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

EUT	High Power Wireless-N 600mW Dual Band Access Point
Frequency band (Operating)	☒ WLAN: 2.412GHz ~ 2.462GHz ☒ WLAN: 5.150GHz ~ 5.250GHz ☒ WLAN: 5.725GHz ~ 5.850GHz ☐ Bluetooth: 2.402GHz ~ 2.480 GHz
Device category	☐ Portable (<20cm separation) ☒ Mobile (>20cm separation)
Exposure classification	☐ Occupational/Controlled exposure (S = 5mW/cm^2) ☒ General Population/Uncontrolled exposure (S=1mW/cm^2)
Antenna diversity	☐ Single antenna ☒ Multiple antennas ☐ Tx diversity ☐ Rx diversity ☒ Tx/Rx diversity
Max. output power	802.11b: 27.26 dBm (531.54 mW) 802.11g: 29.26 dBm (843.83 mW) 802.11n (20MHz): 27.31 dBm (537.80 mW) 802.11n (40MHz): 27.34 dBm (542.20 mW) 802.11a: 26.27 dBm (424.00 mW) 802.11an (20MHz): 26.28 dBm (424.43 mW) 802.11an (40MHz): 26.32 dBm (428.60 mW)
Antenna gain (Max)	802.11b/g/n: 2 dBi ; 802.11a, an: 4 dBi
Evaluation applied	☒ MPE Evaluation* ☐ SAR Evaluation ☐ N/A
Remark: *1. The maximum output power is 29.26 dBm (843.83 mW) at 2462MHz (withnumeric 2.0 antenna gain.)* *2. DTS device is not subject to routine RF evaluation; MPE estimate is used to justify the compliance.* *3. For mobile or fixed location transmitters, no SAR consideration applied. The maximum power density is 1.0 mW/cm^2 even if the calculation indicates that the power density would be larger.*	

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 (mW) = P (W) / 1000 and
d (cm) = d(m) / 100

Yields

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

Where *d = Distance in cm*
P = Power in mW
G = Numeric antenna gain
S = Power density in mW / cm^2

Maximum Permissible Exposure

ANT R

Modulation Mode	Frequency band (MHz)	Max. Conducted output power(dBm)	Antenna gain (dBi)	Distance (cm)	Power density (mW/cm2)	Limit (mW/cm2)
802.11b	2412-2462	24.32	2.0	20	0.085	1
802.11g	2412-2462	26.39	2.0	20	0.137	1
802.11n (20MHz)	2412-2462	24.38	2.0	20	0.086	1
802.11n (40MHz)	2422-2452	24.43	2.0	20	0.087	1
802.11a	5150-5250	8.06	4.0	20	0.003	1
802.11a	5725-5850	23.37	4.0	20	0.109	1
802.11an (20MHz)	5150-5250	8.11	4.0	20	0.003	1
802.11an (20MHz)	5725-5850	23.29	4.0	20	0.107	1
802.11an (40MHz)	5190-5230	9.09	4.0	20	0.004	1
802.11an (40MHz)	5755-5795	23.35	4.0	20	0.108	1

ANT L

Modulation Mode	Frequency band (MHz)	Max. Conducted output power(dBm)	Antenna gain (dBi)	Distance (cm)	Power density (mW/cm2)	Limit (mW/cm2)
802.11b	2412-2462	24.22	2.0	20	0.083	1
802.11g	2412-2462	26.23	2.0	20	0.132	1
802.11n (20MHz)	2412-2462	24.26	2.0	20	0.084	1
802.11n (40MHz)	2422-2452	24.43	2.0	20	0.087	1
802.11a	5150-5250	7.64	4.0	20	0.003	1
802.11a	5725-5850	23.43	4.0	20	0.110	1
802.11an (20MHz)	5150-5250	7.09	4.0	20	0.003	1
802.11an (20MHz)	5725-5850	23.42	4.0	20	0.110	1
802.11an (40MHz)	5190-5230	8.15	4.0	20	0.003	1
802.11an (40MHz)	5755-5795	23.35	4.0	20	0.108	1

ANT R+L

Modulation Mode	Frequency band (MHz)	Max. Conducted output power(dBm)	Antenna gain (dBi)	Distance (cm)	Power density (mW/cm2)	Limit (mW/cm2)
802.11b	2412-2462	27.26	2.0	20	0.336	1
802.11g	2412-2462	29.26	2.0	20	0.532	1
802.11n (20MHz)	2412-2462	27.31	5.01	20	0.339	1
802.11n (40MHz)	2422-2452	27.34	5.01	20	0.342	1
802.11an (20MHz)	5150-5250	10.87	7.01	20	0.012	1
802.11an (20MHz)	5725-5850	26.28	7.01	20	0.424	1
802.11an (40MHz)	5150-5250	10.52	7.01	20	0.011	1
802.11an (40MHz)	5725-5850	26.28	7.01	20	0.424	1

NOTE:

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

CPD1 / LPD1 + CPD2 / LPD2 + ……etc. < 1

CPD = Calculation power density

LPD = Limit of power density