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December 8, 2009

3.1 Antenna Description

The antenna consists of linearly vertically polarized antenna covered by a polycarbonate Radome. The antenna is fed by a coaxial cable connected to a SMA (F) connector at the base.

3.2 Antenna specifications and performance

The proposed antenna consists of a bicone attached to the center conductor of the coaxial feed line, which is connected to a SMA connector through a 50 Ohms coaxial cable. The required specifications below can be achieved by optimizing the cone geometry to produce the maximum results within the frequency bandwidth.

PROTOTYPE

3.2.1 Operating frequency bandwidth.

The antenna is designed to cover the band from 14.40 – 15.35 GHz.

3.2.2 Polarization

The antenna is Right Hand Circular (RHCP) polarized when oriented perpendicular to the azimuth plane. Polarizer is used to achieve the conversion from linear to RHCP.

3.2.3 Azimuth and Elevation Coverage.

The antenna provides 360 degrees azimuth coverage and maximum of 40 degrees in elevation. The antenna can be optimized to meet +/- 60 degrees elevation with 3.1 dBiC nominal gain.

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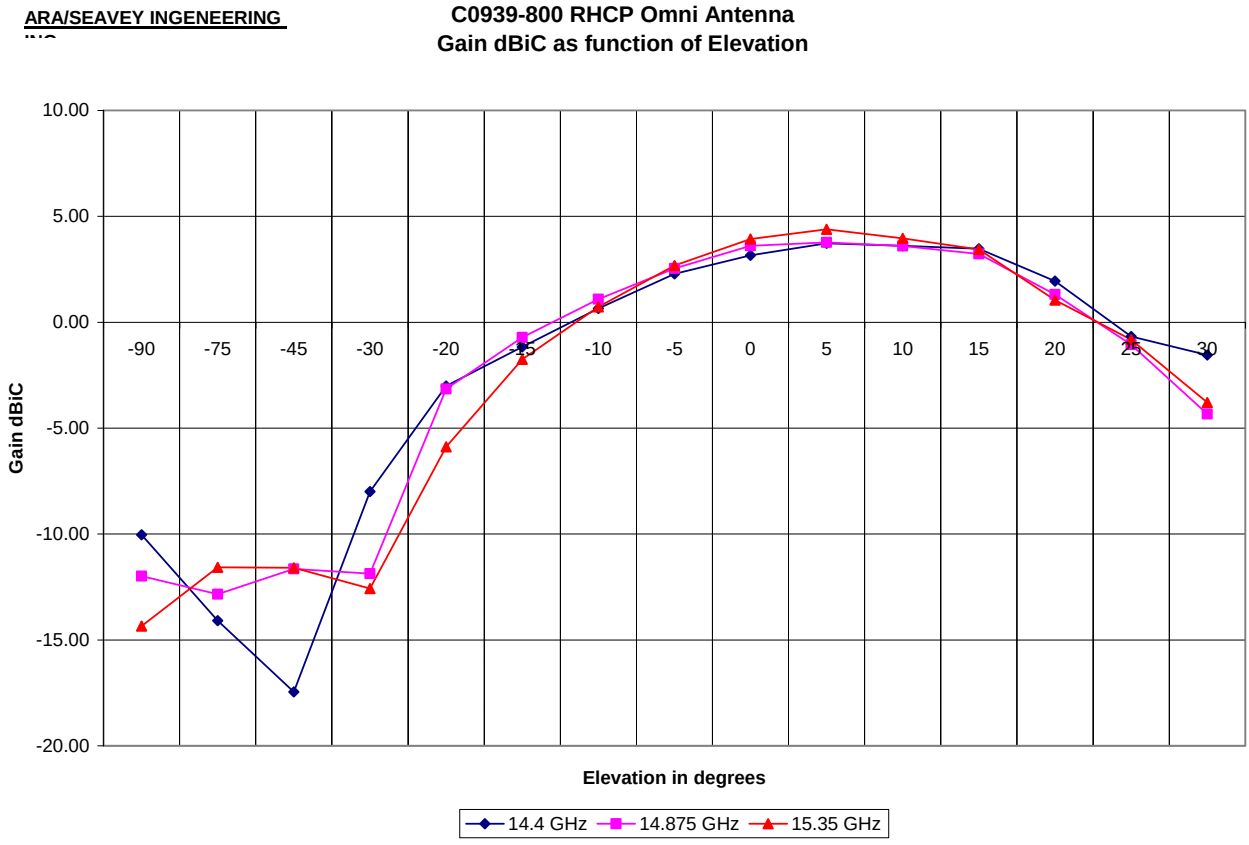
3.2.4 Gain/Antenna Pattern

The average measured gain of the prototype antenna including Radome is 4.39 dBiC nominal at +15 degrees from horizon. Below is statistical data analysis within +/- 20 degrees from Horizon.

Nominal Gain Spec:	3.10 dB
Meas Avg Gain @ 14.4 GHz:	1.63 dB
Meas Avg Gain @ 14.875 GHz:	1.69 dB
Meas Avg Gain @ 15.35 GHz:	1.39 dB
Meas Total Average Gain:	1.57 dB
Min Gain Spec	0.00 dB
Meas % of pts > Min Gain @ 14.4 GHz:	82%
Meas % of pts > Min Gain @ 14.875 GHz:	85%
Meas % of pts > Min Gain @ 15.35 GHz:	81%
Meas Total % of pts > Min Gain:	83%



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3.2.5 VSWR

The prototype antennas have a Max VSWR of 1.5:1 within the measurement tolerance.

3.2.6 Axial Ratio. Axial Ratio is Max 5dB. Below is statistical data analysis within +/- 20 degrees from Horizon.

Max A.R. Spec Max:	5.00 dB
Meas Avg GH @ 14.4 GHz:	2.85 dB
Meas Avg GH @ 14.875 GHz:	2.16 dB
Meas Avg GH @ 15.35 GHz:	4.32 dB
Meas Total Average A.R.:	3.11 dB
Max A.R. Spec :	6.00 dB
Meas % of pts < Max GH @ 14.4 GHz:	98%
Meas % of pts < Max GH @ 14.875 GHz:	99%
Meas % of pts < Max GH @ 15.35 GHz:	79%
Meas Total % of pts < Max A.R.:	92%

Mechanical and Environmental testing.

Although no test was performed on this first prototype, the antenna was designed to meet all mechanical and environmental testing using in house experience from the existing FCS model which did undergo vibration, shock, temperature and other military requirement tests.