

FCC – Test report

Report Number : **60/760.10.205.01** Date of Issue: 28 June 2011

Model : **CONTROL PANEL**

Product Type : SAUNAS CONTROL PANEL

Applicant : Dayton Industrial Co., Ltd.

Address : 2-12 Kwai Fat Road, 11-A Kwai Chung,
New Territories, Hong Kong

Production Facility : Kendy Enterprise Ltd.

Address : 2-12 Kwai Fat Road, 11-A Kwai Chung,
New Territories, Hong Kong

Test Result : ☒ **Positive** ☐ **Negative**

Total pages including Appendices : 43

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Hong Kong

2 Details about the Test Laboratory

Details about the Test Laboratory

Company name: TÜV SÜD HONG KONG LTD.
3/F, West Wing, Lakeside 2,
10 Science Park West Avenue,
Science Park, Shatin
HK.

Telephone: 852 2776 1323
Fax: 852 2776 1372

Test site

Company name: Neutron Engineering Inc.
3, Jinshagang 1st Road,
ShiXia, Dalang Town,
DongGuan, China

FCC Registered Test Site Number 319330

3 Description of the Equipment Under Test

Description of the Equipment Under Test

Product: SAUNAS CONTROL PANEL

Model no.: CONTROL PANEL

Serial number: NIL

Options and accessories: NIL

Rated Voltage: 5 VDC, 3.3VDC

Rated Current: NIL

Rated Power: NIL

Frequency: NIL

Description of the EUT: EUT Main unit size: 21cm x 13 cm x 4 cm
Control size: 11.5 cm x 6.5 cm x 6.5 cm
Supply by power supply (Provided by client)

4 Summary of Test Standards and Results

Emission Tests						
Test Condition	Test Requirement	Test Method	Pages	Test Result		
				Pass	Fail	N/A
Radiated Emission (Fundamental & Spurious Emission)	FCC Part 15 Section 15.249 & 15.209	ANSI C63.4:2003	7-26	☒	☐	☐
Conducted Emission on AC 150kHz to 30MHz	FCC Part 15 Section 15.207	ANSI C63.4:2003	27-33	☒	☐	☐

5 General Remarks

Remarks

NIL

SUMMARY:

All tests according to the regulations cited on page 5 were

☒ - Performed

☐ - **Not** Performed

The Equipment Under Test

☒ - **Fulfills** the general approval requirements.

☐ - **Does not** fulfill the general approval requirements.

Sample Received Date: 20 October 2010

Testing Start Date: 20 October 2010

Testing End Date: 05 May 2011

- TÜV SÜD HONG KONG LTD. -

Reviewed by:



Edmond FUNG
EMC Test Engineer



Prepared by:



Cheng Kin Yeung
EMC Test Engineer

6 Emission Test Results

6.1 Radiated Emission Test (Fundamental)

Date of test : 26 October 2010

Test requirement : FCC Part 15 Section 15.249

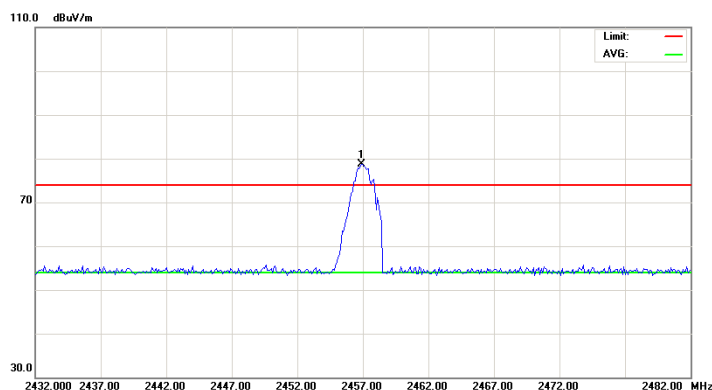
Test method : ANSI C63.4:2003

Operating mode : On mode

Antenna polarity : Horizontal

Remarks : NIL

Test Result	
☒	Passed
☐	Not Passed



Freq. (MHz)	Ant.Pol. H/V	Reading	Ant./CF CF(dB)	Average factor (dB)	Act.		Limit	
		Peak (dBuV/m)			Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)
2456.90	H	47.11	-31.54	51.05	78.65	27.60	114.00	94.00

