RF RADIATION HAZARD ANALYSIS
PSSI C27 2.4 – C Band

Frequency of Operation	6.175 GHz – Center Band
HPA Power at the Flange	700 Watts
Insertion Loss + HPA Backoff	4.97 dB
Power at OMT	223.0 Watts
Antenna Diameter	2.4 Meters
Antenna Surface Area	4.524 Sq. Meters
Sub Reflector	N/A
Sub Reflector Area	N/A
Antenna Gain Ratio	0.8318E+5
Antenna Aperture Efficiency	0.668

Region	Radiation Level	Hazard Assessment
Far Field (RF) 163.79 Meters/537.4 Feet (WF)	5.307 mw/sq. cm	Potential Hazard
Near Field (RN) 68.25 Meters/223.92 Feet (WN)	13.87 mw/sq. cm	Potential Hazard
Transition (RT)	Equal to or less than 13.87 mw/sq. cm	Potential Hazard
Main Reflector Region (WM)	1.038 mw/sq. cm	Satisfies ANSI
Power Density Reflector and Ground (WG)	0.519 mw/sq. cm	Satisfies ANSI
Power Density Reflector Edge and Ground (WI)	0.216 mw/sq. cm	Satisfies ANSI

Conclusions

Based on the above analysis it is concluded that harmful levels of radiation will not exist in areas normally occupied by the public or the SNG operations personnel, as the antenna is mounted on top of the SNG trailer of which is 13 (thirteen) feet tall. This height keeps the public and operators well clear of the edge of the reflector during times of operation. The SNG is marked with radiation hazard signs. The only access to the antenna area is from the roof of the truck and is limited to access by trained SNG personnel. With the normal look angles used within the United States, the five-degree or better look angles move the hazard even further away from the public. To ensure the compliance with safety limits, the transmitter will be turned off and marked to remain off whenever rooftop access is needed and whenever maintenance and repair personnel are within the radiation areas that exceed the levels recommended by applicable guidelines. Additionally, the SNG operator is always at the SNG vehicle during operations to keep the hazard area secure and insure that the guidelines are enforced.

Analysis of Non-Ionizing Radiation

Antenna Diameter, (D) = ……………… D : = 2.4 meters D · 3.281 = 7.8744 feet

Antenna Surface Area, (Sa) =………… Sa : = π · (D · D/4) Sa = 4.524 sq meters

Sub Reflector Diameter, (Ds) =……….. Ds : = 0 cm Ds · .3937 = 0 inches

Sub Reflector Area, (As) =……………. As : = π · (Ds · Ds/4) As = 0 sq cm

Center Frequency, (Cf) =……………… Cf : = 6.175 GHz

Wavelength at (Cf), (Lambda) =………. Lambda : = .049 meters
(C-band = .049, Ku-band = .0211)

Transmit Power at HPA Flange, (P1) =... P1 : = 700 Watts P2 = log(P1)·10 P2 = 28.451 dB

Path Loss from HPA to OMT, (Loss) =... Loss : = .67 dB

HPA Backoff from Saturation, (Loss2) =. Loss2 : = 4.30 dB

Power at OMT, (P) =………………. P3 : = P2-Loss-Loss2 P3 = 23.481dB(OMT power in dB)
$P := 10^{P3/10}$ P = 222.894 Watts(OMT in Watts)

Antenna Gain at (Cf), (Gain) =………… Gain : = 41.5 dBi

Antenna Gain/ Power Ratio, (Ges) =…... $Ges := 10^{Gain/10}$ $Ges = 1.413\text{-}10^{4}$ Ratio

Antenna Aperture Efficiency, (n) =……. n : = .668

Far Field (Rf) = Rf : = (60 · (D·D))/Lambda Rf = 70.531 meters Rf x 3.281 = 231.411 feet

Far Field Pwr Density (Wf) = Wf : = (Ges · P)/(4 · π) x (Rf · Rf) Wf = 5.307 mw sq cm

Near Field (Rn) = Rn : = (D · D)/4 · Lambda Rn = 29.388 meters Rn x 3.281 = 96.421 feet

Near Field Pwr Density (Wn) = Wn : = ((16 · n · P)/ π · (D · D)) · .1 Wn = 13.87 mw sq cm

Transition Region (Rt) = Rt : = Wn x 1 Rt = 13.87 mw sq cm (Equal to or less than)

Pwr Density at Sub Reflector (Ws) = Ws : =((2 · P)/ As) · 1000 Ws = 0 mw sq cm

Main Reflector Region Pwr Density (Wm) = Wm : = ((2 · P)/Sa) · .1 Wm = 1.038 mw sq cm

Pwr Density / Main Reflector and Ground (Wg) = Wg : = (P/Sa) · .1 Wg = 0.519 mw sq cm

Pwr Density / Reflector Edge and Ground (WI) - WI : = Wg/D WI = 0.216 mw sq cm