

RF EXPOSURE REPORT

FOR

Applicant	:	FIBRAIN sp. zo. o.
Address	:	Poland, Zaczernie 190F, 36-062
Equipment under Test	:	GPON ONT
Model No.	:	HL-4GQVS
Trade Mark	:	HALNy Networks
FCC ID	:	2AWIZHL4GQVS
Manufacturer	:	Unionman Technology Co., LTD
Address	:	No.5 Huitai Road, Huinan High-Tech Industrial Park, Huizhou City, Guangdong, China.

Issued By: Dongguan Dongdian Testing Service Co., Ltd.

Add.: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City,
Guangdong Province, China, 523808

Tel.: +86-0769-38826678, **E-Mail:** ddt@dgddt.com, <http://www.dgddt.com>

REPORT

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TEST REPORT DECLARE

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Address	:	No.5 Huitai Road, Huinan High-Tech Industrial Park, Huizhou City, Guangdong, China.

Standard Used: KDB447498 D01 General RF Exposure Guidance v06

We Declare:

The equipment described above is assessed by Dongguan Dongdian Testing Service Co., Ltd and in the configuration assessed the equipment complied with the standards specified above. The assessed results are contained in this report and Dongguan Dongdian Testing Service Co., Ltd is assumed of full responsibility for the accuracy and completeness of these assess.

After evaluation, our opinion is that the equipment In Accordance with above standard.

Report No:	DDT-R20052115-1E4		
Date of Receipt:	May 26, 2020	Date of Test:	May 26, 2020 ~ Aug. 08, 2020

Prepared By:

Talent Zhang

Talent Zhang/Engineer

Approved By:



Damon Hu/EMC Manager

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Dongguan Dongdian Testing Service Co., Ltd.

Revision History

Rev.	Revisions	Issue Date	Revised By
---	Initial issue	Aug. 08, 2020	

1. General information

1.1. Description of Equipment

EUT* Name	: GPON ONT
Model Number	: HL-4GQVS
EUT function description	: Please reference user manual of this device
Power supply	: DC 12V/1A from external AC Adapter
Radio Specification	: IEEE802.11b/g/n, IEEE802.11a/n/ac
Operation frequency	: IEEE 802.11b: 2412MHz-2462MHz IEEE 802.11g: 2412MHz-2462MHz IEEE 802.11n HT20: 2412MHz-2462MHz IEEE 802.11n HT40: 2422MHz-2452MHz IEEE 802.11a: 5180MHz-5240MHz, 5745MHz-5825MHz IEEE 802.11n HT20: 5180MHz-5240MHz, 5745MHz-5825MHz IEEE 802.11n HT40: 5190MHz-5230MHz, 5755MHz-5795MHz IEEE 802.11ac HT20: 5180MHz-5240MHz, 5745MHz-5825MHz IEEE 802.11ac HT40: 5190MHz-5230MHz, 5755MHz-5795MHz IEEE 802.11ac HT80: 5210MHz, 5775MHz
Modulation	: IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20, HT40: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac: OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK)
Data rate	: IEEE 802.11b: 1, 2, 5.5, 11 Mbps IEEE 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps IEEE 802.11n HT20: 6.5, 13, 19.5, 26, 39, 52, 58.5, 65 Mbps IEEE 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps IEEE 802.11n HT20: 14.4, 28.9, 43.3, 57.8, 86.7, 115.6, 130.0, 144.4 Mbps IEEE 802.11n HT40: 30, 60, 90, 120, 180, 240, 270, 300 Mbps IEEE 802.11ac HT20: 14.4, 28.8, 43.4, 57.8, 86.6, 115.6, 130, 144.4, 173.4 Mbps IEEE 802.11ac HT40: 30, 60, 90, 120, 180, 240, 270, 300, 360, 400 Mbps IEEE 802.11ac HT80: 65, 130, 195, 260, 390, 520, 585, 650, 780, 866.6 Mbps
Antenna Type	: Antenna 1: PCB antenna, 2.4G band maximum PK gain: 3 dBi, 5G band maximum PK gain: 3 dBi Antenna 2: PCB antenna, 2.4G band maximum PK gain: 3 dBi, 5G band maximum PK gain: 3 dBi Antenna 4: PCB antenna, 5G band maximum PK gain: 3 dBi Antenna 4: PCB antenna, 5G band maximum PK gain: 3 dBi
Exposure category	: General population/uncontrolled environment
Sample Type	: Series production

