EXHIBIT A – SPECIAL TEMPORARY AUTHORITY JUSTIFICATION

Cobham SATCOM, pursuant to Section 5.61 of the Commission's Rules, 47 C.F.R. § 5.61, hereby requests Special Temporary Authority ("STA") to conduct demonstrations of a 0.6 meter (24") satellite earth station terminal for United States military and government personnel. STA is sought for a period of 180 days beginning not later than December 15, 2010. Consistent with the standards set forth in Section 5.61(a), Cobham SATCOM outlines below its need for the requested STA and the compelling reasons why the requested STA should be granted expeditiously.

Cobham SATCOM is an affiliate of Cobham plc ("Cobham"), a leading provider of equipment and services to the United States aerospace and defense industries. Cobham and its affiliated companies presently provide technology and engineering support for the Atlas and Delta IV launch vehicles, Joint Strike Fighter initiative, Global Hawk UAV, as well as many other programs of critical importance to the U.S. Department of Defense ("DoD") and Department of Homeland Security ("DHS"). Cobham SATCOM oversees Cobham's portfolio of satellite earth station engineering and manufacturing firms that includes TracStar Systems, Inc., Sea Tel Marine Antennas and Patriot Antenna Systems. Cobham SATCOM has been contacted by multiple government agencies, including the Joint Communications Support Element ("JCSE") requesting a demonstration of a prototype parabolic, center fed 0.6 meter Ka-band antenna system under development by Cobham SATCOM beginning in December 2010. Cobham SATCOM expects to continue demonstrations for the full 180-day desired term and may seek long-term experimental authority under Part 5 of the Commission's Rules if further evaluation of the prototype system is required.

Grant of this STA request will serve the public interest by allowing Cobham SATCOM to demonstrate a new 0.6 meter satellite earth station terminal for U.S. military and government personnel who are urgently evaluating Ka-band systems in connection with military operations, homeland security and disaster recovery applications. The 0.6 meter system has the ability to support two-way broadband applications that require throughput beyond that which other available C- and Ku-band systems can accommodate. This capability allows military and DHS personnel in the field to access and provide critical information and materials necessary for timely and effective decision-making. It also enables remote terminals to provide greatly enhanced information on border surveillance, coastal patrol and other high-priority, frontline homeland security operations previously inaccessible via narrowband or capacity restricted communications platforms.

Grant of experimental STA will not adversely impact any authorized user of RF spectrum. Demonstrations of the 0.6 meter terminal will be conducted exclusively by highly trained Cobham SATCOM engineers. The terminal has a beamwidth at the half-power point of 1.2 degrees and fully complies with 2-degree spacing obligations in the Ka-band (29.5 – 30.0 GHz) when input to the antenna is limited to 3.0 Watts.

In summary, grant of this STA will enable Cobham SATCOM to demonstrate and test an advanced antenna system for U.S. military and other federal government agencies that have expressed interest in Ka-band solutions. Moreover, grant of the requested STA will not adversely impact any authorized user of 29.5 – 30.0 GHz spectrum. For all of the above reasons, Cobham SATCOM requests expedited treatment and approval of its STA application.

EXHIBIT B – DESCRIPTION OF SERVICE

1.0 Service Overview

The experiments contemplated under this STA will utilize a center fed 0.6 meter single reflector antenna designed and manufactured by Cobham SATCOM affiliate Sea Tel Marine Antennas ("Sea Tel") coupled with a 3.0 Watt block upconverter.

During the proposed demonstrations the 0.6 terminal will communicate exclusively with the WildBlue 1 or Anik F2, both of which are co-located at 111 degrees west longitude, or the AMC 15 at 105 degrees west longitude, depending on the availability of each satellite. Cobham SATCOM contemplates performing experiments and demonstrations that involve voice, data and video applications.

All tests will occur in a subset of conventional Ka-band frequencies (29.5-30.0 GHz space-to-earth).

For the purposes of this experimental STA application, the point of contact is:
Mark Steel
Senior Director of Engineering
Cobham SATCOM
Tel: +1 407-650-9054 (Extn. 32804)
Cell: + 1 703-409-1595
Email: mark.steel@cobham.com

The above contact has complete oversight of all test operations and authority to cease transmissions from the antenna under test.

2.0 2-Degree Spacing Compliance Statement

The proposed antenna fully complies with 2-degree spacing obligations when input is limited to 3.0 Watts, and Cobham SATCOM will take appropriate measures to ensure that input to the 0.6 meter antenna is maintained at or below 3.0 Watts during all proposed tests/demonstrations.[1]

Cobham SATCOM understands that the proposed demonstrations conducted pursuant to STA will not be entitled to protection and will need to accept interference from other spectrum users. If the use of the proposed 0.6 meter antenna should cause harmful interference into other systems, Cobham SATCOM will terminate transmission immediately upon notice from the FCC or offended parties.

[1] Preliminary manufacturer antenna patterns (*see infra*, Exhibit C) demonstrate that off-axis gain of the proposed 0.6 meter antenna may exceed the levels specified under section 25.209 of the Commission's Rules by 1 to 5 dB in certain instances beginning at approximately +/- 3.0º. As noted above, restricting input to 3.0 Watts ensures full compliance with 2-degree spacing obligations.

