

**47 C.F.R. Part 1, Subpart I, Section 1.1310
47 C.F.R. Part 2, Subpart J, Section 2.1091
Maximum Permissible Exposure Calculations**

For FCC ID: SZV-PTM215BZ

EUT Device Category = General Population/Uncontrolled Exposure

EUT consists of ISM band radio transmitting over a range of: **2402 MHz to 2480 MHz**, operating using Zigbee or Bluetooth LE protocols.

MPE Summary:

According subpart 1.1307 (b)(1) and 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure						
Frequency Range (MHz)	Electric Strength (V/m)	Field Magnetic Strength (A/m)	Field Power Density (mW/cm²)	Averaging Time (Minutes)		
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

Calculated Formulary:

Predication of MPE limit at a given distance

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

S = power density (in appropriate units, e.g. mW/cm²)

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

PG = EIRP

MPE and Limit are calculated for this device as follows:

2.402 GHz to 2.48 GHz Frequency Band							
Zigbee Transceiver (1 Mbps)							
Freq	Output Power (dBm)	Max Antenna Gain (dBi)	Max EIRP (dBm)	Max EIRP (mW)	Power Density at 20 cm (mW/cm ²)	Limit (mW)	Margin (mW)
2405	4.18	1.5	5.68	3.698	0.0007	1.000	0.9993
2445	4.07	1.5	5.57	3.606	0.0007	1.000	0.9993
2480	4.06	1.5	5.56	3.597	0.0007	1.000	0.9993

2.402 GHz to 2.48 GHz Frequency Band							
BLE Transceiver (1 Mbps)							
Freq	Output Power (dBm)	Max Antenna Gain (dBi)	Max EIRP (dBm)	Max EIRP (mW)	Power Density at 20 cm (mW/cm ²)	Limit (mW)	Margin (mW)
2402	4.36	1.5	5.86	3.855	0.0008	1.000	0.9992
2440	4.22	1.5	5.72	3.733	0.0007	1.000	0.9993
2480	4.18	1.5	5.68	3.698	0.0007	1.000	0.9993

2.402 GHz to 2.48 GHz Frequency Band							
BLE Transceiver (2 Mbps)							
Freq	Output Power (dBm)	Max Antenna Gain (dBi)	Max EIRP (dBm)	Max EIRP (mW)	Power Density at 20 cm (mW/cm ²)	Limit (mW)	Margin (mW)
2402	4.20	1.5	5.70	3.715	0.0007	1.000	0.9993
2440	4.07	1.5	5.57	3.606	0.0007	1.000	0.9993
2480	4.03	1.5	5.53	3.573	0.0007	1.000	0.9993

Result: The device meets FCC MPE limit at 20 cm for General Population/Uncontrolled Exposure as specified in 47 CRF §1.1310 and §2.1091.