Remark: The EUT was placed on the top of the turntable in test site area.
The resolution bandwidth setting on the test receiver was 9 KHz, Detector function peak (9kHz~30MHz).
The resolution bandwidth setting on the test receiver was 120 KHz, Detector function peak (30 MHz~1000MHz).
The resolution bandwidth setting on the test receiver was 1MHz, Detector function peak (1 GHz~5GHz).
The test shall be made in the operation mode. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
For emissions measurement, the receiving antenna was placed 3 meters far away from the turntable.
The antenna was fixed on the same height with the EUT to find each suspected emissions of both horizontal and vertical polarization.
Adjust the emission and slightly rotate the turntable to locate the position with maximum reading.
Adjust the emission and slightly height of the antenna to locate the position with maximum reading.
If the peak scan value lower limit more than 20dB, then this signal data does not show in graph
9kHz -30MHz and 18500 MHz to 26500MHz only have the background noise, the test date and graph does not show on the test report

Radiated Emission Test (Fundamental)

Date of test : 26 October 2010

Test requirement : FCC Part 15 Section 15.249

Test method : ANSI C63.4:2003

Operating mode : On mode

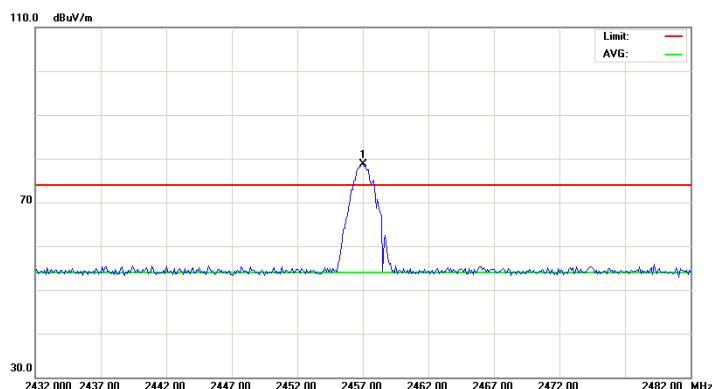
Antenna polarity : Vertical

Remarks : NIL

Test Result

☒ Passed

☐ Not Passed



Freq. (MHz)	Ant.Pol. H/V	Reading	Ant./CF CF(dB)	Average factor (dB)	Act.		Limit	
		Peak (dBuV/m)			Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)
2457.00	V	47.18	-31.54	51.05	78.72	27.67	114.00	94.00

Remark: The EUT was placed on the top of the turntable in test site area.

The resolution bandwidth setting on the test receiver was 9 KHz, Detector function peak (9kHz~30MHz).

The resolution bandwidth setting on the test receiver was 120 KHz, Detector function peak (30 MHz~1000MHz).

The resolution bandwidth setting on the test receiver was 1MHz, Detector function peak (1 GHz~5GHz).

The test shall be made in the operation mode. The turntable was rotated by 360 degrees to determine the position of the highest radiation.

For emissions measurement, the receiving antenna was placed 3 meters far away from the turntable.

The antenna was fixed on the same height with the EUT to find each suspected emissions of both horizontal and vertical polarization.

Adjust the emission and slightly rotate the turntable to locate the position with maximum reading.

Adjust the emission and slightly height of the antenna to locate the position with maximum reading.

If the peak scan value lower limit more than 20dB, then this signal data does not show in graph

9kHz -30MHz and 18500 MHz to 26500MHz only have the background noise, the test date and graph does not show on the test report

