FCC Verification Test Report

For

Formosa21 Inc.

EUT Name: Nano RF Receiver

Model No.: RF612; RF612x; RF612-xxx (x=0~9，A~Z)

Brand Name: aim ahead in multimedia

Prepared By:

Asia Institute Technology (Dongguan) Limited

Date of Receipt: Sep. 20, 2012

Date of Test: Sep. 21~Oct.15, 2012

Date of Issue: Oct. 16, 2012

Test Result: Pass

Verification of Compliance

Client Information:

Applicant: Formosa21 Inc.

Applicant add.: 8F-6, No.351, Sec. 2, Zhongshan Rd., Zhonghe Dist., New Taipei City 23504, Taiwan (R.O.C.)

EUT Information:

EUT Name: Nano RF Receiver

Model No.: RF612; RF612x; RF612-xxx (x=0~9，A~Z)

Brand Name: aim Ahead in multimedia

Test procedure used: FCC Part 15 Subpart B Class B

ICES-003

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 and IC requirements. And it is applicable only to the tested sample identified in the report.

Reviewed by: Seal-Chen
Test director

Approved by: Jerson Wu
Technical director

1 Contents

2 Test Summary

Test	Test Requirement	Test Method	Criterion	Result
Mains Terminals Disturbance Voltage, 150kHz to 30MHz	FCC Part 15 Subpart B ICES-003	FCC Part 15 Subpart B ANSI C63.4: 2009	Limits	PASS
Radiated Emissions 30MHz to 1GHz 1 GHz to 6 GHz	FCC Part 15 Subpart B ICES-003	FCC Part 15 Subpart B ANSI C63.4: 2009	Limits	PASS
Remark: None				
Model description: The only different about RF612;RF612x;RF612-xxx(x=0~9，A~Z) exterior and printing. x may represent different alphabet (A-Z) or numeral (0-9).				

2.1 Measurement Uncertainty

The report uncertainty of measurement **y** ± **U** , where expended uncertainty **U** is based on a standard uncertainty Multiplied by a coverage factor of **k=2** , providing a level of confidence of approximately 95% .

No.	Item	Frequency Range	U , Value
1	Power Line Conducted Emission (Conduction 1)	150KHz~30MHz	1.18 dB
2	Power Line Conducted Emission (Conduction 2)	150KHz~30MHz	2.00 dB
3	Disturbance Power Emission (Conduction 1)	30MHz~300MHz	3.12 dB
4	Radiated Emission Test	30MHz~1GHz	3.40 dB
5	Radiated Emission Test	1GHz~18GHz	3.30 dB

3 Test Facility

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

.FCC- Registration No: 248337

The 3m Semi-Anechoic Chamber, 3m/10m Open Area Test Site and Shielding Room of Asia Institute Technology (Dongguan) Limited have been registered by Federal Communications Commission (FCC) on Nov.20, 2009.

.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, 2010.

.VCCI- Registration No: 2705

The 3m/10m Open Area Test Site, Shielding Room and 3m Chamber of Asia Institute Technology (Dongguan) Limited have been registered by Voluntary Control Council for Interference on Jan.24, 2010 and Oct. 30, 2010. The Telecommunication Ports Conducted Disturbance Measurement of Asia Institute Technology (Dongguan) Limited have been registered by Voluntary Control Council for Interference on Sep. 06, 2011.

.TUV Rhineland

Asia Institute Technology (Dongguan) Limited has been assessed on Dec.29, 2011 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 Sep.22, 2011.

3.1 Deviation from standard

None

3.2 Abnormalities from standard conditions

None

4 General Information

4.1 General Description of EUT

Manufacturer:	Formosa21 Inc.
Manufacturer Address:	8F-6, No.351, Sec. 2, Zhongshan Rd., Zhonghe Dist., New Taipei City 23504, Taiwan (R.O.C.)
EUT Name:	Nano RF Receiver
Model No:	RF612; RF612x; RF612-xxx (x=0~9，A~Z)
Brand Name:	aim Ahead in multimedia
Serial No:	N/A
Power Supply:	DC 5.0V
Test Supply:	DC 5.0V from PC
Power Cord:	N/A
Signal Cable:	N/A
Model description: The only different about RF612;RF612x;RF612-xxx(x=0~9，A~Z) exterior and printing. x may represent different alphabet (A-Z) or numeral (0-9).	

Key component's information:

No.	component name	Brand Name	Model No:	Serial No:
1	N/A	N/A	N/A	N/A

4.1.1 EUT Test Mode

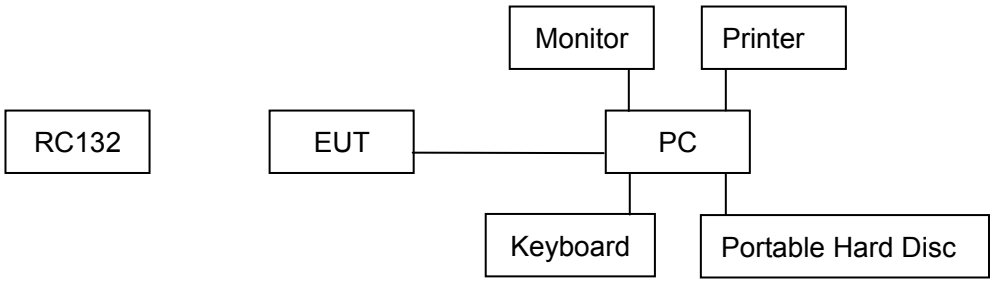
Mode 1	The EUT is Running.

4.2 Description of Test setup

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

1. Block diagram of EUT configuration

Mode 1:Running



4.3 Peripheral List

No.	Equipment	Manufacturer	EMC Compliance	Model No.	Serial No.	Power cord	signal cable
1	Personal computer	H P	CE 、FCC	DX2310	CNG8250MZ3	1.8m/unshielded /detachable	N/A
2	Keyboard	DELL	CE、FCC	SK-8115	CN-ONM432-71616-81M-OLKB	N/A	1.5m/unshielded /undetachable
3	Monitor	DELL	CE、FCC	T980KAC DK21SN	TWS20006045	1.8m/unshielded /detachable	1.8m/shielded /detachable
4	Printer	EPSON	CE、FCC	STYLUS C45	FY9YC48288	1.5m/unshielded /detachable	1.8m/unshielded /detachable
5	Portable Hard Disc	ALUMINUM	CE、FCC	3.5 HDD Storage Box	06832c009	1.8m/unshielded /detachable	1.2m/unshielded /detachable
6	RF Presenter	Formosa21 Inc.	CE、FCC	RC132	N/A	N/A	N/A

4.4 EUT Peripheral List

No.	Equipment	Manufacturer	EMC Compliance	Model No.	Serial No.	Power cord	signal cable
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A

5 Equipments List For All Test Items

☒Radiation Test Equipment						
No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	Spectrum Analyzer	ADVANTEST	R3182	150900201	2011.12.30	2012.12.30
2	EMI Measuring Receiver	R&S	ESPI	1164.6407.03	2012.06.26	2013.06.25
3	Low Noise Pre Amplifier	Tsj	MLA-10K01-B01-27	1205323	2012.06.26	2013.06.26
4	TRILOG Super Broadband test Antenna	SCHWARZBECK	VULB9160	9160-3206	2012.01.06	2013.01.06
5	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2012.06.26	2013.06.26

☒1# Conduction Test equipment						
No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	EMI Test Receiver	R&S	ESCI	100124	2012.06.25	2013.06.25
2	LISN	Kyoritsu	KNW-242	8-837-4	2012.06.25	2013.06.25
3	LISN	Kyoritsu	KNW-407	8-1789-3	2012.06.25	2013.06.25
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2012.06.25	2013.06.25

Note:

1. ☐ is not applicable in this Test Report. ☒ is applicable in this Test Report.

