

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	OFR-T1-G			
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 ($S = 5\text{mW}/\text{cm}^2$) ☒ General Population/Uncontrolled exposure ($S=1\text{mW}/\text{cm}^2$)			
Antenna diversity	☐ Single antenna ☒ Multiple antennas ☐ Tx diversity ☐ Rx diversity ☒ Tx/Rx diversity			
Max. Output power	WIFI:2.412-2.462GHz IEEE 802.11b mode: 21.59dBm IEEE 802.11g mode: 26.94dBm IEEE 802.11n HT20 mode: 26.38dBm 5150 MHz~5250 MHz IEEE802.11a mode: 14.17dBm IEEE802.11an HT20 mode: 14.13dBm IEEE802.11an HT40 mode: 14.26dBm IEEE802.11ac VHT20 mode: 14.51dBm IEEE802.11ac VHT40 mode: 14.03dBm IEEE802.11ac VHT80 mode: 11.88dBm 5725MHz-5850MHz IEEE802.11a mode: 15.76dBm IEEE802.11an HT20 mode: 15.80dBm IEEE802.11an HT40 mode: 15.46dBm IEEE802.11ac VHT20 mode: 15.65dBm IEEE802.11ac VHT40 mode: 15.25dBm IEEE802.11ac VHT80 mode: 13.13dBm BLE 4.0 2402-2480:1.06dBm			
Antenna gain (Max)	Gain(dBi)			
		2.4G	Band I	Band IV
	Antenna 1	2.04	3.96	3.40
	Antenna 2	2.04	3.96	3.40
Evaluation applied	☒ MPE Evaluation* ☐ SAR Evaluation ☐ N/A			

Remark:

1. The maximum output power is 26.94dBm (494.311mW) at 2462MHz (with 1.600 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:

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

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

Yields

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

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/cm ²)	Limit (mW/cm ²)
IEEE802.11b	2412-2462	22	2.04	20	0.0482	1
IEEE802.11g		27	2.04	20	0.1523	1
IEEE802.11 n(20MHz)		26.5	2.04	20	0.1358	1
IEEE802.11a mode	5150~5250	15	3.96	20	0.0150	1
IEEE802.11an HT20 mode		14.5	3.96	20	0.0133	1
IEEE802.11an HT40 mode		14.5	3.96	20	0.0133	1
IEEE802.11ac VHT20 mode		15	3.96	20	0.0150	1
IEEE802.11ac VHT40 mode		14.5	3.96	20	0.0133	1
IEEE802.11ac VHT80 mode		12	3.96	20	0.0075	1
IEEE802.11a mode	5725~5850	16	3.40	20	0.0165	1
IEEE802.11an HT20 mode		16	3.40	20	0.0165	1
IEEE802.11an HT40 mode		15.5	3.40	20	0.0147	1
IEEE802.11ac VHT20 mode		16	3.40	20	0.0165	1
IEEE802.11ac VHT40 mode		15.5	3.40	20	0.0147	1
IEEE802.11ac VHT80 mode		13.5	3.40	20	0.0093	1

For Bluetooth:

Modulation Mode	Frequency band (MHz)	Max. tune up power(dBm)	Antenna gain (dBi)	Distance (cm)	Power density (mW/cm ²)	Limit (mW/cm ²)
BLE4.0	2402-2480	2	2.04	20	0.0005	1

Note:

All of the Bluetooth& WLAN can transmit simultaneously, the formula of calculated the MPE is:

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

CPD = Calculation power density

LPD = Limit of power density

Bluetooth+ WLAN = $0.0005 + 0.1523 = 0.1528 \text{ mW/cm}^2$

(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.)