



## Radio Frequency Exposure

### LIMIT

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.

### EUT Specification

<b>EUT</b>	WiFi Access Point
<b>Frequency band (Operating)</b>	<input checked="" type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz <input checked="" type="checkbox"/> WLAN: 5.150GHz ~ 5.250GHz <input type="checkbox"/> WLAN: 5.250GHz ~ 5.350GHz <input type="checkbox"/> WLAN: 5.470GHz ~ 5.725GHz <input checked="" type="checkbox"/> WLAN: 5.725GHz ~ 5.850GHz <input type="checkbox"/> Bluetooth: 2.402GHz ~ 2.480 GHz
<b>Device category</b>	<input type="checkbox"/> Portable (<20cm separation) <input checked="" type="checkbox"/> Mobile (>20cm separation)
<b>Exposure classification</b>	<input type="checkbox"/> Occupational/Controlled exposure ( $S = 5\text{mW}/\text{cm}^2$ ) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure ( $S=1\text{mW}/\text{cm}^2$ )
<b>Antenna diversity</b>	<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
<b>Max. output power</b>	Non-Beamforming Band: 2412-2462MHz 802.11b: 27.68 dBm (585.65 mW) 802.11g: 29.18 dBm (828.06 mW) 802.11n (20MHz): 29.16 dBm (824.82 mW) 802.11n (40MHz): 26.72 dBm (470.12 mW) 802.11ac VHT20 (20MHz): 29.23 dBm (837.04 mW) 802.11ac VHT40 (40MHz): 26.77 dBm (475.64 mW)  Band: 5150-5250 MHz 802.11a: 24.33 dBm (271.03 mW) 802.11an (20MHz): 26.05 dBm (402.50 mW) 802.11an (40MHz): 23.75 dBm (237.16 mW) 802.11ac (20MHz): 26.11 dBm (408.13 mW) 802.11ac (40MHz): 23.82 dBm (241.05 mW) 802.11ac (80MHz): 17.64 dBm (58.03 mW)  Band: 5725-5850 MHz 802.11a: 23.85 dBm (242.66mW) 802.11an (20MHz): 23.83 dBm (241.65 mW) 802.11an (40MHz): 24.40 dBm (275.20 mW) 802.11ac (20MHz): 23.92 dBm (246.67 mW) 802.11ac (40MHz): 24.58 dBm (287.23 mW) 802.11ac (80MHz): 21.41 dBm (138.40 mW)



Max. output power	<p>Beamforming</p> <p>Band: 2412-2462MHz</p> <p>802.11n (20MHz): 26.15 dBm (412.44 mW)</p> <p>802.11n (40MHz): 23.71 dBm (235.08 mW)</p> <p>802.11ac VHT20 (20MHz): 26.22 dBm (418.55 mW)</p> <p>802.11ac VHT40 (40MHz): 23.76 dBm (237.84 mW)</p> <p>Band: 5150-5250 MHz</p> <p>802.11an (20MHz): 23.04 dBm (201.27 mW)</p> <p>802.11an (40MHz): 20.74 dBm (118.59 mW)</p> <p>802.11ac (20MHz): 23.10 dBm (204.08 mW)</p> <p>802.11ac (40MHz): 20.81 dBm (120.54 mW)</p> <p>802.11ac (80MHz): 14.63 dBm (29.02 mW)</p> <p>Band: 5725-5850 MHz</p> <p>802.11an (20MHz): 20.82 dBm (120.84 mW)</p> <p>802.11an (40MHz): 21.39 dBm (137.61 mW)</p> <p>802.11ac (20MHz): 20.91 dBm (123.35 mW)</p> <p>802.11ac (40MHz): 21.57 dBm (143.63 mW)</p> <p>802.11ac (80MHz): 18.40 dBm (69.21 mW)</p>
Antenna gain (Max)	<p>2412-2462MHz: ANT A: 4.4 dBi ; ANT B: 3.9 dBi</p> <p>5150-5250MHz: ANT A: 4.7 dBi ; ANT B: 4.7 dBi</p> <p>5725-5850MHz: ANT A: 4.7 dBi ; ANT B: 4.7 dBi</p>
Evaluation applied	<p><input checked="" type="checkbox"/> MPE Evaluation*</p> <p><input type="checkbox"/> SAR Evaluation</p> <p><input type="checkbox"/> N/A</p>
<p><b>Remark:</b></p> <p>1. The maximum output power is <u>26.77dBm (475.64mW)</u> at <u>2437 MHz</u> (with numeric 1 antenna gain.)</p> <p>2. DTS device is not subject to routine RF evaluation; MPE estimate is used to justify the compliance.</p> <p>3. For mobile or fixed location transmitters, no SAR consideration applied. The maximum power density is 1.0 mW/cm<sup>2</sup> even if the calculation indicates that the power density would be larger.</p>	

\*Note: Simultaneous transmission is not applicable for this EUT.

