

FCC Test Report

Client Information:

Applicant: KEY MOUSE ELECTRONIC ENTERPRISE CO., LTD.
Applicant add.: No.3, Wugong 5th Rd., Sinjhuang City, Taipei County 242, Taiwan

EUT Information:

EUT Name: Receiver
Model No.: RG-G5, RG-Gx (x=0~9, A~Z)
Brand Name: N/A

Prepared By:

Asia Institute Technology (Dongguan) Limited
Add. : No.6 Binhe Road, Tianxin Village, Huangjiang,
Dongguan, Guangdong, China.
Date of Receipt: Aug. 20, 2009 Date of Test: Aug.20. ~ Aug.26, 2009
Date of Issue: Aug. 26, 2009 Test Result: **Pass**

Test procedure used: ANSI C63.4-2003

This device described above has been tested by Asia Institute Technology (Dongguan) Limited, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

*This test report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. government.

NVLAP Lab. Code: 200800-0

Reviewed by: Boney Yang
Test director

Approved by: Kleaven Lin
Technical director

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2 Test Summary

2.1 Compliance with FCC Part 15 subpart C

Test	Test Requirement	Standard Paragraph	Result
Antenna requirement	FCC Part 15 C:2008	Section 15.203	PASS
Conduction Emissions	FCC Part 15 C:2008	Section 15.249	PASS
Radiated Emissions	FCC Part 15 C:2008	Section 15.249(a) Section 15.249(d)	PASS
Band edges	FCC Part 15 C:2008	Section 15.249(d)	PASS
Occupied Bandwidth	FCC Part 15 C:2008	Section 15.215	PASS

2.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties, The following measurements uncertainty Level have estimated based on ANSI C63.4:2003, the maximum value of the uncertainty as below

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 1.38\text{dB}$
2	Radiated Emission Test	$\pm 3.57\text{dB}$

3 Test Facility

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

.NVLAP- Lab Code: 200800-0

Asia Institute Technology (Dongguan) Limited has been accredited by NVLAP on April 29, 2008.

.FCC- Registration No: 248337

The 3m Semi-Anechoic Chamber, 3m/10m Open Area Test Site and Shielding Room of Asia Institute Technology (Dong guan) Limited have been registered by Federal Communications Commission (FCC) on Dec.07, 2006.

.Industry Canada(IC)-Registration No: IC6819A-1 & IC6819A-2

The 3m Semi-Anechoic Chamber and 3m/10m Open Area Test Site of Asia Institute Technology (Dongguan) Limited have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing on Nov.07, 2006.

.VCCI- Registration No: R-2482 & C-2730

The 3m/10m Open Area Test Site and Shielding Room of Asia Institute Technology (Dongguan) Limited have been registered by Voluntary Control Council for Interference on Jan.24, 2007.

.TUV Rhineland

Asia Institute Technology (Dongguan) Limited has been assessed on Jan.16, 2007 that it can carry out EMC tests by order and under supervision of TUV Rhineland.

.ITS- Registration No: TMPSHA031

Asia Institute Technology (Dongguan) Limited has been assessed and included in Intertek Shanghai TMP Program regarding Laboratory facilities and test equipment on Nov.10, 2006.

