RADIO FREQUENCY EXPOSURE

LIMIT

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	Pro2,Pro2 Plus			
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 ☐ Bluetooth: 2.402GHz ~ 2.480GHz ☐ 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. Average Output power	WIFI:2.412-2.462GHz IEEE 802.11b mode: 18.31dBm IEEE 802.11g mode: 15.62dBm IEEE 802.11n HT20 mode: 14.90dBm 5150 MHz~5250 MHz IEEE802.11a mode: 15.36dBm IEEE802.11an HT20 mode: 14.79dBm IEEE802.11an HT40 mode: 14.41dBm 5725MHz-5850MHz IEEE802.11a mode: 15.48dBm IEEE802.11an HT20 mode: 14.49dBm IEEE802.11an HT40 mode: 14.06dBm			
Antenna gain (Max)		Gain(dBi)		
		2.4G	BandI	BandIV
	Antenna 1	4.33	4.27	4.26
	Antenna 2	4.33	4.27	4.26
	Directional gain	7.34	7.28	7.27
Evaluation applied	☒ MPE Evaluation* ☐ SAR Evaluation ☐ N/A			

Remark:

1. *The maximum output power is 18.31dBm (67.764mW) at 2412MHz (with 2.710 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.*

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 / cm²

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 / cm²

For WLAN:

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	18.5	4.33	20	0.0382	1
IEEE802.11g		16	4.33	20	0.0215	1
IEEE802.11 n(20MHz)		15	7.34	20	0.0341	1
IEEE802.11a mode	5150~5250	15.5	4.27	20	0.0189	1
IEEE802.11an HT20 mode		15	7.28	20	0.0336	1
IEEE802.11an HT40 mode		14.5	7.28	20	0.0300	1
IEEE802.11a mode	5725~5850	15.5	4.26	20	0.0188	1
IEEE802.11an HT20 mode		14.5	7.27	20	0.0299	1
IEEE802.11an HT40 mode		14.5	7.27	20	0.0299	1

Note:

Only WLAN can transmit, the formula of calculated the MPE is:
CPD1 / LPD1 + CPD2 / LPD2 + ……etc. < 1
CPD = Calculation power density
LPD = Limit of power density
WLAN =0.0382mW/cm2

(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.)