Radiated Emission Test 9kHz - 1000MHz

Date of test : 21 April 2011

Test requirement : FCC Part 15 Section 15.249

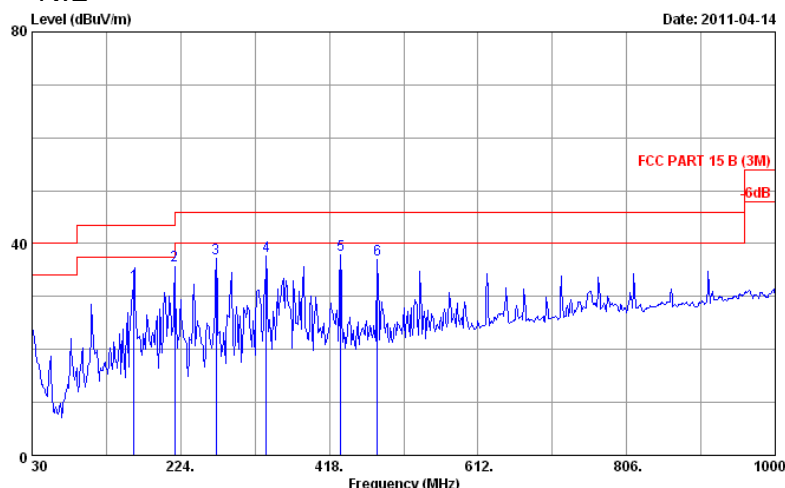
Test method : ANSI C63.4:2003

Operating mode : transmit without connect another unit

Antenna polarity : Horizontal

Remarks : NIL

Test Result

☒ Passed
☐ Not Passed


Freq. (MHz)	Ant. Pol. H/V	Reading	Ant./CF CF(dB)	Act.	Limit	Note
		QP (dBuV)		QP (dBuV)	QP (dBuV)	
163.00	H	20.07	12.15	32.22	43.50	X/F
216.00	H	24.00	11.91	35.91	43.50	X/F
270.56	H	21.70	15.58	37.28	46.00	X/F
335.55	H	20.48	17.25	37.73	46.00	X/F
432.55	H	17.24	20.54	37.78	46.00	X/F
481.05	H	15.35	21.54	36.89	46.00	X/F

Remark: The EUT was placed on the top of the turntable in test site area.
The resolution bandwidth setting on the test receiver was 9 KHz, Detector function peak (9kHz~30MHz).
The resolution bandwidth setting on the test receiver was 120 KHz, Detector function peak (30 MHz~1000MHz).
The resolution bandwidth setting on the test receiver was 1MHz, Detector function peak (1 GHz~5GHz).
The test shall be made in the operation mode. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
For emissions measurement, the receiving antenna was placed 3 meters far away from the turntable.
The antenna was fixed on the same height with the EUT to find each suspected emissions of both horizontal and vertical polarization.
Adjust the emission and slightly rotate the turntable to locate the position with maximum reading.
Adjust the emission and slightly height of the antenna to locate the position with maximum reading.
If the peak scan value lower limit more than 20dB, then this signal data does not show in graph
9kHz -30MHz and 18500 MHz to 26500MHz only have the background noise, the test date and graph does not show on the test report

Radiated Emission Test 1000MHz - 26500MHz

Date of test : 21 April 2011

Test requirement : FCC Part 15 Section 15.249

Test method : ANSI C63.4:2003

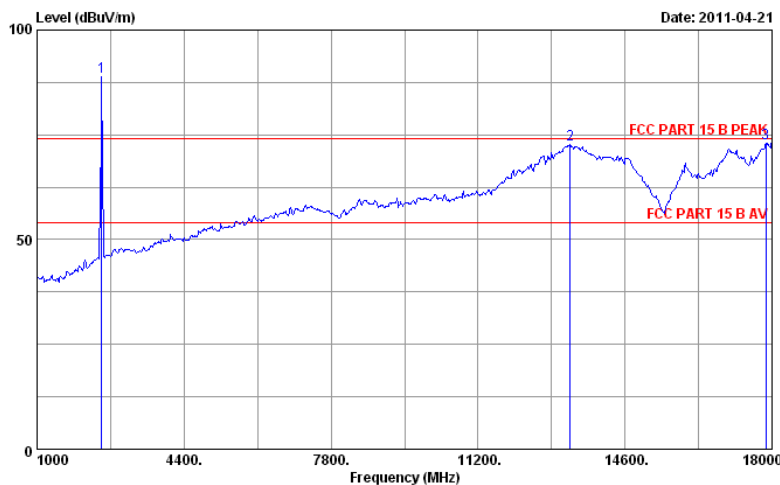
Operating mode : transmit without connect another unit

Antenna Polarity : Horizontal

Remarks : NIL

Test Result

☒ Passed

☐ Not Passed


Freq. (MHz)	Ant. Pol. H/V	Reading (dBμV/m)	Ant./CF CF(dB)	Act. (dBμV/m)	Limit (dBμV/m)	Note
2496.00	H	53.70	35.30	89.00	74.00	Peak
13325.00	H	26.78	45.80	72.58	74.00	Peak
13325.00	H	0.78	45.80	46.58	54.00	AVG
17864.00	H	26.51	46.50	73.01	74.00	Peak
17864.00	H	0.70	46.50	47.20	54.00	AVG

Remark: The EUT was placed on the top of the turntable in test site area.
The resolution bandwidth setting on the test receiver was 9 KHz, Detector function peak (9kHz~30MHz).
The resolution bandwidth setting on the test receiver was 120 KHz, Detector function peak (30 MHz~1000MHz).
The resolution bandwidth setting on the test receiver was 1MHz, Detector function peak (1 GHz~5GHz).
The test shall be made in the operation mode. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
For emissions measurement, the receiving antenna was placed 3 meters far away from the turntable.
The antenna was fixed on the same height with the EUT to find each suspected emissions of both horizontal and vertical polarization.
Adjust the emission and slightly rotate the turntable to locate the position with maximum reading.
Adjust the emission and slightly height of the antenna to locate the position with maximum reading.
If the peak scan value lower limit more than 20dB, then this signal data does not show in graph
9kHz -30MHz and 18500 MHz to 26500MHz only have the background noise, the test date and graph does not show on the test report