3.1 Deviation from standard

None

3.2 Abnormalities from standard conditions

None

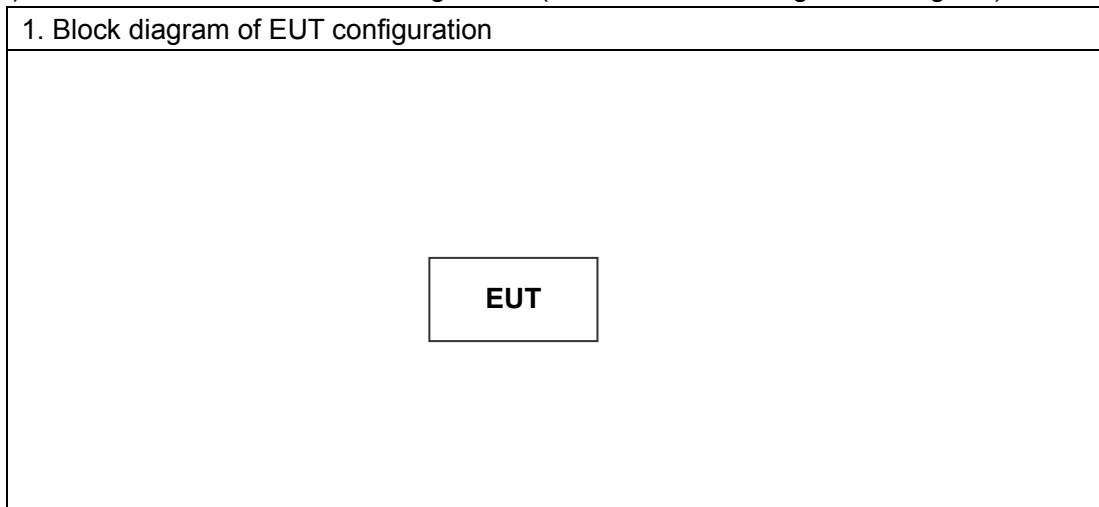
4 General Information

4.1 General Description of EUT

Manufacturer:	DONGGUAN EASTECH ELECTRICAL PRODUCTS CO., LTD.				
Manufacturer Address:	No.182, Kuiqing Rd., Qinghuang Industrial District, Qingxi Town, Dongguan City, Guangdong, 523650, China				
EUT Name:	Receiver				
Model No:	RG-G5, RG-Gx (x=0~9, A~Z)				
Operation frequency:	2405 MHz to 2477MHz				
Channel Number:	32				
Modulation Technology:	GFSK				
Antenna Type:	extended wire lay on PCB				
Brand Name:	N/A				
Serial No:	N/A				
Power Supply Range:	DC 5V from PC				
Power Supply:	DC 5V from PC				
Power Cord:	N/A				
Model description: RG-Gx (x=0~9, A~Z) All the models are totally identical, 'x' means the product's color depend on different markets' requirement.					
Description of Channel:					
Frequency Group1 (MHz)			Frequency Group2 (MHz)		
2405	2435	2460	2406	2425	2455
2407	2436	2461	2408	2429	2456
2412	2437	2465	2409	2430	2462
2414	2438	2468	2410	2432	2463
2417	2439	2468	2411	2434	2464
2420	2442	2469	2413	2443	2466
2421	2451	2472	2415	2444	2467
2422	2452	2473	2416	2446	2470
2427	2457	2475	2418	2448	2471
2428	2458	2476	2419	2449	2477
2431	2459		2433	2453	

4.2 Description of Test conditions

(1) EUT was tested in normal configuration (Please See following Block diagram)



(2) E.U.T. test conditions:

15.31(e): For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

(3) Test frequencies:

According to the 15.31(m) Measurements on intentional radiators or receivers, other than TV broadcast receivers, shall be performed and, if required. Reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table:

Frequency range over which device operates	Number of frequencies	Location in the range of operation
1 MHz or less	1	Middle
1 to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle and 1 near bottom

(4) Frequency range of radiated measurements:

According to the 15.33, the test range will be up to the tenth harmonic of the highest fundamental frequency

4.3 Peripheral List

No.	Equipment	Manufacturer	Model No.	Serial No.	Power cord	signal cable
1	Notebook	Hasee	F235S	B2676h02027080010	1.3m/unshielded /Undetachable /Without ferrite core	N/A

5 Equipments List for All Test Items

No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	Spectrum Analyzer	ADVANTEST	R3182	150900201	2009.04.17	2010.04.16
2	EMI Measuring Receiver	Schaffner	SCR3501	235	2009.03.09	2009.09.08
3	Low Noise Pre Amplifier	Tsj	MLA-10K01-B01-27	1205323	2009.03.09	2009.09.08
4	Low Noise Pre Amplifier	Tsj	MLA-0120-A02-34	2648A04738	2009.04.08	2010.04.07
5	TRILOG Super Broadband test Antenna	SCHWARZBECK	VULB9160	9160-3206	2009.07.15	2010.07.14
6	Broadband Horn Antenna	SCHWARZBECK	BBHA9120A	451	2009.07.15	2010.07.14
7	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2009.03.09	2009.09.08
8	EMI Test Receiver	R&S	ESCI	100124	2008.12.29	2009.12.28
9	LISN	Kyoritsu	KNW-242	8-837-4	2009.04.08	2010.04.07
10	LISN	Kyoritsu	KNW-407	8-1789-3	2009.04.08	2010.04.07
11	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2009.03.10	2009.09.09

6 Test Result

6.1 Antenna requirement

6.1.1 Standard requirement

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

6.1.2 EUT Antenna

The antenna is integrated on the main PCB and no consideration of replacement.

6.2 Conduction Emissions Measurement

6.2.1 limit

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

Note: Decreases with the logarithm of the frequency.

6.2.2 Test procedure

EUT was placed upon a wooden test table 0.8m above the horizontal metal reference plane and 0.4m from the vertical ground plane, and it was connected to an AMN. The closest distance between the boundary of the EUT and the surface of the AMN is 0.8m. All peripherals were connected to another AMN, and placed at a distance of 10cm from each other. A spectrum and receiver was connected to the RF output port of the AMN. Both average and quasi-peak value were detected.

6.2.3 Test result

Line

Frequency (MHz)	Factor (dB)	Reading Level (dBuV)	Quasi peak (dBμV)	Margin (dB)	Limit (dBμV)	Reading Level (dBuV)	Average (dBμV)	Margin (dB)	Limit (dBμV)
0.178	11.413	16.043	27.456	-37.744	65.200	10.443	21.856	-33.344	55.200
*0.214	11.011	31.128	42.139	-22.032	64.171	24.128	35.139	-19.032	54.171
0.282	10.802	18.392	29.194	-33.035	62.229	10.792	21.594	-30.635	52.229
0.842	10.230	16.433	26.663	-29.337	56.000	7.833	18.063	-27.937	46.000
2.697	10.170	14.334	24.504	-31.496	56.000	7.234	17.404	-28.596	46.000
12.847	10.340	21.917	32.257	-27.743	60.000	15.817	26.157	-23.843	50.000

