



## 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                        | UIDTG2472                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Frequency band (Operating) | <input checked="" type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz<br><input checked="" type="checkbox"/> WLAN: 5.15GHz ~ 5.25GHz<br><input type="checkbox"/> WLAN: 5.25GHz ~ 5.35GHz<br><input type="checkbox"/> WLAN: 5.47GHz ~ 5.725GHz<br><input checked="" type="checkbox"/> WLAN: 5.725GHz ~ 5.85GHz<br><input type="checkbox"/> Others                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Device category            | <input type="checkbox"/> Portable (<20cm separation)<br><input checked="" type="checkbox"/> Mobile (>20cm separation)<br><input type="checkbox"/> Others                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Exposure classification    | <input type="checkbox"/> Occupational/Controlled exposure ( $S = 5\text{mW}/\text{cm}^2$ )<br><input checked="" type="checkbox"/> General Population/Uncontrolled exposure ( $S=1\text{mW}/\text{cm}^2$ )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Antenna diversity          | <input type="checkbox"/> Single antenna<br><input checked="" type="checkbox"/> Multiple antennas<br><input type="checkbox"/> Tx diversity<br><input type="checkbox"/> Rx diversity<br><input checked="" type="checkbox"/> Tx/Rx diversity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Max. output power          | 2.412-2.462GHz<br>IEEE 802.11b mode: 29.87 dBm<br>IEEE 802.11g mode: 29.82 dBm<br>draft 802.11n Standard-20 MHz Channel mode: 28.83 dBm<br>draft 802.11n Wide-40 MHz Channel mode: 28.19 dBm<br>5.15-5.25GHz:<br>802.11a mode: 24.40 dBm<br>802.11an Standard-20 MHz Channel mode: 23.37 dBm<br>802.11an Wide-40 MHz Channel mode: 20.59 dBm<br>802.11ac Standard -20 MHz Channel mode: 23.36 dBm<br>802.11ac Wide-40 MHz Channel mode: 20.63 dBm<br>802.11ac Wide-80 MHz Channel mode: 18.01 dBm<br>5.725-5.85GHz:<br>IEEE 802.11a mode: 25.64 dBm<br>draft 802.11an Standard-20 MHz Channel mode:25.62 dBm<br>draft 802.11an Wide-40 MHz Channel mode: 25.41 dBm<br>draft 802.11ac Standard-20 MHz Channel mode:25.59 dBm<br>draft 802.11ac Wide-40 MHz Channel mode: 25.37 dBm<br>draft 802.11ac Wide-80 MHz Channel mode: 25.17 dBm |
| Antenna gain (Max)         | Dipole antennas for 2.4GHz Gain 3.20 dBi<br>and Dipole antennas for 5 GHz Gain 5.20 dBi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                            | Dipole antennas for 2.4GHz Gain 5.40 dBi<br>and Dipole antennas for 5 GHz Gain 3.50 dBi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Evaluation applied         | <input checked="" type="checkbox"/> MPE Evaluation*<br><input type="checkbox"/> SAR Evaluation<br><input type="checkbox"/> N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |



## Remark:

1. The maximum output power is 29.87dBm (966.1mW) at 2437MHz (with 5.4 numeric antenna gain.); 24.40dBm (275.4mW) at 5190MHz (with 3.50numeric antenna gain.); 24.64dBm (291.1mW) at 5825MHz (with 3.5numeric 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

$$\text{Given } E = \frac{\sqrt{30 \times P \times G}}{d} \quad \& \quad S = \frac{E^2}{3770}$$

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>



| 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            | 29.87                            | 5.4                | 20            | 0.659658                            | 1                           |
| 802.11g          |                      | 29.82                            | 5.4                | 20            | 0.651993                            | 1                           |
| 802.11 n(20MHz)  |                      | 28.83                            | 5.4                | 20            | 0.527052                            | 1                           |
| 802.11 n(40MHz)  |                      | 28.19                            | 5.4                | 20            | 0.454834                            | 1                           |
| 802.11a          | 5150-5250            | 24.40                            | 3.5                | 20            | 0.122702                            | 1                           |
| 802.11 an(20MHz) |                      | 23.37                            | 3.5                | 20            | 0.096795                            | 1                           |
| 802.11 an(40MHz) |                      | 20.59                            | 3.5                | 20            | 0.051033                            | 1                           |
| 802.11 ac(20MHz) |                      | 23.36                            | 3.5                | 20            | 0.096572                            | 1                           |
| 802.11 ac(40MHz) |                      | 20.63                            | 3.5                | 20            | 0.051505                            | 1                           |
| 802.11 ac(80MHz) |                      | 18.01                            | 3.5                | 20            | 0.028174                            | 1                           |
| 802.11a          | 5725-5850            | 25.64                            | 3.5                | 20            | 0.163250                            | 1                           |
| 802.11 an(20MHz) |                      | 25.62                            | 3.5                | 20            | 0.162500                            | 1                           |
| 802.11 an(40MHz) |                      | 25.41                            | 3.5                | 20            | 0.154829                            | 1                           |
| 802.11 ac(20MHz) |                      | 25.59                            | 3.5                | 20            | 0.161381                            | 1                           |
| 802.11 ac(40MHz) |                      | 25.37                            | 3.5                | 20            | 0.153410                            | 1                           |
| 802.11 ac(80MHz) |                      | 25.17                            | 3.5                | 20            | 0.146505                            | 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=0.6597+0.1633=0.8230

(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.)