EXHIBIT C – KA-BAND EARTH-TO-SPACE ANTENNA PATTERNS

1 Introduction

Optim Microwave is developing a new center fed 24" reflector antenna for Tx/Rx applications at K and Ka Bands. The receive band is 19.4-21.2 GHz. The transmit band is 29.1-31.0 GHz.

The reflector diameter including the lip on the rim is 24 inches. The internal depth of the reflector is 5.6 inches.

This report contains the predicted performance of the antenna as of 2/23/2010.

2 Predicted Antenna Performance

2.1 Predicted Reflections, Gains, Beamwidths and First Side Lobe Levels

Table 1 contains the predicted reflection coefficients, gains, beamwidths and first sidelobe levels for the antenna. An exaggerated loss of 0.1 dB has been assumed in the gain calculations. Losses from the feed network have not been included in the calculations.

Frequency (GHz)	Predicted Reflection Coefficient	Estimated Gain (dBi)	3 dB Beamwidth (degrees)	Co Pol 1st Side Lobe (dBp)	Cross Pol 1st Side Lobe (dBp)
19.340	0.209	40.45	1.70	-19.21	-26.60
19.580	0.160	40.56	1.69	-19.15	-27.64
19.820	0.137	40.69	1.67	-19.57	-28.23
20.060	0.101	40.79	1.66	-19.82	-29.23
20.300	0.077	40.81	1.66	-19.67	-29.87
20.540	0.065	40.84	1.65	-19.64	-30.72
20.780	0.069	40.94	1.64	-20.19	-32.28
21.020	0.148	41.01	1.63	-20.74	-32.74
21.260	0.187	40.91	1.64	-20.46	-31.89
29.060	0.111	43.55	1.24	-22.33	-37.80
29.280	0.093	43.67	1.22	-22.52	-36.60
29.500	0.089	43.73	1.21	-22.49	-36.26
29.720	0.084	43.78	1.20	-22.77	-37.40
29.940	0.095	43.86	1.20	-22.85	-36.96
30.160	0.106	43.98	1.18	-23.16	-38.15
30.380	0.126	44.12	1.17	-23.50	-41.60
30.600	0.143	44.18	1.16	-22.88	-34.87
30.820	0.159	44.20	1.16	-22.27	-31.09
31.040	0.181	44.20	1.15	-21.55	-29.49

Table 1: Predicted Preformance Parameters

2.2 Predicted CP Patterns and Linear Patterns on the 45° Plane

Example predicted patterns are shown in Figures 1 to 38.

On each plot are shown Co-Pol reference curves corresponding to:

$$\begin{aligned} & \text{For } \theta \leq 7^\circ \qquad\qquad\qquad (\theta \text{ in degrees}) \\ \text{Gain} &= 29 - 25\log_{10}(\theta) \ \text{dBi} \end{aligned}$$

$$\begin{aligned} & \text{For } 7^\circ \leq \theta \leq 9.2^\circ \\ \text{Gain} &= 7.9 \ \text{dBi} \end{aligned}$$

$$\begin{aligned} & \text{For } \theta \leq 48^\circ \\ \text{Gain} &= 32 - 25\log_{10}(\theta) \ \text{dBi} \end{aligned}$$

$$\begin{aligned} & \text{For } \theta \geq 48^\circ \\ \text{Gain} &= -10 \ \text{dBi} \end{aligned}$$

Also, on each plot are shown a Cross-Pol reference curves corresponding to:

