Radiation Hazard Analysis

Operator:	**USEI**
Location Designation:	**USEI Teleport**
County:	**Okanogan**
Town:	**Brewster**
State/Zip:	**Washington** **98812**

FCC Callsign:	
SES ID:	
STA:	

Input Values	Value	Unit
D = Aperture Diameter	7.30	Meters
d = Subreflector Diameter	0.56	Meters
G = Antenna Gain	64.6	dBi
FCC Designation	Ka	Band
F = Frequency	28.000	GHz
P = Transmitter Power Watts:	150	Watts
R_{ua} = closest point to uncontrolled area	50	meters
Elevation angle at closest point R_{ua}	10	Degrees
Height (AGL)	8.00	meters

Band	Frequency
L	1000-2000
S	2000-4000
C	4000-8000
X	8000-12500
Ku	12500-18000
K	18000-25500
Ka	26500-40000
O	40000-50000
V	50000-75000

OET 65 Calculated Values	Formula	Value	Unit
λ= Wavelength	$\dfrac{c}{F}$	0.0107	meters
G = Antenna Gain	$10^{(G/10)}$	2884031.503	(W) linear
η = Apperture Efficiency	$\dfrac{G\lambda^2/4\pi}{\pi D^2/4}$	63%	percentage
A = Area of reflector	πR^2	41.854	meters^2
a = area of subreflector	πr^2	2463.009	cm^2
R_{nf} = Near-Field Region	$\dfrac{D^2}{4\lambda}$	1244.263 / 216	meters / Meters AGL
R_t = Transition Region	$>R_{nf}$ / $<R_{ff}$	1244.263 / 2986.231	>meters / <meters
R_{ff} = Far Field Region	$\dfrac{0.6D^2}{\lambda}$	2986.231 / 519	meters / Meters AGL

	Radiation Analysis Zone	Formula	Level	Value	Exposure Limits	
					General Public	Occupational
					<1mW/cm2	<5mW/cm2
1	Power Subreflector	$\dfrac{4P}{a}$	243.605	mW/cm2	>FCC MPE See Note 1	>FCC MPE See Note 2
2	Antenna Surface	$\dfrac{4P}{A}$	1.434	mW/cm2	>FCC MPE See Note 1	<FCC MPE
3	Main Reflector Ground	$\dfrac{P}{A}$	0.358	mW/cm2	<FCC MPE	<FCC MPE
4	S_{nf} =Near-Field Power Density	$\dfrac{4\eta P}{A}$	0.901	mW/cm2	<FCC MPE	<FCC MPE
5	S_t = Max Transition Power Density	$\leq S_{nf}$	0.901	mW/cm2	<FCC MPE	<FCC MPE
6	S_{ff} = Max Far field Power Density	$\dfrac{PG}{4\pi R_{ff}^2}$	0.386	mW/cm2	<FCC MPE	<FCC MPE
7	Off Access Level Near Field	S_{nf} - 20 dB	0.00901	mW/cm2	<FCC MPE	<FCC MPE

Notes

1. The antenna is installed in a controlled location access is restricted to authorized personnel only. The antenna is marked with RF Radiation Hazard signage.
2. Inside the controlled area, MPE levels exceed the MPE exposure for occupational levels. The levels will be reduced to safe MPE by removing power to the transmitters when work is performed on or around the antenna. This area can only be accessed by qualified personnel.
3. The field develops 8 meters above ground level at the minimum elevation angle which is not accessable to the general public.

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County:	**Okanogan**	SES ID:
Town:	**Brewster**	STA:
State/Zip:	**Washington 98812**	

Input Values	Value	Unit
D = Aperture Diameter	9.10	Meters
d = Subreflector Diameter	0.56	Meters
G = Antenna Gain	66.4	dBi
FCC Designation	Ka	Band
F = Frequency	28.000	GHz
P = Transmitter Power Watts:	150	Watts
R_{ua} = closest point to uncontrolled area	50	meters
Elevation angle at closest point R_{ua}	10	Degrees
Height (AGL)	8.00	meters

Band	Frequency
L	1000-2000
S	2000-4000
C	4000-8000
X	8000-12500
Ku	12500-18000
K	18000-25500
Ka	26500-40000
O	40000-50000
V	50000-75000

OET 65 Calculated Values	Formula	Value	Unit
λ = Wavelength	$\dfrac{c}{F}$	0.0107	meters
G = Antenna Gain	$10^{(G/10)}$	4365158.322	(W) linear
η = Apperture Efficiency	$\dfrac{G\lambda^2/4\pi}{\pi D^2/4}$	61%	percentage
A = Area of reflector	πR^2	65.039	meters^2
a = area of subreflector	πr^2	2463.009	cm^2
R_{nf} = Near-Field Region	$\dfrac{D^2}{4\lambda}$	1933.522 / 336	meters / Meters AGL
R_t = Transition Region	$>R_{nf}$ / $<R_{ff}$	1933.522 / 4640.454	>meters / <meters
R_{ff} = Far Field Region	$\dfrac{0.6D^2}{\lambda}$	4640.454 / 806	meters / Meters AGL

	Radiation Analysis Zone	Formula	Level	Value	Exposure Limits	
					General Public	Occupational
					<1mW/cm2	<5mW/cm2
1	Power Subreflector	$\dfrac{4P}{a}$	243.605	mW/cm2	>FCC MPE See Note 1	>FCC MPE See Note 2
2	Antenna Surface	$\dfrac{4P}{A}$	0.923	mW/cm2	<FCC MPE	<FCC MPE
3	Main Reflector Ground	$\dfrac{P}{A}$	0.231	mW/cm2	<FCC MPE	<FCC MPE
4	S_{nf} = Near-Field Power Density	$\dfrac{4\eta P}{A}$	0.565	mW/cm2	<FCC MPE	<FCC MPE
5	S_t = Max Transition Power Density	$\leq S_{nf}$	0.565	mW/cm2	<FCC MPE	<FCC MPE
6	S_{ff} = Max Far field Power Density	$\dfrac{PG}{4\pi R_{ff}^2}$	0.242	mW/cm2	<FCC MPE	<FCC MPE
7	Off Access Level Near Field	S_{nf} - 20 dB	0.00565	mW/cm2	<FCC MPE	<FCC MPE

Notes

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