

Maximum Permissible Exposure (MPE) Calculation

Reference document:	47 CFR §15.247(i) & §1.1310	
Test Requirements:	According to §1.1310, the criteria listed in tab. 1 shall be used to evaluate the environmental impact of human exposure to RF radiation as specified in §1.1307(b). For equipment authorization purposes the term co-location refers to simultaneously transmitting (co-transmitting) antennas located within 20cm of each other within a product.	
Limit	1mW/cm ²	
Calculation Result*:	Power Density = 0.076mW/cm ² at a sphere of 20cm.	Comply

The EXRP40F device is capable of operating in the 2.412 – 2.462 GHz and 5.15-5.250, 5.745-5.825 GHz bands. The maximum conducted power is 38mW for 2.412 – 2.462 GHz, 17mW for 5.15-5.250, and 37mW for 5.745-5.825 GHz. For simultaneous transmission, RF exposure compliance is with respect to the aggregate exposure from all simultaneously transmitting transmitters/antennas.

When operating four Beams, transmitting simultaneously, the worst case prediction occurs at 2400-2483.5 MHz Band, 38mW of power, 4dBi antenna gain. The maximum exposure level in this scenario is 0.076mW/cm² at a distance of 20 cm.

* Equation (3) given in OET Bulletin 65 is used to estimate the MPE distance.

$$S = \frac{PG}{4\pi R^2}$$

S=power density, in mW/cm²

P=power input to the antenna, in mW

G=numeric gain of the antenna,

R= distance to the center of the antenna, in cm

MPE levels at 20cm are calculated as follows:

Frequency Band	Data Rate [Mbps]	MPE Distance [cm]	Aggregate Output Power [mW]	Antenna Gain [dBi]	Power density [mW/cm ²]	Limit [mW/cm ²]	Margin [mW/cm ²]
Four Beams, transmitting simultaneously, Worst-Case							
2.4G	1	20	152	4	0.076	1	0.92