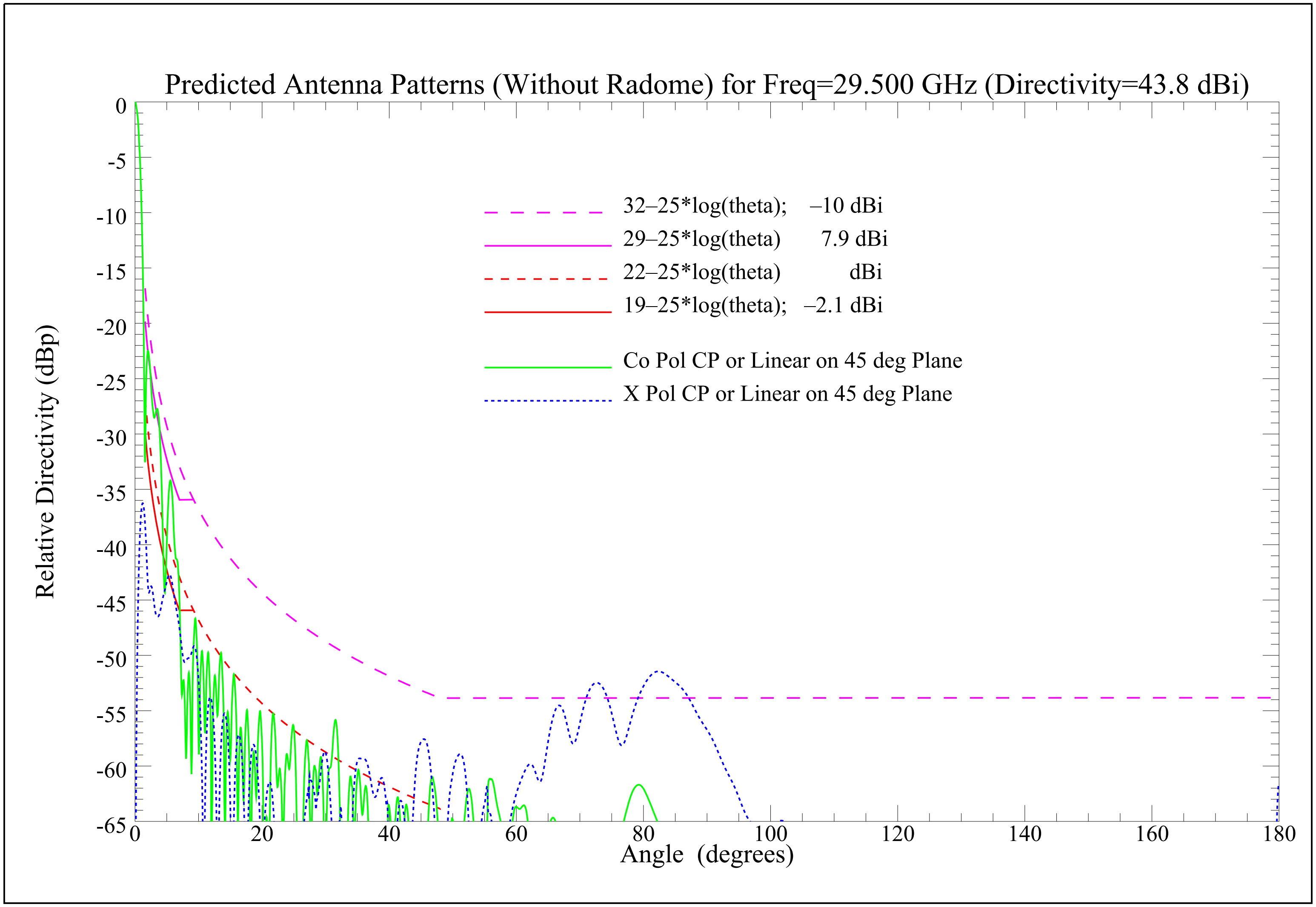
$$\begin{aligned} & \text{For } \theta \leq 7^\circ \qquad\qquad\qquad (\theta \text{ in degrees}) \\ \text{Gain} &= 19 - 25\log_{10}(\theta) \ \text{dBi} \end{aligned}$$

$$\begin{aligned} & \text{For } 7^\circ \leq \theta \leq 9.2^\circ \\ \text{Gain} &= -2.1 \ \text{dBi} \end{aligned}$$

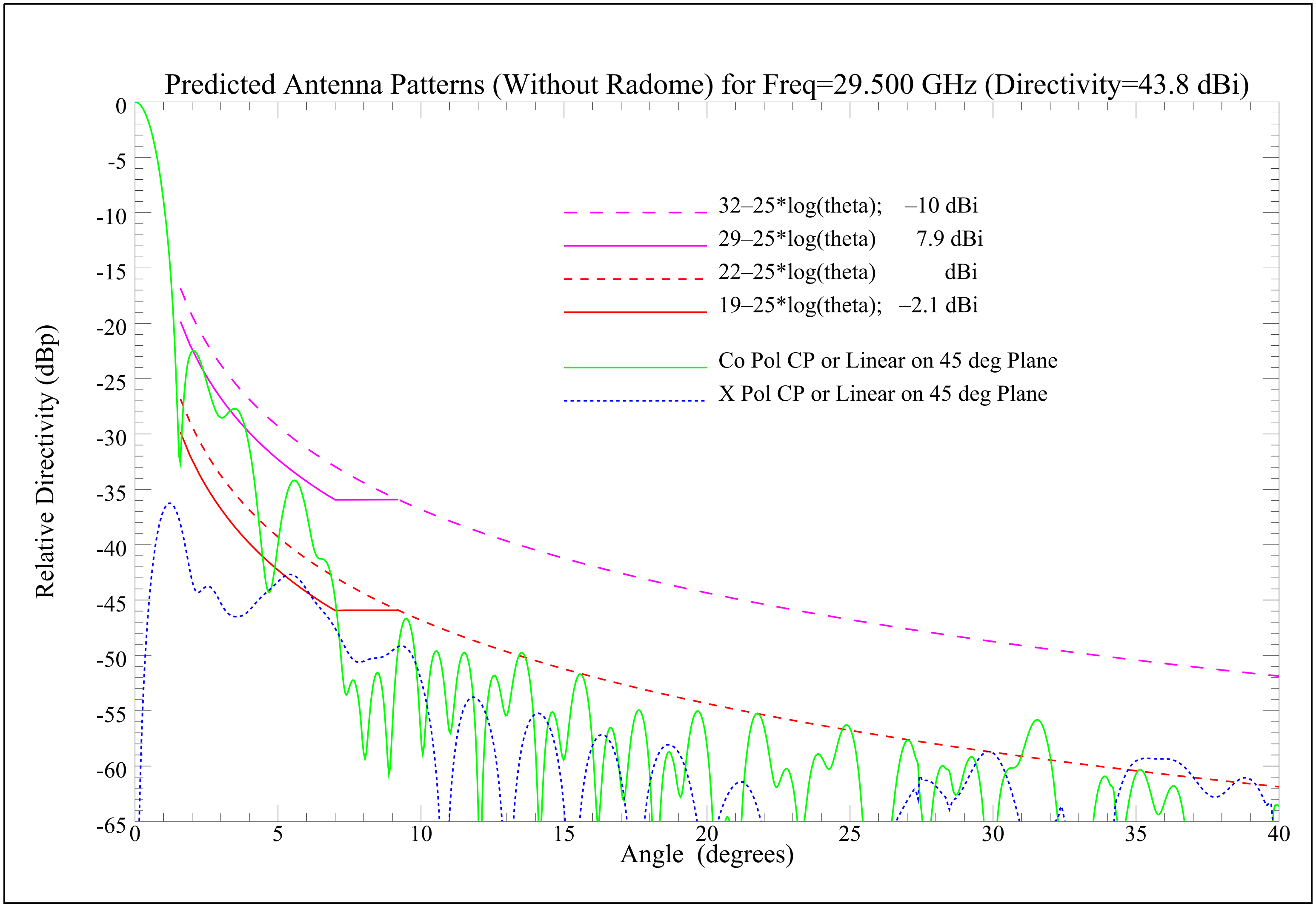
$$\begin{aligned} & \text{For } \theta \leq 48^\circ \\ \text{Gain} &= 22 - 25\log_{10}(\theta) \ \text{dBi} \end{aligned}$$

