MPE Calculation / RF Exposure

Product: Pathfinder2 MINI
Applicant: Dogtra Co., Ltd.
Model: PM20C
Address: 35, Namdongdong-ro 33beon-gil, Namdong-gu, Incheon 21694 Rep. of KOREA
FCC ID: SWN-PM20C

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

MPE Prediction

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

$$S = ERP/4 \pi R^2$$
$$\text{In other words, } R = \sqrt{ERP/4\pi} \times S(Pd)$$

For 900 MHz UHF(DSS)

Where S = Power density

ERP = Effective Radiated Power

R = distance to the centre of radiation of the antenna

Calculation S = 0.61 mW/cm^2 for General population uncontrolled exposure (FCC Part 1.1310 Radiofrequency radiation exposure limits)

P = 30.00 dBm (1000 mW) : maximum output power including tune-up tolerance.[*note]

G = Antenna gain = 0 dBi (1 in linear terms)

ERP = P x G = 1000 mW

R = $\sqrt{1000/12.56}$ x 0.61

R = 11 cm

Conclusion **This device complies with the FCC MPE limit at 11 cm for uncontrolled exposure environment.**

Note: Tune-up tolerance: 29 dBm +/- 1 dB

BLE and 900 MHz UHF do not transmit at the same time.

For BLE(DTS)

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

Values S = 1.0 mW/cm^2 for General population uncontrolled exposure (FCC Part 1.1310 Radiofrequency radiation exposure limits)

S = 1.0 mW/cm^2

PT(BLE) = -3 dBm (0.50 mW) : maximum output power including tune-up tolerance.[*note]

G = Antenna gain = -7.57 dBi (0.175 in linear terms)

EIRP = PT x G

R = 11 cm

Calculation EIRP = 0.50 x 0.175 = 0.09 mW

S = 0.09/12.56 x (11)^2 = 0.09/1520.53

S = 0.00006 mW/cm^2

Conclusion **This confirms compliance to the required radio frequency radiation exposure limit of 1.0 mW/cm^2 at 11 cm operation.**

Note: Tune-up tolerance : -4 dBm +/- 1 dB
BLE and 900 MHz UHF do not transmit at the same time.