6 Emission Test Results

6.1 Mains Terminals Disturbance Voltage Measurement

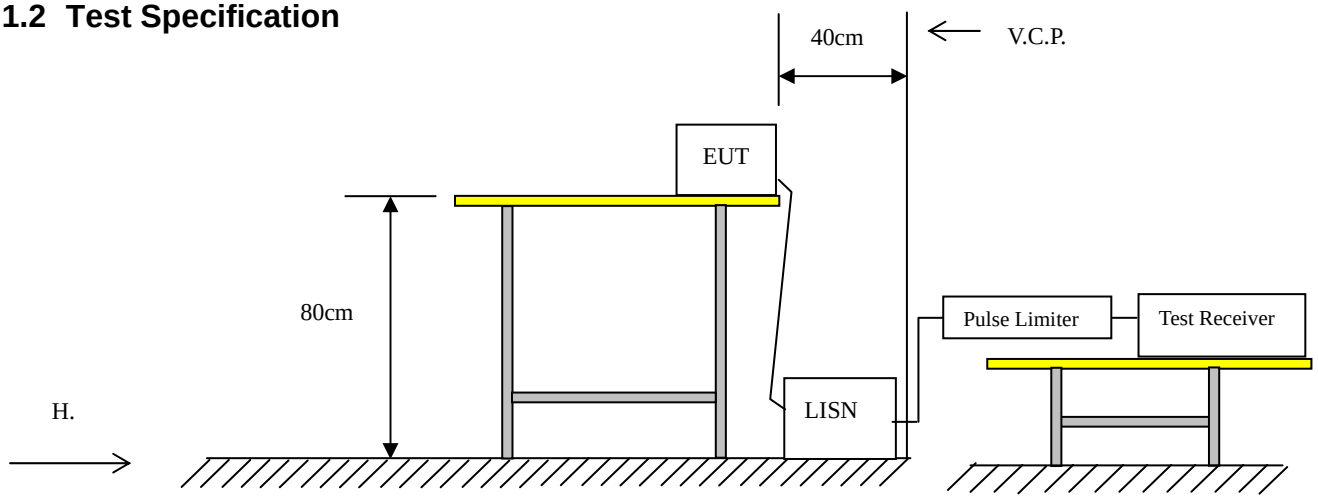
Frequency (MHz)	☐ Class A (dBμV)		☒ Class B (dBμV)	
	Q.P. (Quasi-Peak)	A.V. (Average)	Q.P. (Quasi-Peak)	A.V. (Average)
0.15 ~ 0.50	79	66	66 to 56	56 to 46
0.50 ~ 5.0	73	60	56	46
5.0 ~ 30	73	60	60	50

Detector:	Peak for pre-scan (9kHz Resolution Bandwidth) Quasi-Peak & Average if maximized peak within 6dB of Average Limit

6.1.1 E.U.T. Operation

Temperature:	22°C	Humidity:	53% RH	Atmospheric Pressure:	101	Kpa
Test Mode:	Mode 1			The Worst Mode:	Mode 1	

6.1.2 Test Specification



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.

6.1.3 Measurement Data

An initial pre-scan was performed on the live and neutral lines.

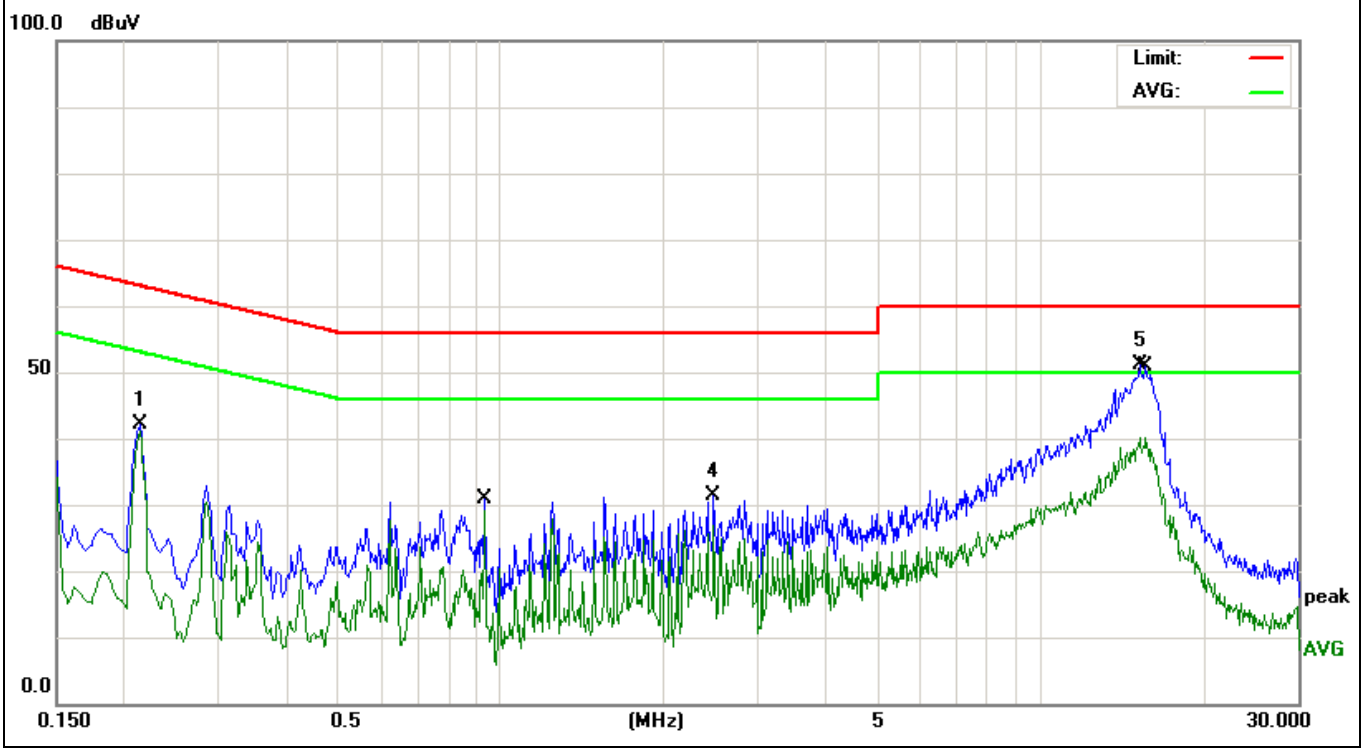
Quasi-peak or average measurements were performed at the frequency which maximum peak emissions were detected.

Please refer to the attached quasi-peak & average measurement data for reference.

EUT：	Nano RF Receiver	Model Name ：	RF612
Temperature：	22 ℃	Relative Humidity：	53%
Pressure：	1010hPa	Test Date :	2012-09-27
Test Mode：	Mode 1	Phase :	Line
Test Voltage ：	DC 5.0V from PC		

Frequency (MHz)	Meter Reading (dBμV)	Factor(dB)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Detector
0.2139	31.01	11.04	42.05	63.05	-21.00	Quasi-Peak
0.2139	30.02	11.04	41.06	53.05	-11.99	Average
2.4820	21.09	10.17	31.26	56.00	-24.74	Quasi-Peak
0.9340	18.83	10.19	29.02	46.00	-16.98	Average
*15.2459	49.73	1.36	51.09	60.00	-8.91	Quasi-Peak
15.6659	38.71	1.37	40.08	50.00	-9.92	Average

