

According to FCC §1.1310 Radiofrequency radiation exposure limits.

(2) At operating frequencies less than or equal to 6 GHz, the limits for maximum permissible exposure (MPE), derived from whole-body SAR limits and listed in Table 1 of paragraph (e) of this section, may be used instead of whole-body SAR limits as set forth in paragraph (a) through (c) of this section to evaluate the environmental impact of human exposure to RF radiation as specified in §1.1307(b), except for portable devices as defined in §2.1093 as these evaluations shall be performed according to the SAR provisions in §2.1093 of this chapter.

MPE Calculation formula: $S = (P \times G) / (4 \times \pi \times R^2)$

Where;

S = power density in mW/cm²

P = output power to antenna in mW

G = gain of antenna in linear scale

R = distance between observation point and center of the radiator in cm

So, calculated both MPE below;

Application	Output Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power density (mW/ cm ²)
BLE	2.3	0	20	0.0004576
WiFi	243.2	2	20	0.0591

S for BLE = $(2.3 \times 1) / (4 \times \pi \times 20^2) = (2.3) / (5,026.548) = 0.0004576 \text{ mW/ cm}^2$

S for WiFi = $(243.2 \times 1.22) / (4 \times \pi \times 20^2) = (2.3) / (5,026.548) = 0.0591 \text{ mW/ cm}^2$

The requirement of power density in Table 1 at 2.4GHz, 1 mW/cm² is satisfied for both. (FCC Part 1.1310 Table 1 Limits for maximum permissible exposure)

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	*900/f ²	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
(B) 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/1500	30
1,500-100,000			1.0	30

According to RSS-102, Issue 5 March 2015,

2.5 Exemption Limits for Routine Evaluation

All transmitters are exempt from routine SAR and RF exposure evaluations provided that they comply with the requirements of sections 2.5.1 or 2.5.2.

2.5.1 Exemption Limits for Routine Evaluation – SAR Evaluation

SAR evaluation is required if the separation distance between the user and/or bystander and the antenna and/or radiating element of the device is less than or equal to 20 cm, except when the device operates at or below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance defined in Table 1.

Table 1: SAR evaluation – Exemption limits for routine evaluation based on frequency and separation distance^{4,5}

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of ≤5 mm	At separation distance of 10 mm	At separation distance of 15 mm	At separation distance of 20 mm	At separation distance of 25 mm
≤300	71 mW	101 mW	132 mW	162 mW	193 mW
450	52 mW	70 mW	88 mW	106 mW	123 mW
835	17 mW	30 mW	42 mW	55 mW	67 mW
1900	7 mW	10 mW	18 mW	34 mW	60 mW
2450	4 mW	7 mW	15 mW	30 mW	52 mW
3500	2 mW	6 mW	16 mW	32 mW	55 mW
5800	1 mW	6 mW	15 mW	27 mW	41 mW

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of 30 mm	At separation distance of 35 mm	At separation distance of 40 mm	At separation distance of 45 mm	At separation distance of ≥50 mm
≤300	223 mW	254 mW	284 mW	315 mW	345 mW
450	141 mW	159 mW	177 mW	195 mW	213 mW
835	80 mW	92 mW	105 mW	117 mW	130 mW
1900	99 mW	153 mW	225 mW	316 mW	431 mW
2450	83 mW	123 mW	173 mW	235 mW	309 mW
3500	86 mW	124 mW	170 mW	225 mW	290 mW
5800	56 mW	71 mW	85 mW	97 mW	106 mW

The EUT is not locating near 20cm from users. So, exempted SAR Evaluation.

2.5.2 Exemption Limits for Routine Evaluation – 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 $1.31 \times 10^{-2} f^{0.6834} \text{ W}$ (adjusted for tune-up tolerance), where f is in MHz;

Where the e.i.r.p. of BLE = 0.0023 & e.i.r.p. of WiFi = 0.3855 < the limit @2402MHz = $0.0131 \times 2402^{0.6834} = 2.676 \text{ W}$, so EUT, BLE and WiFi, is also exempted for RF Exposure Evaluation.