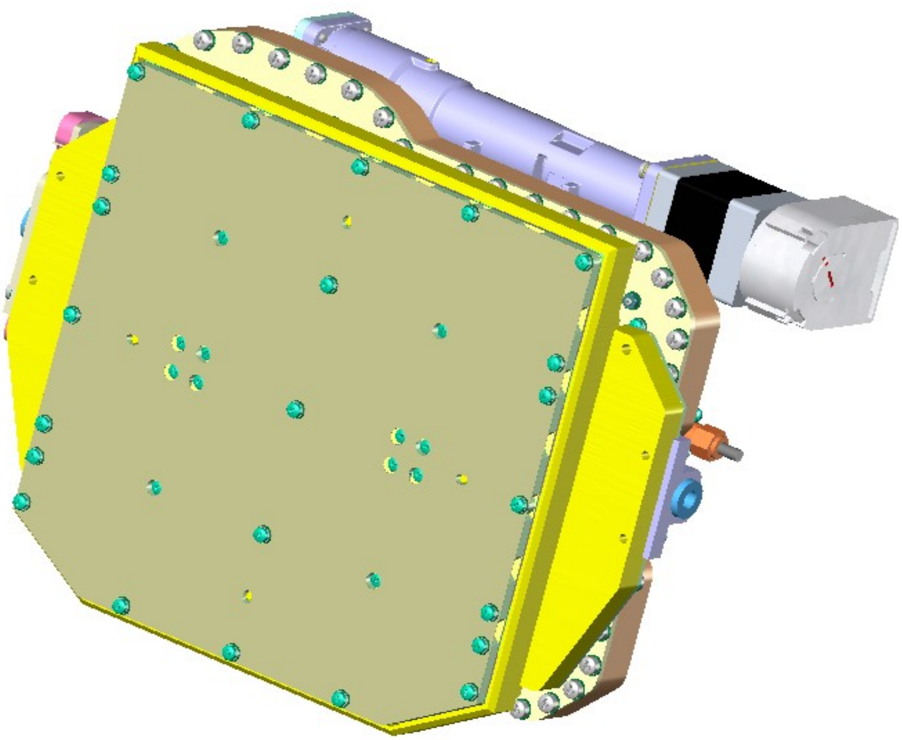

Figure 1
SR-70 Panel Array

[3] A Radiation Hazard analysis has been included as an Exhibit.

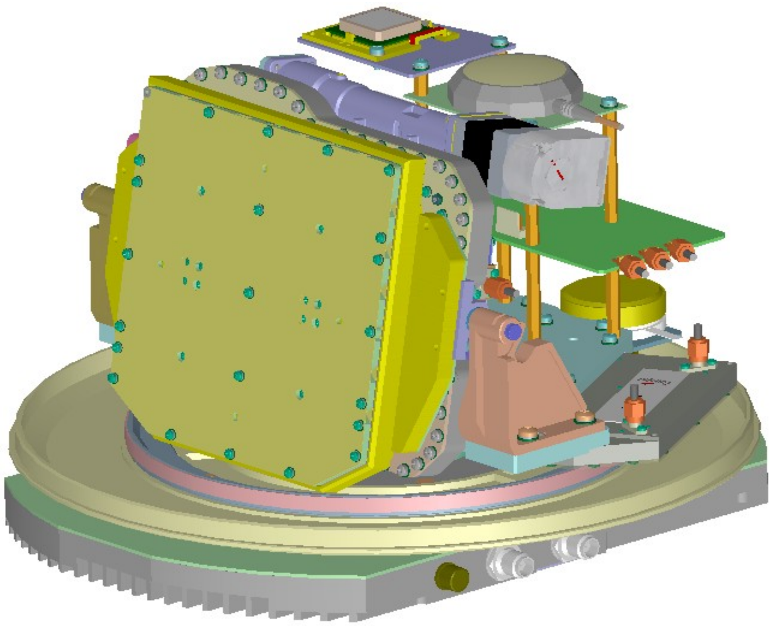

Figure 2
SR-70 Antenna

3.0 Antenna Operation

As with all RAS antennas, the SR70 has active control of the azimuth, elevation and polarization angles to maintain precise pointing towards the target satellite. The antenna scans mechanically in both azimuth and elevation.

For satellite acquisition and reacquisition, the proven principles implemented in existing RAS antennas will be applied. A simplified block diagram of the major components in the tracking and acquisition system is shown in Figure 3.

