The Boeing Company
Experimental Application

Description and Technical Information

The Seatel 2403 antenna has become available for testing and service validation purposes. The Boeing Company ("Boeing") intends to test the antenna in a maritime mobile context on various platforms to validate potential new satellite communications services. Boeing intends to conduct its experimental operations on a non-harmful interference basis. Boeing already operates the Seatel 2403 on an STA basis. *See* Call Sign WD2XFK (various file numbers). This application reflects the technical parameters previously authorized by the Commission on an STA basis.

Experimental authorizations have already been granted for similar types of Seatel antennas used in the maritime mobile context (*see, e.g.,* File No. 0047-EX-ML-2003 and 0280-EX-ST-2003, Call Sign WD2XAU; *see also* File No. 0300-EX-ST-2003, Call Sign WB9XUG). Given the FCC's existing precedent permitting limited experimental operations using similar Seatel antennas in a maritime mobile context, Boeing seeks authority to test the Seatel 2403 antenna in a similar context, and respectfully requests grant of the requested experimental authorization at the earliest practicable time.

Antenna Overview

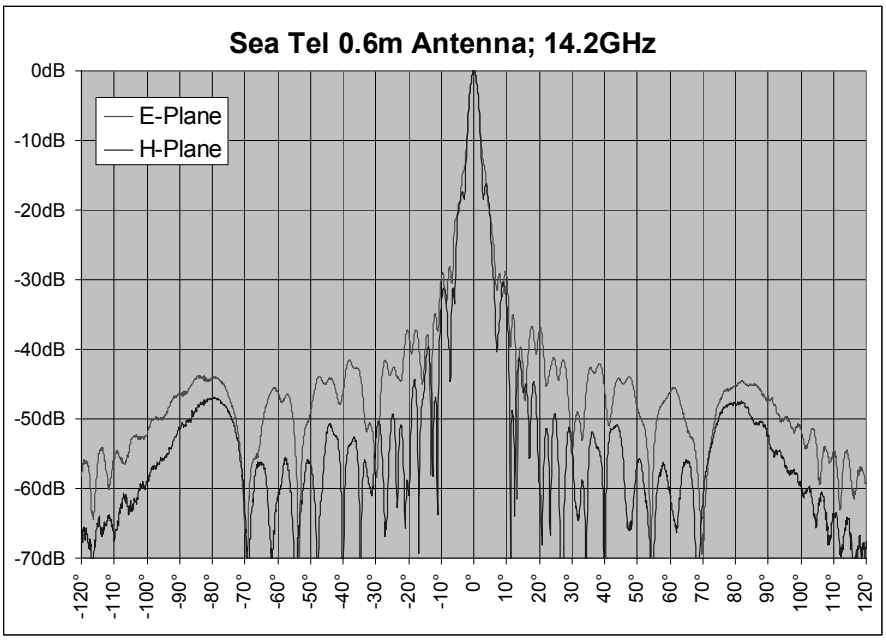
General Antenna Description

The Seatel 2403 antenna is a 0.6m diameter axially symmetric reflector with a dual-polarized dual-band backfire feed. The antenna is mounted on a 3-axis gimbal to maintain accurate pointing to the satellite, and adjust the plane of polarization for both forward (receive) and return (transmit) links by mechanical rotation of the feed assembly. The antenna is enclosed in a sandwich radome designed for low loss in both the transmit and receive bands.

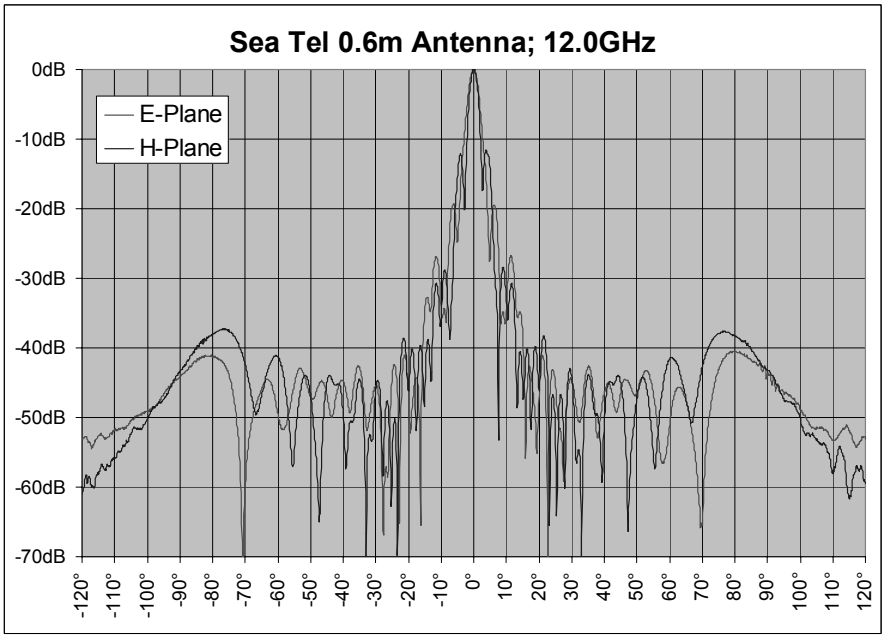
Photograph of Antenna

Antenna Patterns

The plots provided here present the measured principal E and H-plane patterns at mid-band frequencies in the transmit and receive bands (14.2GHz and 12.0GHz respectively).



Measured Transmit Band Patterns



Measured Receive Band Patterns

Other Technical Characteristics

Peak Directive Gain

The measured peak directive gain of the antenna in the transmit and receive bands is tabulated below.

Frequency (GHz)	11.2	12.0	12.8	14.0	14.2	14.4
Gain (dBi)	34.9	35.5	36.3	37.1	37.1	37.2

Measured Peak Directive Gain

Transmit and Receive Frequencies, Emissions

The transmit frequency band is 14.0-14.5 GHz, with a maximum instantaneous bandwidth of 36 MHz. The receive frequency band is 11.7-12.2 GHz, with a maximum instantaneous bandwidth of 36 MHz. The receive noise temperature is 112K. The peak ERP is 19.5 kW. Emissions to be employed during the experimental operations include 32M4G7D and 24M3G7D.

Spatial/Polarization Tracking Method

"DishScan" is used to spatially track the satellite signal. DishScan moves the antenna beam in a circular path around the line-of-sight to the satellite, with a typical angular displacement of 0.08°. Received signal strength is monitored during this movement which allows the antenna to be positioned to equalize the signal received on all four quadrants of the antenna. In this way, satellite tracking is maintained within accepted industry standards.

Polarization tracking is accomplished "open loop," based on knowledge of the satellite and ship locations and the polarization of the satellite transponder. The antenna plane of polarization is adjusted by mechanical rotation of the feed assembly within the reflector.

Scan Angle Limitations

The antenna scan range is 0-90° in elevation and 360° (continuous) in azimuth. A blanking sector will be defined based on illumination of the ship's mast and other superstructure parts (if any), and the antenna subsystem will be inhibited from transmitting when pointing within this sector.

Tracking Rates

Stabilization rates exceed 90 degrees per second for the elevation and cross-level axes. Azimuth stabilization exceeds 12 degrees per second with unlimited azimuth capability.