Radiated Emission Test 9kHz - 1000MHz

Date of test : 14 April 2011

Test requirement : FCC Part 15 Section 15.249

Test method : ANSI C63.4:2003

Operating mode : transmit without connect another unit

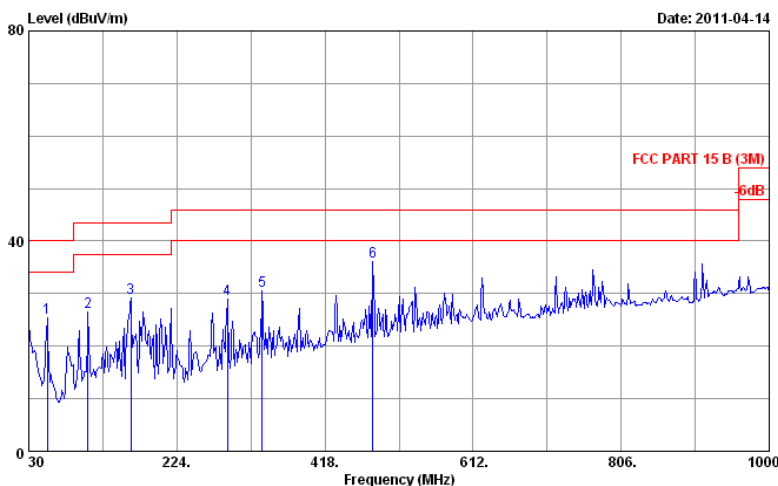
Antenna Polarity : Vertical

Remarks : NIL

Test Result

☒ Passed

☐ Not Passed



Freq. (MHz)	Ant. Pol. H/V	Reading QP (dBuV)	Ant./CF CF(dB)	Act. QP (dBuV)	Limit QP (dBuV)	Note
54.25	V	17.00	8.35	25.35	40.00	X/F
107.60	V	14.30	12.32	26.62	43.50	X/F
163.86	V	17.18	12.08	29.26	43.50	X/F
289.96	V	12.93	16.02	28.95	46.00	X/F
335.55	V	13.18	17.25	30.43	46.00	X/F
481.05	V	14.49	21.54	36.03	46.00	X/F

Remark: The EUT was placed on the top of the turntable in test site area.

The resolution bandwidth setting on the test receiver was 9 KHz, Detector function peak (9kHz~30MHz).

The resolution bandwidth setting on the test receiver was 120 KHz, Detector function peak (30 MHz~1000MHz).

The resolution bandwidth setting on the test receiver was 1MHz, Detector function peak (1 GHz~5GHz).

The test shall be made in the operation mode. The turntable was rotated by 360 degrees to determine the position of the highest radiation.

For emissions measurement, the receiving antenna was placed 3 meters far away from the turntable.

The antenna was fixed on the same height with the EUT to find each suspected emissions of both horizontal and vertical polarization.

Adjust the emission and slightly rotate the turntable to locate the position with maximum reading.

Adjust the emission and slightly height of the antenna to locate the position with maximum reading.

If the peak scan value lower limit more than 20dB, then this signal data does not show in graph

9kHz -30MHz and 18500 MHz to 26500MHz only have the background noise, the test date and graph does not show on the test report