Neutral

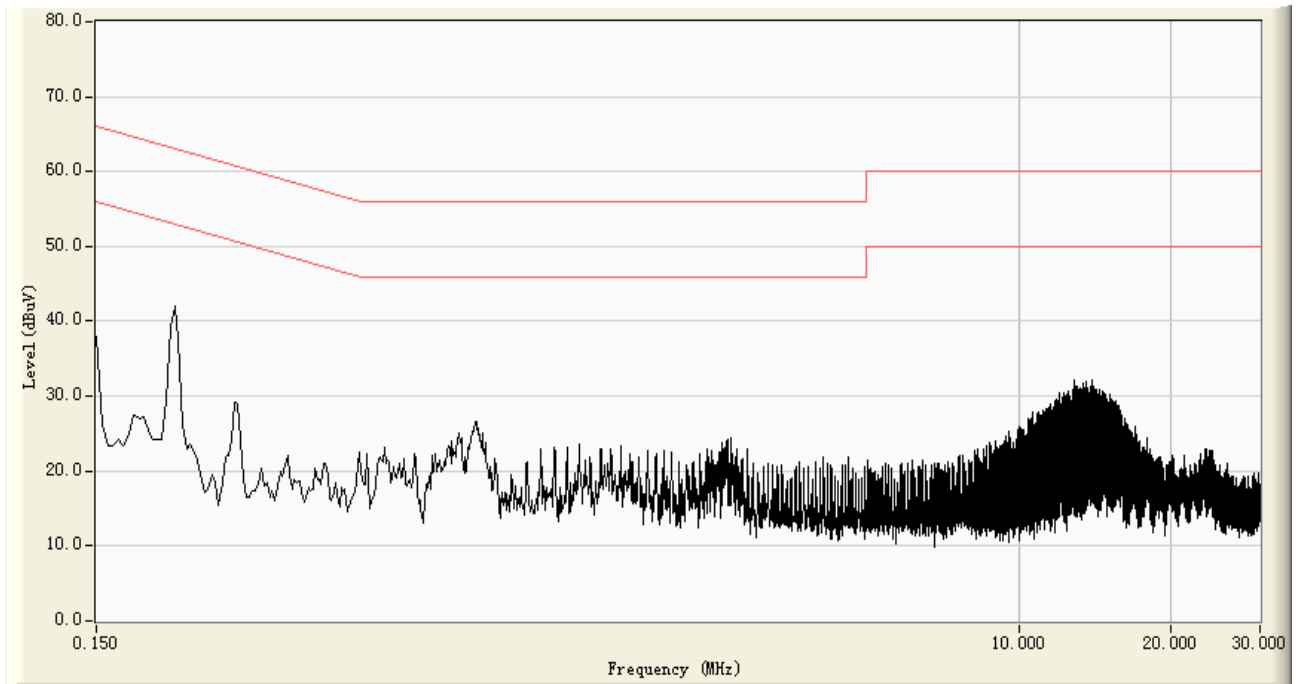
Frequency (MHz)	Factor (dB)	Reading Level (dBuV)	Quasi peak (dBμV)	Margin (dB)	Limit (dBμV)	Reading Level (dBuV)	Average (dBμV)	Margin (dB)	Limit (dBμV)
0.178	11.423	18.382	29.805	-35.395	65.200	10.782	22.205	-32.995	55.200
*0.214	11.021	31.411	42.432	-21.739	64.171	23.811	34.832	-19.339	54.171
0.286	10.803	19.402	30.205	-31.909	62.114	13.602	24.405	-27.709	52.114
0.782	10.272	18.701	28.973	-27.027	56.000	12.101	22.373	-23.627	46.000
0.854	10.236	18.529	28.765	-27.235	56.000	10.829	21.065	-24.935	46.000
2.414	10.180	16.370	26.550	-29.450	56.000	9.770	19.950	-26.050	46.000

Note: "*" means the worst case

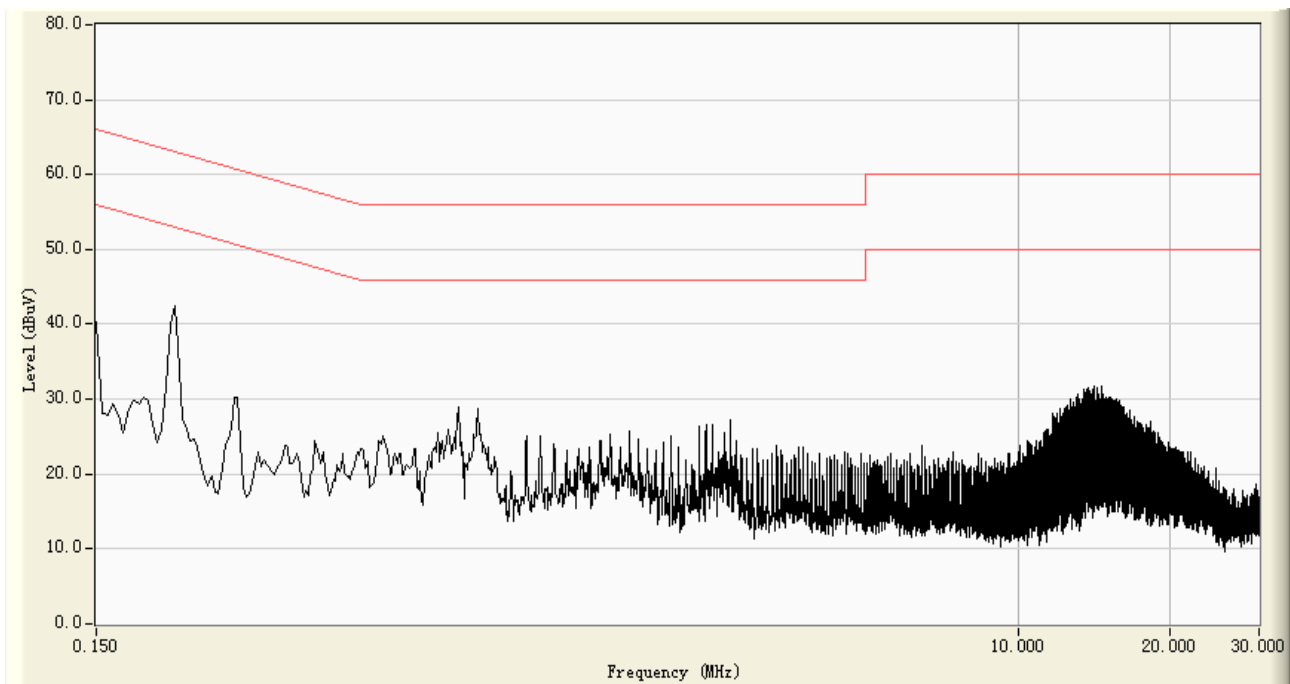
Quasi peak/Average = Reading Level + Factor

