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-AR300M mini router**
Model/Type No.:	**GL-AR300MD, GL-AR300M**
FCC ID:	**2AFIW-AR300M**
Prepared By:	**Shenzhen Hongcai Testing Technology Co., Ltd.** 1st-3rd Floor, Building C, Shuanghuan Xin Yi Dai Hi-Tech Industrial Park, No.8 Baoqing Road, Baolong Industrial Zone, Longgang District, Shenzhen, Guangdong, China Tel: +86-755-86337020 Fax:+86-755-86337028
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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-AR300M mini router
Model No.:	GL-AR300MD
Supplementary Model:	GL-AR300M
Frequency Band:	2412MHz～2462MHz; 5725MHz-5850MHz
Number of Channels:	For 2.4GHz: 802.11b/g/n(HT20) :11 Channels; 802 11n(HT40) : 7 Channels; For 5GHz: 802.11a/ 802.11n20/802.11ac20:5, 802.11n40/802.11ac40:2
Channels Spacing:	For 2.4G: 802.11b/g/n20/n40 For 5G: 802.11a/802.11n20/802.11ac20 :20MHz, 802.11n40/802.11ac40 :40MHz
Type of Modulation:	64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode
Antenna Gain:	For 2.4G:Ant 1:3.7dBi, Ant 2: 3.7dBi Foe 5G:3dBi
Antenna Type:	For 2.4G:PCB Antenna For 5G: Integral Antenna
Rated Voltage:	DC: 5V/1A 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.*

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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	☐ FHSS: 2.400GHz ~ 2.483GHz ☒ WLAN: 2.400GHz ~ 2.483GHz ☐ WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz ☒ WLAN: 5.745GHz ~ 5825GHz ☐Others: _____
Device category	☐Portable (<20cm separation) ☒Mobile (>20cm separation) ☐Others _____
Exposure classification	☐Occupational/Controlled exposure (S = 5mW/cm2) ☒General Population/Uncontrolled exposure (S=1mW/cm^2) ☐Others: _____
Antenna diversity	☒Single antenna ☐Multiple antennas: ☐Tx diversity ☐Rx diversity ☐Tx/Rx diversity
Max. output power	For 2.4G:Ant 1:17.52dBm (0.0565W), Ant 2:19.89dBm (0.0975W) For 5G:18.39dBm (0.069W)
Antenna gain (Max)	For 2.4G:Ant 1:3.7dBi (Numeric gain:2.34), Ant 2: 3.7dBi (Numeric gain:2.34) For 5G:3dBi (Numeric gain:2.00)
Evaluation applied	☒MPE Evaluation ☐SAR Evaluation

Note:

1. For 2.4G:Ant 1:The maximum output power is 17.52dBm at IEEE 802.11b mode 2462MHz (with 2.34 numeric antenna gain.) ,
   Ant 2: The maximum output power is 19.89dBm at IEEE 802.11b mode 2462MHz (with 2.34 numeric antenna gain.)
   For 5G:The maximum output power is 18.39dBm at IEEE 802.11a mode 5785MHz (with 2 numeric antenna gain.)
2. 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.

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1.4 Human Exposure Assessment Results

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 (mW) = P (W) / 1000 and
*d (cm) =100 * d (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 / cm^2

EUT parameter (data from the separate report)	
Given $E = \frac{\sqrt{30 \times P \times G}}{d}$ & $S = \frac{E^2}{3770}$	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)	For 2.4G:Ant 1:17.52dBm (0.0565W) Ant 2: 19.89dBm (0.0975W) For 5G: 18.39dBm (0.069W)
Antenna gain (G)	For 2.4G:Ant 1:3.7dBi (Numeric gain:2.34) Ant 2: 3.7dBi (Numeric gain:2.34) For 5G:3dBi (Numeric gain:2.00)
Exposure classification	S=1mW/cm^2

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Minimum distance in meter (d) (from transmitting structure to the human body)	20cm (0.2m)

Yields

$$S = \frac{30xPxG}{3770d^2},$$

For 2.4G:Ant 1:P1=0.0565W, G1=2.34, d1=0.2,S1=0.0263mW/cm^2

Ant 2: P2=0.0975W, G2=2.34, d1=0.2, S2=0.0453mW/cm^2

For 5G:P3=0.069W , G3=2.00, d3=0.2,S3=0.0274mW/cm^2

Or

$$d=\sqrt{\frac{30xPxG}{3770S}},$$

For 2.4G:Ant 1:S1=1, P1=0.0565W, G1=2.34, d1=0.0324m

Ant 2:S2=1, P2=0.0975W, G2=2.34, d2=0.0426m

For 5G:S3=1, P3=0.069W, G3=2.00, d3=0.0331m

Conclusion:

S1=0. 0847mW/cm^2, S2=0.0453 mW/cm^2, and 0.0274mW/cm^2 is significant lower than the General Population Exposure Power Density Limit 1mW/cm^2 or except the distance when human body proximity to the antenna is less than 2WS.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 / cm^2 even if the calculation indicates that the power density would be larger.)

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