



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	Wireless Cable Modem Gateway
Frequency band (Operating)	☒ WLAN: 2.412GHz ~ 2.462GHz ☐ WLAN: 5.150GHz ~ 5.250GHz ☐ WLAN: 5.725GHz ~ 5.850GHz ☐ Bluetooth: 2.402GHz ~ 2.480 GHz ☐ Zigbee: 2.405GHz ~ 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: 27.31dBm(528.03mW) 802.11g: 27.19dBm(524.19mW) 802.11n HT20: 27.26dBm(531.56mW) 802.11n HT40: 27.22dBm(527.62mW)
Antenna gain (Max)	ANT 1: Printed Antenna/ 5.93dBi ANT 2: Printed Antenna/ 5.17dBi Directional gain: 8.57 (dBi)
Evaluation applied	☒ MPE Evaluation* ☐ SAR Evaluation ☐ N/A

Remark:

1. The maximum output power is 27.31 dBm (528.03mW) at 2412MHz (with numeric 8.57 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.

*Note: Simultaneous transmission is not applicable for this EUT.

**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**

Modulation Mode	Frequency band (MHz)	Max. Conducted output power(mW)	Antenna gain (dBi)	Distance (cm)	Power density (mW/cm2)	Limit (mW/cm2)
802.11b	2412-2462	528.03	8.57	20	0.770	1
802.11g	2412-2462	524.19	8.57	20	0.749	1
802.11n HT20	2412-2462	531.56	8.57	20	0.762	1
802.11n HT40	2422-2452	527.62	8.57	20	0.755	1

NOTE:

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

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

CPD = Calculation power density

LPD = Limit of power density