Factor= Cable Loss + LISN insertion loss

Line --Operating mode: Running



Neutral --Operating mode: Running



6.3 Radiated Emissions Measurement

6.3.1 Limit

Fcc part15.249 (a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Frequency of Emission (MHz)	Field Strength of fundamental (dB μ V/m)	Field Strength of Harmonics(dB μ V/m)
902-928	94	54
2400-2483.5	94	54
5725-5875	94	54
24000-24250	108	68

Note: Field strength limits are specified at a distance of 3 meters. the above field strength limits in paragraphs of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

Fcc part15.249 (d)Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Frequency of Emission (MHz)	Field Strength		Measurement Distance (meters)
	μ V/m	dB μ V/m	
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

6.3.2 Test procedure

EUT was placed upon a wooden test table which was placed on the turn table 0.8m above the horizontal metal ground plane, and operating in the mode as mentioned above. A receiving antenna was placed 3m away from the EUT. During testing, turn around the turn table and move the antenna from 1m to 4m to find the maximum field-strength reading. All peripherals were placed at a distance of 10cm between each other. Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

6.3.3 Test Result

Test Data: 2009-8-24

Frequency Range: 30MHz to 1GHz

RBW/VBW: 100KHz/300KHz for spectrum, RBW=120KHz for receiver

Measurement Distance: 3 m

Operating Environment: 20.3°C, 58% RH, 102 Kpa

(a) Antenna polarization: Horizontal

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
55.220	13.960	0.215	14.175	-25.825	40.000	QUASIPeAK
156.100	16.600	0.561	17.161	-26.339	43.500	QUASIPeAK
194.900	13.830	1.972	15.802	-27.698	43.500	QUASIPeAK
286.080	16.740	0.421	17.161	-28.839	46.000	QUASIPeAK
371.440	19.050	0.286	19.336	-26.664	46.000	QUASIPeAK
*870.020	29.120	0.280	29.400	-16.600	46.000	QUASIPeAK

(b) Antenna polarization: vertical

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
137.670	15.730	2.550	18.280	-25.220	43.500	QUASIPeAK
211.390	13.810	2.150	15.960	-27.540	43.500	QUASIPeAK
243.400	15.280	2.095	17.375	-28.625	46.000	QUASIPeAK
287.050	16.760	0.722	17.482	-28.518	46.000	QUASIPeAK
366.590	18.900	0.456	19.356	-26.644	46.000	QUASIPeAK
*621.700	24.910	1.012	25.922	-20.078	46.000	QUASIPeAK

Note: '*' means the worst case

Measurement Level = Reading Level + Factor

Factor=Ant Factor + Cable Loss

Test Data: 2009-8-24

Frequency Range: 1GHz to 25GHz

RBW/VBW: 1MHz/1MHz for Peak, 1MHz/10Hz for Average

Measurement Distance: 3 m

Operating Environment: 20.3°C, 58% RH, 102 Kpa

(a) Antenna polarization: Horizontal

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1330.000	29.698	14.076	43.774	-30.226	74.000	PEAK
1580.000	29.919	11.074	40.994	-33.006	74.000	PEAK
2400.000	33.897	14.569	48.466	-25.534	74.000	PEAK
2405.000	33.913	43.985	77.898	-36.102	114.000	PEAK
2405.024	33.913	43.236	77.149	-16.851	94.000	AVERAGE
2500.000	34.183	14.057	48.240	-25.760	74.000	PEAK
4810.000	40.010	1.137	41.147	-32.853	74.000	PEAK
*4810.258	40.010	1.017	41.027	-12.973	54.000	AVERAGE

(b) Antenna polarization: vertical

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1495.000	29.919	15.937	45.856	-28.144	74.000	PEAK
1580.000	29.919	11.769	41.689	-32.311	74.000	PEAK
2400.000	33.897	14.092	47.989	-26.011	74.000	PEAK
2405.000	33.913	43.063	76.976	-37.024	114.000	PEAK
*2405.000	33.913	42.063	75.976	-18.024	94.000	AVERAGE
2500.000	34.183	13.955	48.138	-25.862	74.000	PEAK

Note: '*' means the worst case

Measurement Level = Reading Level + Factor

Factor=Ant Factor + Cable Loss

Low Channel: 2405 MHz

(a) Antenna polarization: Horizontal

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1330.000	29.698	14.670	44.368	-29.632	74.000	PEAK
1495.000	29.919	10.203	40.122	-33.878	74.000	PEAK
1580.000	29.919	10.707	40.627	-33.373	74.000	PEAK
2439.000	33.997	41.572	75.569	-38.431	114.000	PEAK
*2439.234	33.997	40.534	74.531	-19.469	94.000	AVERAGE
2495.000	34.173	13.593	47.766	-26.234	74.000	PEAK
2995.000	35.829	9.683	45.512	-28.488	74.000	PEAK

(b) Antenna polarization: vertical

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1330.000	29.698	15.068	44.766	-9.234	54.000	PEAK
*1495.000	29.919	16.507	46.426	-7.574	54.000	PEAK
1580.000	29.919	12.949	42.869	-11.131	54.000	PEAK
1980.000	31.610	10.075	41.685	-12.315	54.000	PEAK
2439.000	33.997	38.799	72.796	-41.204	114.000	PEAK
2439.563	33.997	37.369	71.366	-22.634	94.000	AVERAGE
2500.000	34.183	14.158	48.341	-25.659	74.000	PEAK
2990.000	35.825	8.720	44.545	-29.455	74.000	PEAK
3205.000	36.152	7.057	43.209	-30.791	74.000	PEAK

