

TEST REPORT

Verified Code: 434796

Report No.:	E202012115394-4	Application No.:	E202012115394
Client:	SHENZHEN EASYLINKIN TECHNOLOGY CO.,LTD		
Address:	705, Floor 7, Zhongdian Difu Building, Zhenhua Road, Fuqiang Community, Huaqiang North Street, Futian District, Shenzhen, Guangdong Province, China		
Sample Description:	LoRaWAN Gateway		
Model:	G200-HA923		
Test Specification:	CFR 47, FCC Part 2.1091 Radio frequency radiation exposure evaluation: mobile devices. KDB 447498 D01 General RF Exposure Guidance v06		
Receipt Date:	2021-01-11		
Test Date:	2021-01-12 to 2021-03-11		
Issue Date:	2021-04-15		
Test Result:	Pass		
Prepared By: Test Engineer Xie Jiang	Reviewed By: Technical Manager Wu Haoting	Approved By: Manager Yong Dai 	
Other Aspects:			
Note: Note			
Abbreviations: ok / P = passed; fail / F = failed; n.a. / N = not applicable;			
The test result in this test report refers exclusively to the presented test sample. This report shall not be reproduced except in full, without the written approval of GRGT.			



DIRECTIONS OF TEST

- 1. This station carries out test task according to the national regulation of verifications which can be traced to National Primary Standards and BIPM.**
- 2. The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test result without the written permission of the test laboratory.**
- 3. If there is any objection concerning the test, the client should inform the laboratory within 15 days from the date of receiving the test report.**

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1. GENERAL DESCRIPTION OF EUT

1.1. APPLICANT

Name: SHENZHEN EASYLINKIN TECHNOLOGY CO.,LTD
Address: 705, Floor 7, Zhongdian Difu Building, Zhenhua Road, Fuqiang Community, Huaqiang North Street, Futian District, Shenzhen, Guangdong Province, China

1.2. MANUFACTURER

Name: SHENZHEN EASYLINKIN TECHNOLOGY CO.,LTD
Address: 705, Floor 7, Zhongdian Difu Building, Zhenhua Road, Fuqiang Community, Huaqiang North Street, Futian District, Shenzhen, Guangdong Province, China

1.3. FACTORY

Name: SHENZHEN EASYLINKIN TECHNOLOGY CO.,LTD
Address: 705, Floor 7, Zhongdian Difu Building, Zhenhua Road, Fuqiang Community, Huaqiang North Street, Futian District, Shenzhen, Guangdong Province, China

1.4. BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

Equipment: LoRaWAN Gateway
Model No.: G200-HA923
Adding Model: /
Trade Name: Easylinkin
FCC ID: 2AYYO-G200AS
Power supply: DC12V power supplied by adapter
Adapter Model: PS120W1000U
Specification: Input: 100-240V~50/60Hz 0.5A Max
Output: 12.0V --- 1.0A 12.0W
Frequency Range: WIFI:2412MHz~2462MHz: 802.11b; 802.11g; 802.11n(HT20)
2422MHz~2452MHz: 802.11n(HT40);
Lora: 919.1MHz ~924.8MHz
Transmit Power: WIFI:
18.16dBm for 802.11b mode
21.94dBm for 802.11g mode
21.87dBm for 802.11n HT20 mode
20.15dBm for 802.11n HT40 mode
Lora:
Peak: 109.38dBuV/m (Max.)
Average: 77.86dBuV/m (Max.)
Modulation type: WIFI:
DSSS for 802.11b mode;
OFDM for 802.11g mode;

Channel space: OFDM for 802.11n mode.
Lora: GFSK
WIFI: 5MHz
Lora:/

Antenna Specification: External antenna with 2.15dBi gain (Max.)

Temperature Range: 0 °C ~ +60 °C

Hardware Version: PCB-GW200M-01D

Software Version: g200_v2.0.0.2001201313

Sample No: E202012115394-0003, E202012115394-0001

Note: The EUT have two different color appearances.

2. LABORATORY AND ACCREDITATIONS

2.1. LABORATORY

The tests & measurements refer to this report were performed by Shenzhen EMC Laboratory of Guangzhou GRG Metrology & Test Co., Ltd.