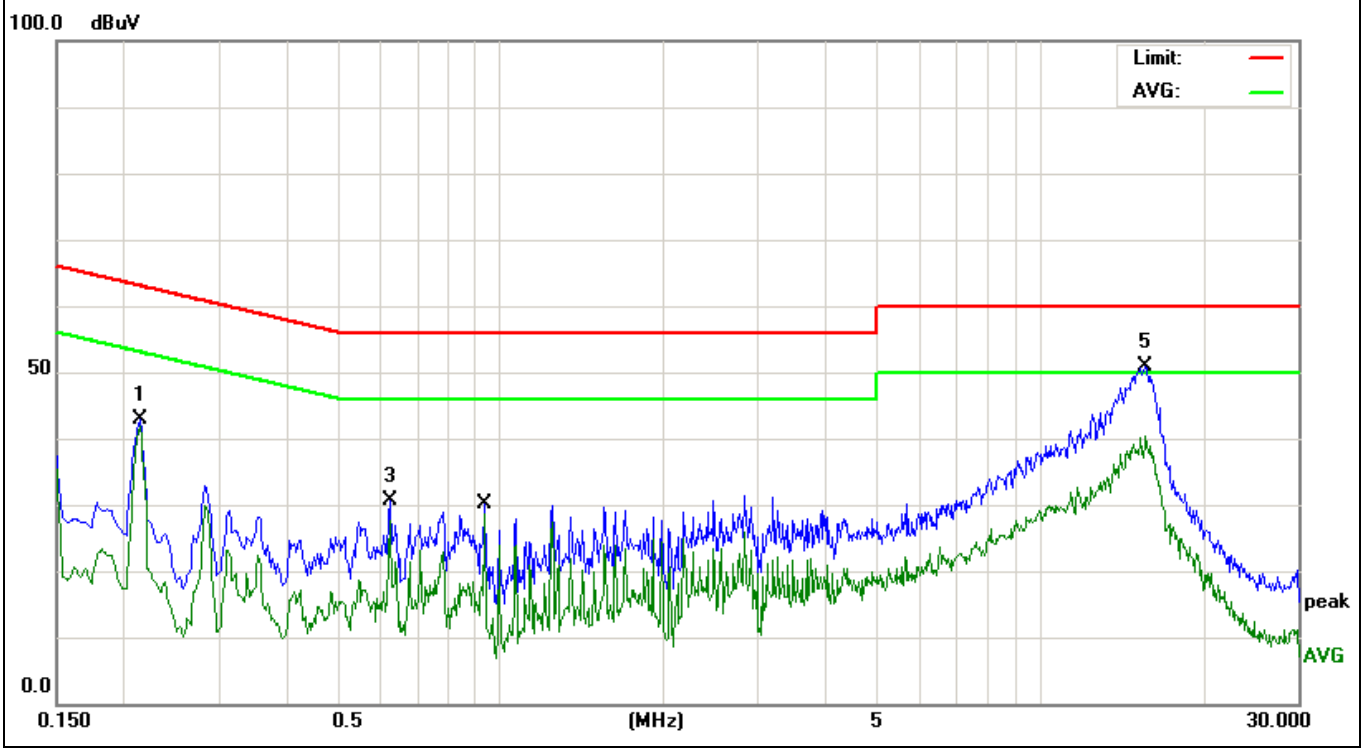
Remark:
1. Factor = Insertion Loss + Cable Loss.
2. '*' means the worst case.



EUT：	Nano RF Receiver	Model Name ：	RF612
Temperature：	22 ℃	Relative Humidity：	53%
Pressure：	1010hPa	Test Date :	2012-09-27
Test Mode：	Mode 1	Phase :	Neutral
Test Voltage ：	DC 5.0V from PC		

Frequency (MHz)	Meter Reading (dBμV)	Factor(dB)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Detector
0.2139	31.80	11.04	42.84	63.05	-20.21	Quasi-Peak
0.2139	30.87	11.04	41.91	53.05	-11.14	Average
0.6219	20.33	10.29	30.62	56.00	-25.38	Quasi-Peak
0.9340	18.46	10.19	28.65	46.00	-17.35	Average
15.6699	49.48	1.37	50.85	60.00	-9.15	Quasi-Peak
15.6699	38.99	1.37	40.36	50.00	-9.64	Average

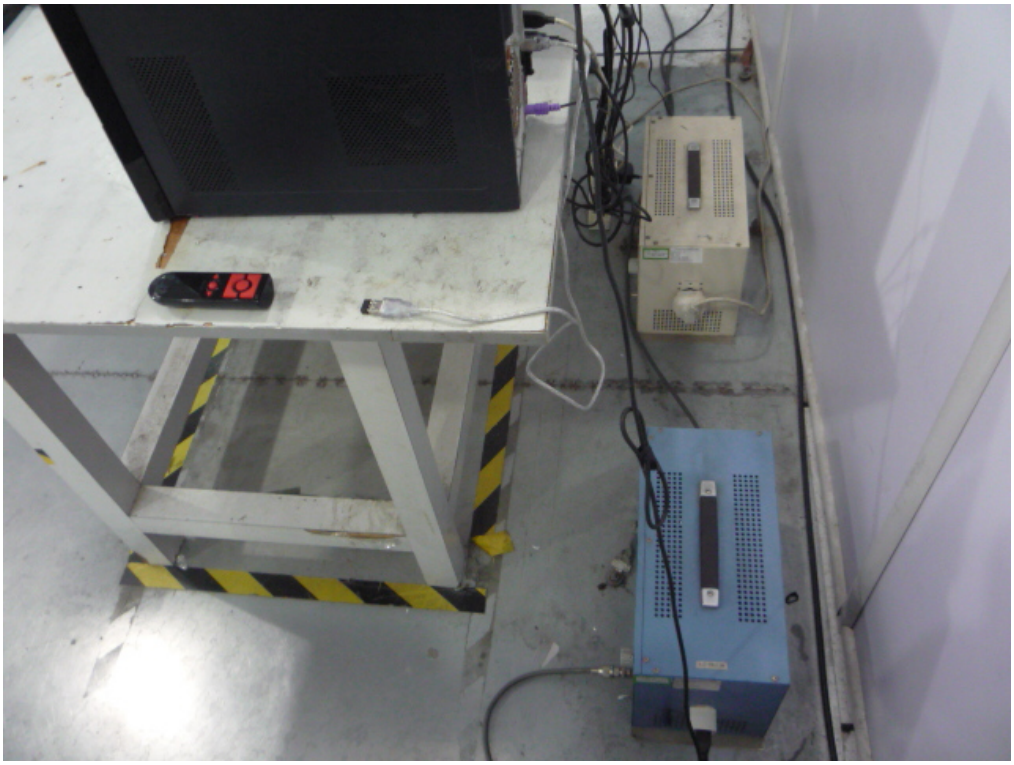
Remark:
1. Factor = Insertion Loss + Cable Loss.
2. '*' means the worst case.



6.1.4 Test Setup Photograph

Model: RF612

Model: RF612



6.2 Radiated Emission Measurement

Limits of Radiated Emission Measurement

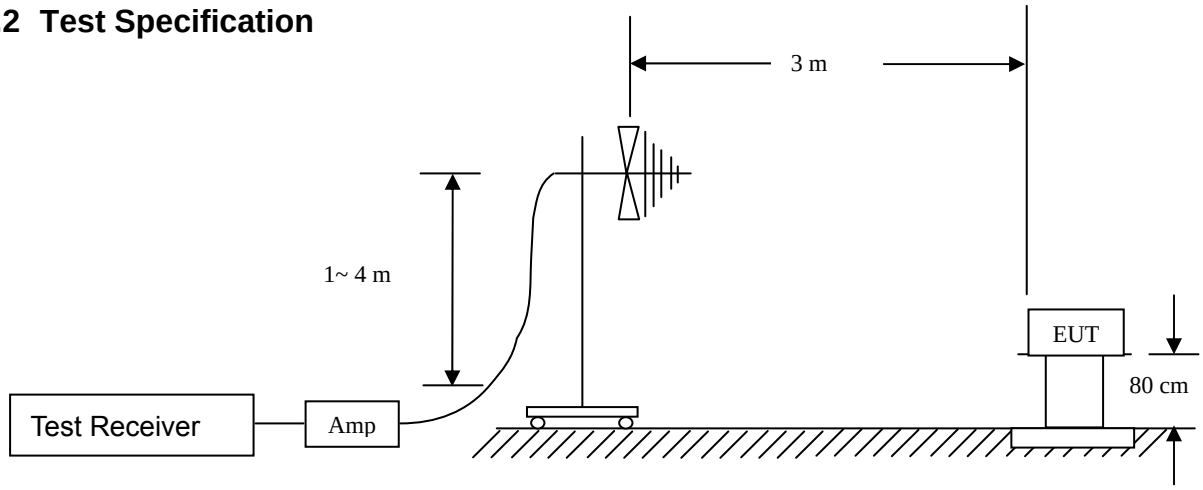
Frequency (MHz)	☐ Class A (10m)	☒ Class B (3m)
	Quasi-Peak dB(μV/m)	Quasi-Peak dB(μV/m)
30 ~ 88	39.0	40.0
88 ~ 216	43.5	43.5
216 ~ 960	46.5	46.0
Above 960	49.5	54.0

Detector:	Peak for pre-scan (120kHz resolution bandwidth) Quasi-Peak if maximum peak within 6dB of limit

6.2.1 E.U.T. Operation

Temperature:	23°C	Humidity:	56% RH	Atmospheric Pressure:	101	Kpa
Test Mode:	Mode 1			The Worst Mode:	Mode 1	

6.2.2 Test Specification



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.

