

RF Exposure Compliance Requirement

For single RF sources (i.e., any single fixed RF source, mobile device, or portable device, as defined in paragraph §1.1307 (b)(2) of this section): A single RF source is exempt if:

(A) The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph §1.1307 (b)(3)(ii)(A) of this section. Medical implant devices may only use this exemption and that in paragraph §1.1307 (b)(3)(ii)(A);

(B) Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by:

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

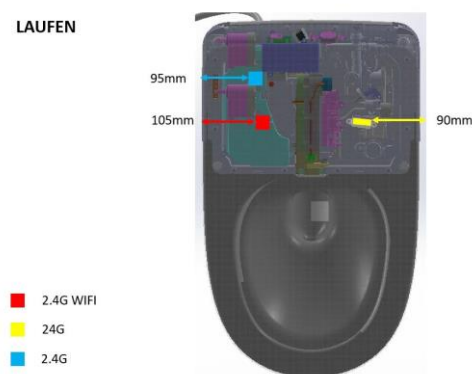
d = the separation distance (cm);

(C) Or using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least $\lambda/2\pi$, where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda/4$ or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

TABLE 1 TO § 1.1307(b)(3)(i)(C)—SINGLE RF SOURCES SUBJECT TO ROUTINE ENVIRONMENTAL EVALUATION

RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	1,920 R ² .
1.34-30	3,450 R ² /f ² .
30-300	3.83 R ² .
300-1,500	0.0128 R ² f.
1,500-100,000	19.2R ² .

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Physical arrangement of wireless module

Test data:

ERP Calculation:

EIRP to field strength at a specified measurement distance of 3 m: $EIRP (dBm) = E (dB\mu V/m) - 95.3$.

$ERP = EIRP - 2.15dB$

The 2.4GHz maximum field strength $75 dB\mu V/m @ 3m$, so $EIRP (dBm) = 75 dB\mu V/m - 95.3 = -20.3dBm$,

$ERP = -22.45dBm$

Mode	Maximum Conducted Power(dBm)	Antenna Gain (dBi)	EIRP (dBm)	ERP (dBm)
2.4G Wi-Fi	17	2.54	19.54	17.39

Result:

Mode	Frequency range (MHz)	$\lambda/2\pi(m)$	R(m)	Threshold ERP (mW)	Threshold ERP (dBm)	ERP (dBm)
2.4G Wi-Fi	2412-2462	0.020	0.062	73.805	18.681	17.39
2.4G	2452.9	0.019	0.062	73.805	18.681	-9.82

Remark: R is the minimum distance from user, please refer to the physical arrangement of wireless module.

24GHz, 2.4G Wi-Fi and 2.4G BLE can't transmit simultaneously, for 24GHz RF exposure please refer to Report No.: 2504B0947SHA-002.

According to §1.1307 (b)(3) section C and 447498 D04 Interim General RF Exposure Guidance v01, the SAR report is not required.

Test Location:

Intertek Testing Services Shenzhen Ltd. Guangzhou Branch

All tests were performed at:

Room102/104, No 203, KeZhu Road, Science City, GETDD Guangzhou, China