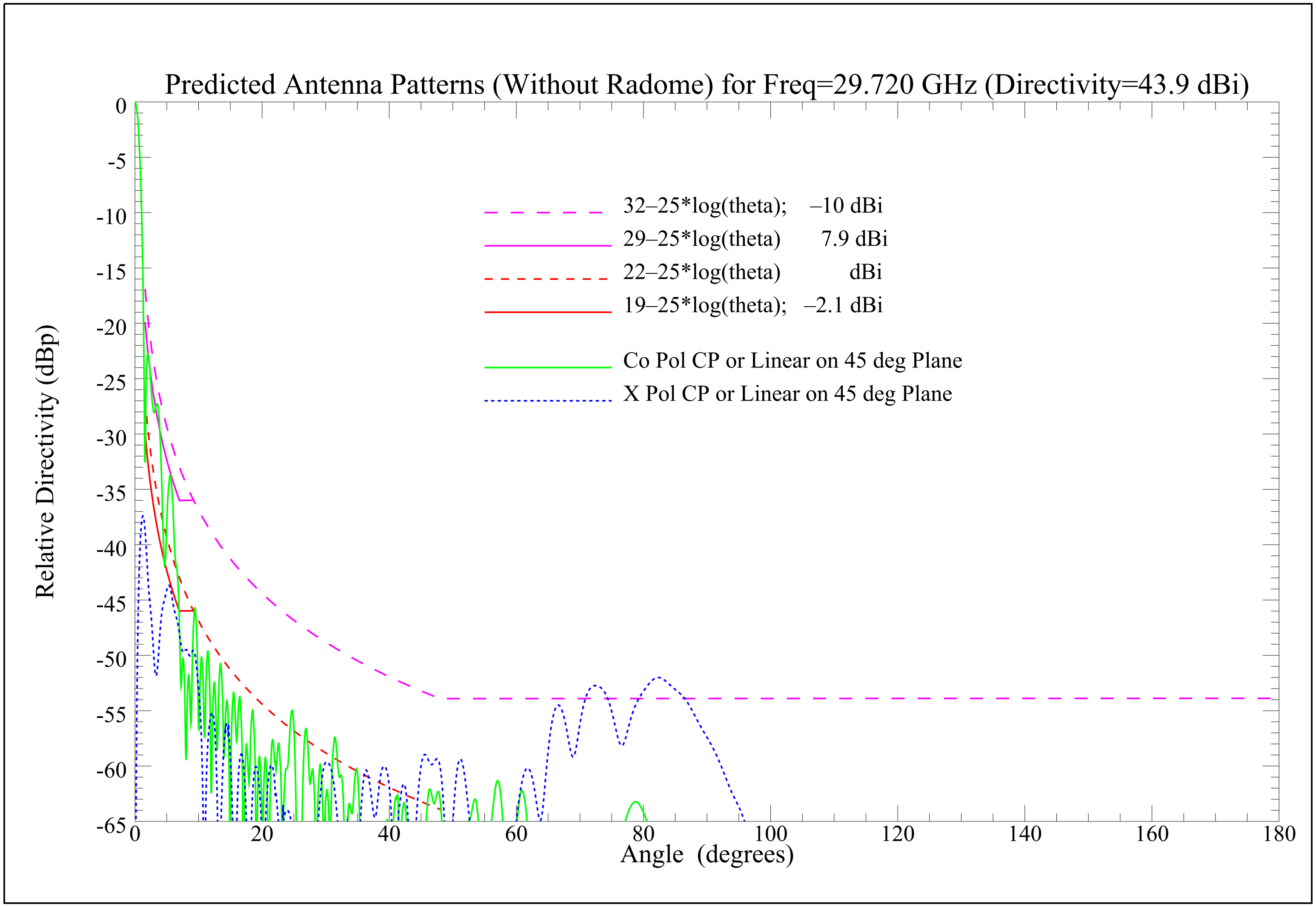
In plotting these curves, it is assumed that there are no losses in the antenna. If radome and waveguide losses are included, the antenna patterns will move down relative to these reference curves.

