

MPE Calculation / RF Exposure

Product: CREAMO ADDI + kit

Applicant: CREAMO.INC

Model: ADDI + kit

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FCC ID: 2AZOW-ADDIKIT

According to FCC §15.247(i) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
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
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

Before equipment certification is granted, the procedure of IC RSS-102 must be followed concerning the exposure of humans to RF fields.

According to IC RSS-102 Issue 2 section 4.1, RF limits used for general public will be applied to the EUT.

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Time Averaging (min)
0.003 - 1	280	2.19	-	6
1 - 10	280 / f	2.19 / f	-	6
10 - 30	28	2.19 / f	-	6
30 - 300	28	0.073	2*	6
300 - 1 500	1.585 f ^{0.5}	0.0042 f ^{0.5}	f / 150	6
1 500 - 15 000	61.4	0.163	10	6
15 000 - 150 000	61.4	0.163	10	616000 / f ^{1.2}
150 000- 300 000	0.158 f ^{0.5}	4.21 x 10 ⁻⁴ f ^{0.5}	6.67 x 10 ⁻⁵ f	616000 / f ^{1.2}

Note: f is frequency in MHz

* Power density limit is applicable at frequencies greater than 100 MHz

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

Classification The antenna of this product is at least 20 cm away from the body of the user. So this product is classified as mobile device.

Max. tune-up power(dBm)

ADDI + kit
-14.10

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

In other words, $R = \sqrt{ERP/4\pi \times S(Pd)}$

Where S = Power density
ERP = Effective Radiated Power
R = distance to the centre of radiation of the antenna

Values S = 1.0 mW/cm² for General population uncontrolled exposure (FCC Part 1.1310 Radiofrequency radiation exposure limits)
S = 1.0 mW/cm²
PT = -14.10 dBm (0.04 mW) : measured maximum output power
G = Antenna gain = -7.12 dBi (0.194 in linear terms)
EIRP = PT x G
R = 20 cm

Calculation EIRP = 0.04 x 0.194 = 0.008 mW
S = 0.008/12.56 x (20)² = 0.008/5024
S = 0.000 002 mW/cm²

Conclusion This confirms compliance to the required radio frequency radiation exposure limit of 1.0 mW/cm² at 20 cm operation.

Max. tune-up power(dBm)

ADDI +
-9.65

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

In other words, $R = \sqrt{ERP/4\pi \times S(Pd)}$

Where

S = Power density

ERP = Effective Radiated Power

R = distance to the centre of radiation of the antenna

Values

S = 1.0 mW/cm² for General population uncontrolled exposure (FCC Part 1.1310 Radiofrequency radiation exposure limits)

S = 1.0 mW/cm²

PT = -9.65 dBm (0.11 mW) : measured maximum output power

G = Antenna gain = -7.12 dBi (0.194 in linear terms)

EIRP = PT x G

R = 20 cm

Calculation

EIRP = 0.11 x 0.194 = 0.021 mW

S = 0.021/12.56 x (20)² = 0.021/5024

S = 0.000 004 mW/cm²

Conclusion

This confirms compliance to the required radio frequency radiation exposure limit of 1.0 mW/cm² at 20 cm operation.