

1 Safety Human Exposure

1.1 Radio Frequency Exposure Compliance

1.1.1 Electromagnetic Fields

RESULT:

Pass

Test Specification

Test standard : CFR47 FCC Part 2: Section 2.1091
CFR47 FCC Part 1: Section 1.1310
FCC KDB Publication 447498 v06, section 7
RSS-102 Issue 5 March 2015, section 2.5.2

➤ **FCC requirements**

FCC requirement: Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 20cm normally can be maintained between the user and the device.

MPE Calculation Method according to KDB 447498 v06

Power Density: $S_{(mW/cm^2)} = PG/4\pi R^2$ or $EIRP/4\pi R^2$

Where:

S = power density (mW/cm²)

P = power input to the antenna (mW)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna (cm)

From the peak RF output power, the minimum mobile separation distance, d=20 cm, as well as the antenna gain (Max. 3.69dBi for 2.4GHz Band, 3.85dBi for 5GHz Band), the RF power density can be calculated as below:

$$S_{(mW/cm^2)} = PG/4\pi R^2$$

a) **EUT RF Exposure Evaluation operations, Worst Case mode**

Test Mode	Measured Peak Power (dBm)	Antenna Gain (dBi)	Measured e.i.r.p (dBm)	$S_{(mW/cm^2)} = PG/4\pi R^2$	Limit (mW/cm ²)
Bluetooth	8.85	3.69	12.54	0.004	1.0
2.4GHz band Wi-Fi (802.11 g MIMO)	29.36	3.69	33.05	0.402	
5GHz bands Wi-Fi(802.11 n MIMO)	19.70	3.85	23.55	0.045	

➤ **IC requirements:** The EUT shall comply with the requirement of RSS-102 section 2.5.2.

Exemption from Routine Evaluation Limits – RF Exposure Evaluation

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device’s radiating element is greater than 20 cm, except when the device operates as follows:

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;

- RF exposure evaluation exempted power for 2.4GHz Bands: 2.68 W
- RF exposure evaluation exempted power for NII bands: 4.52 W

a) EUT RF Exposure Evaluation standalone operations, Worst Case mode

Test Mode	Measured Peak Power (dBm)	Antenna Gain (dBi)	Measured e.i.r.p		Limit (mW/cm ²)
			(dBm)	(W)	
Bluetooth	8.85	3.69	12.54	0.0179	2.68
2.4GHz band Wi-Fi (802.11 g MIMO)	29.36	3.69	33.05	2.018	2.68
5GHz bands Wi-Fi(802.11 n MIMO)	19.70	3.85	23.55	0.226	4.52

The e.i.r.p. for BLE, DTSs and FHSs are less than the RF exposure evaluation exempted power. So RF exposure evaluation is not required.

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