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2.2. ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to GB/T 27025(ISO/IEC 17025:2017)

USA A2LA(Certificate #:2861.01)

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Canada	Industry Canada
USA	FCC

3. EVALUATION METHOD

Exposure category: General population/uncontrolled environment

EUT Type: Production Unit

Device Type: Mobile Device

Refer Standard: KDB 447498 D01 General RF Exposure Guidance v06

FCC Part 2 §2.1091

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 0.2m normally can be maintained between the user and the device, and below RF Permissible Exposure limit shall comply with.

In accordance with KDB447498D01 for Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modeled or measured field strengths or power density, is ≤ 1.0 . The MPE ratio of each antenna is determined at the minimum test separation distance required by the operating configurations and exposure conditions of the host device, according to the ratio of field strengths or power density to MPE limit, at the test frequency. Either the maximum peak or spatially averaged results from measurements or numerical simulations may be used to determine the MPE ratios. Spatial averaging does not apply when MPE is estimated using simple calculations based on far-field plane-wave equivalent conditions. The antenna installation and operating requirements for the host device must meet the minimum test separation distances required by all antennas, in both standalone and simultaneous transmission operations, to satisfy compliance.

4. 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

5. CALCULATION METHOD

Predication of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = PG / 4\pi R^2$$

Where: S=power density

P=power input to antenna

G=power gain of the antenna in the direction of interest relative to anisotropic radiator

R=distance to the center of radiation of the antenna

From the EUT RF output power, the minimum mobile separation distance, $d=0.2\text{m}$, as well as the maximum gain of the used as following information, the RF power density can be obtained.

Frequency Band	Antenna type	Internal Identification	Maximum antenna gain
2.4GHz	External antenna	Antenna 1	2.15dBi
924.8MHz	External antenna	Antenna 1	2.15dBi

6. ESTIMATION RESULT

4.1 CONDUCTED POWER RESULTS

2.4GHz WIFI

Mode	Channel	Frequency(MHz)	Peak Conducted Output Power (dBm)
802.11b	1	2412	18.16
	6	2437	17.73
	11	2462	15.78
802.11g	1	2412	21.94
	6	2437	21.12
	11	2462	19.56
802.11n HT20	1	2412	21.87
	6	2437	21.02
	11	2462	19.20
802.11n HT40	3	2422	19.95
	6	2437	20.15
	9	2452	19.80

Lora

Frequency(MHz)	dBuV/m	Peak Conducted Output Power (dBm)
924.8	109.38	2.38

4.2 MANUFACTURING TOLERANCE

2.4GHz

Frequency (MHz)	802.11b	802.11g	802.11n HT20	802.11n HT40
	2412	2412	2412	2437
Target (dBm)	18.0	21.0	21.0	20.0
Tolerance $\pm$ (dB)	1.0	1.0	1.0	1.0

Frequency (MHz)	926
Target (dBm)	2.0
Tolerance $\pm$ (dB)	1.0

4.3 MEASUREMENT RESULTS

4.3.1 STANDALONE MPE

Mode	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	Duty Cycle	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	(dBm)	(mW)					
802.11b	19.0	79.4328	2.15	1.6406	100%	0.0259	1.0000
802.11g	22.0	158.4893	2.15	1.6406	100%	0.0518	1.0000
802.11n HT20	22.0	158.4893	2.15	1.6406	100%	0.0518	1.0000
802.11n HT40	20.0	100.0000	2.15	1.6406	100%	0.0327	1.0000

Frequency(MHz)	Output power		Antenna Gain (dBi)	Antenna Gain (linear)	Duty Cycle	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	(dBm)	(mW)					
926	3.0	1.9953	2.15	1.6406	100%	0.0007	1.0000

Remark: 1. Maximum average power including tune-up tolerance;

2. MPE use distance is 20cm from manufacturer declaration of user manual.

According to KDB447498 for Transmitters used in mobile exposure conditions for simultaneous transmission operations;

$\sum$ of MPE ratios ≤ 1.0

7. CONCLUSION

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

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