Overon America
Call Sign: E150031
Earth Station: 4.9m ASC Signal Model ES49MPJ-1

Compliance with FCC Report & Order (FCC 96-377) for the 13.75 - 14.0 GHz Band

Pursuant to FCC Report and Order 96-377 ("FCC 96-377"), the 13.75-14.0 GHz band is allocated to the fixed satellite service ("FSS") on a co-primary basis with U.S. government shipboard radar radiolocation operations and National Aeronautics and Space Administration ("NASA") Tracking and Data Relay Satellite Systems ("TDRSS") operations. As demonstrated in this exhibit, Overon America's ("Overon") 4.9m gateway earth station (the "ASC 4.9m") in Miami, Florida complies with FCC 96-377 and will operate in the 13.75-14.0 GHz band within the parameters designed to protect U.S. Navy radiolocation and NASA TDRSS operations and will not cause harmful interference. The parameters for the earth station are:

Table 1 – Earth Station Characteristics

- Coordinates (NAD-83): 25° 50' 28.0" N, 80° 18' 59.0" W
- Satellite Location: Eutelsat 117WB (formerly Satmex 9) at 117° W.L.
- Frequency Band: 13.75-14.0 GHz for uplink
- Polarizations: Horizontal/Vertical
- Emission: 36M0G7W
- Modulation: Digital
- Maximum Uplink EIRP:
  - 36M0G7W: 74.7 dBW
- Transmit Antenna Characteristics:
  - Antenna Size: 4.9m
  - Antenna Type/Model: ASC Signal Model ES49MPJ-1
  - Gain: 54.9 dBi @ 13.9 GHz
- RF power and power density into Antenna Flange
  - 36M0G7W: 19.8 dBW or -19.7 dBW/4 kHz

- Minimum Elevation Angle: Miami, Florida (39.5° @ 239.7° Azimuth) at 117° W.L. (Eutelsat 117WB).

- Side Lobe Antenna Gain: $32 - 25*\log(\theta) = -7.9$ dBi for $\theta = 39.5°$

Because the 13.75-14.0 GHz band is shared with the U.S. government, coordination in this band requires resolution data pertaining to potential interference between the subject earth station and U.S. Navy radiolocation and NASA TDRSS services.

1. Potential Impact to Government Radiolocation (Shipboard Radar)

U.S. Navy shipboard radiolocation operations may occur anywhere in the 13.4-14.0 GHz frequency band. FCC Order 96-377 allocates the top 250 MHz of this 600 MHz band to FSS on a co-primary basis with radiolocation operations and provides that FSS earth stations must have a power flux density ("PFD") value of -167 dBW/m^2/4 kHz to prevent harmful interference to government radiolocation services. The closest distance to the shoreline from the Miami, Florida earth station is approximately 13.6 km east toward Bird Key. The calculation of the power spectral density at this distance is given by:

- Clear Sky EIRP:
  - 36M0G7W: 74.7 dBW

- Carrier Bandwidths:
  - 36M0G7W: 36 MHz

- Power Density at Antenna Input:
  - 36M0G7W: -19.7 dBW/4 kHz

- Maximum EIRP Density per Carrier:
  - 36M0G7W: 35.2 dBW/4 kHz

- Maximum EIRP Density towards Horizon:
  - -24.4 dBW/4 kHz

- Transmit Antenna Gain:
  - 54.9 dBi @ 13.9 GHz

- Antenna Gain Horizon: FCC Reference Pattern
- Antenna Elevation Angle: = 39.5°

The earth station will radiate interference toward the ocean according to its off-axis side-lobe performance. A conservative analysis, using the FCC standard reference pattern, results in off-axis antenna gains of -10 dBi towards Biscayne Bay.

- The signal density at the shoreline, through free space is:
    - PFD = Antenna Feed Power density (dBW/4kHz) + Antenna Off-Axis Gain (dBi) – Spread Loss (dbW-m^2)

PFD = -19.7 dBW/4kHz + (-10) dBi – 10*log[4π*(13600m)^2]
= -123.363 dBW/m^2/4 kHz – Additional Path Losses (70.85 dB)
= -194.213 dBW/m^2/4 kHz

Our calculations indicate additional path loss of approximately 70.85 dB including absorption loss and clutter blockage loss from the earth station to the nearest shoreline. The calculated PFD, including additional path losses to the closest shoreline, is -194.213 dBW/m^2/4 kHz. This is 27.213 dB below the -167.0 dBW/m^2/4 kHz interference criteria of the R&O 96-377. Therefore, there should be no interference to the U.S. Navy radiolocation operations from the Miami, Florida earth station due to the distance and the terrain blockage between the site and the shore.

2. Potential Impact to NASA's Tracking and Data Relay Satellite System

Pursuant to FCC 96-377, FSS earth stations proposing to operate in the 13.75-14.0 GHz band must be coordinated with TDRSS forward link-to-LEO and with TDRSS earth stations. Because the geographic location of the Overon earth station in Miami, Florida is outside of the 390 km coordination radius of TDRSS ground stations, TDRSS links will not be impacted by Overon's proposed earth station operations.

In addition, consistent with footnote US337, Eutelsat Americas has already coordinated operation of the E117WB satellite with NASA in the 13.75-13.8 GHz band, which includes specific earth station uplink power spectral density limits to ensure compatibility with TDRSS operations.[1] Overon will limit any earth station operations in the 13.75-13.8 GHz band to the values reflected in the NASA-Eutelsat Americas coordination agreement.

[1] *See* Operational Level Coordination Agreement Between NASA and Eutelsat Americas Concerning the TDRS 12W Satellite Network and the Raggiana-18 Satellite Network (December 2015).

Therefore, there will be no potential interference to the TDRSS space-to-space link.

3. Coordination Result Summary and Conclusion

The results of the analysis and calculations performed in this exhibit indicate that Overon may operate its ASC 4.9m gateway earth station at the Miami, Florida facility without causing interference to the U.S. Navy radiolocation and NASA TDRSS space-to-earth and space-to-space operations. Accordingly, Overon may operate on a co-primary basis to U.S. government services in the 13.75-14.0 GHz band.