4 FCC §1.1307(b) (1), §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/cm^2)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*(100)	≤6
3.0-30	1842/f	4.89/f	*($900/f^2$)	<6
30-300	61.4	0.163	1.0	<6
300-1,500			f/300	<6
1,500-100,000			5	<6

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):	42.31
Maximum average output power at antenna input terminal (mW):	17021.585
Prediction frequency (MHz):	897.9875
Antenna Gain, maximum (dBi):	-0.56
Maximum Antenna Gain (numeric):	0.88
Prediction distance (cm):	20
Power density of prediction frequency at 20 cm (mW/cm^2):	2.99
FCC MPE limit for controlled exposure at prediction frequency (mW/cm^2):	2.99

The average output power was derived from the maximum tune up power (45.32 dBm) and duty cycle (50%). The average output power = peak output power – 10*log(1/duty cycle)=45.32-3.01=42.31 dBm..

Note: Duty Cycle declared by customer

Results

In order to pass the controlled exposure limit of 2.99 mW/cm^2 with the Output Power being 45.10 dBm, 50% duty cycle, and prediction distance of 20cm, the EUT can have a maximum antenna gain of -0.56 dBi.