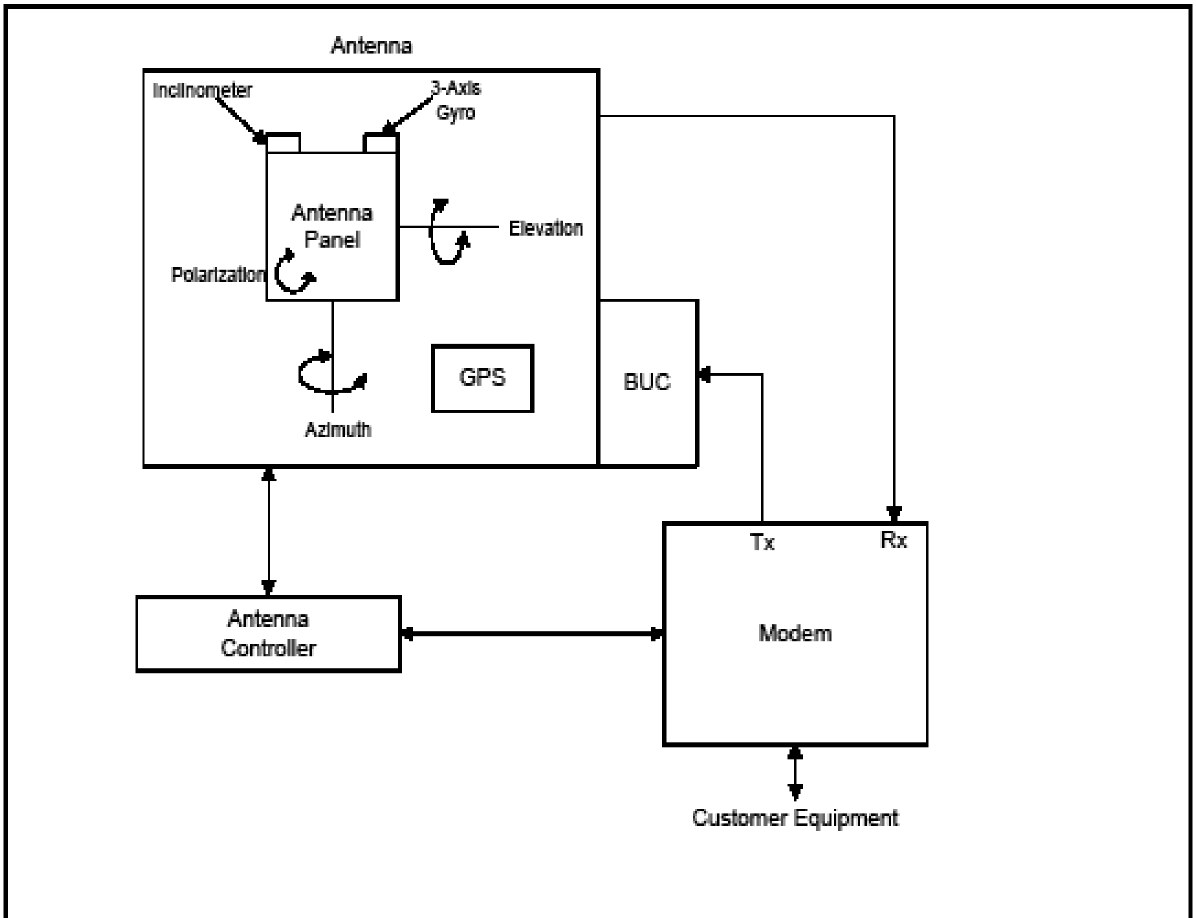

Figure 3
Typical Antenna Equipment Set-up

During operation, the antenna uses a built-in GPS receiver to determine its position on the earth. It then uses the geographical position and the longitudinal position of the satellite to determine the appropriate elevation angle. Once the elevation angle is set, the antenna rotates in azimuth. During the scanning process the antenna receives Eb/No information from the modem to verify that the target satellite has been acquired. Once the satellite is acquired, the antenna dithers in both azimuth and elevation by ±2.0° to maintain peaking on the satellite and the transmission is enabled. The antenna also has internal 3-axis gyroscopes and 2-axis inclinometers to help with the tracking while the antenna is in motion. The antenna will use the information from the gyros to determine when the pointing offset has reached 2.0° and will initiate transmit muting when this occurs within 100 milliseconds.

Consistent with 47 C.F.R. §25.226(d) and for purposes of protecting radio astronomy sites, in the absence of a coordination agreement with the National Science Foundation, RAS terminals will not operate in the 14.47-14.5 GHz band within specified exclusion distances of radio astronomy sites.