6.2.3 Measurement Data

An initial pre-scan was performed in the 3m chamber using the spectrum analyzers in peak detection mode. The EUT was measured by Biology antenna with 2 orthogonal polarities and peak emissions from the EUT were detected within 6dB of the class B limit line.

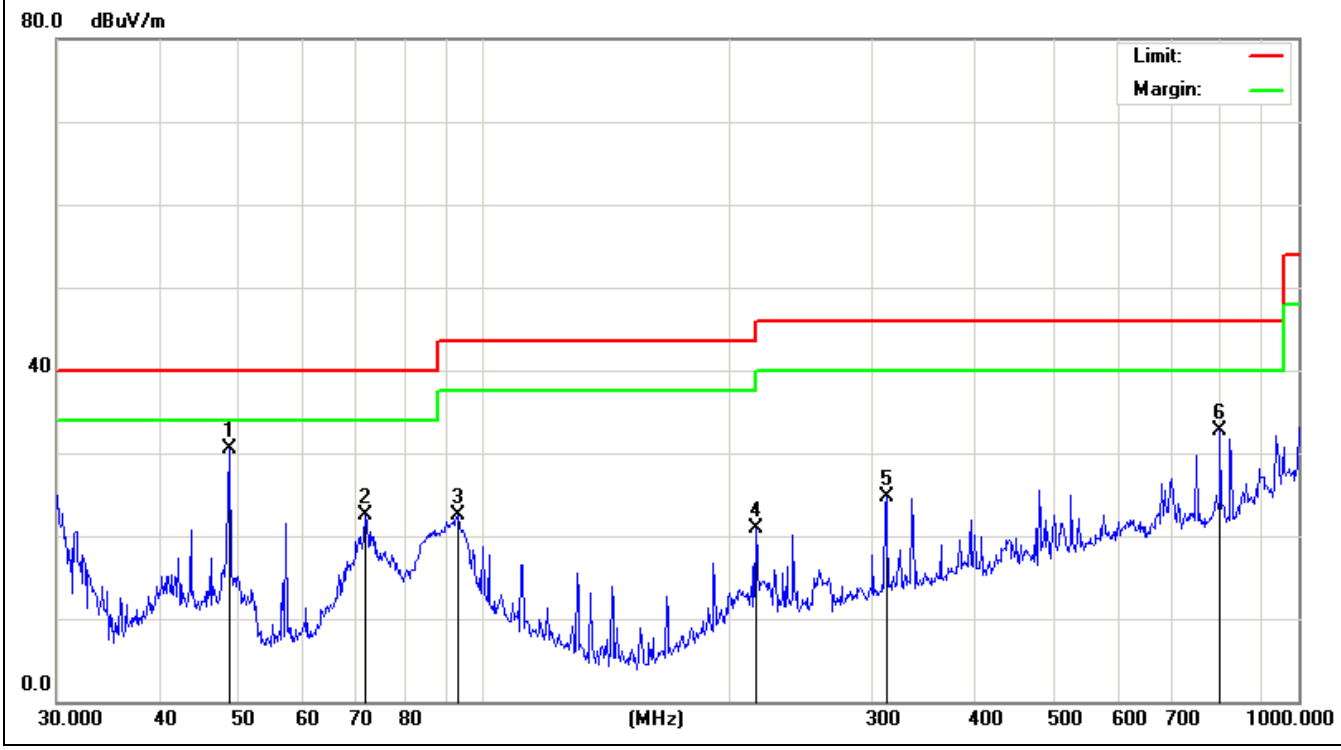
The following quasi-peak measurements were performed on the EUT.

Between 30-1000MHz

EUT：	Nano RF Receiver	Model Name ：	RF612
Temperature：	23 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Test Date :	2012-09-29
Test Mode：	Mode 1	Phase :	Vertical
Test Voltage ：	DC 5.0V from PC		

Frequency (MHz)	Reading Level (dBμV)	Factor(dB)	Measurement (dBμV)	Limits (dBμV)	Margin (dB)	Detector
48.8429	46.00	-15.42	30.58	40.00	-9.42	Quasi-Peak
71.5806	39.81	-17.28	22.53	40.00	-17.47	Quasi-Peak
93.1132	37.74	-15.33	22.41	43.50	-21.09	Quasi-Peak
216.0240	35.35	-14.40	20.95	46.00	-25.05	Quasi-Peak
312.1792	34.24	-9.56	24.68	46.00	-21.32	Quasi-Peak
801.7862	32.97	-0.36	32.61	46.00	-13.39	Quasi-Peak

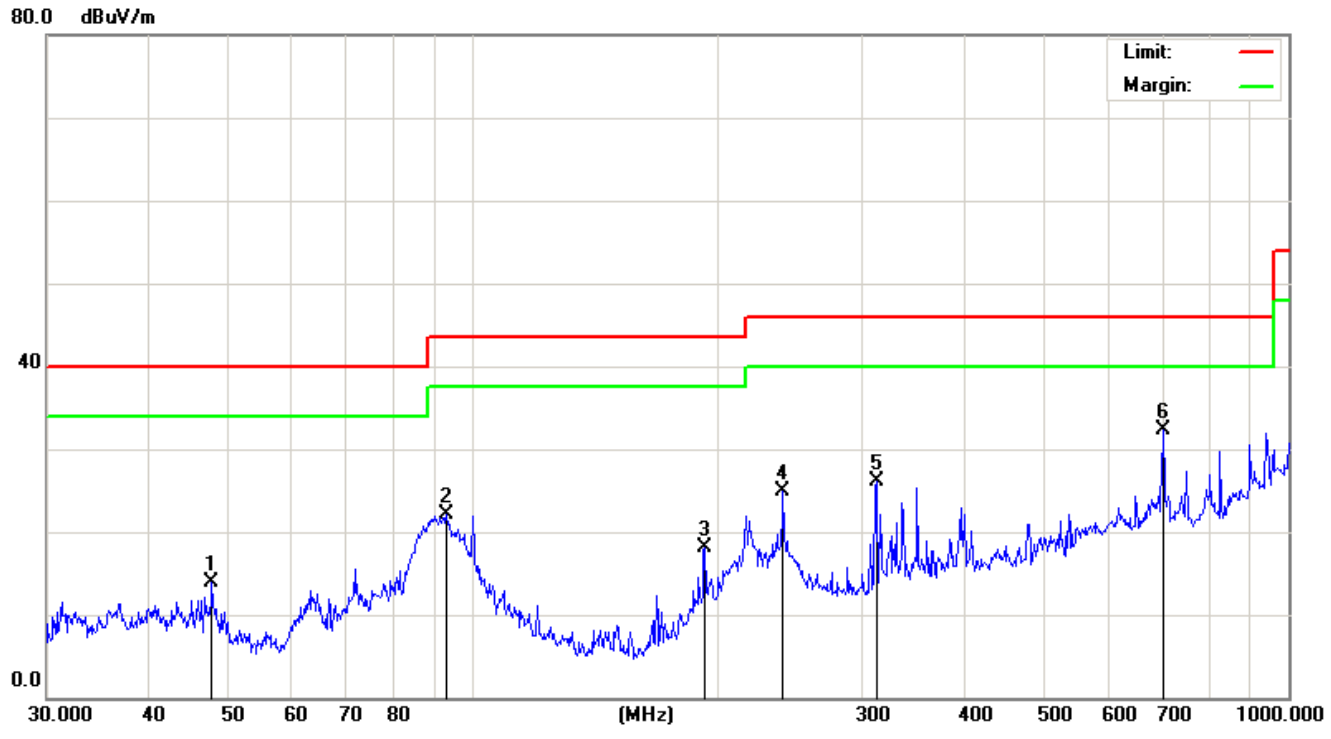
Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	Nano RF Receiver	Model Name ：	RF612
Temperature：	23 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Test Date :	2012-09-29
Test Mode：	Mode 1	Phase :	Horizontal
Test Voltage ：	DC 5.0V from PC		

