



RF Exposure Evaluation Report

Report No.: SET2013-03549

Product: WIFI/BT Module

FCC ID: GCOMLK002A

Brand Name: N/A

Applicant: SHENZHEN HUAPU DIGITAL Co., LTD

Address: 5F Building 6, Huaide Cuigai Industry Zone, Fuyong,
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Issued by: CCIC-SET

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Test Report

Product.....: WIFI/BT Module

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

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Manufacturer.....: SHENZHEN HUAPU DIGITAL Co., LTD

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

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



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1 .SUMMARY

1.1 Description of EUT

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				
HW Version	V2.0				
SW Version	N/A				

Remark 1: The above DUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

Remark 2: The external antenna must be matched properly to achieve best performance regarding radiated power, DC-power consumption, modulation accuracy and harmonic suppression. There are 2 PCS Antennas(one for BT, and another for WIFI) matching networks included on the MLK029A Module PCB and the peak gain is 2dBi.



2 Maximum Permissible Exposure

2.1. Applicable Standard

System operation under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess limit for maximum permissible exposure. In accordance with 47CFR FCC Part 2 Subpart 2.1091 this device has been defined as a mobile device whereby a distance whereby a distance of 0.2m normally can be maintained between the user and the device.

Table: Limits For Maximum Permissible Exposure(MPE)

(A) Limits for Occupational/controlled Exposure				
Frequency Range(MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density(S) (mW/cm ²)	Averaging Time (minute) E ² , H ² or s
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
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6
(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 (minute) E ² , H ² or s
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
f=frequency in MHz *Plane-wave equivalent power density				



2.2 MPE Calculation Method

A rough estimation of the expected exposure in power flux density on a given point can be made with the following equation:

$$S = \frac{PG}{4\pi R^2}$$

Where:

S=power density

P=power input to the antenna

G=numeric gain of the antenna in the direction of interest relative to an isotropic radiator

R=distance to the centre of radiation of the antenna

The antenna of the product, under normal use condition is at least 20 cm away from the body of the user. Warning statement to the user for keeping at least 20cm separation distance and the prohibition of operating to a person has been printed on the user's manual. Therefore, the S of the device is calculated with R=20cm, and if it is below the limit S, then we can conclude the device complies with the rules.

TEST RESULTS:

For 802.11b

Test Frequency (MHz)	Minimum Separation Distance(cm)	Output Power (dBm)	Output Power (mW)	Antenna Gain (Nemeric)	Power Density at 20cm (Mw/cm ²)	Power Density limit (Mw/cm ²)	Test Results
2412	20.00	15.16	32.809	1.585	0.010351	1.000	pass
2437	20.00	15.12	32.508	1.585	0.010256	1.000	pass
2462	20.00	15.27	33.651	1.585	0.010616	1.000	pass



For 802.11g

Test Frequency (MHz)	Minimum Separation Distance(cm)	Output Power (dBm)	Output Power (mW)	Antenna Gain (Nemeric)	Power Density at 20cm (Mw/cm ²)	Power Density limit (Mw/cm ²)	Test Results
2412	20.00	15.11	32.434	1.585	0.010232	1.000	pass
2437	20.00	15.16	32.809	1.585	0.010351	1.000	pass
2462	20.00	15.10	32.359	1.585	0.010209	1.000	pass

For 802.11n(20MHz)

Test Frequency (MHz)	Minimum Separation Distance(cm)	Output Power (dBm)	Output Power (mW)	Antenna Gain (Nemeric)	Power Density at 20cm (Mw/cm ²)	Power Density limit (Mw/cm ²)	Test Results
2412	20.00	15.03	31.842	1.585	0.010046	1.000	pass
2437	20.00	15.02	31.769	1.585	0.010023	1.000	pass
2462	20.00	15.11	32.434	1.585	0.010232	1.000	pass

For 802.11n(40MHz)

Test Frequency (MHz)	Minimum Separation Distance(cm)	Output Power (dBm)	Output Power (mW)	Antenna Gain (Nemeric)	Power Density at 20cm (Mw/cm ²)	Power Density limit (Mw/cm ²)	Test Results
2422	20.00	12.84	19.231	1.585	0.006067	1.000	pass
2437	20.00	12.79	19.011	1.585	0.005998	1.000	pass
2452	20.00	12.86	19.319	1.585	0.006095	1.000	pass

For GFSK

Test Frequency (MHz)	Minimum Separation Distance(cm)	Output Power (dBm)	Output Power (mW)	Antenna Gain (Nemeric)	Power Density at 20cm (Mw/cm ²)	Power Density limit (Mw/cm ²)	Test Results
2402	20.00	6.68	4.656	1.585	0.001469	1.000	pass



2441	20.00	7.68	5.861	1.585	0.001849	1.000	pass
2480	20.00	8.27	6.714	1.585	0.002118	1.000	pass

For $\pi/4$ -DQPSK

Test Frequency (MHz)	Minimum Separation Distance(cm)	Output Power (dBm)	Output Power (mW)	Antenna Gain (Nemeric)	Power Density at 20cm (Mw/cm ²)	Power Density limit (Mw/cm ²)	Test Results
2402	20.00	6.61	4.581	1.585	0.001445	1.000	pass
2441	20.00	7.36	5.445	1.585	0.001718	1.000	pass
2480	20.00	7.26	5.321	1.585	0.001679	1.000	pass

For 8-DPSK

Test Frequency (MHz)	Minimum Separation Distance(cm)	Output Power (dBm)	Output Power (mW)	Antenna Gain (Nemeric)	Power Density at 20cm (Mw/cm ²)	Power Density limit (Mw/cm ²)	Test Results
2402	20.00	5.89	3.882	1.585	0.001225	1.000	pass
2441	20.00	6.44	4.406	1.585	0.00139	1.000	pass
2480	20.00	8.21	6.622	1.585	0.002089	1.000	pass

Simultaneously MPE evaluation:

The highest radio MPE for WIFI antenna is 0.0106, and MPE radio for Bluetooth antenna is 0.0021, so the sum of MPE radio is 0.0127<1.

3. Conclusion

The measurement results comply with the FCC limit for the controlled RF Exposure.

**** END OF REPORT ****