

INTERTEK TESTING SERVICES

RF Exposure

The Equipment Under Test (EUT) is a Smart Wifi Bridge with Wi-Fi function operating in 2412-2462MHz and normal 2.4G Transmitter function operating at 2410MHz. Wi-Fi and normal 2.4G Transmitter function can transmit at the same time. The EUT is powered by DC 5V via USB port from adapter. The EUT is powered by 120V/60Hz. For more detail information pls. refer to the user manual.

Standalone SAR evaluation for Wifi function

2.4GHz WiFi:

Antenna Type: Integral Antenna.

Antenna Gain: 3dBi.

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

The nominal conducted output power specified: 21dBm (Tolerance: +/-3dB).

The maximum conducted output power for the EUT is 23.01 dBm in the frequency 2437MHz(IEEE 802.11n-HT20) which is within the production variation.

The minimum conducted output power for the EUT is 18.77dBm in the frequency 2462MHz(IEEE 802.11b) which is within the production variation.

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 = 21dBm+3dB +3dBi = 27dBm = 501.19mW

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:

$$= 501.19\text{mW} / 4\pi R^2$$

$$= 0.1\text{mW}/\text{cm}^2$$

The MPE limit is 1.0 mW/cm² for general population and uncontrolled exposure in the 2.4GHz 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.

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Standalone SAR evaluation for 2.4G transmitter

2.4GHz transmitter:

Antenna Type: Integral Antenna.

Antenna Gain: 0dBi.

Modulation Type: GFSK.

The nominal conducted output power specified: -12dBm (Tolerance: +/-3dB).

The nominal radiated output power (e.i.r.p) specified: -12dBm (Tolerance: +/-3dB).

The maximum peak radiated emission for the EUT is 81.1dBμV/m at 3m in the frequency 2410MHz

The EIRP = $[(FS \cdot D)^2 / 30]$ mW = -14.13dBm

which is within the production variation.

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 = -9dBm = 0.13mW

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:

$$= 0.13\text{mW} / 4\pi R^2$$

$$= 0.00003 \text{ mW/cm}^2$$

The MPE limit is 1.0 mW/cm² for general population and uncontrolled exposure in the 2.4GHz 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.

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Simultaneous Transmission SAR Evaluation

For Simultaneous transmitting of 2.4G Wifi and 2.4G transmitter, According to 865664D02 2.2 d) 1):

The sum of the ratios of the spatially averaged results to the applicable frequency dependent MPE limits = $0.1/1 + 0.00003/1 = 0.10003 < 1$

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.”