

MPE Calculation : Field Disturbance Sensor

Host device MN(Mode)	Tx Frequency (MHz)	Field Strength at 3m (dBuV/m)	Conversion Factor (dB) ^{Note}	Maximum EIRP (dBm)	Maximum EIRP (mW)	Maximum power density (mW/cm ²)	Requirement (mW/cm ²)
CIOT-L7FM(Motion sensor)	10523	84.80	-95.26	-10.46	0.090	0.00002	1.000
CIOT-L20M(Motion sensor)	10523	80.64	-95.26	-14.62	0.035	0.00001	1.000

Note: EIRP(dBm) = E(dBuV/m) + 20logD -104.8; Where D is the measurement distance in meters.

The EUT will only be used with a separation of 20 centimeters or greater between the antenna and the body of the user.

The MPE sample calculation for this exposure is shown below.

$$\begin{aligned}
 S &= \text{EIRP} / (4 R^2 \pi) \\
 &= 0.09 / (4 \times 20^2 \times \pi) \\
 &= 0.00002 \text{ mW/cm}^2
 \end{aligned}$$

- Note

S= Maximum power density(mW/cm²)

EIRP= Equivalent Isotropic Radiated Power(mW)

R= Distance to the center of the radiation of the antenna(20cm)

▪ 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)
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

f = frequency in MHz * = Plane-wave equivalent power density

Conclusion : The exposure condition of this device is compliant with FCC

MPE Calculation : BLE

Host device MN(Mode)	Transmitting Frequency (MHz)	Max. Target Power (dBm)	ANT Gain (dBi)	Maximum EIRP (dBm)	Maximum EIRP (mW)	Maximum power density (mW/cm ²)	Requirement (mW/cm ²)
CIOT-L7FM(BLE)	2402.00	-3.50	3.14	-0.36	0.921	0.00020	1.000
CIOT-L20M(BLE)	2402.00	-3.50	3.14	-0.36	0.921	0.00020	1.000

The EUT will only be used with a separation of 20 centimeters or greater between the antenna and the body of the user.

The MPE sample calculation for this exposure is shown below.

$$\begin{aligned}
 S &= \text{EIRP} / (4 R^2 \pi) \\
 &= 0.921 / (4 \times 20^2 \times \pi) \\
 &= 0.0002 \text{ mW/cm}^2
 \end{aligned}$$

- Note

S= Maximum power density(mW/cm²)

EIRP= Equivalent Isotropic Radiated Power(mW)

R= Distance to the center of the radiation of the antenna

▪ Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric Field strength (V/m)	Magnetic field strength (A/m)	Power Density (mW/cm ²)	Averageing 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 ~ 1,500			f / 1500	30
1,500 ~ 100,000			1.0	30

Conclusion : The exposure condition of this device is compliant with FCC

RF Exposure Compliance for simultaneous operations

▪ Configurations for simultaneous operation

Model for host device	CIOT-L7FM		CIOT-L20M		-	-	-	Σ of MPE ratios
RF function or mode	Motion Sensor	BLE	Motion Sensor	BLE	-	-	-	
Band	10.525GHz	2.4GHz	10.525GHz	2.4GHz	-	-	-	
Power Density (mW/cm ²)	0.00002	0.00020	0.00001	0.00020	-	-	-	
Requirement (mW/cm ²)	1.00000	1.00000	1.00000	1.00000	-	-	-	
MPE ratio (Power Density/Requirement)	0.00002	0.00020	0.00001	0.00020	-	-	-	0.00022
CIOT-L7FM (MPE ratio)	0.00002	0.00020	-	-	-	-	-	
CIOT-L20M (MPE ratio)	-	-	0.00001	0.00020	-	-	-	
	-	-	-	-	-	-	-	
	-	-	-	-	-	-	-	-

Note: The maximum power density in each RF function was used for above table.

▪ Requirement = Σ of MPE ratios ≤ 1

Conclusion : The exposure condition of this device is compliant with FCC rules.