



RF TEST REPORT

Report No.: SET2013-03885

Product Name: WIFI/BT Module

FCC ID: GCOMLK002A

Model No. : MLK020A, MLK020B, MLK020C, MLK021A, MLK021B, MLK022A, MLK022B, MLK023A, MLK024A, MLK025A, MLK026A, MLK026C, MLK027A, MLK027B, MLK028A, MLK028B, MLK029A, MLK029B, MLK030A, MLK030B, MLK031A, MLK032A, MLK033A, MLK034A, MLK035A, MLK036A, MLK037A, MLK038A, MLK039A, MLK040A, MLK041A, MLK042A, MLK043A, MLK044A, MLK045A, MLK046A, MLK047A, MLK048A, MLK049A, MLK050A, MLK051A, MLK052A, MLK053A, MLK054A, MLK055A, MLK056A, MLK057A, MLK058A, MLK059A, MLK060A

Applicant: SHENZHEN HUAPU DIGITAL CO., LTD

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Test Report

Product Name: WIFI/BT Module

Brand Name.....: N/A

Trade Name: N/A

Applicant: SHENZHEN HUAPU DIGITAL CO., LTD

Applicant Address: 5F Building 6, Huaide Cuigai Industry Zone, Fuyong,
Shenzhen, China

Manufacturer: SHENZHEN HUAPU DIGITAL CO., LTD

Manufacturer Address: 5F Building 6, Huaide Cuigai Industry Zone, Fuyong,
Shenzhen, China

Test Standards: 47 CFR Part 15 Subpart C: Radio Frequency Devices
ANSI C63.10:2009: American National Standard for
Testing Unlicensed Wireless Devices

Test date: July 18, 2013

Test Result.....: PASS

Tested by:

Mo Huina July 19, 2013
Mo Huina, Test Engineer

Reviewed by.....:

Shuangwen Zhang July 19, 2013
Shuangwen Zhang, Senior Engineer

Approved by.....:

Wu Li'an July 19, 2013
Wu Li'an, Manager

TABLE OF CONTENTS

RF TEST REPORT	1
1. GENERAL INFORMATION	4
1.1. EUT Description	4
1.2. Test Standards and Results.....	5
1.3. Facilities and Accreditations	6
2. 47 CFR PART 15C REQUIREMENTS.....	7
2.1. Radiated Emission for Co-located	7

Change History		
Issue	Date	Reason for change
1.0	July 19, 2013	First edition

1. General Information

1.1. EUT Description

Product Feature & Specification					
DUT Type	WIFI/BT Module				
Model Name	MLK020A, MLK020B, MLK020C, MLK021A, MLK021B, MLK022A, MLK022B, MLK023A, MLK024A, MLK025A, MLK026A, MLK026C, MLK027A, MLK027B, MLK028A, MLK028B, MLK029A, MLK029B, MLK030A, MLK030B, MLK031A, MLK032A, MLK033A, MLK034A, MLK035A, MLK036A, MLK037A, MLK038A, MLK039A, MLK040A, MLK041A, MLK042A, MLK043A, MLK044A, MLK045A, MLK046A, MLK047A, MLK048A, MLK049A, MLK050A, MLK051A, MLK052A, MLK053A, MLK054A, MLK055A, MLK056A, MLK057A, MLK058A, MLK059A, MLK060A				
FCC ID	GCOMLK002A				
Frequency	2400- 2483.5MHz				
Antenna Type	PIFA				
Antenna Gain	2.0dBi				
HW Version	V2.0				
SW Version	N/A				

Note 1: The EUT is a WIFI/BT Module, it supports ISM 2.4GHz Bluetooth and 2.4GHz WIFI band.

Note 2: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

1.2. Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart C (Bluetooth, 2.4GHz ISM band radiators) for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 15 Subpart C 2012	Radio Frequency Devices

Test detailed items/section required by FCC rules and results are as below:

No.	Section in CFR 47	Description	Result
1	15.209 15.247(c)	Radiated Emission	PASS

Note: The test of Radiated Emission was performed according to the method of measurements prescribed in ANSI C63.4 2009.

1.3. Facilities and Accreditations

1.3.1. Facilities

CNAS-Lab Code: L1659

CCIC Southern Electronic Product Testing (Shenzhen) Co., Ltd. CCIC is a third party testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L1659. A 12.8*6.8*6.4 (m) fully anechoic chamber was used for the radiated spurious emissions test.

