Gilat SR300Ku Antenna Experimental License Application

1.0 Introduction

Gilat North America (GNA), formerly RaySat Antenna Systems, hereby requests an experimental authorization to operate up to 15 Land Mobile-Satellite Service ("LMSS") earth stations in the 14.0-14.5 GHz and 11.7-12.2 GHz frequency bands.

GNA has developed the SR300Ku in response to customer requests for a higher performing antenna than the SR250 already authorized under call sign WF2XQF and file number 0343-EX-RR-2013[1]. The SR300Ku has a low profile, which allows it to be placed unobtrusively on vehicles. The full motion tracking system allows the user to have broadband data access while on the move. The antenna technology builds upon GNA's proven antenna technology for mobile applications. The tracking technology is derived from the SR250 antenna.

GNA requests an Experimental License in order to allow testing and integration of the SR300Ku onto US Government and commercial users' vehicles.

2.0 SR300Ku Antenna

The SR300Ku antenna technology is based upon GNA's proven antenna technology for mobile applications found in the SR250 antenna. The major enhancement is in the antenna panel which is larger than the one in the SR250, thus for a given input power level the transmitted EIRP will be greater than on the SR250. The antenna allows tracking in three axis: azimuth, elevation and polarization.

The antenna consists of an 11.2 inch by 6.3 inch flat panel array mounted on a rotatable platform. The platform rotates in azimuth to orient the panel towards the satellite. As well the panel tilts to set the elevation angle. In addition, the antenna has a polarization control mechanism which sets the correct polarization angle for both transmit and receive.

A drawing of the antenna assembly is shown in Figure 1.

3.0 Antenna Operation

As with all GNA antennas, the SR300Ku has active control of the azimuth, elevation and polarization angles. The antenna moves mechanically in azimuth and elevation.

[1] A renewal request for this call sign was submitted to the FCC on 11 September 2015. We are still waiting for approval.

For the satellite acquisition and reacquisition, the proven principles implemented in existing GNA antennas will be applied. A simplified block diagram of the major components in the tracking and acquisition system is shown in Figure 2.

Upon being powered on, 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 calculate the appropriate elevation angle. Once the panel is set to the calculated elevation angle, the antenna rotates in azimuth. During the scanning process the antenna receives Eb/No and network information from the modem to verify the target satellite has been acquired. The transmit signal is enabled after the satellite is acquired and the modem receive lock is established. The antenna also has internal 3-axis gyroscopes and 2-axis inclinometer to help with the tracking while the antenna is in motion. The antenna will also use the information from the gyros to determine when the pointing offset has reached 0.5° and will initiate transmit muting when this occurs. The transmission will be muted within 100 milliseconds of this occurring.

4.0 Antenna Patterns

The transmit gain pattern shown in Figure 3 exceeds the Commission's routine licensing guidelines, but by limiting the input power spectral density to **-22.0 dBW/4kHz** the off axis EIRP density remains under the off-axis PSD mask even with a 0.5 degree pointing error in the GSO plane as shown in Figure 4. Thus, at all times, transmissions from the SR300Ku antenna are compliant with the Commission's 2-degree spacing interference levels.

The maximum level of off-pointing is set to 0.5° in the plane of the GSO arc after which the transmissions are muted. In addition, reduced input power spectral density into the antenna ensures compliance with off-axis EIRP levels associated with two-degree spacing and the coordinated parameters of the serving satellite.

GNA has performed detailed analysis and has confirmed that the adjacent satellite interference levels produced under the worst case operating conditions with a -22.0 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 Protection of Other Users in the 14.0 – 14.5 GHz Band

Protection of Fixed-Satellite Service. GNA's terminals operate in such a manner that the off-axis EIRP levels are no greater than the levels produced by routinely licensed VSAT earth stations. This is consistent with past FCC licensing conditions in the LMSS context. To the extent that any adjacent satellite operator experiences unacceptable interference from GNA's experimental operations, GNA will cease terminal transmissions immediately.

Protection of Potential NGSO FSS Systems. GNA acknowledges that non-geostationary orbit ("NGSO") systems are also permitted to operate in the Ku-band. However, no such

systems are currently authorized or plan to operate within the period contemplated for the proposed experimental operations.

Protection of Terrestrial Radio Services. GNA has examined current spectrum use in the 14.0-14.5 GHz band and has determined that there are no active FCC-licensed terrestrial services in this band in North America with which its proposed operations could conflict.

Protection of the Radio Astronomy Service. For purposes of this experimental application, GNA terminals will not operate within the vicinity of Radio Astronomy sites and during observation periods.

Protection of Space Research Service. GNA recognizes the use 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. For purposes of this experimental application, GNA will not operate within the vicinity of these earth stations.