Note: '*' means the worst case

Measurement Level = Reading Level + Factor

Factor=Ant Factor + Cable Loss

Middle Channel :2439 MHz

(a) Antenna polarization: Horizontal

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1330.000	29.698	14.193	43.891	-30.109	74.000	PEAK
1580.000	29.919	10.222	40.142	-33.858	74.000	PEAK
1730.000	30.680	15.743	46.422	-27.578	74.000	PEAK
2475.000	34.107	41.682	75.789	-38.211	114.000	PEAK
*2475.136	34.107	40.356	74.463	-19.537	94.000	AVERAGE
2483.500	34.135	5.882	40.017	-33.983	74.000	PEAK
2500.000	34.183	12.682	46.865	-27.135	74.000	PEAK
2735.000	35.130	7.506	42.635	-31.365	74.000	PEAK

(b) Antenna polarization: vertical

Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1330.000	29.698	13.865	43.563	-30.437	74.000	PEAK
1495.000	29.919	15.281	45.200	-28.800	74.000	PEAK
1580.000	29.919	11.637	41.557	-32.443	74.000	PEAK
2475.000	34.107	36.534	70.641	-43.359	114.000	PEAK
*2475.034	34.107	34.236	68.343	-25.657	94.000	AVERAGE
2483.500	34.135	6.107	40.242	-33.758	74.000	PEAK
2500.000	34.183	14.002	48.185	-25.815	74.000	PEAK
2995.000	35.829	8.894	44.723	-29.277	74.000	PEAK
3165.000	36.099	7.653	43.751	-30.249	74.000	PEAK

Note: '*' means the worst case

Measurement Level = Reading Level + Factor

Factor=Ant Factor + Cable Loss

High Channel :2477 MHz

6.4 Band edges

6.4.1 Limit

Fcc part15.249 (d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

6.4.2 Test procedure

- (1) Connected the antenna port to the Spectrum Analyzer, set the Spectrum Analyzer as RBW=100Hz,VBW \geq RBW, Sweep time=Auto, Detector Function=Peak
- (2) The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission.
- (3) The above procedure shall be repeated at the lowest, and the highest frequency of the stated frequency range.

6.4.3 Test Result

Please refer to report section 6.2.3 which met the requirement of limits in 15.209

6.5 Occupied Bandwidth

6.5.1 Limit

Fcc part15.239 (d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

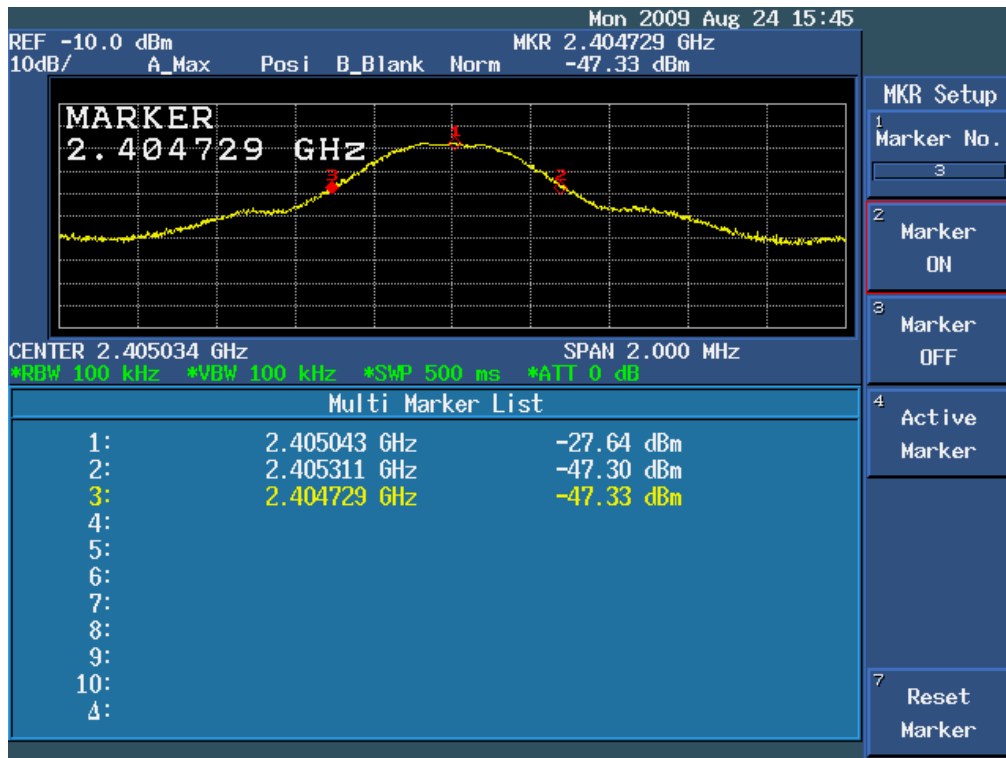
6.5.2 Test procedure

- (1) Connected the antenna port to the Spectrum Analyzer, set the Spectrum Analyzer as RBW=10Hz,VBW \geq RBW, Sweep time=Auto, Detector Function=Peak
- (2) The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission.
- (3) The above procedure shall be repeated at the lowest, and the highest frequency of the stated frequency range with modulated mode.

