

INTERTEK TESTING SERVICES

RF Exposure

The equipment under test (EUT) is Portable Power Station with Wireless Charging function operating 120KHz-130KHz, 2.4G WIFI function operating in 2412-2462MHz and BT(BLE) function operating in 2402MHz~2480MHz. The EUT is powered by AC Input: 100-120VAC, 50/60Hz or Car Input: 12VDC/10A, 120W Max; or Solar Input: 12-60VDC/10A, Max, 600W Max . For more detail information pls. refer to the user manual.

Wireless Charging:

Antenna type: Integral Antenna(embedded coil antenna)

The maximum H-Field Strength of the EUT is: 0.1888A/m.

2.4GHz WiFi:

Antenna Type: Integral Antenna.

Antenna1 Gain: 3.96dBi.

Modulation Type: BPSK, QPSK, 16QAM, 64QAM, CCK, DQPSK, DBPSK and DSSS.

Band	Maximum Conducted Output Power		Antenna Gain (dBi)	Numeric gain
	(dBm)	(mW)		
2.4G	802.11b	20	3.96	2.489
	802.11g	19	3.96	2.489
	802.11n HT20	19	3.96	2.489
	802.11n HT40	18.5	3.96	2.489
Bluetooth (Low Energy)		6	3.96	2.489

According to FCC Part 2.1091, this unlicensed transmitting devices is categorically excluded from routine environmental evaluation for RF exposure prior to equipment authorization or use, According to the KDB 447498 and OET 65, the simple calculation as below:

The source-based time averaged maximum radiated power = 20dBm +3.96dBi = 23.96dBm = 248.886mW

From above data, the exposed power density at a distance (R) of 20cm from the center of radiation of the antenna for 2.4GHz band can be calculated according to OET 65 as follow:

$$= 248.886\text{mW} / 4\pi R^2$$

$$= 0.0495 \text{ mW/cm}^2$$

$$< 1\text{mW/cm}^2$$

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The MPE limit is 1.0 mW/cm² for general population and uncontrolled exposure in the WIFI frequency range according to FCC Part 1.1310. As the measured power density at 20cm from the transmitter is lower than the MPE limit, the compliance to the MPE limit can be ensured by indicating the minimum 20cm separation between the transmitter's radiating structure and body of the user or nearby persons.

BT(BLE):

Antenna Type: Integral Antenna.

Antenna1 Gain: 3.96dBi.

Modulation Type: GFSK.

According to FCC Part 2.1091, this unlicensed transmitting devices is categorically excluded from routine environmental evaluation for RF exposure prior to equipment authorization or use, According to the KDB 447498 and OET 65, the simple calculation as below:

The source-based time averaged maximum radiated power = 6.0dBm +3.96dBi = 9.96dBm =9.9083mW

From above data, the exposed power density at a distance (R) of 20cm from the center of radiation of the antenna for 2.4GHz band can be calculated according to OET 65 as follow:

$$= 9.9083\text{mW} / 4\pi R^2$$

$$= 0.00197 \text{ mW/cm}^2$$

$$<1\text{mW/cm}^2$$

The MPE limit is 1.0 mW/cm² for general population and uncontrolled exposure in the WIFI frequency range according to FCC Part 1.1310. As the measured power density at 20cm from the transmitter is lower than the MPE limit, the compliance to the MPE limit can be ensured by indicating the minimum 20cm separation between the transmitter's radiating structure and body of the user or nearby persons.

Simultaneous:

BT antenna and 2.4G WiFi antenna can not transmit Simultaneous;

For Simultaneous transmitting of 2.4GHz WiFi +Wireless Charging and BT+Wireless Charging, According to 865664D02 2.2 d) 1):

2.4GHz WiFi +Wireless Charging:

The sum of the ratios of the spatially averaged results to the applicable frequency dependent MPE limits = 0.0495/1 + 0.1888/1.63 = 0.1653 < 1

BT+Wireless Charging:

The sum of the ratios of the spatially averaged results to the applicable frequency dependent MPE limits = 0.00197/1 + 0.1888/1.63 = 0.1178 < 1

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Since the sum of the MPE ratios for all simultaneously transmitting antennas incorporated in the device is ≤ 1.0 , the EUT is considered to satisfy MPE compliance for simultaneous transmission operations.

The following RF exposure statement or similar sentence is proposed to be included in the user manual:

“FCC RF Radiation Exposure Statement Caution: This Transmitter must be installed to provide a separation distance of at least 20 cm from all persons.”

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