

Radiation Hazard Analysis

Operator: **SES**
 Location Designation: **SES Woodbine**
 County: **Carroll**
 Town: **Mt Airy**
 State/Zip: **MD 21771**

FCC Callsign:
 SES ID:
 STA:

Input Values	Value	Unit
$D = \text{Aperture Diameter}$	9.10	Meters
$d = \text{Subreflector Diameter}$	0.56	Meters
$G = \text{Antenna Gain}$	66.4	dBi
FCC Designation	Ka	Band
$F = \text{Frequency}$	28.000	GHz
$P = \text{Transmitter Power Watts}$	150	Watts
$R_{ua} = \text{closest point to uncontrolled area}$	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
$\lambda = \text{Wavelength}$	$\frac{c}{F}$	0.0107	meters
$G = \text{Antenna Gain}$	$10^{(G/10)}$	4365158.322	(W) linear
$\eta = \text{Aperture Efficiency}$	$\frac{G\lambda^2/4\pi}{\pi D^2/4}$	61%	percentage
$A = \text{Area of reflector}$	πR^2	65.039	meters ²
$a = \text{area of subreflector}$	πr^2	2463.009	cm ²
$R_{nf} = \text{Near-Field Region}$	$\frac{D^2}{4\lambda}$	1933.522	meters
		336	Meters AGL
$R_t = \text{Transition Region}$	$>R_{nf}$	1933.522	>meters
	$<R_{ff}$	4640.454	<meters
$R_{ff} = \text{Far Field Region}$	$\frac{0.6D^2}{\lambda}$	4640.454	meters
		806	Meters AGL

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

Notes

- The antenna is installed in a controlled location access is restricted to authorized personnel only. The antenna is marked with RF Radiation Hazard signage.
- 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.
- The field develops 8 meters above ground level at the minimum elevation angle which is not accessible to the general public.