Radiated Emission Test 1000MHz - 26500MHz

9

Date of test : 21 April 2011

Test requirement : FCC Part 15 Section 15.249

Test method : ANSI C63.4:2003

Operating mode : transmit without connect another unit

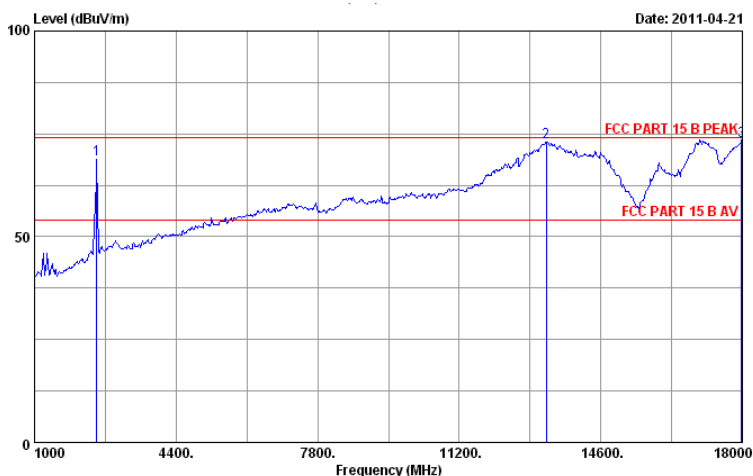
Antenna Polarity : Vertical

Remarks : NIL

Test Result

☒ Passed

☐ Not Passed



Freq. (MHz)	Ant. Pol. H/V	Reading (dBμV/m)	Ant./CF CF(dB)	Act. (dBμV/m)	Limit (dBμV/m)	Note
2496.00	V	33.38	35.30	68.68	74.00	Peak
13291.00	V	27.12	45.80	72.92	74.00	Peak
13291.00	V	0.78	45.80	46.58	54.00	AVG
17983.00	V	26.73	46.58	73.31	74.00	Peak
17983.00	V	0.62	46.58	47.20	54.00	AVG

Remark: The EUT was placed on the top of the turntable in test site area.

The resolution bandwidth setting on the test receiver was 9 KHz, Detector function peak (9kHz~30MHz).

The resolution bandwidth setting on the test receiver was 120 KHz, Detector function peak (30 MHz~1000MHz).

The resolution bandwidth setting on the test receiver was 1MHz, Detector function peak (1 GHz~5GHz).

The test shall be made in the operation mode. The turntable was rotated by 360 degrees to determine the position of the highest radiation.

For emissions measurement, the receiving antenna was placed 3 meters far away from the turntable.

The antenna was fixed on the same height with the EUT to find each suspected emissions of both horizontal and vertical polarization.

Adjust the emission and slightly rotate the turntable to locate the position with maximum reading.

Adjust the emission and slightly height of the antenna to locate the position with maximum reading.

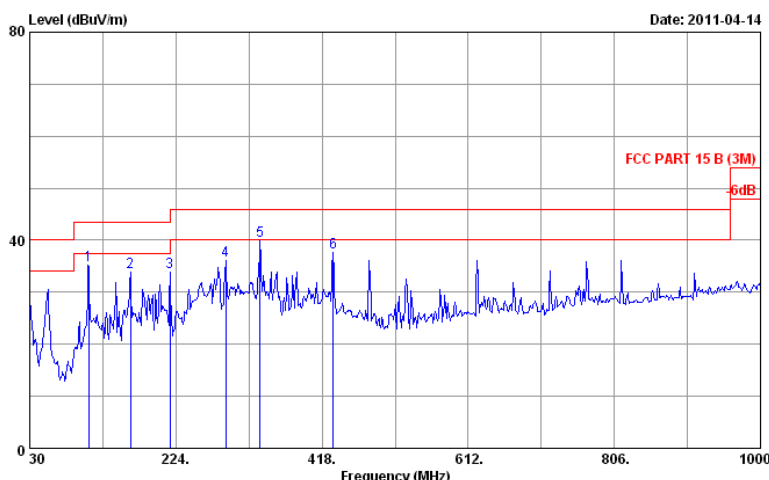
If the peak scan value lower limit more than 20dB, then this signal data does not show in graph

9kHz -30MHz and 18500 MHz to 26500MHz only have the background noise, the test date and graph does not show on the test report

Radiated Emission Test 9kHz – 1000MHz

Date of test : 14 April 2011
Test requirement : FCC Part 15 Section 15.109
Test method : ANSI C63.4:2003
Operating mode : PC
Antenna Polarity : Horizontal
Remarks : NIL

Test Result
☒ Passed
☐ Not Passed



Freq. (MHz)	Ant. Pol. H/V	Reading QP (dBuV)	Ant./CF CF(dB)	Act. QP (dBuV)	Limit QP (dBuV)	Note
108.00	H	22.90	12.32	35.22	43.50	X/F
163.86	H	21.87	12.08	33.95	43.50	X/F
216.24	H	21.92	11.91	33.83	46.00	X/F
289.96	H	20.18	16.02	36.20	46.00	X/F
335.55	H	22.71	17.25	39.96	46.00	X/F
432.55	H	17.09	20.55	37.64	46.00	X/F