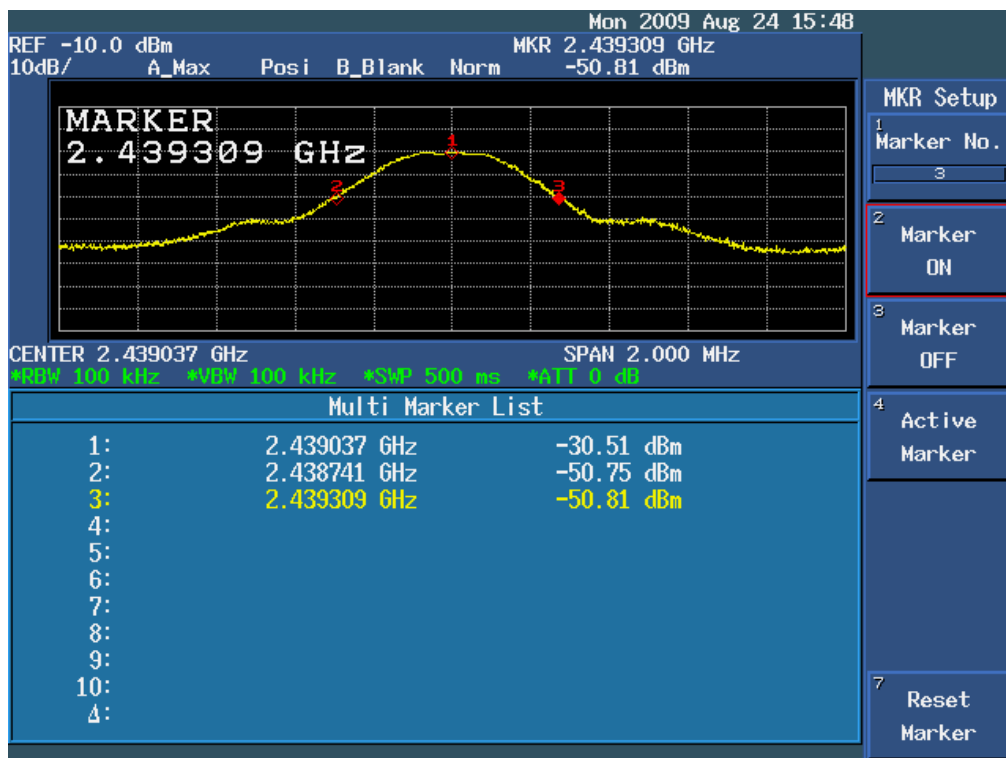
6.5.3 Test Result

channel	Channel frequency (MHz)	20dB bandwidth (KHz)	Limit (KHz)	Conclusion
Low	2405	582	N/A	Pass
Mid	2439	568	N/A	Pass
High	2477	504	N/A	Pass