Frequency (MHz)	Reading Level (dBμV)	Factor(dB)	Measurement (dBμV)	Limits (dBμV)	Margin (dB)	Detector
47.8260	27.43	-13.60	13.83	40.00	-26.17	Quasi-Peak
92.7871	37.20	-15.05	22.15	43.50	-21.35	Quasi-Peak
192.4185	32.91	-14.82	18.09	43.50	-25.41	Quasi-Peak
239.9874	36.73	-11.86	24.87	46.00	-21.13	Quasi-Peak
312.1792	35.76	-9.56	26.20	46.00	-19.80	Quasi-Peak
701.7607	33.64	-1.30	32.34	46.00	-13.66	Quasi-Peak

Remark:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



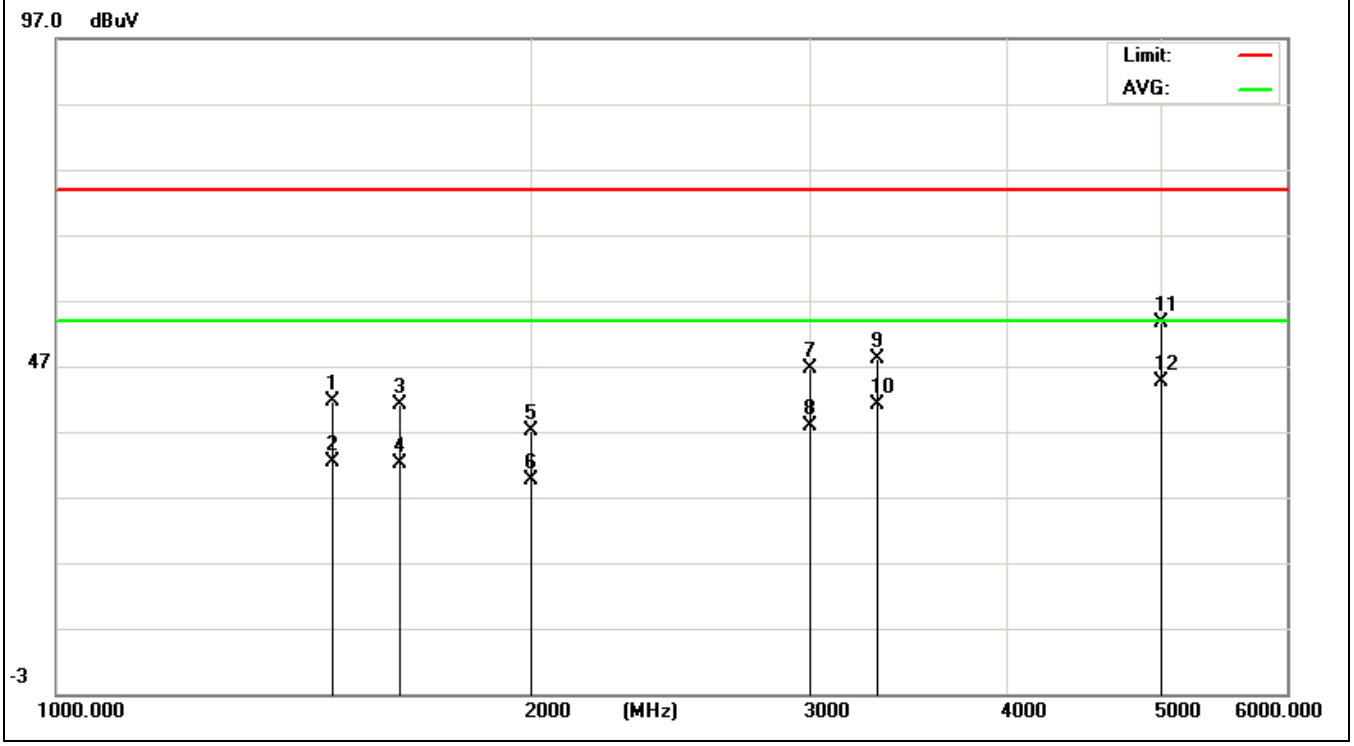
Between 1000-6000MHz

EUT：	Nano RF Receiver	Model Name ：	RF612
Temperature：	23 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Test Date :	2012-10-07
Test Mode：	Mode 1	Phase :	Vertical
Test Voltage ：	DC 5.0V from PC		

Frequency	Meter Reading (dBμV)		Factor	Emission Level (dBμV)		Limits (dBμV)		Margin (dBμV)	
(MHz)	Peak	Average	(dB)	Peak	Average	Peak	Average	Peak	Average
1495.000	51.55	42.30	-9.88	41.67	32.42	74.00	54.00	-32.33	-21.58
1650.000	50.95	42.00	-9.77	41.18	32.23	74.00	54.00	-32.82	-21.77
2000.000	46.19	38.65	-9.08	37.11	29.57	74.00	54.00	-36.89	-24.43
2995.000	48.25	39.62	-1.72	46.53	37.90	74.00	54.00	-27.47	-16.10
3305.000	49.20	42.16	-1.05	48.15	41.11	74.00	54.00	-25.85	-12.89
*5000.000	48.42	39.26	5.26	53.68	44.52	74.00	54.00	-20.32	-9.48

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.
2. '*' means the worst case

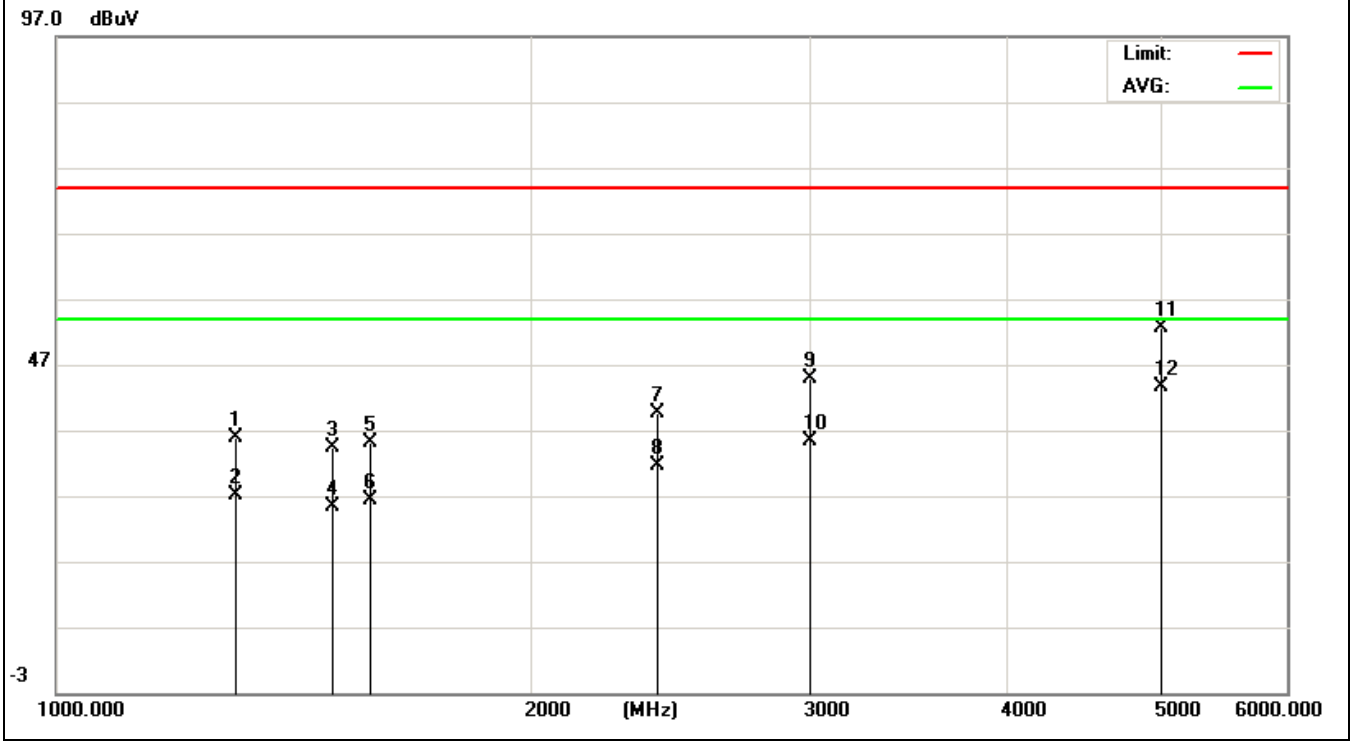


EUT：	Nano RF Receiver	Model Name ：	RF612
Temperature：	23 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Test Date :	2012-10-07
Test Mode：	Mode 1	Phase :	Horizontal
Test Voltage ：	DC 5.0V from PC		

