



RF Exposure Evaluation

FCC ID : 2AWFPBCN1

IC : 26107-BCN1

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:

- below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- 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;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.

RF EXPOSURE

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1. Regulation

According to §15.247(i), 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 levels in excess of the Commission's guidelines. See § 1.1307(b)(1) of this Chapter.

Limits for Maximum Permissible Exposure: RF exposure is calculated.

Frequency Range	Electric Field Strength [V/m]	Magnetic Field Strength [A/m]	Power Density [mW/cm ²]	Averaging Time [minute]
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/1 500	30
1 500 ~ 15 000	/	/	1	30

f=frequency in MHz, *= plane-wave equivalent power density

MPE (Maximum Permissible Exposure) Prediction

Predication of MPE limit at a given distance: Equation from KDB 447498 D01 General RF Exposure Guidance v06

$$S = PG/4\pi R^2 \quad (\Rightarrow R = \sqrt{PG/4\pi S})$$

S = power density [mW/cm²]

P = Power input to 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]

2. RF Exposure Compliance Issue

The information should be included in the user's manual:

This appliance and its antenna must not be co-located or operation in conjunction with any other antenna or transmitter. A minimum separation distance of 20 cm must be maintained between the antenna and the person for this appliance to satisfy the RF exposure requirements.



MPE Calculations : Bluetooth LE

- Frequency Range : 2402 MHz ~ 2480 MHz

- Measured RF Maximum Output Power (Avg.) : 3.74 dBm

- Target Power & Tolerance 3.00 dBm & ± 1.00 dB

(Maximum : 4.00 dBm & Minimum : 2.00 dBm)

- Maximum Peak Antenna Gain : 2.30 dBi

- **Maximum Output Power for the Calculation :** 4.00 dBm

The EUT will only be used with a separation of 20 centimeters or greater between the antenna and the body of the The MPE Calculations for this exposure is shown below.

<p>- EIRP = P + G</p> <p>= <u>4.00</u> dBm + <u>2.30</u> dBi</p> <p>= <u>6.30</u> dBm</p> <p>= <u>4.27</u> mW</p>	<p>- NOTE</p> <p>P : Max tuneup Power (dBm)</p> <p>G : Maximum Peak Antenna Gain (dBi)</p> <p>$EIRP \leq 1.31 \times 10^{-2} f^{0.6834} W$</p> <p>= EIRP ≤ 2.736 W</p>
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Power Density at the specific separation

<p>- S = EIRP / (4 X R²π)</p> <p>= 4.27 / (4 X 20² X π)</p> <p>= <u>0.000 849</u> mW/cm²</p>	<p>- NOTE</p> <p>S : Maximum Power Density (mW/cm²)</p> <p>EIRP : Equivalent Isotropic Radiated Power (mW)</p> <p>R : Distance to the center of the radiation of the antenna (<u>20</u> cm)</p>
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