Maximum Permissible Exposure Report

For

GL Technologies (Hong Kong) Limited

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

HongKong

FCC ID: 2AFIW-B1300

FCC Rule(s):	FCC 47CFR Part 1.1310
Product Description:	**GL.iNet 1300M Home AC Router**
Tested Model:	**GL- B1300**
Report No.:	HCT17JR291E-3
Sample Receipt Date:	September 28, 2017
Tested Date:	November 12~ November 30, 2017
Issued Date:	December 1, 2017
Tested By:	Jason Su / Engineer
Reviewed By:	Silin Chen / EMC Manager
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Prepared By:	

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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 1300M Home AC Router
Trade Name:	GL·iNet
Model No.:	GL-B1300
Adding Model(s):	/
Hardware Version:	GL-B1300-V1.3
Software Version:	V2.264
Rated Voltage:	Input: AC 100-240V, 50/60Hz; Output: DC 12V 1.5A
Power Adapter Model:	/
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
Data Rate:	2.4GHz: maximum of 400Mbps 5GHz: maximum of 867Mbps
Modulation:	2.4GHz: IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE 802.11g: OFDM IEEE 802 11n HT20: OFDM IEEE 802 11n HT40: OFDM 5GHz: 802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK) 802.11n HT20: OFDM (64QAM, 16QAM, QPSK, BPSK) 802.11n HT40: OFDM (64QAM, 16QAM, QPSK, BPSK)

	802.11ac: OFDM (64QAM, 16QAM, QPSK, BPSK, 256QAM)
Type of Antenna:	PCB Antenna
Antenna Gain:	2.4GHz: Chain1: 2.1dBi Chain2: 2.1dBi 5GHz: Chain1: 8.4dBi Chain2: 8.4dBi

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: _____
	Note: 2.4G WiFi and 5G WiFi can not transmit simultaneously
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	WLAN: 2.400GHz ~ 2.483GHz The total peak power: P1 = 19.78dBm (0.0951W)
	WLAN: 5.150GHz ~ 5.250GHz The total peak power: P2 = 13.79dBm (0.0239W)
	WLAN: 5.745GHz ~ 5.825GHz The total peak power: P3 = 13.60dBm (0.0229W)
Antenna gain (Max)	WLAN: 2.400GHz ~ 2.483GHz: G1=2.1dBi (Numeric gain:1.62)
	WLAN: 5.150GHz ~ 5.250GHz: G2=8.4dBi (Numeric gain:6.92)
	WLAN: 5.745GHz ~ 5.825GHz: G3=8.4dBi (Numeric gain:6.92)

Evaluation applied	☒MPE Evaluation ☐SAR Evaluation

Note:

1. 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/cm^2)	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/f^2	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/f^2	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 $E = \frac{\sqrt{30 \times P \times G}}{d}$ & $S = \frac{E^2}{3770}$

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
Exposure classification	S=1mW/cm^2
Minimum distance in meter (d) (from transmitting structure to the human body)	20cm (0.2m)

Yields

$$S = \frac{30xPxG}{3770d^2}, \quad \text{d=0.2m=20cm}$$

WLAN: 2.400GHz ~ 2.483GHz
P1=0.0951W=95.1mW, G1=1.62,
S1=0.031mW/cm^2

WLAN: 5.150GHz ~ 5.250GHz
P2=0.0239W=23.9mW, G2=6.92,
S2=0.033mW/cm^2

WLAN: 5.745GHz ~ 5.825GHz
P3=0.0229W=22.9mW, G3=6.92,
S3=0.032mW/cm^2

Conclusion:
S1=0.031mW/cm^2 , S2=0.033mW/cm^2 , S3=0.032mW/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.)