

Radio Frequency Exposure Report

On Behalf of

GL Technologies (Hong Kong) Limited

210D Enterprise Place, Hong Kong Science Park, Sha Tin, NT, Hong Kong

Product Name:	GL-MT300A mini router
Model/Type No.:	GL-MT300A
FCC ID:	2AFIW-MT300A
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1 - GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Applicant:	GL Technologies (Hong Kong) Limited.
Address of Applicant:	210D Enterprise Place, Hong Kong Science Park, Sha Tin, NT, Hong Kong.
Manufacturer 1:	GL Technologies (Hong Kong) Limited.
Address of manufacturer:	210D Enterprise Place, Hong Kong Science Park, Sha Tin, NT, Hong Kong.

General Description of E.U.T

Items	Description
EUT Description:	GL-MT300A mini router
Model No.:	GL-MT300A
Frequency Band:	IEEE 802.11b : 2412MHz~2462MHz; IEEE 802.11g : 2412MHz~2462MHz; IEEE 802.11n(HT20) : 2412MHz~2462MHz; IEEE 802.11n(HT40) : 2422MHz~2452MHz;
Number of Channels:	IEEE 802.11b :11 Channels; IEEE 802.11g :11 Channels; IEEE 802.11n(HT20) : 11 Channels; IEEE 802.11n(HT40) : 7 Channels;
Channels Spacing:	IEEE 802.11b : 5MHz IEEE 802.11g : 5MHz IEEE 802.11n(HT20) : 5MHz IEEE 802.11n(HT40) : 5MHz
Type of Modulation:	IEEE 802.11b: CCK IEEE 802.11g: OFDM IEEE 802.11n(HT20): OFDM IEEE 802.11n(HT40): OFDM
Transmit Data Rate:	maximum of 300Mbps
Antenna Type:	PCB Antenna
Antenna Gain:	Ant 1: 3.7dBi(Numeric gain:2.34) Ant 2: 3.7dBi(Numeric gain:2.34)
Power Rating:	DC 5V/1A from micro USB

Remark: * The test data gathered are from the production sample provided by the manufacturer.
* Supplementary models have the same base board circuit, the appearance is different.

1.2 Objective

The objective of the following report is used to demonstrate that EUT operated in a manner that ensures the public is not exposed to radio frequency energy levels in excess of the relative provisions of FCC 47CFR Part 1.1307

1.3 General Description of Test

Items	Description
EUT Frequency band	<input type="checkbox"/> FHSS: 2.400GHz ~ 2.483GHz <input checked="" type="checkbox"/> WLAN: 2.400GHz ~ 2.483GHz <input type="checkbox"/> WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz <input type="checkbox"/> WLAN: 5.745GHz ~ 5825GHz <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 = 5mW/cm ²) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure (S=1mW/cm ²) <input type="checkbox"/> Others: _____
Antenna diversity	<input checked="" type="checkbox"/> Single antenna <input type="checkbox"/> Multiple antennas: <ul style="list-style-type: none"> <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input type="checkbox"/> Tx/Rx diversity
Max. output power	Chain 1:19.25dBm (0.0841W) Chain 2:24.57dBm(0.286W)
Antenna gain (Max)	Ant 1:3.7dBi(Numeric gain:2.34) Ant 2: 3.7dBi(Numeric gain:2.34)
Evaluation applied	<input checked="" type="checkbox"/> MPE Evaluation <input type="checkbox"/> SAR Evaluation
<p>Note:</p> <p>Chain 1:1. The maximum output power is 19.25dBm at IEEE 802.11g mode 2412MHz (with 2.34 numeric antenna gain.)</p> <p>Chain 2: 2. The maximum output power is 24.57dBm at IEEE 802.11g mode 2412MHz (with 2.34 numeric antenna gain.)</p> <p>3. For mobile or fixed location transmitters, no SAR consideration applied. The minimum separation generally be used is at least 20 cm, even if the calculations indicate that the MPE distance would be lesser.</p>	

1.4 Human Exposure Assessment Results

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:

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

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

Yields

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

Equation 1

Where d = distance in cm

P = Power in mW

G = Numeric antenna gain

S = Power Density in mW / cm²

EUT parameter (data from the separate report)	
Given $E = \frac{\sqrt{30 \times P \times G}}{d} \quad \& \quad S = \frac{E^2}{3770}$	Where G: numerical gain of transmitting antenna; TP: Transmitted power in watt; d: distance from the transmitting antenna in meter
Max average output power in Watt (TP)	Chain 1:19.25dBm (0.0841W) Chain 2:24.57dBm(0.286W)
Antenna gain (G)	Ant 1:3.7dBi(Numeric gain:2.34) Ant 2: 3.7dBi(Numeric gain:2.34)
Exposure classification	S=1mW/cm ²
Minimum distance in meter (d) (from transmitting structure to the human body)	20cm (0.2m)

Yields

$$S = \frac{30 \times P \times G}{3770 d^2},$$

Chain 1: P1=0.0841W, G1=2.34, d1=0.2, S1=0.0391mW/cm²

Chain 2: P2=0.286W, G2=2.34, d2=0.2, S2=0.1331mW/cm²

Or

$$d = \sqrt{\frac{30 \times P \times G}{3770 S}},$$

Chain 1: S1=1, P1=0.0841W, G1=2.34, d1=0.0396m

Chain 2: S2=1, P2=0.286W, G2=2.34, d2=0.0729m

Conclusion:

S1=0.0391mW/cm² and S2=0.1331mW/cm² is significant lower than the General Population Exposure Power Density Limit 1mW/cm² or except the distance when human body proximity to the antenna is less than 2.67cm then will reach the General Population Exposure Power Density Limit (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.)