FCC-Registration No.: 406086

CCIC Southern Electronic Product Testing (Shenzhen) 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 406086, Renewal date Nov. 19, 2011, valid time is until Nov. 18, 2014.

1.3.2. Test Environment Conditions

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

Temperature (°C):	15 - 35
Relative Humidity (%):	30 -60
Atmospheric Pressure (kPa):	86KPa-106KPa

2. 47 CFR Part 15C Requirements

2.1. Radiated Emission for Co-located

2.1.1. Requirement

According to FCC section 15.247(c), radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

Note:

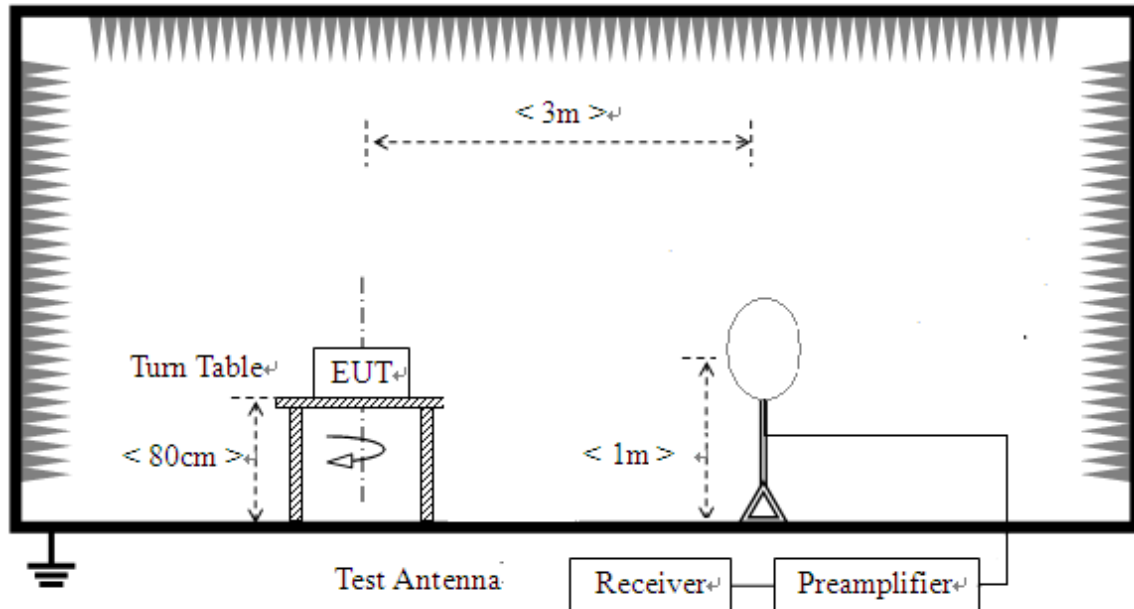
1. For Above 1000MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.
2. For above 1000MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK)

In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), also should comply with the radiated emission limits specified in Section 15.209(a)(above table)

