



14. Radio Frequency Exposure

14.1 Applicable Standards

<input type="checkbox"/> §1.1307(b)(3)(i)(A)	The available maximum time-averaged power is no more than 1 mW, regardless of separation distance.																																			
<input type="checkbox"/> §1.1307(b)(3)(i)(c)	<p>ERP is below a threshold calculated based on the distance , R between the person and the antenna / radiating structure, where $R > \lambda / 2 \pi$.</p> <p style="text-align: center;">TABLE B.1—THRESHOLDS FOR SINGLE RF SOURCES SUBJECT TO ROUTINE ENVIRONMENTAL EVALUATION</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2">RF Source Frequency</th> <th colspan="2">Minimum Distance</th> <th>Threshold ERP</th> </tr> <tr> <th>f_L MHz</th> <th>f_H MHz</th> <th>$\lambda_L / 2\pi$</th> <th>$\lambda_H / 2\pi$</th> <th>W</th> </tr> </thead> <tbody> <tr> <td>0.3</td> <td>– 1.34</td> <td>159 m</td> <td>– 35.6 m</td> <td>$1,920 R^2$</td> </tr> <tr> <td>1.34</td> <td>– 30</td> <td>35.6 m</td> <td>– 1.6 m</td> <td>$3,450 R^2/f^2$</td> </tr> <tr> <td>30</td> <td>– 300</td> <td>1.6 m</td> <td>– 159 mm</td> <td>$3.83 R^2$</td> </tr> <tr> <td>300</td> <td>– 1,500</td> <td>159 mm</td> <td>– 31.8 mm</td> <td>$0.0128 R^2f$</td> </tr> <tr> <td>1,500</td> <td>– 100,000</td> <td>31.8 mm</td> <td>– 0.5 mm</td> <td>$19.2R^2$</td> </tr> </tbody> </table> <p>Subscripts L and H are low and high; λ is wavelength. From § 1.1307(b)(3)(i)(C), modified by adding Minimum Distance columns.</p>	RF Source Frequency		Minimum Distance		Threshold ERP	f_L MHz	f_H MHz	$\lambda_L / 2\pi$	$\lambda_H / 2\pi$	W	0.3	– 1.34	159 m	– 35.6 m	$1,920 R^2$	1.34	– 30	35.6 m	– 1.6 m	$3,450 R^2/f^2$	30	– 300	1.6 m	– 159 mm	$3.83 R^2$	300	– 1,500	159 mm	– 31.8 mm	$0.0128 R^2f$	1,500	– 100,000	31.8 mm	– 0.5 mm	$19.2R^2$
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<input checked="" type="checkbox"/> § 1.1307(b)(3)(i)(B).	<p>Device operates between 300 MHz and 6 GHz and the maximum time-averaged power or effective radiated power (ERP), whichever is greater, $\leq P_{th}$</p> $P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}}(d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$ <p>Where</p> $x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$ <p>and</p> $ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$ <p>$d = \text{the separation distance (cm);}$</p>																																			

**14.2 EUT Specification**

Frequency band (Operating)	<input type="checkbox"/> WLAN: 2412MHz ~ 2462MHz <input type="checkbox"/> WLAN: 5150MHz ~ 5250MHz <input type="checkbox"/> WLAN: 5250MHz ~ 5350MHz <input type="checkbox"/> WLAN: 5470MHz ~ 5725MHz <input type="checkbox"/> WLAN: 5725MHz ~ 5850MHz <input checked="" type="checkbox"/> Bluetooth: 2402MHz ~ 2480MHz
Device category	<input type="checkbox"/> Portable (<20cm separation) <input checked="" type="checkbox"/> Mobile (>20cm separation)
Antenna diversity	<input checked="" type="checkbox"/> Single antenna <input type="checkbox"/> Multiple antennas <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input type="checkbox"/> Tx/Rx diversity
Evaluation applied	<input type="checkbox"/> Blanket 1 mW Blanket Exemption <input checked="" type="checkbox"/> MPE-based Exemption <input type="checkbox"/> SAR-based Exemption
Remark:	
The maximum conducted output power is <u>11.02dBm (19.498mW)</u> at <u>2441MHz</u> (with <u>3.53dBi antenna gain</u> .)	

14.3 Result

Channel Frequency (MHz)	Max. Conducted output power (dBm)	Max. Tune up power (dBm)	Antenna Gain(dBi)	Max.Tune up e.r.p. Power (dBm)	Max. Tune up e.r.p power (mW)	Limit (mW)
2441	11.02	11.52	3.53	12.90	19.498	3060

No non-compliance noted.



Maximum Permissible Exposure (Co-location)

BT+2.4G

Modulation Type	Channel Frequency (MHz)	Max. Conducted output power (dBm)	Max. Tune up power (dBm)	Antenna Gain(dBi)	Distance (cm)	Max.Tune up e.r.p. Power (mW)	Limit (mW)	MPE Ratio
11n HT20	2437	27.31	27.81	3.53	20	829.917	3060	0.2712
GFSK	2441	11.02	11.52	3.53	20	19.498	3060	0.0064
Co-location Total								0.2776
Σ MPE ratios Limit								1

BT+5G

Modulation Type	Channel Frequency (MHz)	Max. Conducted output power (dBm)	Max. Tune up power (dBm)	Antenna Gain(dBi)	Distance (cm)	Max.Tune up e.r.p. Power (mW)	Limit (mW)	MPE Ratio
11ac VHT20	5720	21.74	22.24	3.71	20	239.883	3060	0.0784
GFSK	2441	11.02	11.52	3.53	20	19.498	3060	0.0064
Co-location Total								0.0848
Σ MPE ratios Limit								1

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