4 FCC §1.1307(b) (1), §1.1307, §2.1091 &§90.223 - RF Exposure

4.1 Applicable Standards

FCC §2.1091, (a) Requirements of this section are a consequence of Commission responsibilities under the National Environmental Policy Act to evaluate the environmental significance of its actions. See subpart I of part 1 of this chapter, in particular §1.1307(b).

According to §1.1310 and §2.1091 RF exposure is calculated.

Limits for Occupational/Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm²)	Averaging Time (minute)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*(100)	≤6
3.0-30	1842/f	4.89/f	*(900/f²)	<6
30-300	61.4	0.163	1.0	<6
300-1,500			f/300	<6
1,500-100,000			5	<6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-3.0	614	1.63	*(100)	<30
3.0-30	824/f	2.19/f	*(900/f²)	<30
30-300	27.5	0.073	1.0	<30
300-1,500			f/1500	<30
1,500-100,000			1.0	<30

Note: f = frequency in MHz
* = Plane-wave equivalent power density

4.2 MPE Prediction

Predication of MPE limit at a given distance, Equation from OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where: S = power density
P = power input to antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

4.3   Test Results

Maximum average output power at antenna input terminal (dBm):	32.51
Maximum average output power at antenna input terminal (mW):	1782.379
Prediction frequency (MHz):	935.0125
Antenna Gain, maximum (dBi):	26.63
Maximum Antenna Gain (numeric):	460.26
Prediction distance (cm):	200
Power density of prediction frequency at 200 cm (mW/cm^2):	1.63
FCC MPE limit for controlled exposure at prediction frequency (mW/cm^2):	3.117

The average output power was derived from the maximum tune up power (35.52 dBm) and duty cycle (50%).
The average output power = peak output power – $10*\log(1/\text{duty cycle}) = 35.52 - 3.01 = 32.51$ dBm.

Note: Duty Cycle declared by customer
Note: Prediction distance declared by customer

Results

The device passes the uncontrolled exposure limit of 3.117 mW/cm^2 with the Output Power being 35.52 dBm, 50% duty cycle, prediction distance of 200cm and a maximum antenna gain of 26.63 dBi.