Further, RAS recognizes the utilization of the frequency band from 14.0-14.05 GHz and the possible use of the band from 14.05-14.2 GHz allocated to the National Aeronautics and Space Administration ("NASA") Tracking and Data Relay Satellite System ("TDRSS") for space research conducted at White Sands, New Mexico and Blossom Point, Maryland. Consistent with 47 C.F.R. §25.226(c), RAS will cease transmit operations within 125 km of the operational facilities unless and until it reaches a coordination agreement with NASA permitting such operations. RAS will operate the SR70 antennas within a 20 km radius of Vienna, VA and Petersburg, VA. Therefore, RAS will not enter the 125 km TDRSS radius of White Sands or will reach a coordination agreement with NASA if it is operating within the 125 km radius of the Blossom Point, MD facility when that facility commences operations.

RAS acknowledges that non-geostationary orbit ("NGSO") systems are also permitted to operate in the Ku-band. However, no such systems are currently authorized or planned to operate within the period contemplated for the proposed experimental operations. To the extent such systems are ultimately deployed, RAS will coordinate with NGSO FSS licensees to protect their systems from harmful interference.

4.0 Antenna Patterns

The transmit gain pattern shown in Figures 4 and 5 exceeds the Commission's routine licensing guidelines, but by limiting the input power spectral density to -25.2dBW/4kHz the off axis EIRP density remains under the Section 25.226(a)(1)(i) off-axis power spectral density ("PSD") mask even with a 2.0 degree scanning offset in the GSO plane as shown in Figure 6. *See* 47 C.F.R. § 25.226(b)(1)(iv)(A). Thus, at all times transmissions from the SR70 antenna are compliant with the Commission's two-degree spacing levels.

The maximum level of off-pointing is set to 2.0° in the plane of the GSO arc after which the transmissions are commanded to turn off within 100 milliseconds. *See* 47 C.F.R. § 25.226(b)(1)(iv)(B). In addition, reduced input power into the antenna ensures compliance with off-axis EIRP levels associated with two-degree spacing and the coordinated parameters of the serving satellite. RAS has performed detailed analysis and has confirmed that the adjacent satellite interference levels produced under the worst case operating conditions with a -25.2 dBW/4kHz at the input flange would be no worse than a Section 25.209 compliant antenna with -14dBW/4kHz at its input flange.

5.0 CONCLUSION

As demonstrated herein, grant of the requested experimental STA would strongly serve the public interest. Specifically, grant of the requested authority would permit RAS to add a new antenna to its already authorized LMSS operations and expand the range of mobile broadband options available to U.S. government users, without increasing the potential for interference to other users of Ku-band spectrum.