6.0 Supervision and Control

For purposes of these experiments, the SR300Ku terminals will be operated under GNA's supervision and control. The technical point of contact information for the planned experimental operations is:

Kevin Bruestle

Mobile: 1-571-262-1601
Email: kevin.bruestle@gilatna.com

This contact will have access to all network functions, and will have the ability and authority to cease all transmissions from the terminals wherever they are located.

7.0 CONCLUSION

As demonstrated herein, grant of the requested Experimental License would strongly serve the Government and public interest. Specifically, grant of the requested authority would permit GNA 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 the Ku-band spectrum.

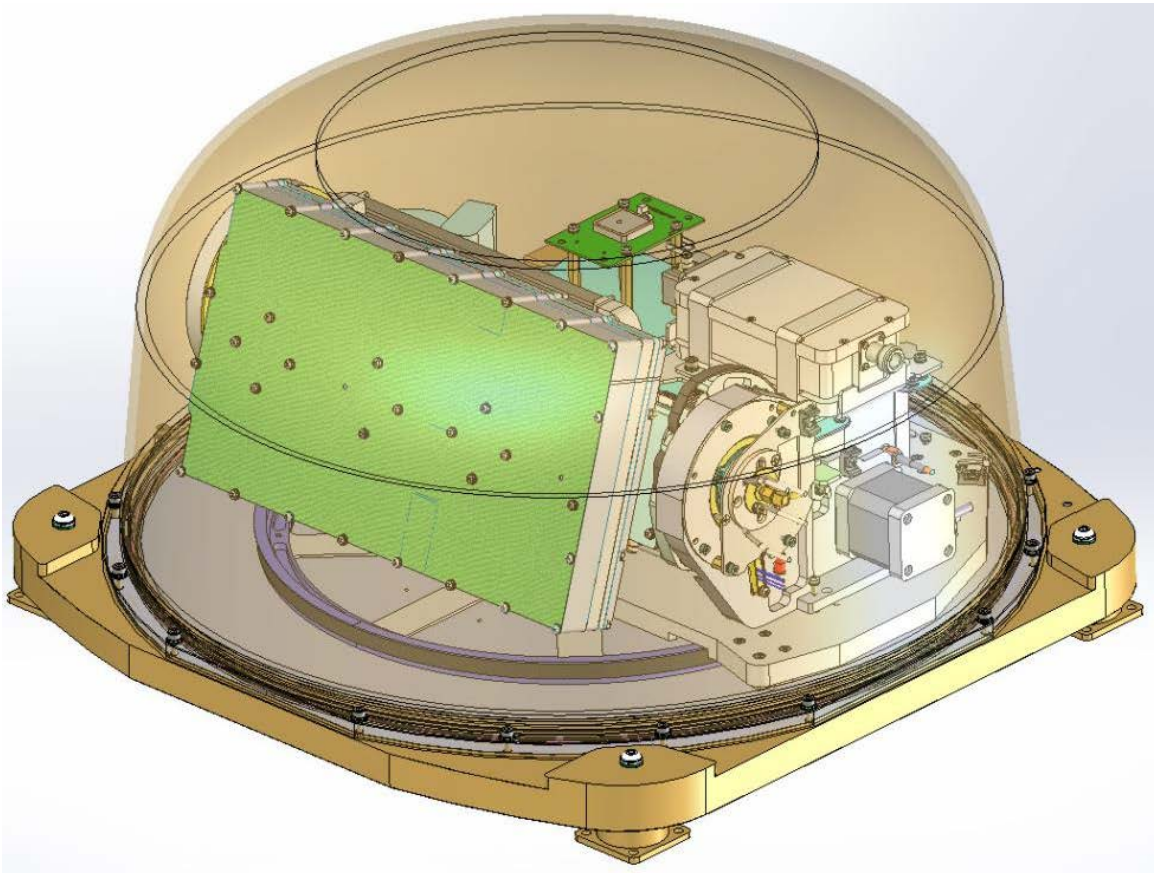

Figure 1
SR300Ku with Flat Panel Array

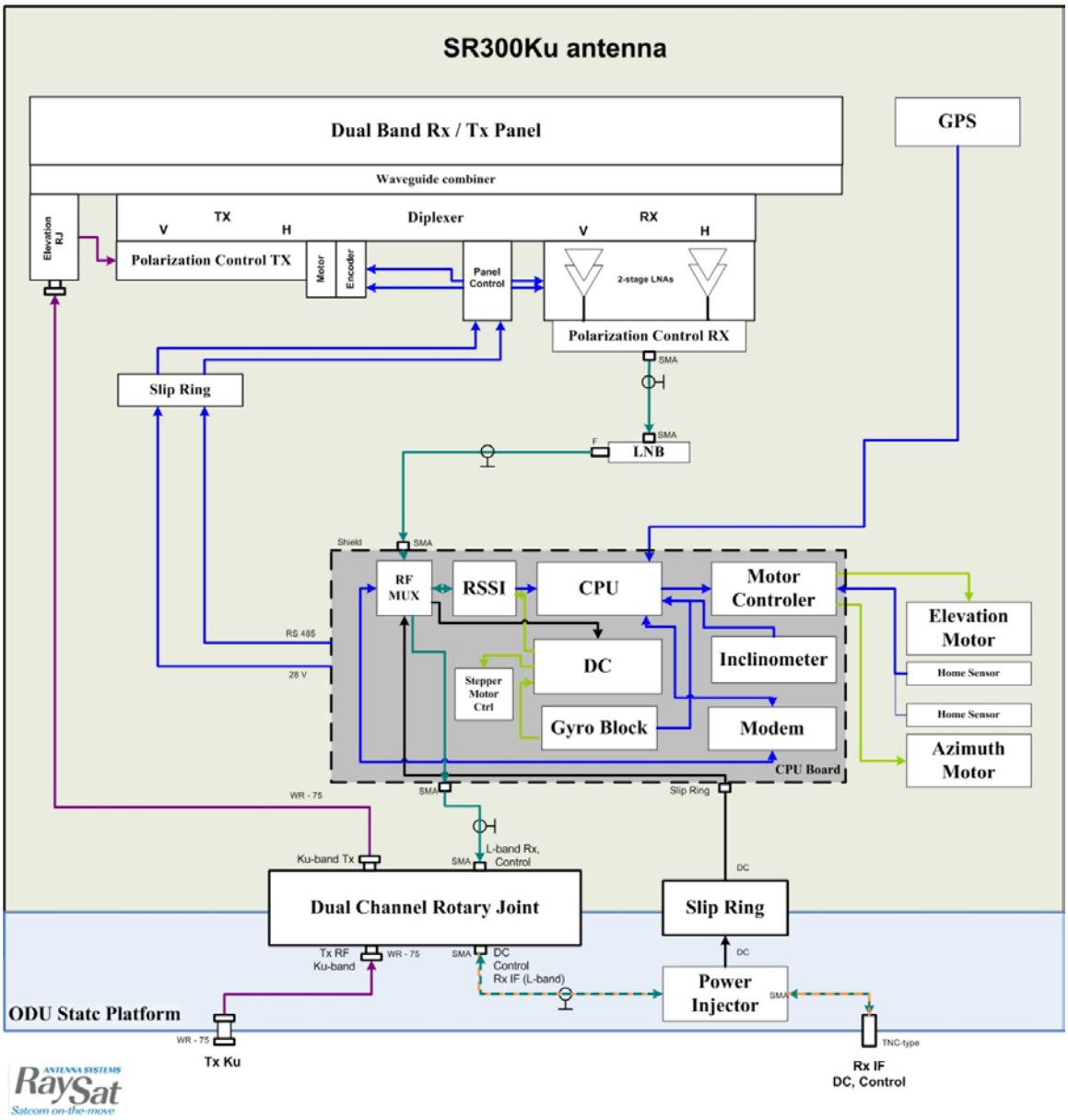

Figure 2
SR300Ku Block Diagram

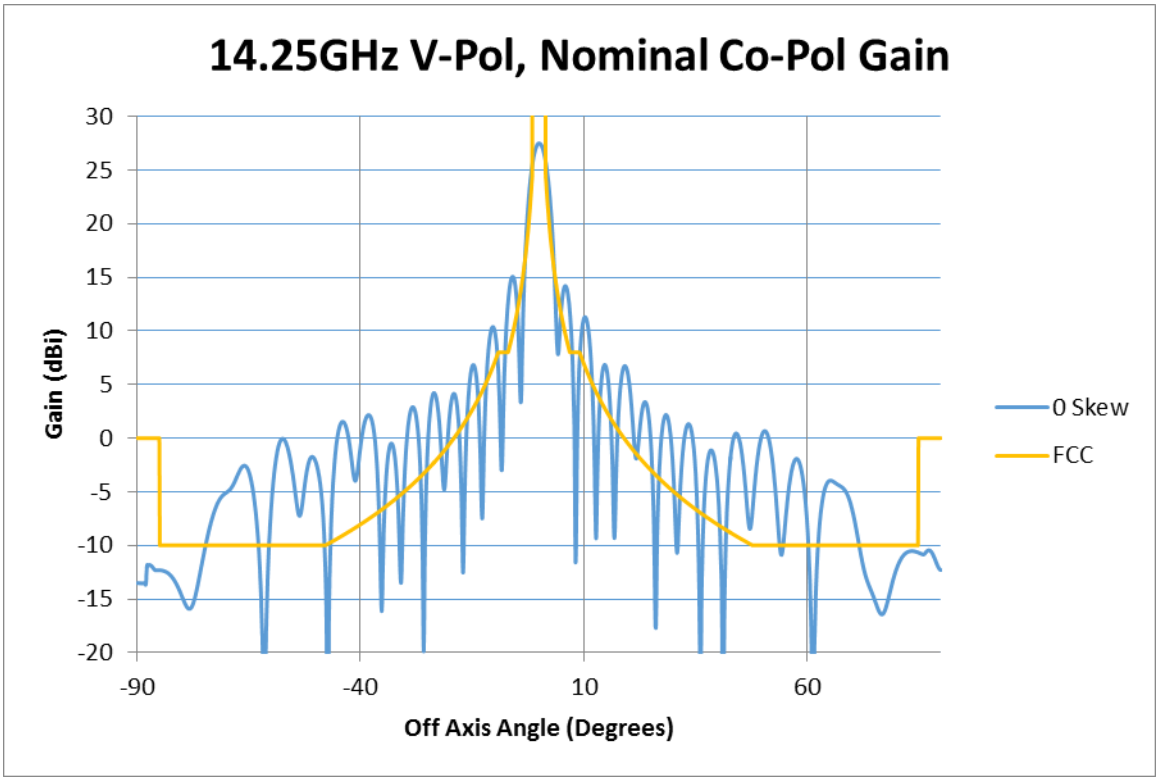

Figure 3
SR300Ku Gain Pattern

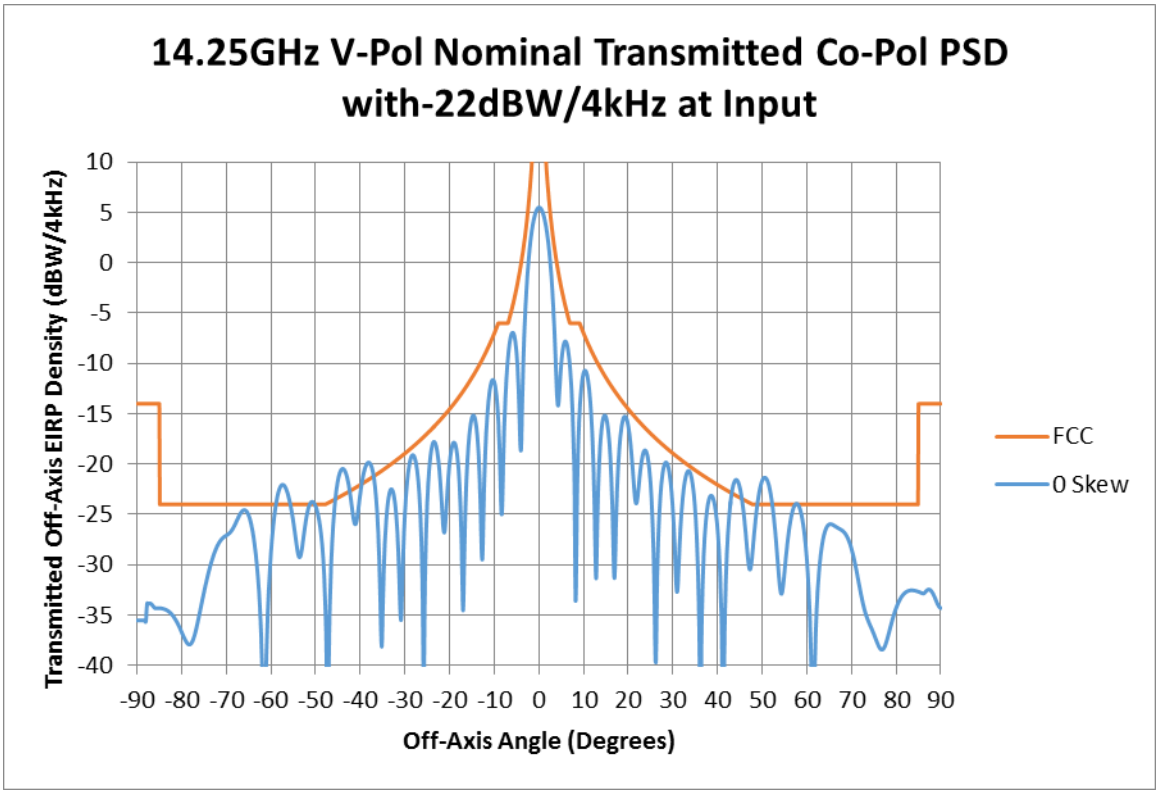

Figure 4
SR300Ku Off-Axis PSD Pattern