Frequency	Meter Reading (dBμV)		Factor	Emission Level (dBμV)		Limits (dBμV)		Margin (dBμV)	
(MHz)	Peak	Average	(dB)	Peak	Average	Peak	Average	Peak	Average
1300.000	46.13	37.54	-10.33	35.80	27.21	74.00	54.00	-38.20	-26.79
1495.000	44.14	35.15	-9.88	34.26	25.27	74.00	54.00	-39.74	-28.73
1580.000	44.99	36.23	-9.88	35.11	26.35	74.00	54.00	-38.89	-27.65
2400.000	45.30	37.22	-5.70	39.60	31.52	74.00	54.00	-34.40	-22.48
2995.000	46.60	36.99	-1.72	44.88	35.27	74.00	54.00	-29.12	-18.73
*5000.000	47.37	38.26	5.26	52.63	43.52	74.00	54.00	-21.37	-10.48

Remark:

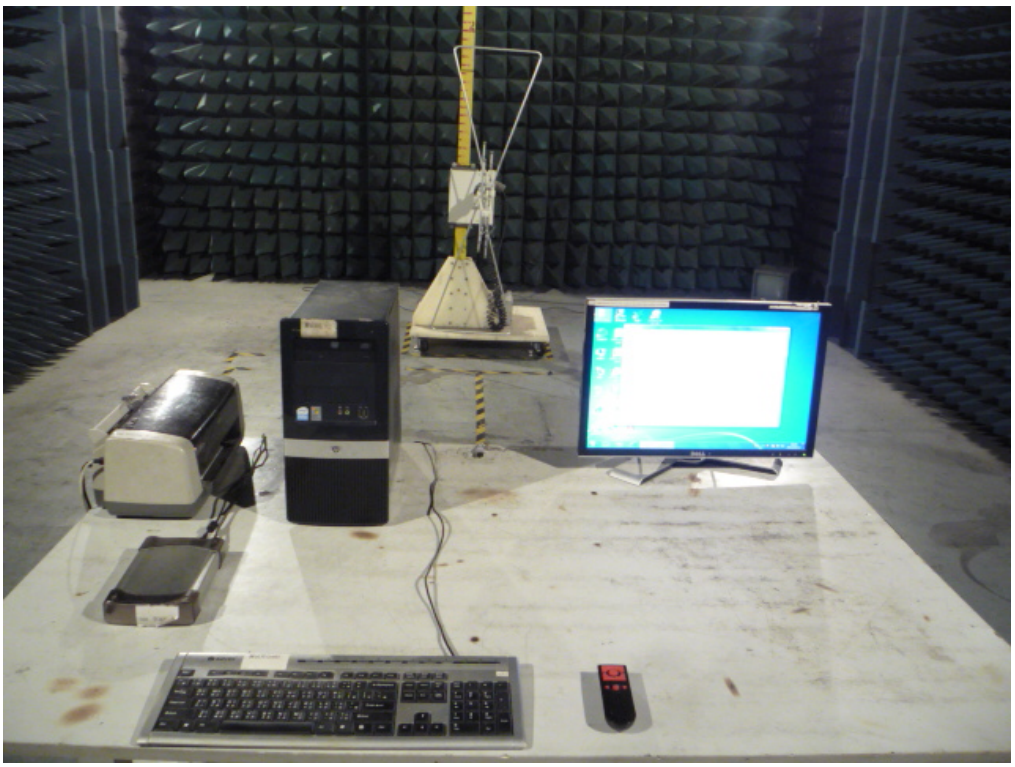
3. Factor = Antenna Factor + Cable Loss – Pre-amplifier.
4. '*' means the worst case