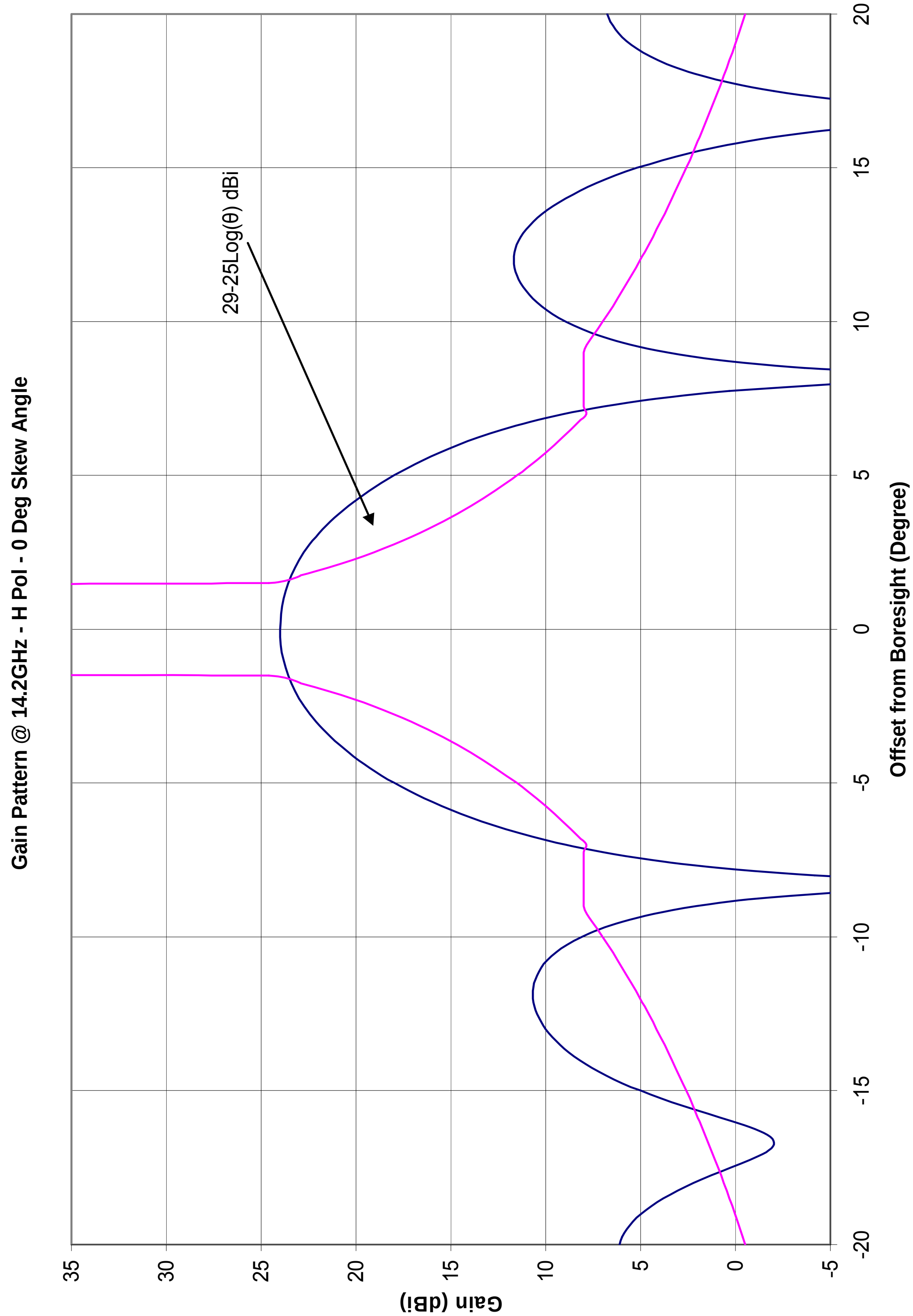

Figure 4
Close-In Gain Pattern

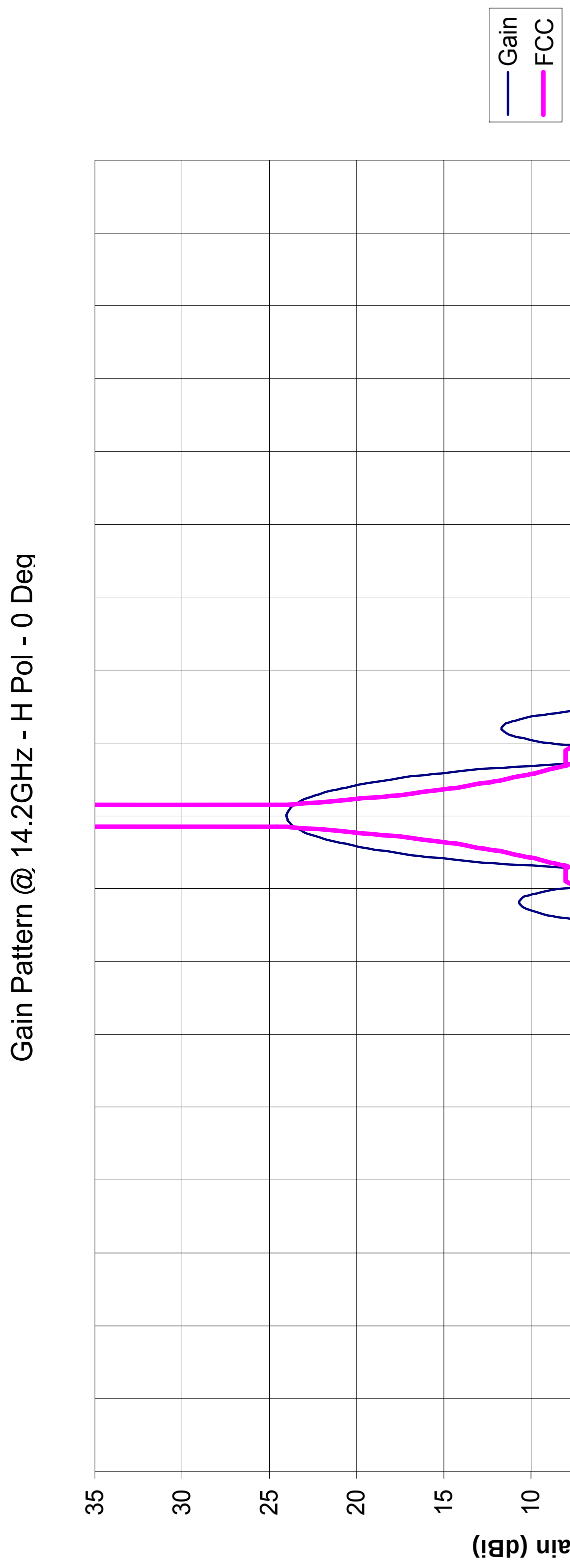

