

US Tech Test Report:
FCC ID:
IC:
Test Report Number:
Issue Date:
Customer:
Model:

FCC Part 15 Certification/ RSS 210
O7P-362
10147A-362
21-0267
November 12, 2021
Inventek Systems
ISM43362-M3G-L44-*

Maximum Permissible Exposure to RF (MPE) CFR 15.247 (i), CFR 1.1310 (e)

The maximum exposure level to the public from the RF power of the EUT shall not exceed a power density, **S** as per the respective limits in Table 1 below, at a distance, **d**, of 20 cm (Mobile condition) from the EUT.

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

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
300-1,500			f/1500	30
1,500-100,000			1.0	30

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

Therefore, for:

MPE for 2400-2483.5 MHz:

Inventek Wi-Fi module

Limit: 1.0 mW/cm²

Peak Power (dBm) = 19.9 dBm

Peak Power (Watts) = 0.0977 W

Gain of Transmit Antenna = 5.0 dBi = 3.16 numeric

d = Distance = 20 cm = 0.2 m

$$\begin{aligned} S &= (PG / 4\pi d^2) = \text{EIRP} / 4A = 0.0977 (3.16) / 4\pi * 0.2 * 0.2 \\ &= 0.3087 / 0.5027 = 0.6141 \text{ W/m}^2 \\ &= (0.6141 \text{ W/m}^2) (1\text{m}^2/\text{W}) (0.1 \text{ mW/cm}^2) \\ &= 0.06141 \text{ mW/cm}^2 \end{aligned}$$

which is << less than S = 1.0 mW/cm²

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Microchip Technology Inc., BLE Module

Limit: 1.0 mW/cm²

Peak Power (dBm) = 1.36 dBm

Peak Power (Watts) = 0.00136 W

Gain of Transmit Antenna = 1.63 dBi = 1.456 numeric

d = Distance = 20 cm = 0.2 m

$$\begin{aligned} S &= (PG/4\pi d^2) = \text{EIRP}/4A = 0.00136 (1.456)/4*\pi*0.2*0.2 \\ &= 0.00198/0.5027 = 0.003939 \text{ W/m}^2 \\ &= (0.6141 \text{ W/m}^2) (1\text{m}^2/\text{W}) (0.1 \text{ mW/cm}^2) \\ &= 0.000394 \text{ mW/cm}^2 \end{aligned}$$

which is << less than S = 1.0 mW/cm²

MMB Research Inc, Hornet MiO/Z357PA40

Limit: 1.0 mW/cm²

Peak Power (dBm) = 19.2 dBm

Peak Power (Watts) = 0.083 W

Gain of Transmit Antenna = 5.0 dBi = 3.16 numeric

d = Distance = 20 cm = 0.2 m

$$\begin{aligned} S &= (PG/4\pi d^2) = \text{EIRP}/4A = 0.083 (3.16)/4*\pi*0.2*0.2 \\ &= 0.2623/0.5027 = 0.5217 \text{ W/m}^2 \\ &= (0.5217 \text{ W/m}^2) (1\text{m}^2/\text{W}) (0.1 \text{ mW/cm}^2) \\ &= 0.05217 \text{ mW/cm}^2 \end{aligned}$$

which is << less than S = 1.0 mW/cm²

Sum of all MPE for all 2.4 GHz band radios:

$$0.06141 + 0.05217 + 0.000394 = \mathbf{0.1140 \text{ mW/cm}^2}$$

which is << less than S = 1.0 mW/cm²

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RSS-102, 2.5.2 compliance for 2400-2483.5 MHz radio device:

At or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;

In this case $f = 2440$ MHz

$$1.31 * 10^{-2} * 2440^{0.6834} = 2.7 \text{ W (2700 mW)}$$

$$\text{EUT max EIRP} = 19.8 \text{ dBm} + 5 \text{ dBi} = 24.8 \text{ dBm EIRP} = 301.9 \text{ mW}$$

Microchip Technology Inc., BLE Module:
 $1.36 \text{ dBm} + 1.63 \text{ dBi} = 2.99 \text{ dBm EIRP} = 2.99 \text{ mW}$

MMB Research Inc, Hornet MiO/Z357PA40:
 $19.2 \text{ dBm} + 5 \text{ dBi} = 24.2 \text{ dBm EIPR} = 263.0 \text{ mW}$

Sum of all MPE for all 2.4 GHz band radios = 567.89 mW

Which is << than 2700 mW

All calculations performed by:
Date: November 12, 2021
Test Engineer: George Yang

Signature: 