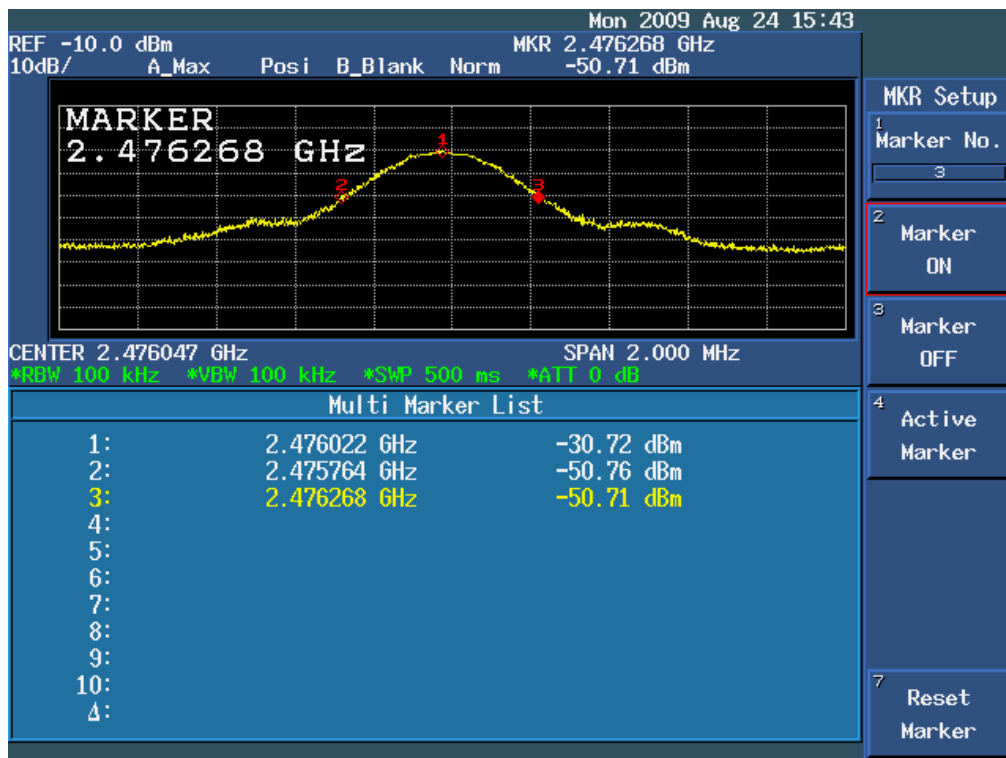
(1) Low: 2405MHz



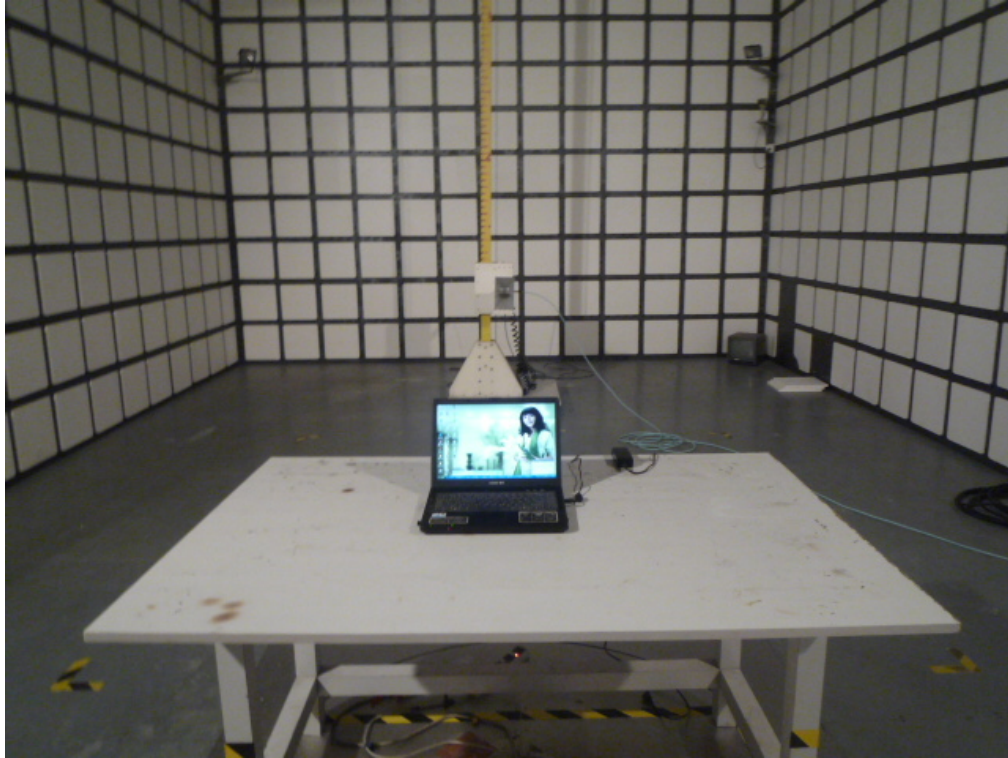
(2) Mid: 2439MHz



(3) High: 2477MHz



6.6 Test Setup photograph



Radiation



Conduction

7 APPENDIX-Photographs of EUT Constructional Details