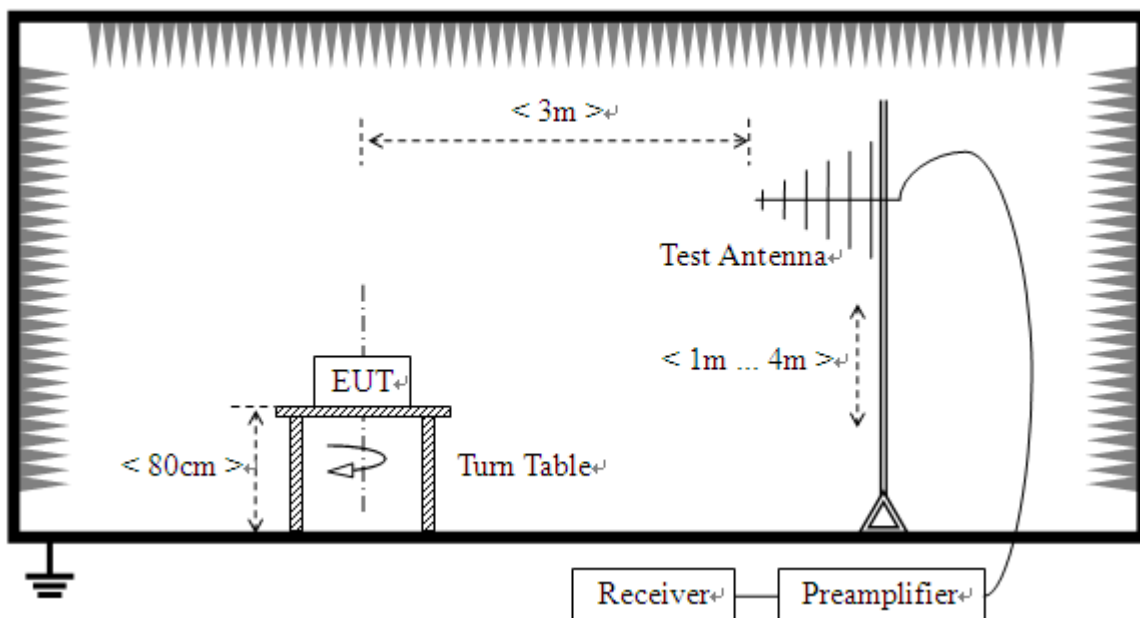
2.1.2. Test Description

A. Test Setup:

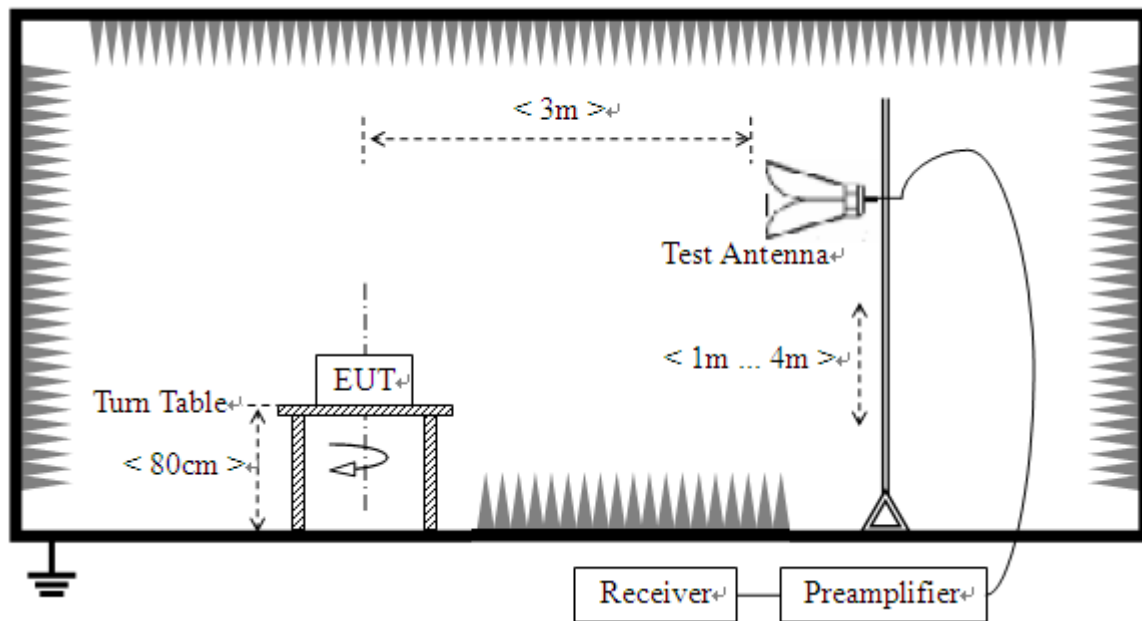
- 1) For radiated emissions from 9kHz to 30MHz



- 2) For radiated emissions from 30MHz to 1GHz



3) For radiated emissions above 1GHz



The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.4 (2009). The EUT was set-up on insulator 80cm above the Ground Plane. The set-up and test methods were according to ANSI C63.4.

The WIFI/BT Module is powered by the PC. The Module is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading. During the measurement, the Module is activated and controlled by the Bluetooth Service Supplier (SS) via a Common Antenna, and is set to operate under hopping-on test mode transmitting 339 bytes DH5 packages at maximum power.

For the Test Antenna:

- In the frequency range of 9kHz to 30MHz, magnetic field is measured with Loop Test Antenna. The Test Antenna is positioned with its plane vertical at 1m distance from the EUT. The center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.
- In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength. The emission levels at both horizontal and vertical polarizations should be tested.

B. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date
Receiver	R&S	ESIB26	A0304218	2013.06.07
Full-Anechoic Chamber	Albatross	12.8m*6.8m*6.4m	A0412372	2013.06.07
Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	9163-274	2013.06.09
Test Antenna - Horn	Schwarzbeck	BBHA 9120D	9120C-963	2013.06.09
Test Antenna - Horn	R&S	HF960	100150	2013.06.10
Test Antenna - Horn	ETS	UG-596A/U	A0902607	2013.06.05
Test Antenna -Loop	Schwarzbeck	HFH2-Z2	100047	2013.06.02
Ampilier 1G~18GHz	R&S	MITEQ AFS42-00101800	25-S-42	2013.06.05
Ampilier 18G~40GHz	R&S	JS42-18002600-28 -5A	12111.0980.00	2013.06.05
amplifier 20M~3GHz	R&S	PAP-0203H	22018	2013.06.10

Note: The Cal. Interval was one year.

2.1.1. Test Procedure

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz

VBW \geq RBW

Sweep = auto

Detector function = peak

Trace = max hold

2.1.2. Test Result

According to ANSI C63.4 selection 4.2.2, because of peak detection will yield amplitudes equal to or greater than amplitudes measured with the quasi-peak (or average) detector, the measurement data from a spectrum analyzer peak detector will represent the worst-case results, if the peak measured value complies with the quasi-peak limit, it is unnecessary to perform an quasi-peak measurement.

The measurement results are obtained as below:

$$E [\text{dB}\mu\text{V/m}] = U_R + A_T + A_{\text{Factor}} [\text{dB}]; A_T = L_{\text{Cable loss}} [\text{dB}] - G_{\text{preamp}} [\text{dB}]$$

A_T : Total correction Factor except Antenna

U_R : Receiver Reading

G_{preamp} : Preamplifier Gain

A_{Factor} : Antenna Factor at 3m

During the test, the total correction Factor A_T and A_{Factor} were built in test software.

Note: All radiated emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

2.1.2.1. Test Mode:

The EUT configuration of the emission tests is Bluetooth + WIFI/PIFA Antenna.

Note: this measurement is performed under the BT fixed on CH78 and WiFi fixed on CH11, because they have the maximum output power in the EMI report

For 9KHz to 30MHz

The test has been performed, and the Radiated Emission level is too low to the limit.

For 30MHz to 25 GHz

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M (802.11b 2462MHz+Bluetooth 2480MHz)											
No.	Frequency (MHz)	Emssion Level		Limit (dBuV/m)	Margin (dB)	Antenna Height(m)	Table Angle	Raw Value	Antenna Factor	Cable Factor	Pre-amplifier
1	399.34	39.24	PK	46.00	6.76	1.00	81	50.71	14.74	1.32	-27.53
2	1520.44	52.06	PK	74.00	21.94	1.00	147	48.6	27.38	4.52	-28.44
2	1520.44	48.95	AV	54.00	5.05	1.00	147	45.49	27.38	4.52	-28.44
3	4885.00	52.33	PK	74.00	21.67	1.00	254	49.13	32.7	7.00	-36.5
3	4885.00	46.97	AV	54.00	7.03	1.00	254	43.77	32.7	7.00	-36.5

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M (802.11b 2462MHz+Bluetooth 2480MHz)											
No.	Frequency (MHz)	Emssion Level		Limit (dBuV/m)	Margin (dB)	Antenna Height(m)	Table Angle	Raw Value	Antenna Factor	Cable Factor	Pre-amplifier
1	39.72	32.89	PK	40.00	7.11	1.00	121	47.4	12.7	0.57	-27.78
2	1520.44	53.21	PK	74.00	20.79	1.00	149	49.75	27.38	4.52	-28.44
2	1520.44	47.88	AV	54.00	6.12	1.00	149	44.42	27.38	4.52	-28.44
2	4884.70	53.02	PK	74.00	20.98	1.00	132	49.82	32.7	7.00	-36.5
2	4884.70	48.97	AV	54.00	5.03	1.00	132	45.77	32.7	7.00	-36.5

- REMARKS:**
1. Emission level (dBuV/m) =Raw Value (dBuV) +Antenna Factor (dB/m) + Cable Factor (dB) +Pre-amplifier Factor
 2. The other emission levels were very low against the limit.
 3. The other emission levels were very low against the limit.
 4. Margin value = Limit value- Emission level.
 5. The limit value is defined as per 15.247
 6. “ * “ : Fundamental frequency

2.1.3. Result: PASS

**** END OF REPORT ****