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Federal Communications Commission
International Bureau
445 12th Street, SW
Washington, DC 20554

6 April, 2012

Dear Sir/Madam:

In support of FCC Form 312, Schedule B, L-3 Interstate Electronics Corporation (IEC) hereby provides the following substantiating information with respect to the Cobham Sea Tel Model 6009 Ku-band Earth Station on Vessel (ESV) antenna as Exhibit J to the application.

Section B4, Earth Station Antenna Facilities

Item B4(f), Antenna Size: 1.5 meters (per manufacturer data sheet, Exhibit A).

Item B4(g), Antenna Gain Transmit and/or Receive:
Transmit gain is 45.1dBi @ 14.25 GHz (per manufacturer data sheet, Exhibit A);
Receive gain is 43.6dBi @ 11.95 GHz (frequency-adjusted from 44.0dBi @ 12.5 GHz on manufacturer data sheet, Exhibit A).
(Note: these values indicate an antenna efficiency of ~65%.)

Section B5, Antenna Heights and Maximum Power Levels

Item B5(d), Maximum Antenna Height above Mean Sea Level: 18 meters (mounted on the 05 level of the USNS Waters; see installation sketch, Exhibit L).

Item B5(f), Maximum Antenna Height Above Rooftop: 3 meters (above ship structure; see installation sketch, Exhibit P).

Item B5(g), Total Input Power at antenna flange: 40 Watts (maximum possible; power is adjusted by the space segment provider).

Item B5(h), Total EIRP for all carriers: 61.12 dBW (maximum possible output power from B5(g) = 40 Watts = 16.02 dBW; transmit antenna gain from B4(g) = 45.1 dBi; EIRP = 16.02 + 45.1 = 61.12 dBW).

Section B6, Frequency Coordination Limits

Item B6(i), Maximum EIRP Density toward the Horizon: -29.48 dBW/4kHz (calculated as follows):

Minimum elevation angle relative to the ship (required to prevent blockage by the ship's structure)	35 degrees
Maximum ship roll angle consistent with operations	10 degrees
Minimum elevation angle above the horizon	25 degrees
EIRP density at 25° elevation angle from manufacturer test data (Exhibit E); note: this includes 0.2dB radome loss	-27.7 dBW/4kHz
Input power density used for Exhibit E elevation sweep	-14 dBW/4KHz
Input power density required for IEC operation (see below)	-15.78 dBW/4kHz
Adjustment to Exhibit E table value for IEC operation	-1.78 dBW/4kHz
Adjusted Maximum EIRP Density toward the Horizon	-29.48 dBW/4kHz

Section B7, Particulars of Operation

IEC transmits various information types (e.g., Range Safety data, target tracking data, digitized video) with various encoding/error-correcting schemes, at various data rates.

Item B7(f), Maximum EIRP per Carrier: 55.70 dBW, based on the following results from Satmaster link-budget analyses of the limiting cases of information bit rate (all other operational combinations of transmitted information types were also analyzed using Satmaster, and all fall within this range):

Parameter	Lowest data rate	Highest data rate
Emission designator	76K0G7W	2M43G7W
Data rate	64 kbps	2048 kbps
Total HPA required	-4.16 dBW	10.90 dBW
Antenna gain	45.1 dBi	45.1 dBi
Waveguide loss	0.3 dB	0.3 dB
Maximum EIRP/carrier	40.64 dBW	55.70 dBW

Item B7(g), Maximum EIRP Density per Carrier: 27.86 dBW/4kHz, based on the following results from Satmaster link-budget analyses of the limiting cases of information bit rate (all other operational combinations of transmitted information types were also analyzed using Satmaster, and all have a value within a 0.01-dB/4kHz rounding error of the stated value due to the linear relationship among information bit rate, power required, and bandwidth required):

Parameter	Lowest data rate	Highest data rate
Emission designator	76K0G7W	2M43G7W
Data rate	64 kbps	2048 kbps
Total HPA required	-4.16 dBW	10.90 dBW
Antenna gain	45.1 dBi	45.1 dBi
Waveguide loss	0.3 dB	0.3 dB
Maximum EIRP/Carrier	40.64 dBW	55.70 dBW
Bandwidth required	0.0651 MHz	2.0832 MHz
Input power density req'd	-15.78 dBW/4kHz	-15.78 dBW/4kHz
Maximum EIRP Density/ Carrier	27.85 dBW/4kHz	27.86 dBW/4kHz

EIRP Density in dBW/4kHz is given computed as

$$\text{EIRP Density [dBW/4kHz]} = \text{EIRP [dBW]} - 10 * \log_{10}(\text{bandwidth req'd [MHz]} / 0.004)$$

For technical questions, please contact

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Sincerely,

Mr. Rick Lloyd
Senior Director Instrumentation Systems Engineering