



## 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	AC750GW
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 checked="" type="checkbox"/> WLAN: 5.725GHz ~ 5.85GHz <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 type="checkbox"/> Single antenna <input checked="" type="checkbox"/> Multiple antennas <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input checked="" type="checkbox"/> Tx/Rx diversity
Max. output power	2.412-2.462GHz IEEE 802.11b mode: 21.79 dBm IEEE 802.11g mode: 22.46 dBm draft 802.11n Standard-20 MHz Channel mode: 23.12 dBm draft 802.11n Wide-40 MHz Channel mode: 20.19 dBm IEEE 802.11a mode: 21.56 dBm draft 802.11an 20 MHz Channel mode: 21.96dBm draft 802.11an 40 MHz Channel mode: 21.45 dBm draft 802.11ac 20 MHz Channel mode: 20.66 dBm draft 802.11ac 40 MHz Channel mode: 21.06 dBm draft 802.11ac 80 MHz Channel mode: 18.65 dBm
Antenna gain (Max)	Dipole antennas for 2.4GHz Gain 7 dBi and Dipole antennas for 5 GHz Gain 7 dBi
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 23.12dBm (205.1mW) at 2462MHz (with 5.012 numeric antenna gain.); 21.96dBm (157.0mW) at 5745MHz (with 5.012 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/cm<sup>2</sup> even if the calculation indicates that the power density would be larger.
4. All three 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:

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

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

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 / cm<sup>2</sup>

### **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<sup>2</sup>



# Compliance Certification Services Inc.

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Modulation Mode	Frequency band (MHz)	Max. Conducted output power(dBm)	Antenna gain (dBi)	Distance (cm)	Power density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
802.11b	2412-2462	21.79	7.0	20	0.1506	1
802.11g		22.46	7.0	20	0.1757	1
802.11 n(20MHz)		23.12	7.0	20	0.2046	1
802.11 n(40MHz)		20.19	7.0	20	0.1042	1
802.11a	5725-5850	21.56	7.0	20	0.1428	1
802.11 an(20MHz)		21.96	7.0	20	0.1566	1
802.11 an(40MHz)		21.45	7.0	20	0.1393	1
802.11 ac(20MHz)		20.66	7.0	20	0.1161	1
802.11 ac(40MHz)		21.06	7.0	20	0.1273	1
802.11 ac(80MHz)		18.65	7.0	20	0.0731	1

**Note:**

Both of the WLAN 2.4G&5.0G 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

WLAN 2.4G+ WLAN 5G=0.2046+0.1566=0.3612

(For mobile or fixed location transmitters, the maximum power density is 1.0 mW/cm<sup>2</sup> even if the calculation indicates that the power density would be larger.)