Antenna Patterns for 29.500 GHz

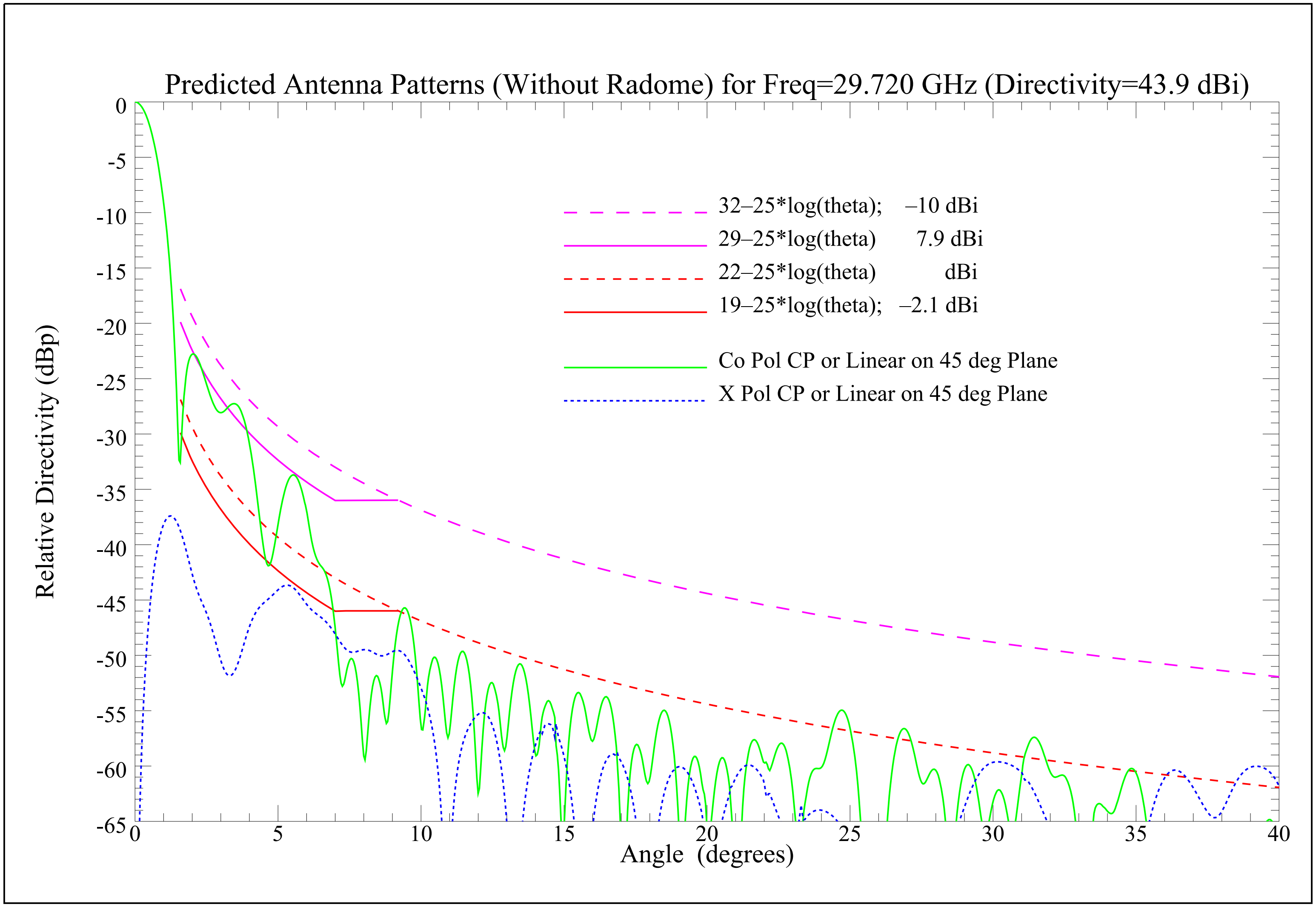


Antenna Patterns for 29.500 GHz



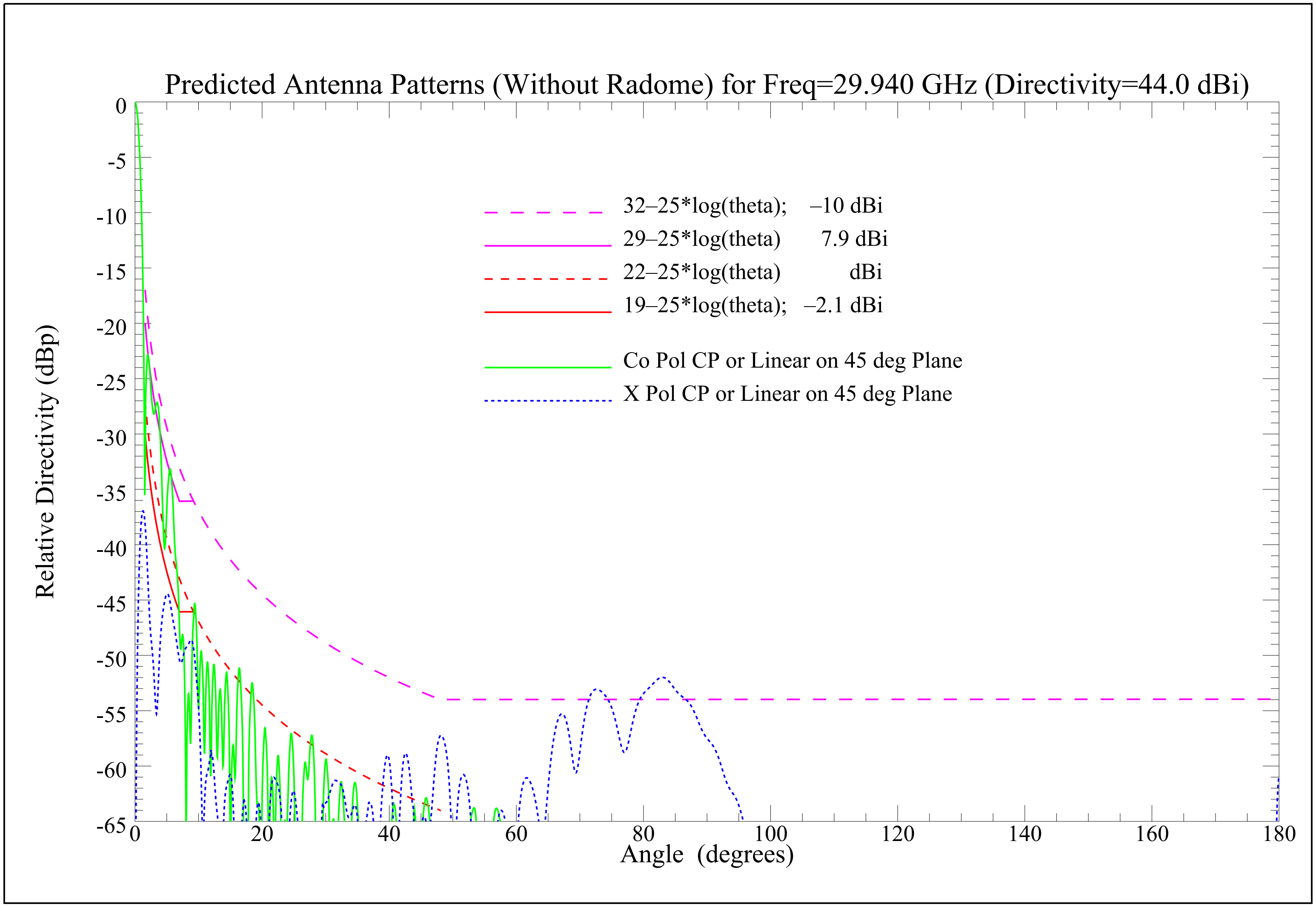


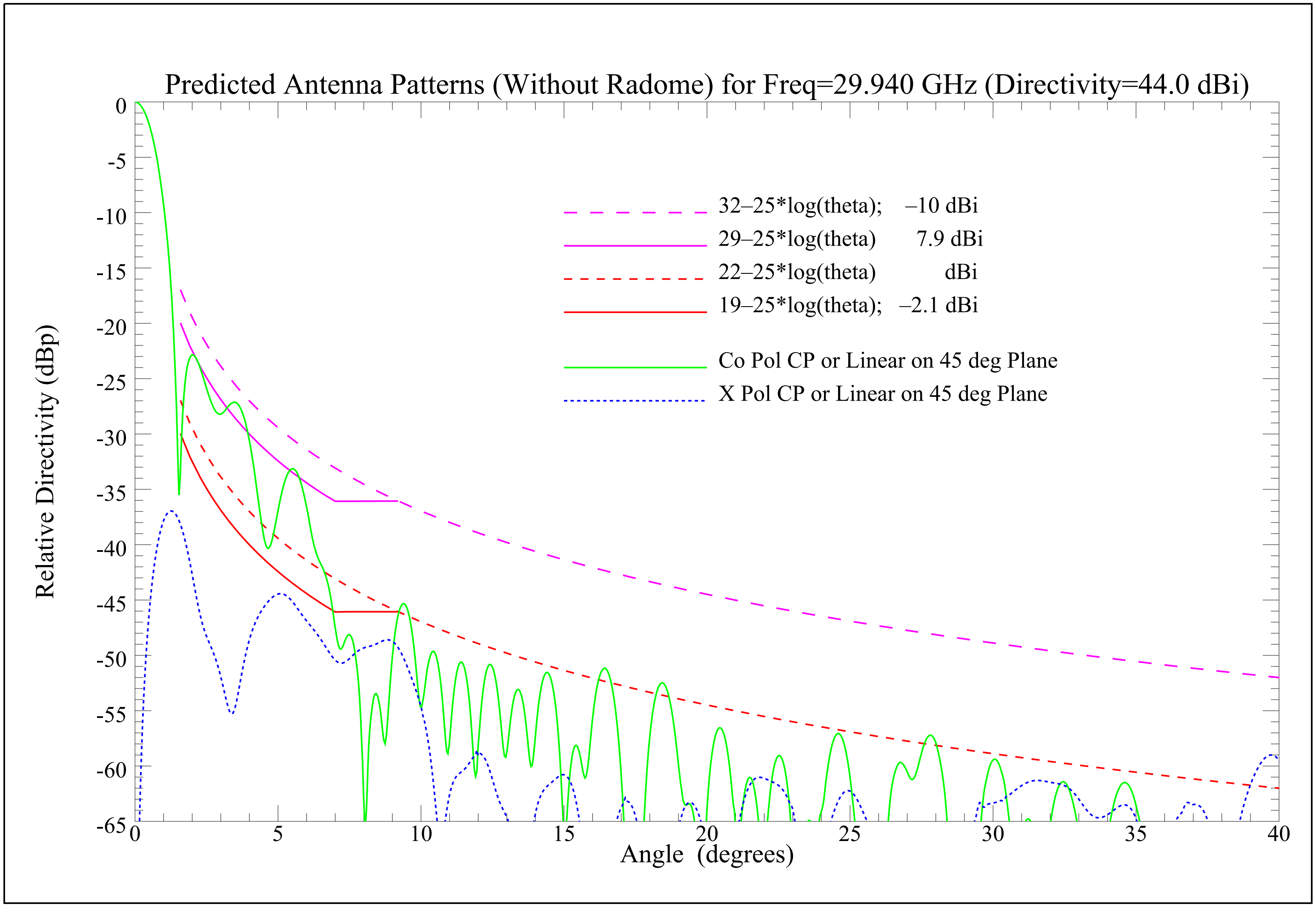
Antenna Patterns for 29.720 GHz



Antenna Patterns for 29.720 GHz

Antenna Patterns for 29.940 GHz





Antenna Patterns for 29.940 GHz

EXHIBIT D – RADIATION HAZARD STUDY

1.0 Antenna Analysis Method

This report is developed in accordance with the prediction methods contained in OET Bulletin No. 65, Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields, Edition 97-01, pp 26-30. The maximum level of non-ionizing radiation to which employees may be exposed is limited to a power density level of 5 milliwatts per square centimeter (5 mW/cm2) averaged over any 6 minute period in a controlled environment and the maximum level of non-ionizing radiation to which the general public is exposed is limited to a power density level of 1 milliwatt per square centimeter (1 mW/cm2) averaged over any 30 minute period in a uncontrolled environment.

2.1 0.6 Meter/4 Watt Antenna Specifications

The proposed antenna is a Sea Tel Ka USAT24 center fed unit equipped with a transceiver restricted to 3 Watts of output. The parameters for this antenna are shown in the table below.