Photo 1

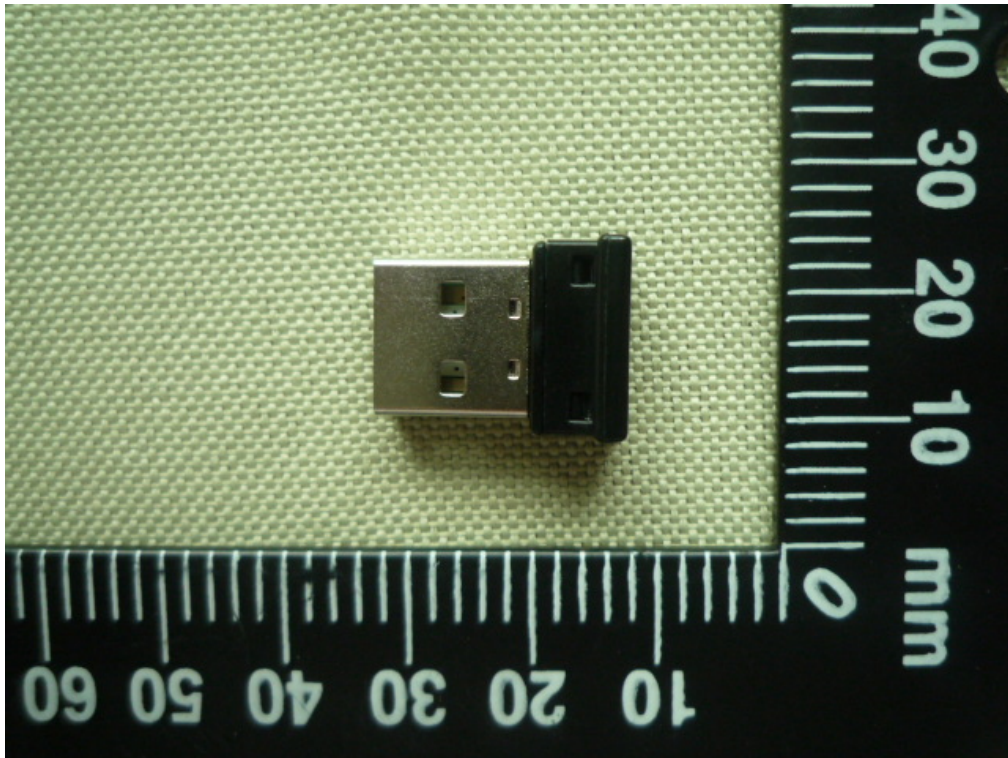


Photo 2

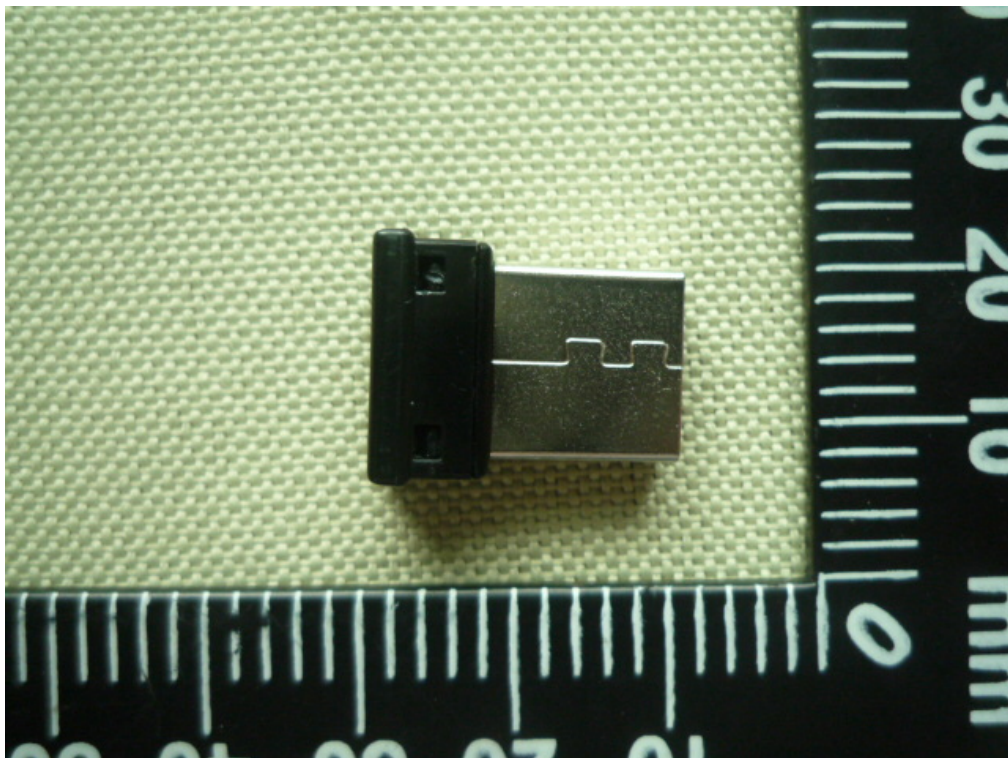


Photo 3

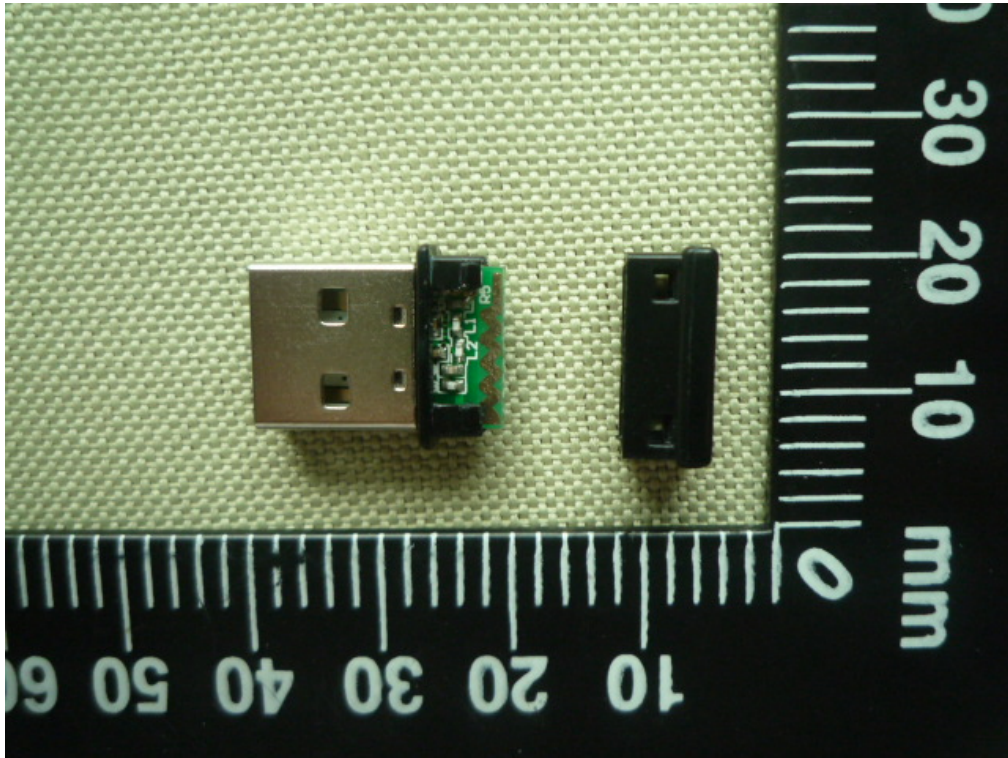


Photo 4

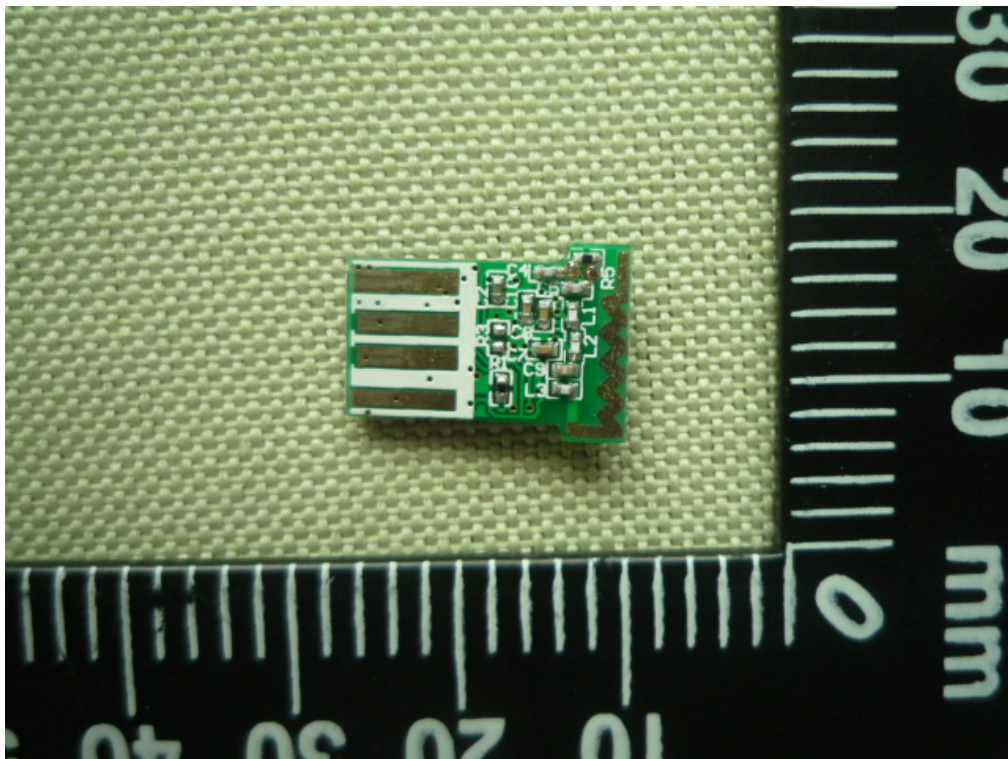


Photo 5