Antenna information			
	Ant1 gain	Ant2 gain	MIMO
IEEE 802.11b	3	3	/
IEEE 802.11g	3	3	/
IEEE 802.11n HT20	3	3	6
IEEE 802.11n HT40	3	3	6

Antenna information					
	Ant1 gain	Ant1 gain	Ant1 gain	Ant1 gain	MIMO
IEEE 802.11a	3	3	3	3	/
IEEE 802.11n HT20	3	3	3	3	9
IEEE 802.11n HT40	3	3	3	3	9
IEEE 802.11ac VHT20	3	3	3	3	9
IEEE 802.11ac VHT40	3	3	3	3	9
IEEE 802.11ac VHT80	3	3	3	3	9

Note:MIMO gain only apply to PSD.

1.2. Assess laboratory

Dongguan Dongdian Testing Service Co., Ltd.

Add.: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City, Guangdong Province, China, 523808

Tel.: +86-0769-38826678, <http://www.dgddt.com>, Email: ddt@dgddt.com

CNAS Accreditation No. L6451; A2LA Accreditation No. 3870.01

FCC Designation Number: CN1182; Test Firm Registration Number: 540522

Industry Canada site registration number: 10288A-1

2. RF Exposure Evaluation

2.1. Requirement

Systems operating under the provisions of FCC 47 CFR section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as mobile device whereby a distance of 0.2 m normally can be maintained between the user and the device, and below RF Permissible Exposure limit shall comply with.

Limits for General Population/Uncontrolled Exposure

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

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

2.2. Calculation method

$$E(\text{V/m}) = \frac{\sqrt{30 \times P \times G}}{d} \quad \text{Power Density: } S(\text{mW/cm}^2) = \frac{E^2}{377}$$

E = Electric field (V/m)

P = Peak RF output power (mW)

G = EUT Antenna numeric gain (numeric)=

d = Separation distance between radiator and human body (m)

The formula can be changed to

We can change the formula to:

$$S = \frac{30 \times P \times G}{377 \times d^2} \quad \text{or, } d = \sqrt{\frac{30 \times P \times G}{377 \times S}}$$

From the peak EUT RF output power, the minimum mobile separation distance, $d=0.2$ m, as well as the gain of the used antenna, the RF power density can be obtained.

2.3. Estimation result

Mode	ANT	PK Output power (dBm)	Output power (mW)	Antenna Gain (dBi)	Antenna Gain (linear)	MPE Values (mW/cm ²)	MPE Limit (mW/cm ²)
2.4G wifi	ANT1	13.02	20.04	3	2.00	0.007973	1
2.4G wifi	ANT2	11.75	14.96	3	2.00	0.005952	1
5G wifi	ANT1	14.33	27.10	3	2.00	0.010782	1
5G wifi	ANT2	14.06	25.47	3	2.00	0.010134	1
5G wifi	ANT3	16.20	41.69	3	2.00	0.016588	1
5G wifi	ANT4	16.23	41.98	3	2.00	0.016703	1

Mode	ANT1 MPE Values (mW/cm ²)	ANT2 MPE Values (mW/cm ²)	ANT3 MPE Values (mW/cm ²)	ANT4 MPE Values (mW/cm ²)	ΣMPE ratios	MPE Limit (mW/cm ²)
2.4G wifi	0.007973	0.005952	/	/	0.013925	1
5G wifi	0.010782	0.010134	0.016588	0.016703	0.054207	1

Maximum Simultaneous transmission MPE Ratio for 2.4G WLAN and 5G WLAN

Maximum MPE ratio 2.4G wifi	Maximum MPE ratio 5G wifi	ΣMPE ratios	Limit	Results
0.013925	0.054207	0.068132	1.000	Pass

Note: The estimation distance is 20 cm

Conclusion: No SAR evaluation required since transmitter power is below FCC threshold

END OF REPORT