Remark: The EUT was placed on the top of the turntable in test site area.
The resolution bandwidth setting on the test receiver was 9 KHz, Detector function peak (9kHz~30MHz).
The resolution bandwidth setting on the test receiver was 120 KHz, Detector function peak (30 MHz~1000MHz).
The resolution bandwidth setting on the test receiver was 1MHz, Detector function peak (1 GHz~5GHz).
The test shall be made in the operation mode. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
For emissions measurement, the receiving antenna was placed 3 meters far away from the turntable.
The antenna was fixed on the same height with the EUT to find each suspected emissions of both horizontal and vertical polarization.
Adjust the emission and slightly rotate the turntable to locate the position with maximum reading.
Adjust the emission and slightly height of the antenna to locate the position with maximum reading.
If the peak scan value lower limit more than 20dB, then this signal data does not show in graph
9kHz -30MHz and 18500 MHz to 26500MHz only have the background noise, the test date and graph does not show on the test report

Radiated Emission Test 1000MHz – 6000MHz

9

Date of test : 21 April 2011

Test requirement : FCC Part 15 Section 15.109

Test method : ANSI C63.4:2003

Operating mode : PC

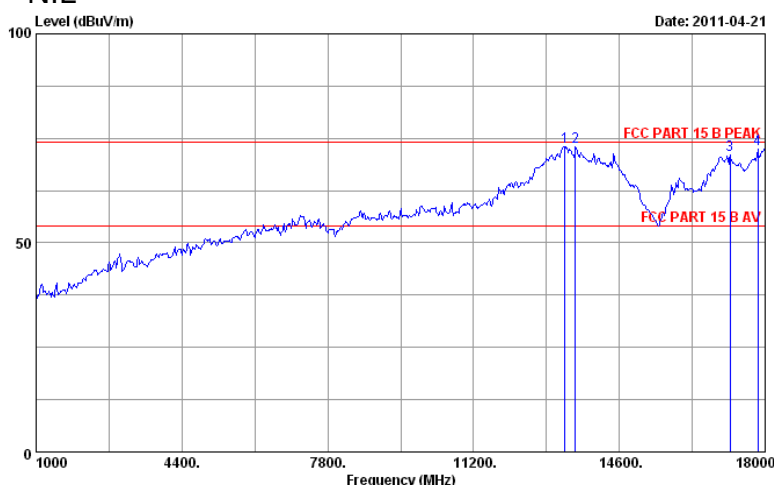
Antenna Polarity : Horizontal

Remarks : NIL

Test Result

☒ Passed

☐ Not Passed



Freq. (MHz)	Ant. Pol. H/V	Reading (dBμV/m)	Ant./CF CF(dB)	Act. (dBμV/m)	Limit (dBμV/m)	Note
13325.00	H	30.60	42.32	72.92	74.00	Peak
13325.00	H	4.26	42.32	46.58	54.00	AVG
17184.00	H	24.59	46.42	71.01	74.00	Peak
17184.00	H	1.10	46.42	47.52	54.00	AVG
17830.00	H	26.78	45.65	72.43	74.00	Peak
17830.00	H	2.88	45.62	48.50	54.00	AVG

Remark: The EUT was placed on the top of the turntable in test site area.

The resolution bandwidth setting on the test receiver was 9 KHz, Detector function peak (9kHz~30MHz).

The resolution bandwidth setting on the test receiver was 120 KHz, Detector function peak (30 MHz~1000MHz).

The resolution bandwidth setting on the test receiver was 1MHz, Detector function peak (1 GHz~5GHz).

The test shall be made in the operation mode. The turntable was rotated by 360 degrees to determine the position of the highest radiation.

For emissions measurement, the receiving antenna was placed 3 meters far away from the turntable.

The antenna was fixed on the same height with the EUT to find each suspected emissions of both horizontal and vertical polarization.

Adjust the emission and slightly rotate the turntable to locate the position with maximum reading.

Adjust the emission and slightly height of the antenna to locate the position with maximum reading.

If the peak scan value lower limit more than 20dB, then this signal data does not show in graph

9kHz -30MHz and 18500 MHz to 26500MHz only have the background noise, the test date and graph does not show on the test report

