



Shenzhen Global Test Service Co.,Ltd.

1F, Building No. 13A, Zhonghaixin Science and Technology City, No.12,6 Road, Ganli Industrial Park, Buji Street, Longgang District, Shenzhen, Guangdong

RF Exposure evaluation

Report Reference No.....: GTSR16120185-02

FCC ID.....: 2AKWA-M82RS02

Compiled by

(position+printed name+signature)...: File administrators Jimmy Wang

Supervised by

(position+printed name+signature)...: Test Engineer Peter Xiao

Approved by

(position+printed name+signature)...: Manager Sam Wang

Date of issue.....: Feb. 18, 2017

Representative Laboratory Name : Shenzhen Global Test Service Co.,Ltd.

Address: 1F, Building No. 13A, Zhonghaixin Science and Technology City, No.12,6 Road, Ganli Industrial Park, Buji Street, Longgang District, Shenzhen, Guangdong

Applicant's name: Shenzhen Mcking Information Technology Co.,Ltd

Address: Room1203,12F,Building A2,Lilang Software Park NO.31Bulan Road Longgang District Shenzhen ,China.

Test specification:

Standard: 47CFR §1.1310

47CFR §2.1091

TRF Originator: Shenzhen Global Test Service Co.,Ltd.

Master TRF: Dated 2014-12

Shenzhen Global Test Service Co.,Ltd. All rights reserved.

This publication may be reproduced in whole or in part for non-commercial purposes as long as the Shenzhen Global Test Service Co.,Ltd. is acknowledged as copyright owner and source of the material. Shenzhen Global Test Service Co.,Ltd. takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

Test item description: Gateway

Trade Mark: /

Manufacturer: Shenzhen Mcking Information Technology Co.,Ltd

Model/Type reference.....: M82RS02

Listed Models: M82RS03, M82RS04, M82RS05, M82RS06, M82RS07, M82RS08, M82RS09

Exposure category.....: General population/uncontrolled environment

EUT Type: Production Unit

Hardware Version: 102RS162V21

Software Version: V1.0

Rating: DC 12V

Result.....: **PASS**

TEST REPORT

Test Report No. :	GTSR16120185-02	Feb. 18, 2017
		Date of issue

Equipment under Test : Gateway

Model /Type : M82RS02

Listed Models : M82RS03, M82RS04, M82RS05, M82RS06, M82RS07, M82RS08, M82RS09

Applicant : **Shenzhen Mcking Information Technology Co.,Ltd**

Address : Room1203,12F,Building A2,Lilang Software Park NO.31Bulan Road Longgang District Shenzhen ,China.

Manufacturer : **Shenzhen Mcking Information Technology Co.,Ltd**

Address : Room1203,12F,Building A2,Lilang Software Park NO.31Bulan Road Longgang District Shenzhen ,China.

Test Result:	PASS
---------------------	-------------

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.

Contents

<u>1.</u>	<u>SUMMARY</u>	<u>4</u>
1.1.	EUT configuration	4
1.2.	Product Description	4
<u>2.</u>	<u>TEST ENVIRONMENT</u>	<u>5</u>
2.1.	Address of the test laboratory	5
2.2.	Test Facility	5
2.3.	Environmental conditions	5
2.4.	Statement of the measurement uncertainty	5
<u>3.</u>	<u>METHOD OF MEASUREMENT</u>	<u>6</u>
3.1.	Applicable Standard	6
3.2.	Limit	6
3.3.	Conducted Power Results	6
3.4.	MPE Calculation Method	7
<u>4.</u>	<u>EVALUATION RESULT</u>	<u>7</u>
4.1.	Standalone MPE	7
<u>5.</u>	<u>CONCLUSION</u>	<u>7</u>

1. SUMMARY

1.1. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

- - supplied by the manufacturer
- - supplied by the lab

<input type="radio"/>	Adapter	M/N:	AOP020-122C
		Manufacturer:	Yanli

1.2. Product Description

Name of EUT	Gateway
Trade Mark	/
Model Number	M82RS02
List Model	M82RS03,M82RS04,M82RS05,M82RS06, M82RS07, M82RS08, M82RS09
FCC ID	2AKWA-M82RS02
Antenna Type	Internal Antenna
Operation frequency	2406MHz-2481MHz
Modulation	GFSK
Channel separation	5MHz
Antenna gain	2.04dBi
Remark: The products are identical in interior structure, electrical circuits and components, just model names and color are different.	