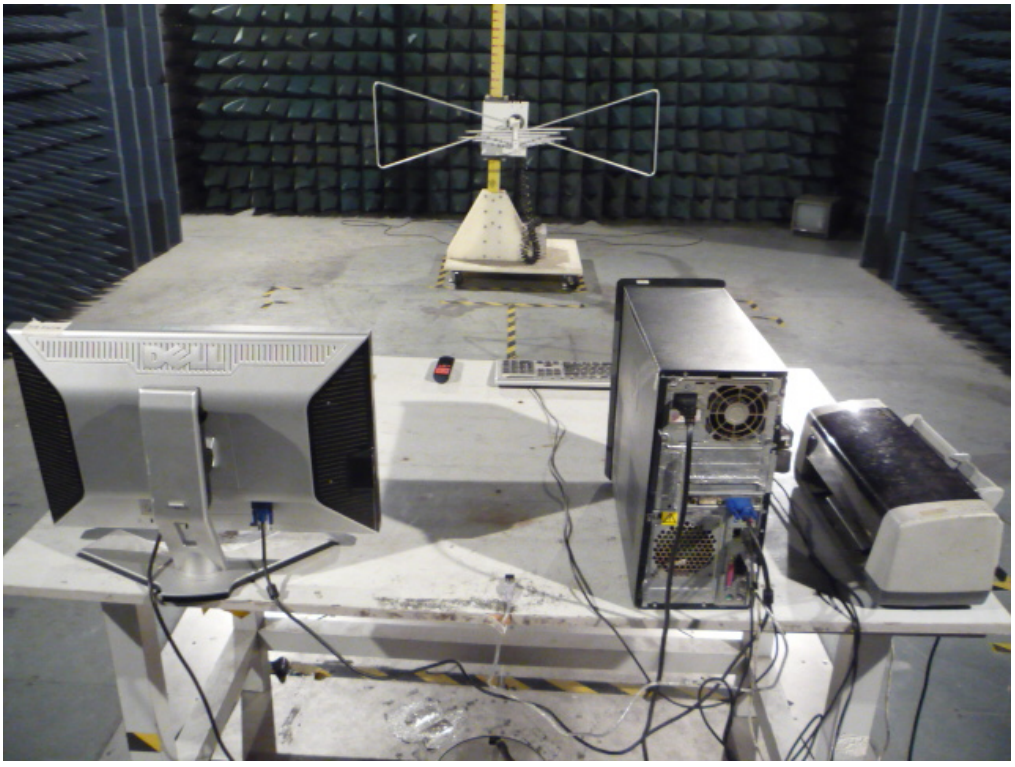
6.2.4 Test Setup photograph

Between 30—1000MHz

Model: RF612

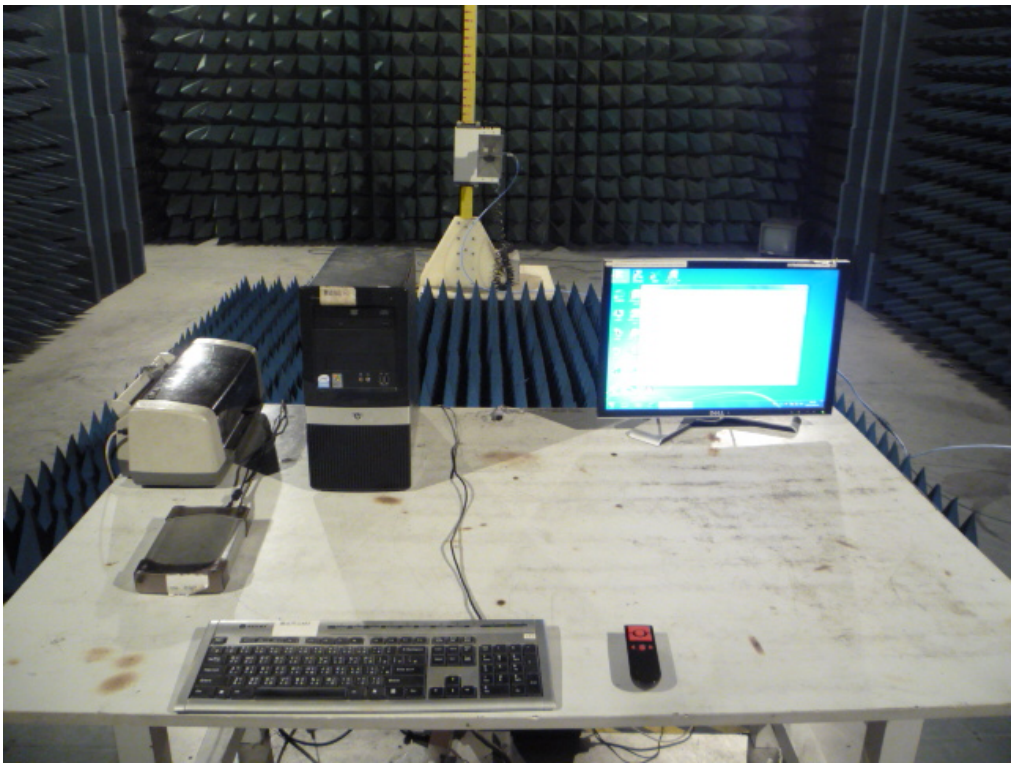


Model: RF612

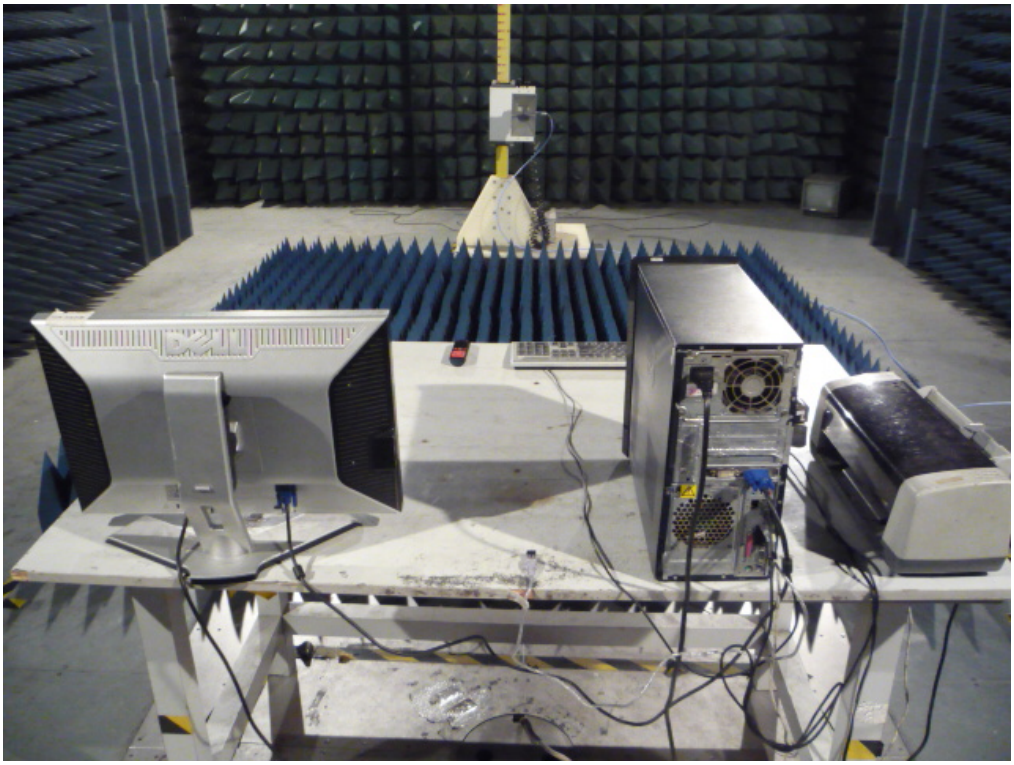


Between 1000—6000MHz

Model: RF612

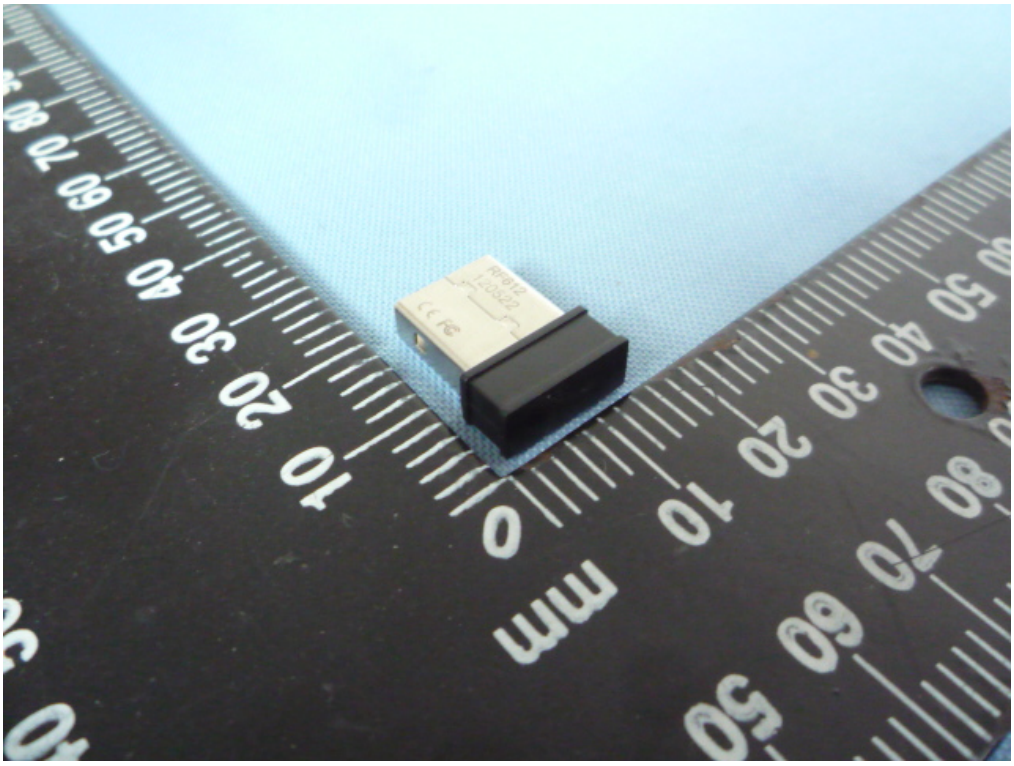


Model: RF612

