Maximum Permissible Exposure Report

For

GL Technologies (Hong Kong) Limited

Unit 210D, 2/F, Enterprise Place Hong Kong Science Park, Shatin, N.T. Hong Kong, China

FCC ID: 2AFIW-AR750

FCC Rule(s):	FCC 47CFR Part 1.1310
Product Description:	**GL.iNet 750M Travel AC Router**
Tested Model:	**GL- AR750**
Report No.:	HCT17IR269E-3
Sample Receipt Date:	Sep 15, 2017
Tested Date:	Sep 15~Oct 27, 2017
Issued Date:	Oct 27, 2017
Tested By:	Jason Su / Engineer
Reviewed By:	Silin Chen / EMC Manager
Approved & Authorized By:	Jandy So / PSQ Manager

Prepared By:

Shenzhen SEM Test Technology Co. Ltd

1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road,

Bao'an District, Shenzhen, 518101,China

Tel.: +86-755-33663308   Fax.: +86-755-33663309   Website: www.semtest.com.cn

Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen SEM Test Technology Co., Ltd.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information	
Applicant:	**GL Technologies (Hong Kong) Limited**
Address of applicant:	Unit 210D, 2/F, Enterprise Place Hong Kong Science Park, Shatin, N.T. Hong Kong, China
Manufacturer:	**GL Technologies (Hong Kong) Limited**
Address of manufacturer:	Unit 210D, 2/F, Enterprise Place Hong Kong Science Park, Shatin, N.T. Hong Kong, China

General Description of EUT	
Product Name:	GL.iNet 750M Travel AC Router
Trade Name:	GL·iNet
Model No.:	GL-AR750
Adding Model(s):	N/A
Hardware Version:	GL-AR750-V1.1
Software Version:	2.263
Rated Voltage:	Input: DC 5V from adapter
Power Adapter Model:	Input: AC100-240V, 50/60Hz; Output: DC 5V/2A
Note: The test data is gathered from a production sample provided by the manufacturer.	

Technical Characteristics of EUT	
Frequency Range:	2412-2462MHz for 802.11b/g/n(HT20) 2422-2452MHz for 802.11n(HT40) U-NII-1: 5150MHz~5250MHz U-NII-3: 5725MHz~5850MHz
Max RF Output Power:	21.24 dBm (Conducted)

Data Rate:	2.4GHz: 1-11Mbps, 6-54Mbps, up to 300Mbps
	5GHz: 802.11a: 6/9/12/18/24/36/48/54 Mbps
	        802.11n: up to 150Mbps
	        802.11ac: at most 433.3 Mbps

Modulation:	2.4GHz: IEEE 802.11b：CCK
	        IEEE 802.11g：OFDM
	        IEEE 802 11n HT20：OFDM
	        IEEE 802 11n HT40：OFDM
	5GHz: 802.11a: OFDM (QPSK, BPSK, 16QAM)
	        802.11n: OFDM (QPSK, BPSK, 16QAM, 64QAM)

	802.11ac: OFDM (QPSK, BPSK, 16QAM, 64QAM, 256QAM)
Type of Antenna:	Internal Antenna
Antenna Gain:	2.4GHz: Chain1: 3dBi Chain2: 3dBi 5GHz: 3dBi

1.2 Test Standards
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 1.1310

1.3 General Description of Test

Items	Description
EUT Frequency band	☐ FHSS: 2.400GHz ~ 2.483GHz ☒ WLAN: 2.400GHz ~ 2.483GHz ☒ WLAN: 5.150GHz ~ 5.250GHz ☒ WLAN: 5.745GHz ~ 5825GHz ☐ Others: _____
Device category	☐ Portable (<20cm separation) ☐ Mobile (>20cm separation) ☒ Others __Fixed location__ (>20cm separation)
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	The 2.4G total peak power 21.24dBm (0.133W) The 5G peak power 21.03dBm (0.127W)
Antenna gain (Max)	2.4G: 3.0dBi (Numeric gain:2.00) 5G: 3.0dBi (Numeric gain:2.00)
Evaluation applied	☒ MPE Evaluation ☐ SAR Evaluation

Note:

1. 2.4GHz:The maximum output is 21.24dBm at IEEE 802.11b mode 2437MHz (with 2.00numeric antenna gain.)

2. 5GHz:The maximum output is 21.03dBm at IEEE 802.11a mode 5785MHz (with 2.00numeric antenna gain.)

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.*

1.4 Human Exposure Assessment Results

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3–3.0	614	1.63	* 100	6
3.0–30	1842/f	4.89/f	* 900/f²	6
30–300	61.4	0.163	1.0	6
300–1,500			f/300	6
1,500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	* 100	30
1.34–30	824/f	2.19/f	* 180/f²	30
30–300	27.5	0.073	0.2	30
300–1,500			f/1500	30
1,500–100,000			1.0	30

f = frequency in MHz * = Plane-wave equivalent power density

Calculation

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

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

$$S = \frac{30 \times (P/1000) \times G}{3770 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2} \qquad \textbf{\textit{Equation 1}}$$

Where d = distance in cm
P = Power in mW
G = Numeric antenna gain
S = Power Density in mW / cm^2

2.4G MPE Evaluation :

EUT parameter (data from the separate report)	
Given $E = \dfrac{\sqrt{30 \times P \times G}}{d}$ & $S = \dfrac{E^2}{3770}$	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)	21.24dBm (0.133W=133.0mW)
Antenna gain (G)	3.0dBi (Numeric gain: 2.00)
Exposure classification	S=1mW/cm^2
Minimum distance in meter (d) (from transmitting structure to the human body)	20cm (0.2m)
Yields $S = \dfrac{30xPxG}{3770d^2}$, P=0.133W=133.0mW, G=2.00, d=0.2m=20cm S=0.053mW/cm^2	
Conclusion: S=0.053mW/cm^2 is significant lower than the FCC 47CFR Part 1.1310 Limit 1mW/cm^2 . (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.)	

5G MPE Evaluation :

EUT parameter (data from the separate report)	
Given $E = \dfrac{\sqrt{30 \times P \times G}}{d}$ & $S = \dfrac{E^2}{3770}$	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)	21.03dBm (0.127W=127.0mW)
Antenna gain (G)	3.0dBi (Numeric gain: 2.00)
Exposure classification	S=1mW/cm^2
Minimum distance in meter (d) (from transmitting structure to the human body)	20cm (0.2m)
Yields $S = \dfrac{30xPxG}{3770d^2}$, P=0.27W=127.0mW, G=2.00, d=0.2m=20cm S=0.050mW/cm^2	

Conclusion:

S=0.050mW/cm^2 is significant lower than the FCC 47CFR Part 1.1310 Limit 1mW/cm^2 .

(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.)