2. TEST ENVIRONMENT

2.1. Address of the test laboratory

Shenzhen Global Test Service Co.,Ltd.

1F, Building No. 13A, Zhonghaixin Science and Technology City, No.12,6 Road, Ganli Industrial Park, Buji Street, Longgang District, Shenzhen, Guangdong

2.2. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.: 964637

Shenzhen Global Test Service Co.,Ltd EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 964637, Jul 24, 2015.

CNAS-Lab Code: L8169

Shenzhen Global Test Service Co.,Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories. Date of Registration: Dec. 11, 2015. Valid time is until Dec. 10, 2018.

2.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15-35 °C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

2.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 2 " and is documented in the Shenzhen Global Test Service Co.,Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen GTS laboratory is reported:

Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	0.57 dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

3. Method of measurement

3.1. Applicable Standard

According to §1.1307(b)(1), systems operating under the provisions of this 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.

According to §1.1310 and §2.1091 RF exposure is calculated.

3.2. Limit

Limits for Maximum Permissible Exposure (MPE)/Controlled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
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				
300 – 1500	61.4	0.163	1.0	6
1500 –	/	/	f/300	6
100,000	/	/	5	6

Limits for Maximum Permissible Exposure (MPE)/Uncontrolled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	30
3.0 – 30	824/f	2.19/f	(180/f ²)*	30
30 – 300				
300 – 1500	27.5	0.073	0.2	30
1500 –	/	/	f/1500	30
100,000	/	/	1.0	30

F=frequency in MHz

*=Plane-wave equivalent power density

3.3. Conducted Power Results

Type	Channel	Frequency (MHz)	Peak Output power (dBm)	Average Output power (dBm)
ANT1	0	2406	-2.39	-2.92
	7	2441	-1.67	-2.14
	15	2481	-1.37	-1.91
ANT2	0	2406	-0.18	-0.84
	7	2441	-1.17	-1.73
	15	2481	-0.55	-1.26
ANT3	0	2406	-3.18	-3.84
	7	2441	-4.88	-5.72
	15	2481	-3.07	-3.75

Type	Channel	Peak Output power ANT1 (dBm)	Peak Output power ANT2 (dBm)	Peak Output power ANT3 (dBm)	Output power Total (dBm)	Limit (dBm)	Result
GFSK	0	-2.39	-0.18	-3.18	3.05	30	Pass
	7	-1.67	-1.17	-4.88	2.48		
	15	-1.37	-0.55	-3.07	3.23		

3.4. MPE 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 an isotropic radiator

R=distance to the center of radiation of the antenna

As declared by the Applicant, the EUT transmits with the maximum source-based Duty Cycle of 100%-see the User manual, and the EUT is a wireless device used in a mobile application, at least 20 cm from any body part of the user or nearby persons; from the maximum EUT RF output power, the minimum mobile separation distance, r =20cm, as well as the gain of the used antenna, and the power drift from Turn-up Procedure provide by manufacturer as following states, the RF power density can be obtained.

4. Evaluation Result

4.1. Standalone MPE

	Minimum Separation Distance (cm)	Output Power (Turn-up Procedure)		Antenna Gain (Numeric)	Power Density At 20 cm (mW/cm ²)	Power Density Limit (mW/cm ²)	Test Results
		dBm	mW				
2.4G	20.00	3.23	2.1038	1.5996	0.0007	1.0000	PASS

5. Conclusion

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

.....End of Report.....