

RF EXPOSURE

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 page 18 of OET Bulletin 65, Edition 97-01

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

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 : Wifi + BLE + LTE

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

Simultaneous MPE

Wifi+BLE+LTE

<p>- Total (%) =</p> $\frac{[\text{Wifi Result(mW/cm}^2) / \text{Limit(mW/cm}^2)] + [\text{LTE Result(mW/cm}^2) / \text{Limit(mW/cm}^2)] + [\text{BLE Result(mW/cm}^2) / \text{Limit(mW/cm}^2)]}{100} * 100$ <p>= [<u>0.032 000</u> / 1] +</p> <p>[<u>0.110 000</u> / 1] +</p> <p>[<u>0.080 490</u> / 1] * 100</p> <p>= <u>22.249</u> %</p>	<p>- NOTE</p> <p>Wifi+BT+LTE</p> <p>Wifi = <u>0.032</u> mW/cm²</p> <p>BLE= <u>0.110</u> mW/cm²</p> <p>LTE= <u>0.080</u> mW/cm²</p> <p>Distance to the center of the radiation of the antenna (<u>20</u> cm)</p> <p>Limit : ≤ 100 %</p>
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RF Exposure Compliance Issue

Therefore, EUT is not required the SAR Evaluation.