**TEST RESULTS**

No non-compliance noted.

**Calculation**

Given  $E = \frac{\sqrt{30 \times P \times G}}{d}$  &  $S = \frac{E^2}{3770}$

Where  $E$  = Field strength in Volts / meter

$P$  = Power in Watts

$G$  = Numeric antenna gain

$d$  = Distance in meters

$S$  = Power density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{3770 d^2}$$

Changing to units of mW and cm, using:

$$P \text{ (mW)} = P \text{ (W)} / 1000 \text{ and}$$

$$d \text{ (cm)} = d \text{ (m)} / 100$$

Yields

$$S = \frac{30 \times (P/1000) \times G}{3770 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2} \quad \textbf{Equation 1}$$

Where  $d$  = Distance in cm

$P$  = Power in mW

$G$  = Numeric antenna gain

$S$  = Power density in mW / cm<sup>2</sup>

**Maximum Permissible Exposure (Non-Beamforming)**

Modulation Mode	Frequency band (MHz)	Max. Conducted output power (dBm)	Antenna Gain(dBi)	Distance (cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
11b	2412-2462	27.68	4.4	20	0.3209	1
11g	2412-2462	29.18	4.4	20	0.4537	1
11n HT20	2412-2462	29.16	4.4	20	0.4519	1
11n HT40	2422-2452	26.72	4.4	20	0.2576	1
11ac VHT20	2412-2462	29.23	4.4	20	0.4586	1
11ac VHT40	2422-2452	26.77	4.4	20	0.2606	1
11a	5150-5250	24.33	4.71	20	0.1595	1
	5725-5850	23.85	4.71	20	0.1428	1
11n HT20	5150-5250	26.05	4.71	20	0.2369	1
	5725-5850	23.83	4.71	20	0.1422	1
11n HT40	5150-5250	23.75	4.71	20	0.1396	1
	5725-5850	24.40	4.71	20	0.1620	1
11ac VHT20	5150-5250	26.11	4.71	20	0.2402	1
	5725-5850	23.92	4.71	20	0.1452	1
11ac VHT40	5150-5250	23.82	4.71	20	0.1419	1
	5725-5850	24.58	4.71	20	0.1690	1
11ac VHT80	5150-5250	17.64	4.71	20	0.0342	1
	5725-5850	21.41	4.71	20	0.0814	1

**Maximum Permissible Exposure (Beamforming)**

Modulation Mode	Frequency band (MHz)	Max. Conducted output power (dBm)	Antenna Gain(dBi)	Distance (cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
11n HT20	2412-2462	26.15	7.16	20	0.4267	1
11n HT40	2422-2452	23.71	7.16	20	0.2432	1
11ac VHT20	2412-2462	26.22	7.16	20	0.4330	1
11ac VHT40	2422-2452	23.76	7.16	20	0.2460	1
11n HT20	5150-5250	23.04	7.71	20	0.2363	1
	5725-5850	20.82	7.71	20	0.1419	1
11n HT40	5150-5250	20.74	7.71	20	0.1392	1
	5725-5850	21.39	7.71	20	0.1616	1
11ac VHT20	5150-5250	23.10	7.71	20	0.2396	1
	5725-5850	20.91	7.71	20	0.1448	1
11ac VHT40	5150-5250	20.81	7.71	20	0.1415	1
	5725-5850	21.57	7.71	20	0.1686	1
11ac VHT80	5150-5250	14.63	7.71	20	0.0341	1
	5725-5850	18.40	7.71	20	0.0813	1

**NOTE:**

Total (Chain0+Chain1) , the formula of calculated the MPE is:

$CPD1 / LPD1 + CPD2 / LPD2 + \dots \text{etc.} < 1$

CPD = Calculation power density

LPD = Limit of power density

**Maximum Permissible Exposure(Co-location)****(Non Beamforming)**

Modulation Mode	Frequency band (MHz)	Max. Conducted output power (dBm)	Antenna Gain(dBi)	Distance (cm)	Power Density (mW/cm <sup>2</sup> )
2.4G 11ac VHT20	2412-2462	29.23	4.4	20	0.4586
5G 11ac VHT20	5150-5250	26.11	4.71	20	0.2402
Co-location Total					0.6988
Maximum Permissible Exposure Limit					1

**(Beamforming)**

Modulation Mode	Frequency band (MHz)	Max. Conducted output power (dBm)	Antenna Gain(dBi)	Distance (cm)	Power Density (mW/cm <sup>2</sup> )
2.4G 11ac VHT20	2412-2462	26.22	7.16	20	0.4330
5G 11ac VHT20	5150-5250	23.10	7.71	20	0.2396
Co-location Total					0.6726
Maximum Permissible Exposure Limit					1