Radiated Emission Test 30MHz – 1000MHz

Date of test : 14 April 2011

Test requirement : FCC Part 15 Section 15.109

Test method : ANSI C63.4:2003

Operating mode : PC

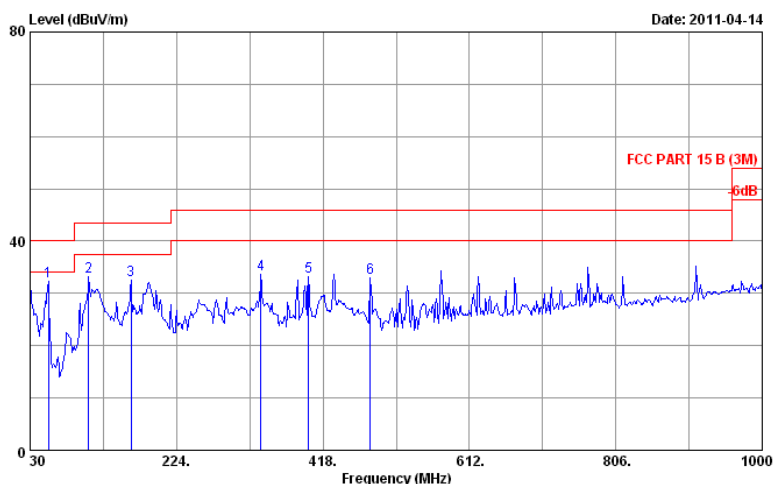
Antenna Polarity : Vertical

Remarks : NIL

Test Result

☒ Passed

☐ Not Passed



Freq. (MHz)	Ant. Pol. H/V	Reading QP (dBuV)	Ant./CF CF(dB)	Act. QP (dBuV)	Limit QP (dBuV)	Note
54.25	V	24.04	8.35	32.39	40.00	X/F
107.60	V	20.78	12.32	33.10	43.50	X/F
163.86	V	20.49	12.08	32.57	43.50	X/F
335.55	V	16.32	17.25	33.57	46.00	X/F
398.60	V	13.90	19.30	33.20	46.00	X/F
481.05	V	11.40	21.54	32.94	46.00	X/F

Remark: The EUT was placed on the top of the turntable in test site area.
The resolution bandwidth setting on the test receiver was 9 KHz, Detector function peak (9kHz~30MHz).
The resolution bandwidth setting on the test receiver was 120 KHz, Detector function peak (30 MHz~1000MHz).
The resolution bandwidth setting on the test receiver was 1MHz, Detector function peak (1 GHz~5GHz).
The test shall be made in the operation mode. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
For emissions measurement, the receiving antenna was placed 3 meters far away from the turntable.
The antenna was fixed on the same height with the EUT to find each suspected emissions of both horizontal and vertical polarization.
Adjust the emission and slightly rotate the turntable to locate the position with maximum reading.
Adjust the emission and slightly height of the antenna to locate the position with maximum reading.
If the peak scan value lower limit more than 20dB, then this signal data does not show in graph
9kHz -30MHz and 18500 MHz to 26500MHz only have the background noise, the test date and graph does not show on the test report

Radiated Emission Test 1000MHz – 6000MHz

Date of test : 21 April 2011

Test requirement : FCC Part 15 Section 15.109

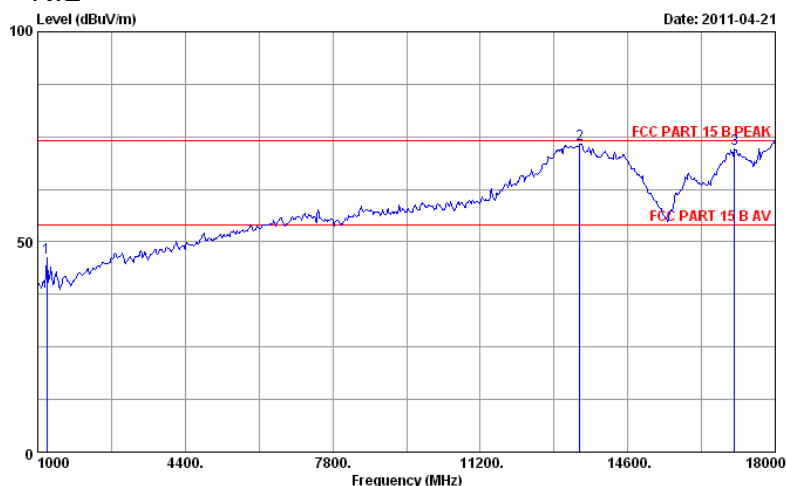
Test method : ANSI C63.4:2003

Operating mode : PC

Antenna Polarity : Vertical

Remarks : NIL

Test Result	
☒	Passed
☐	Not Passed



Freq. (MHz)	Ant. Pol. H/V	Reading (dBμV/m)	Ant./CF CF(dB)	Act. (dBμV/m)	Limit (dBμV/m)	Note
1204.00	V	16.61	29.56	46.17	74.00	Peak
13495.00	V	30.48	42.80	73.28	74.00	Peak
13495.00	V	1.78	42.80	44.58	54.00	AVG
17065.00	V	24.33	47.68	72.01	74.00	Peak
17065.00	V	1.29	47.68	48.97	54.00	AVG