Antenna Actual Diameter	**0.6 meters**
Antenna Surface Area	**.28 sq. meters**
Number of Identical Adjacent Antennas*	**0**
Nominal Antenna Efficiency (ε)	**50%**
Nominal Frequency	**29500 MHz**
Nominal Wavelength (λ)	**0.0102 meters**
Antenna Isotropic Gain	**42.2dB (17,200) @ 29500 MHzi**
Maximum Transmit Power / Carrier	**3 Watts**
Number of Carriers	**1**
Total Transmit Power	**3 Watts**
W/G Loss from Transmitter to Feed	**0 dB**
Total Feed Input Power	**3 Watts**
Near Field Limit	$R_{nf} = D^2/4\lambda = 8.8$ **meters**
Far Field Limit	$R_{ff} = 0.6\ D^2/\lambda = 21.2$ **meters**
Transition Region	R_{nf} **to** R_{ff}

Note that the worst-case radiation hazards exist along the beam axis. Under normal circumstances, it is highly unlikely that the antenna axis will be aligned with any occupied area since that would represent a blockage to the desired signals, thus rendering the link unusable.

In the following sections, the power density in the above regions, as well as other critically important areas will be calculated and evaluated. The calculations are done in the order discussed in OET Bulletin 65.

2.2 Main Reflector Region

The power density at the reflector surface can be calculated from the expression:

PD_{refl} =	**P/A =**	**1.06 mW/cm²**	**(1)**
Where:	**P = total power at feed, milliwatts**		
	A = Total area of reflector, sq. cm		

In the normal range of transmit powers for this satellite antenna, the power densities at or around the reflector surface are expected to exceed safe levels. Please note that precautionary measures will be taken during the individual installations of remote antennas to ensure that this area will be inaccessible to the general public. Operators and technicians have received training specifying this area as a high exposure area. Furthermore, procedures have been established that ensure all transmitters are turned off before access to this area by maintenance personnel is possible.

2.3 On-Axis Near Field Region

The geometrical limits of the radiated power in the near field approximate a cylindrical volume with a diameter equal to that of the antenna. In the near field, the power density is neither uniform nor does its value vary uniformly with distance from the antenna. For the purpose of considering radiation hazard it is assumed that the on-axis flux density is at its maximum value throughout the length of this region. The length of this region, i.e., the distance from the antenna to the end of the near field, is computed as Rnf above.

