



12. Radio Frequency Exposure

12.1.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="3">RF Source Frequency</th> <th colspan="3">Minimum Distance</th> <th>Threshold ERP</th> </tr> <tr> <th>f_L MHz</th> <th></th> <th>f_H MHz</th> <th>$\lambda_L / 2\pi$</th> <th></th> <th>$\lambda_H / 2\pi$</th> <th>W</th> </tr> </thead> <tbody> <tr> <td>0.3</td> <td>–</td> <td>1.34</td> <td>159 m</td> <td>–</td> <td>35.6 m</td> <td>1,920 R²</td> </tr> <tr> <td>1.34</td> <td>–</td> <td>30</td> <td>35.6 m</td> <td>–</td> <td>1.6 m</td> <td>3,450 R²/f²</td> </tr> <tr> <td>30</td> <td>–</td> <td>300</td> <td>1.6 m</td> <td>–</td> <td>159 mm</td> <td>3.83 R²</td> </tr> <tr> <td>300</td> <td>–</td> <td>1,500</td> <td>159 mm</td> <td>–</td> <td>31.8 mm</td> <td>0.0128 R²f</td> </tr> <tr> <td>1,500</td> <td>–</td> <td>100,000</td> <td>31.8 mm</td> <td>–</td> <td>0.5 mm</td> <td>19.2R²</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 ² f | 1,500 | – | 100,000 | 31.8 mm | – | 0.5 mm | 19.2R ² |
| 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 ² f | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1,500 | – | 100,000 | 31.8 mm | – | 0.5 mm | 19.2R ² | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <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 = the separation distance (cm);</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



12.2.EUT Specification

| | |
|---|---|
| Frequency band (Operating) | <input type="checkbox"/> WLAN: 2412MHz ~ 2462MHz <input checked="" type="checkbox"/> WLAN: 5150MHz ~ 5250MHz <input type="checkbox"/> WLAN: 5250MHz ~ 5350MHz <input type="checkbox"/> WLAN: 5470MHz ~ 5725MHz <input checked="" type="checkbox"/> WLAN: 5725MHz ~ 5850MHz <input type="checkbox"/> Bluetooth: 2402MHz ~ 2480MHz |
| Device category | <input type="checkbox"/> Portable (<20cm separation) <input checked="" type="checkbox"/> Mobile (>20cm separation) |
| Exposure classification | <input type="checkbox"/> Occupational/Controlled exposure (S = 5mW/cm ²) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure (S=1mW/cm ²) |
| Antenna diversity | <input type="checkbox"/> Single antenna <input checked="" type="checkbox"/> Multiple antennas <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input checked="" type="checkbox"/> Tx/Rx diversity |
| Evaluation applied | <input checked="" type="checkbox"/> MPE Evaluation* <input type="checkbox"/> SAR Evaluation <input type="checkbox"/> N/A |
| Remark: | |
| <p>Non-Beamforming The maximum conducted output power is <u>26.92dBm (492.459mW)</u> at <u>5795MHz</u> (with <u>4.40dBi antenna gain.</u>)</p> <p>Beamforming The maximum conducted output power is <u>25.34dBm (342.031mW)</u> at <u>5775MHz</u> (with <u>6.49dBi antenna gain.</u>)</p> | |



12.3. Test Results

Non-BeamForming

| 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) |
|-------------------------|----------------------------------|--------------------------|-------------------|---------------------------------|--------------------------------|------------|
| 5230 | 26.74 | 27.24 | 3.52 | 28.61 | 726.11 | 3060 |
| 5795 | 26.92 | 27.42 | 4.40 | 29.67 | 927.62 | 3060 |

BeamForming

| 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) |
|-------------------------|----------------------------------|--------------------------|-------------------|---------------------------------|--------------------------------|------------|
| 5180-5240 | 23.45 | 23.95 | 5.01 | 26.81 | 479.73 | 3060 |
| 5745-5825 | 25.34 | 25.84 | 6.49 | 30.18 | 1042.32 | 3060 |

No non-compliance noted.

Maximum Permissible Exposure (Co-location)

Non-Beamforming

| 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 |
|-------------------|-------------------------|-----------------------------------|--------------------------|-------------------|---------------|--------------------------------|------------|-----------|
| 11ax HE20 | 2437 | 26.70 | 27.20 | 6.03 | 20 | 1282.073 | 3060 | 0.419 |
| 11ax HE40 | 5795 | 26.92 | 27.42 | 4.40 | 20 | 927.620 | 3060 | 0.303 |
| Co-location Total | | | | | | | | 0.722 |
| ΣMPE ratios Limit | | | | | | | | 1 |

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