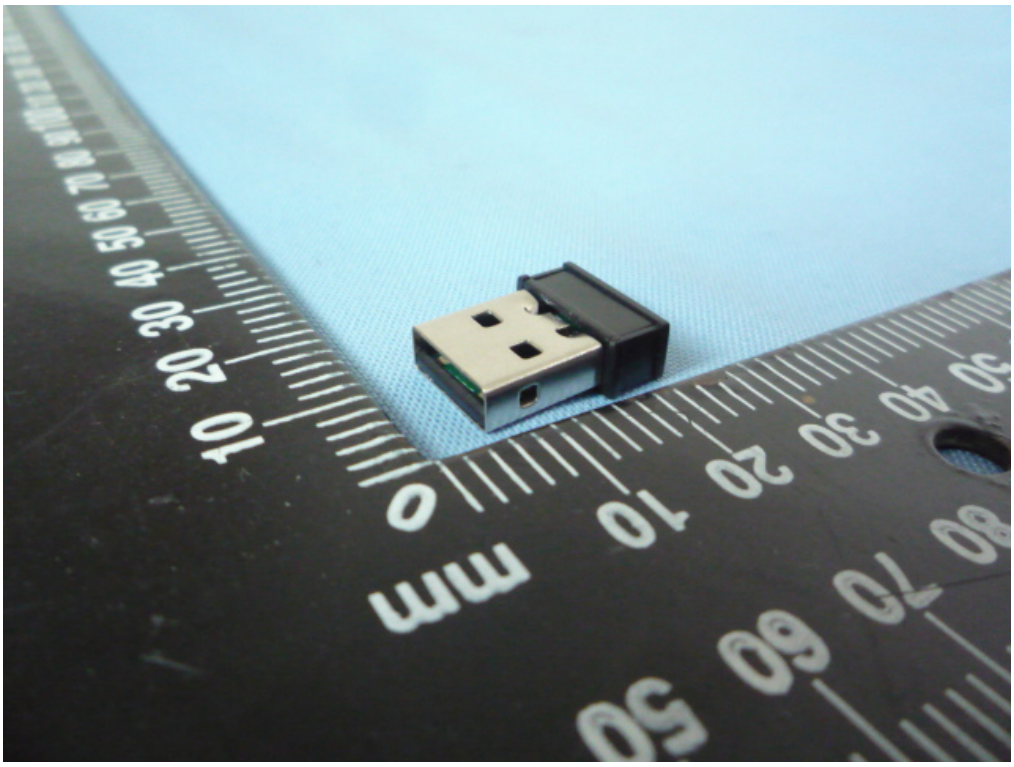


7 APPENDIX-Photographs of EUT Constructional Details

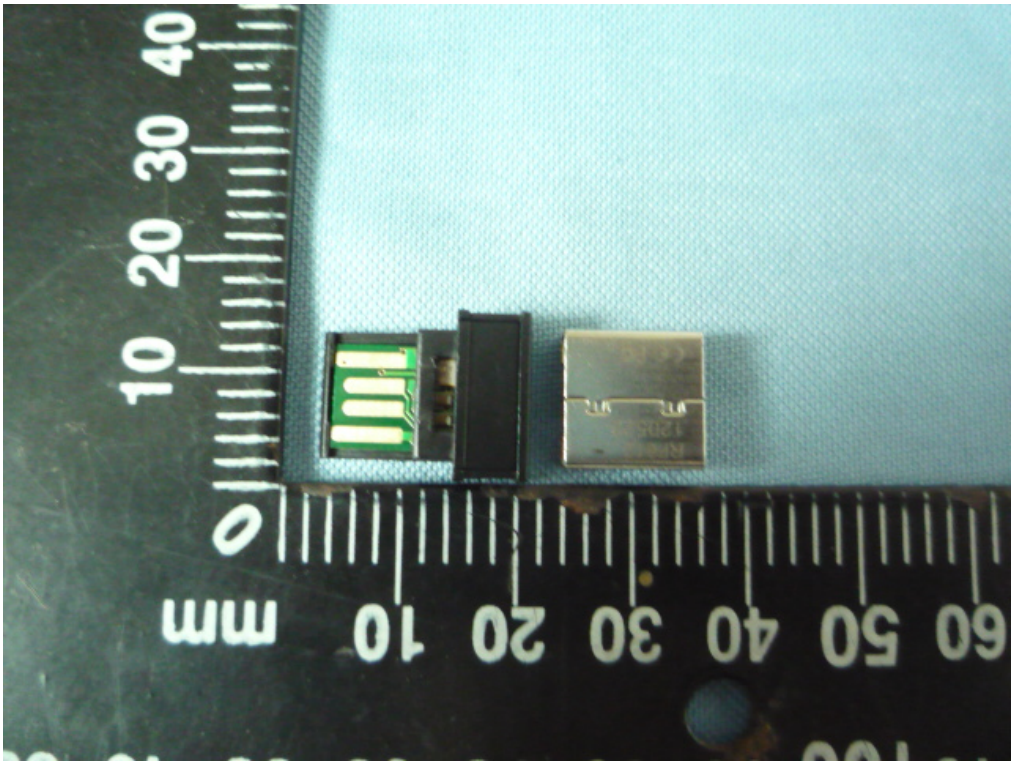
Model: RF612



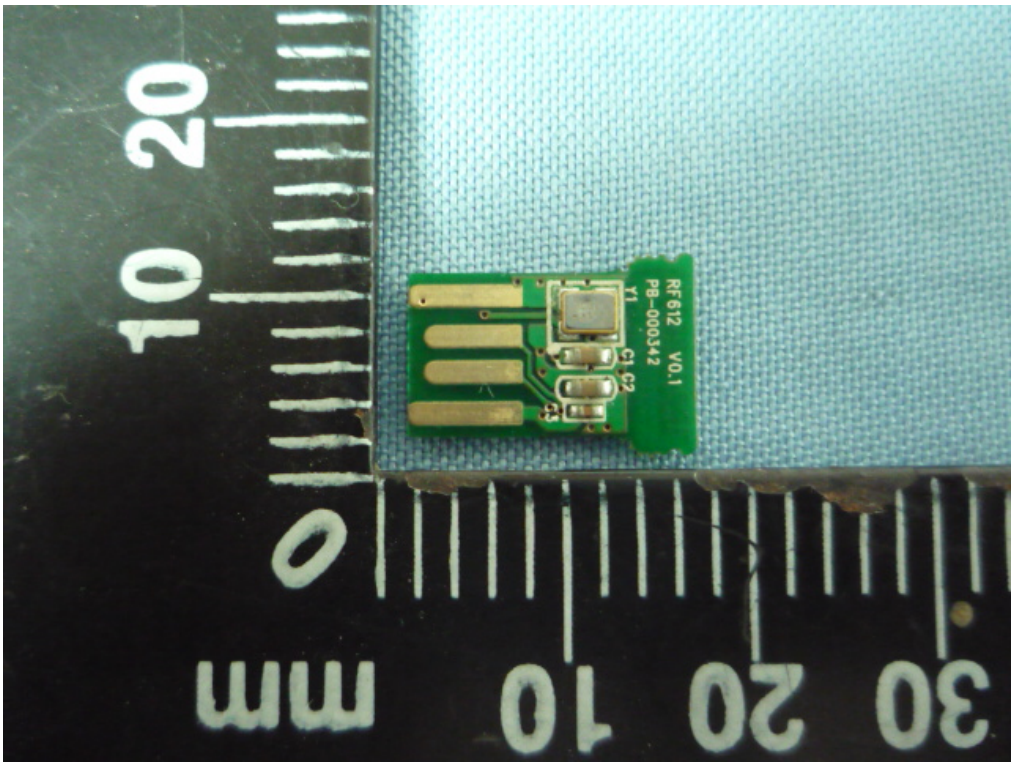
Model: RF612



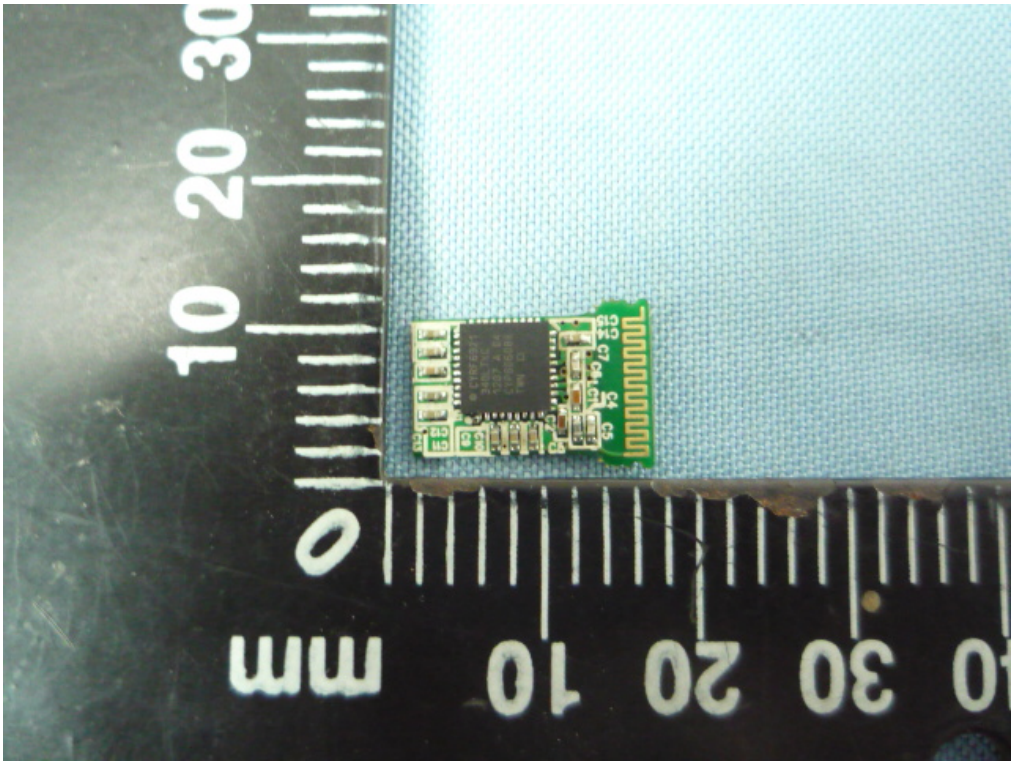
Model: RF612



Model: RF612



Model: RF612



End of the report