The power density within the on-axis near field region can be calculated from the expression:

$PD_{nf} = (4\ P)/(\pi\ D^2)$ =	**1.06 mW/cm² (2)**
	from 0 to 8.8 meters
Evaluation	
Uncontrolled Environment:	**Complies to FCC limits**
Controlled Environment:	**Complies to FCC limits**

2.4 On-Axis Transition Field Region

The transition region is located between the near and far field regions. As stated in Bulletin 65, the power density begins to vary inversely with distance in the transition region. The maximum power density in the transition region will not exceed that calculated for the near field region, and the transition region begins at that value. The maximum value for a given distance within the transition region may be computed for the point of interest according to:

We use the equation below (3) to determine the safe on-axis distances required for the two occupancy conditions:

PD_t =	**$(PD_{nf})(R_{nf})/R$ = dependent on R (3)**
where:	**PD_{nf} = near field power density**
	R_{nf} = near field distance
	R = distance to point of interest
For:	**$8.8 < R < 21.2$ meters**

Evaluation	
Uncontrolled Environment Safe Operating Distance,(meters), R_{safeu}:	**Complies to FCC Limits**
Controlled Environment Safe Operating Distance,(meters), R_{safec}:	**Complies to FCC Limits**

2.5 On-Axis Far-Field Region

The on- axis power density in the far field region (PD_{ff}) varies inversely with the square of the distance as follows:

We use the equation below (4) to determine the safe on-axis distances required for the two occupancy conditions:

PD_{ff} =	**$PG/(4\pi R^2)$ = dependent on R (4)**
where:	**P = total power at feed**
	G = Numeric Antenna gain in the direction of interest relative to isotropic radiator
	R = distance to the point of interest
For:	**$R > R_{ff}$ = 21.2 meters**
	PD_{ff} = 0.9 mW/cm² at R_{ff}

Evaluation	
Uncontrolled Environment Safe Operating Distance,(meters), R_{safeu}:	**Complies to FCC limits**
Controlled Environment Safe Operating Distance,(meters), R_{safec}:	**Complies to FCC limits**

2.6 Off-Axis Far-Field Region

In the far field region power is distributed in a pattern of maxima and minima (sidelobes) as a function of the off-axis angle between the antenna center line and the point of interest. Off-axis power density in the far field can be estimated using the antenna radiation patterns prescribed for the antenna in use. Usually this will correspond to the antenna gain pattern envelope defined by the FCC or the ITU, which takes the form of:

$G_{off} = 32 - 25\log(\Theta)$ (5)
for Θ from 1 to 48 degrees; -10 dBi from 48 to 180 degrees
(Applicable for commonly used satellite transmit antennas)

Considering that satellite antenna beams are aimed skyward, power density in the far field will usually not be a problem except at low look angles. In these cases, the off axis gain reduction may be used to further reduce the power density levels.

For example: At one (1) degree off axis At the far-field limit, we can calculate the power density as:

$G_{off} = 32 - 25\log(1) = 32 - 0$ dBi = 1585 numeric

Evaluation
$PD_{1\ deg\ off\text{-}axis} = PD_{ff} x\ 1585/G = 0.01\ mW/cm^2$

2.7 Off-Axis Power Density in the Near-Field and Transitional Region

According to Bulletin 65, off-axis calculations in the near field may be performed as follows: assuming that the point of interest is at least one antenna diameter removed from the center of the main beam, the power density at that point is at least a factor of 100 (20 dB) less than the value calculated for the equivalent on-axis power density in the main beam. Therefore, for regions at least 1.0 meters away from the center line of the dish, whether behind, below, or in front under of the antenna's main beam, the power density exposure is at least 20 dB below the main beam level as follows:

$PD_{nf(off\text{-}axis)} = PD_{nf} /100 = 0.01\ mW/cm^2$ at D off axis (6)

Evaluation of Safe Occupancy Area in Front of Antenna

The safe distance (S) from a vertical axis passing through the dish center to a safe off axis location in front of the antenna can be determined based on the dish diameter rule above (6). Assuming a flat terrain in front of the antenna, the relationship is:

S = (D/ sin α) + (2h - D - 2)/(2 tan α) (7)

$$S = (D/\sin\alpha) + (2h - D - 2)/(2\tan\alpha) \quad (7)$$

Where: **α = minimum elevation angle of antenna**

D = dish diameter in meters

h = maximum height of object to be cleared, meters

For distances equal or greater than determined by equation (7), the radiation hazard will be below safe levels for all but the most powerful stations (> 4 kilowatts RF at the feed).

For D = 0.6 meters

h = 1.0 meter

Then:

A	S
10	1.7 meters
15	1.2 meters
20	0.9 meters
25	0.8 meters
30	0.7 meters
35	0.6 meters
45	0.6 meters

3.0 Conclusions

Based upon the above analysis, the proposed operations do not exceed RF Guidelines in any section. Cobham SATCOM proposes to comply with the Maximum Permissible Exposure (MPE) limits of 1.0 mW/cm^2 for uncontrolled areas, and the MPE limits of 5.0 mW/cm^2 for controlled areas accordingly:

- The earth station will be manned by Cobham SATCOM personnel at all times during operation, and the public will be denied access to near and far field areas around the operational antenna that exceed MPE limits.

- The transmitter will be turned off during maintenance and personnel will be restricted from areas with levels that exceed MPE during operation of the earth station.