

Exhibit D1
HNS License Sub LLC
Call Sign (New)
Request for Modification

RADIATION CALCULATIONS FOR Vertex RSI 6.3 meter EARTH STATION			
Nomenclature	Formula	Value	Unit
INPUT PARAMETERS			
M = Antenna Aperture Major Axis m = Antenna Aperture Minor Axis d = Diameter of Feed Mouth f = frequency		6.30 6.30 0.152 29.175	meters meters meters GHz
P = Max Power into Antenna		125.0	Watts
n = Aperture Efficiency		60%	
k = Wavelength @ 29.18 GHz		0.0103	meters
CALCULATED VALUES			
A = Area of Reflector	$P \times M \times m / 4$	31.172	meters ²
l = Length of Near Field	$M^2 / 4k$	966	meters
L = Beginning of Far Field	$0.6M^2 / k$	2318	meters
G = Antenna Gain @ 29.18 GHz	$n(4 \times \pi \times A) / k^2$	2,225,935	(63.5) dBi
a = Area of Feed Mouth	$\pi \times d^2 / 4$	0.0181	meters ²
POWER DENSITY CALCULATIONS			
Region	Maximum Power Density in Region		Hazard Assessment (FCC MPE Limit = 1 mW/cm ²)
	Formula	Value (mW/cm ²)	
1 Near Field	$4nP/A$	0.96	< FCC MPE Limit
2 Far Field	$GP / (4(\pi)L^2)$	0.41	< FCC MPE Limit
3 Transition	<= Nr Fld Region	0.96	< FCC MPE Limit
4 Near Reflector Surface	$4P/A$	1.60	> FCC MPE Limit (See Exhibit A)
5 Between Reflector & Ground	P/A	0.40	< FCC MPE Limit
6 Between Subreflector and Feed	$4P/a$	2755.5	> FCC MPE Limit (See Exhibit A)

Exhibit D2
HNS License Sub LLC
Call Sign (New)
Request for Modification

RADIATION CALCULATIONS FOR GDSATCOM 8.1 meter EARTH STATION			
Nomenclature	Formula	Value	Unit
INPUT PARAMETERS			
M = Antenna Aperture Major Axis m = Antenna Aperture Minor Axis d = Diameter of Feed Mouth f = frequency		8.10 8.10 0.152 29.175	meters meters meters GHz
P = Max Power into Antenna		200.0	Watts
n = Aperture Efficiency		60%	
k = Wavelength @ 29.18 GHz		0.0103	meters
CALCULATED VALUES			
A = Area of Reflector	$P \times M \times m / 4$	51.530	meters ²
l = Length of Near Field	$M^2 / 4k$	1596	meters
L = Beginning of Far Field	$0.6M^2 / k$	3831	meters
G = Antenna Gain @ 29.18 GHz	$n(4 \times \pi \times A) / k^2$	3,679,606	(65.7) dBi
a = Area of Feed Mouth	$\pi \times d^2 / 4$	0.0181	meters ²
POWER DENSITY CALCULATIONS			
Region	Maximum Power Density in Region		Hazard Assessment (FCC MPE Limit = 1 mW/cm ²)
	Formula	Value (mW/cm ²)	
1 Near Field	$4nP/A$	0.93	< FCC MPE Limit
2 Far Field	$GP / (4(\pi)L^2)$	0.40	< FCC MPE Limit
3 Transition	<= Nr Fld Region	0.93	< FCC MPE Limit
4 Near Reflector Surface	$4P/A$	1.55	> FCC MPE Limit (See Exhibit A)
5 Between Reflector & Ground	P/A	0.39	< FCC MPE Limit
6 Between Subreflector and Feed	$4P/a$	4408.7	> FCC MPE Limit (See Exhibit A)