# EXHIBIT A - ANALYSIS OF NON-IONIZING RADIATION

## EXHIBIT A1 - ANALYSES OF NON-IONIZING RADIATION, 2.4 m Ku

**HARMFUL LEVELS OF NON-IONIZING RADIATION WILL NOT EXIST IN REGIONS NORMALLY OCCUPIED BY PERSONNEL.**

CRITERIA: ANSI SPECIFICATIONS REQUIRE THAT PERSONNEL NOT BE EXPOSED TO LEVELS OF NON-IONIZING RADIATION EXCEEDING 5 mW / cm2.

THE FOLLOWING ANALYSES SUPPORT THIS DETERMINATION:

## FAR FIELD ANALYSIS:

| | |
|---|---|
| EFFICIENCY | = $\eta = G/(\pi*D/\lambda)^2 = 0.605$ |
| ANTENNA GAIN | = 48.8 dBi (lin 75,858) |
| ANTENNA DIAMETER | = 2.4 Meters |
| LAMBDA | = $3*10^8$ Meters / $14.25*10^9$ Hz = 0.0210526 |
| POWER MAX AT FLANGE | = 330 Watts (25.19 dBW) |
| DISTANCE TO FAR FIELD | = $2*D^2/\lambda$ |
| | = 11.52 / 0.0210526 |
| | = 547 Meters |
| ON-AXIS POWER DENSITY | = G*P/4*$\pi$*Far Field Distance$^2$ |
| | = 75,858 * 330 / 12.56637 * 299,209 |
| | = 6.66 W/m$^2$ |
| | = 0.666 mW/cm$^2$ |

LEVEL IS LESS THAN THE 5 mW/cm$^2$ MAXIMUM ANSI LEVEL PERMITTED

## NEAR FIELD ANALYSIS (Parallel Beam Region & Transition Region):

**PARALLEL BEAM REGION ANALYSIS:**

DISTANCE TO END OF PARALLEL BEAM (CYLINDER) REGION:

= DIAMETER$^2$ / 2.5 * $\lambda$
= 5.76 / 0.0526315
= 109 Meters

POWER DENSITY AT END OF PARALLEL BEAM REGION

= P / CYLINDRICAL PARALLEL BEAM AREA
= 330 / 4.52
= 73.0 W / m$^2$
= 7.30 mW / cm$^2$

LEVEL IS GREATER THAN THE 5 mW/cm$^2$ MAXIMUM ANSI LEVEL PERMITTED
ANTENNA IS MOUNTED 10' IN THE AIR ON TRUCK, NO PERSONNEL WILL OCCUPY THE PARALLEL BEAM REGION DURING OPERATION.

**TRANSITION REGION ANALYSIS:**
THIS REGION WILL DECREASE INVERSELY WITH DISTANCE BEGINNING AT THE END OF THE PARALLEL BEAM REGION WITH 7.30 mW / $cm^2$ AND REDUCE TO 0.66 mW / $cm^2$

## MAIN REFLECTOR ANALYSIS:

= P / REFLECTOR AREA
= 330 / 4.52
= 73.0 W / $m^2$
= 7.30 mW/$cm^2$

LEVEL IS GREATER THAN THE 5 mW/$cm^2$ MAXIMUM ANSI LEVEL PERMITTED ANTENNA IS MOUNTED 10' IN THE AIR ON TRUCK, NO PERSONNEL WILL OCCUPY THE PARALLEL BEAM REGION DURING OPERATION.

**RF POWER WILL BE TURNED OFF DURING ANY ANTENNA MAINTENANCE REQUIRING PERSONNEL TO OCCUPY ANY HAZARDOUS REGION BETWEEN THE FEED HORN, SUB-REFLECTOR, REFLECTOR.**

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