



NCEE Labs
4740 Discovery Drive
Lincoln, NE 68521
402-323-6233

FCC ID: QQIET100

Maximum exposure limits from CFR 47, FCC Part 1.1310:

Table 1—Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) 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
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f ²	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30

The power density is calculated as shown below:

$$S = (P \times G) / (4 \times \pi \times d^2) - \text{used to calculate exposure at 20 cm}$$

$$d = \sqrt{(S / (P \times G) \times 4 \times \pi)} - \text{used to calculate minimum distance to meet limits}$$

S= power density

P = transmitter conducted power (in mW)

G = antenna numeric gain

d = distance to radiation center

Table 2 – Power Density Calculations

Frequency	Antenna Gain	Output power	Output Power +10% to account for tolerance	Power Density	Limit	Distance
MHz	numeric	mW		mW/cm ²	mW/cm ²	
914.88	1.71	1	1.1	0.0003744	0.6099	20
2400 - 2483.5	1.58	224	246.4	0.0774904	1.0000	20

Total percent of limit = 0.06% + 7.49 = 7.55 %, compliant with MPE limit.

914.88 MHz Antenna gain set to 1 because all power measurements were performed as radiated/EIRP.

Note: This equipment is not intended to be operated by hand. It is expected that a 20cm separation will be maintained at all times.

Values for 2AC7Z-ESPWROOM02 taken from RF exposure exhibit from the application documents for the grant dated 4/17/2015.

2.4 GHz Antenna = 1.58 dBi = 1.44 numeric

Power = 23.5 dBm (80.11n(20m) is the highest) = 224 mW