

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) of this chapter.

EUT Specification

EUT	YY5.1917	
Frequency band (Operating)	<input checked="" type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz <input type="checkbox"/> WLAN: 5.15GHz ~ 5.25GHz <input type="checkbox"/> WLAN: 5.25GHz ~ 5.35GHz <input type="checkbox"/> WLAN: 5.47GHz ~ 5.725GHz <input type="checkbox"/> WLAN: 5.725GHz ~ 5.85GHz <input type="checkbox"/> Bluetooth: 2.402GHz ~ 2.480GHz <input type="checkbox"/> Others	
Device category	<input type="checkbox"/> Portable (<20cm separation) <input checked="" type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others	
Exposure classification	<input type="checkbox"/> Occupational/Controlled exposure ($S = 5\text{mW}/\text{cm}^2$) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure ($S=1\text{mW}/\text{cm}^2$)	
Antenna diversity	<input checked="" type="checkbox"/> Single antenna <input type="checkbox"/> Multiple antennas <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input type="checkbox"/> Tx/Rx diversity	
Max. Output power	WIFI:2.412-2.462GHz IEEE 802.11b mode:17.85dBm IEEE 802.11g mode: 18.29dBm IEEE 802.11n HT20 mode: 18.32dBm IEEE 802.11n HT40 mode: 17.94dBm	
Antenna gain (Max)	Brand	Gain(dBi)
	UB	3
Evaluation applied	<input checked="" type="checkbox"/> MPE Evaluation* <input type="checkbox"/> SAR Evaluation <input type="checkbox"/> N/A	

Remark:

1. The maximum output power is 18.32dBm (67.920mW) at 2437MHz (with 1.995 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	18	3	20	0.0250	1
IEEE802.11g		18.5	3	20	0.0281	1
IEEE802.11 n(20MHz)		18.5	3	20	0.0281	1
IEEE802.11 n(40MHz)		18	3	20	0.0250	1

Note:

Only WLAN can transmit, the formula of calculated the MPE is:

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

CPD = Calculation power density

LPD = Limit of power density

WLAN 2.4G=0.0281 mW/cm²

(For mobile or fixed location transmitters, the maximum power density is 1.0 mW/cm² even if the calculation indicates that the power density would be larger.)