RADIO FREQUENCY EXPOSURE

LIMIT

According to §15.247(i) and §15.407(f), 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) of this chapter.

EUT Specification

EUT	850-033343
Frequency band (Operating)	☒ WLAN: 2.412GHz ~ 2.462GHz ☒ WLAN: 5.15GHz ~ 5.25GHz ☐ WLAN: 5.25GHz ~ 5.35GHz ☐ WLAN: 5.47GHz ~ 5.725GHz ☒ WLAN: 5.725GHz ~ 5.85GHz ☐ Others
Device category	☐ Portable (<20cm separation) ☒ Mobile (>20cm separation) ☐ Others
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	2.412-2.462GHz IEEE 802.11b mode: 18.76dBm IEEE 802.11g mode: 21.74 dBm IEEE 802.11n HT20 mode: 21.66 dBm 5150 MHz~5250 MHz IEEE802.11a mode: 13.54dBm IEEE802.11an HT20 mode: 13.51dBm IEEE802.11an HT40 mode: 13.91dBm IEEE802.11ac VHT20 mode: 13.59dBm IEEE802.11ac VHT40 mode: 13.70dBm IEEE802.11ac VHT80 mode: 13.20dBm 5725MHz-5850MHz IEEE 802.11a: 13.00 dBm IEEE 802.11n HT20 MHz Channel Mode: 12.51 dBm IEEE 802.11n HT40 MHz Channel Mode: 12.76 dBm IEEE 802.11ac VHT20 MHz Channel Mode: 12.58 dBm IEEE 802.11ac VHT40 MHz Channel Mode: 12.72 dBm IEEE 802.11ac VHT 80 MHz Channel Mode: 12.33 dBm
Antenna gain (Max)	Dipole antenna for 2.4GHz Gain 2.0dBi Dipole antenna for 5.25GHz Gain 5.0dBi Dipole antenna for 5.75GHz Gain 4.5dBi
Evaluation applied	☒ MPE Evaluation* ☐ SAR Evaluation ☐ N/A

Remark:

1. *The maximum output power is 21.74dBm (149.28mW) at 2412MHz (with 1.585 numeric 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/cm2 even if the calculation indicates that the power density would be larger.
4. All two antennas are completely uncorrelated with each other.

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

Substituting the MPE safe distance using d = 20 cm into Equation 1:

Yields

$$S = 0.000199 \times P \times G$$

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

Modulation Mode	Frequency band (MHz)	Max. tune up power(dBm)	Antenna gain (dBi)	Distance (cm)	Power density (mW/cm2)	Limit (mW/cm2)
IEEE802.11b	2412-2462	19.5	2.0	20	0.0281	1
IEEE802.11g		22.5	2.0	20	0.0561	1
IEEE802.11 n(20MHz)		22.5	2.0	20	0.0561	1
IEEE802.11a mode	5150~5250	14.5	5.0	20	0.0177	1
IEEE802.11an HT20 mode		14.5	5.0	20	0.0177	1
IEEE802.11an HT40 mode		14.5	5.0	20	0.0177	1
IEEE802.11ac VHT20 mode		14.5	5.0	20	0.0177	1
IEEE802.11ac VHT40 mode		14.5	5.0	20	0.0177	1
IEEE802.11ac VHT80 mode		14.5	5.0	20	0.0177	1
IEEE802.11a mode	5725~5850	13.5	4.5	20	0.0126	1
IEEE802.11an HT20 mode		13.5	4.5	20	0.0126	1
IEEE802.11an HT40 mode		13.5	4.5	20	0.0126	1
IEEE802.11ac VHT20 mode		13.5	4.5	20	0.0126	1
IEEE802.11ac VHT40 mode		13.5	4.5	20	0.0126	1
IEEE802.11ac VHT80 mode		13.5	4.5	20	0.0126	1

Note:
Only the WLAN 2.4G can transmit, the formula of calculated the MPE is:
CPD1 / LPD1 < 1
CPD = Calculation power density
LPD = Limit of power density

WLAN 2.4G Max Power density =0.0561 < 1
(For mobile or fixed location transmitters, the maximum power density is 1.0 mW/cm^2 even if the calculation indicates that the power density would be larger.)