Figure 5
Wide Gain Pattern

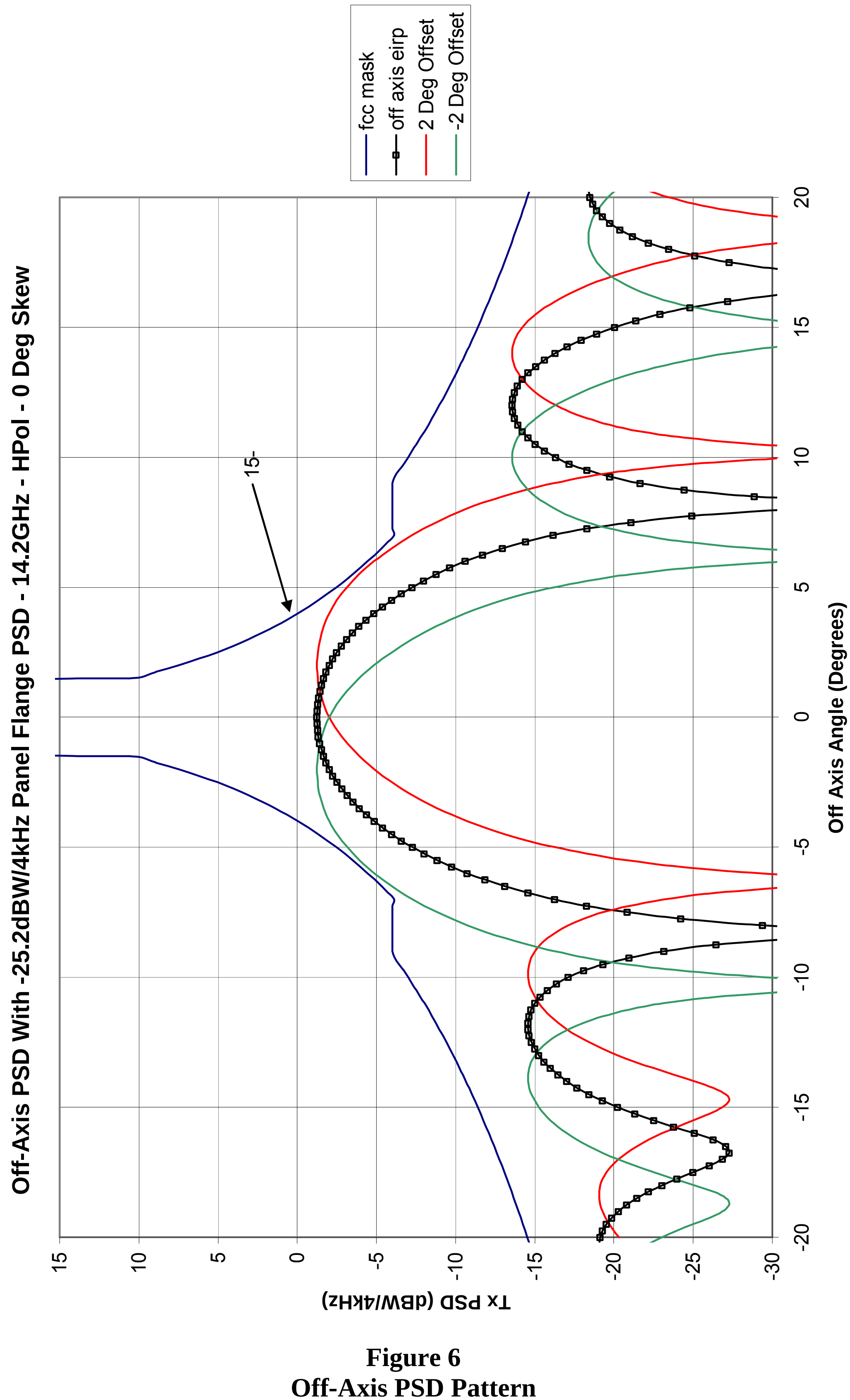

Figure 6
Off-Axis PSD Pattern