Remark: The EUT was placed on the top of the turntable in test site area.
The resolution bandwidth setting on the test receiver was 9 KHz, Detector function peak (9kHz~30MHz).
The resolution bandwidth setting on the test receiver was 120 KHz, Detector function peak (30 MHz~1000MHz).
The resolution bandwidth setting on the test receiver was 1MHz, Detector function peak (1 GHz~5GHz).
The test shall be made in the operation mode. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
For emissions measurement, the receiving antenna was placed 3 meters far away from the turntable.
The antenna was fixed on the same height with the EUT to find each suspected emissions of both horizontal and vertical polarization.
Adjust the emission and slightly rotate the turntable to locate the position with maximum reading.
Adjust the emission and slightly height of the antenna to locate the position with maximum reading.
If the peak scan value lower limit more than 20dB, then this signal data does not show in graph
9kHz -30MHz and 18500 MHz to 26500MHz only have the background noise, the test date and graph does not show on the test report

Radiated Emission Test 9kHz – 1000MHz

Date of test : 14 April 2011

Test requirement : FCC Part 15 Section 15.209

Test method : ANSI C63.4:2003

Operating mode : DVD mode

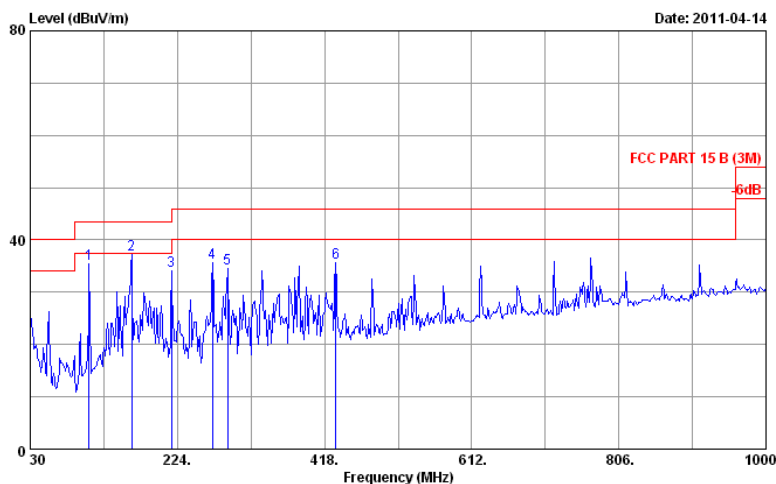
Antenna Polarity : Horizontal

Remarks : NIL

Test Result

☒ Passed

☐ Not Passed



Freq. (MHz)	Ant. Pol. H/V	Reading QP (dBuV)	Ant./CF CF(dB)	Act. QP (dBuV)	Limit QP (dBuV)	Note
107.60	H	23.10	12.32	35.42	43.50	X/F
163.86	H	25.24	12.08	37.32	43.50	X/F
216.24	H	22.09	11.91	34.00	46.00	X/F
270.56	H	20.04	15.58	35.62	46.00	X/F
289.96	H	18.44	16.02	34.46	46.00	X/F
432.55	H	15.18	20.54	35.72	46.00	X/F

Remark: The EUT was placed on the top of the turntable in test site area.
The resolution bandwidth setting on the test receiver was 9 KHz, Detector function peak (9kHz~30MHz).
The resolution bandwidth setting on the test receiver was 120 KHz, Detector function peak (30 MHz~1000MHz).
The resolution bandwidth setting on the test receiver was 1MHz, Detector function peak (1 GHz~5GHz).
The test shall be made in the operation mode. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
For emissions measurement, the receiving antenna was placed 3 meters far away from the turntable.
The antenna was fixed on the same height with the EUT to find each suspected emissions of both horizontal and vertical polarization.
Adjust the emission and slightly rotate the turntable to locate the position with maximum reading.
Adjust the emission and slightly height of the antenna to locate the position with maximum reading.
If the peak scan value lower limit more than 20dB, then this signal data does not show in graph
9kHz -30MHz and 18500 MHz to 26500MHz only have the background noise, the test date and graph does not show on the test report

Radiated Emission Test 1000MHz – 6000MHz

9

Date of test : 21 April 2011

Test requirement : FCC Part 15 Section 15.209

Test method : ANSI C63.4:2003

Operating mode : DVD mode

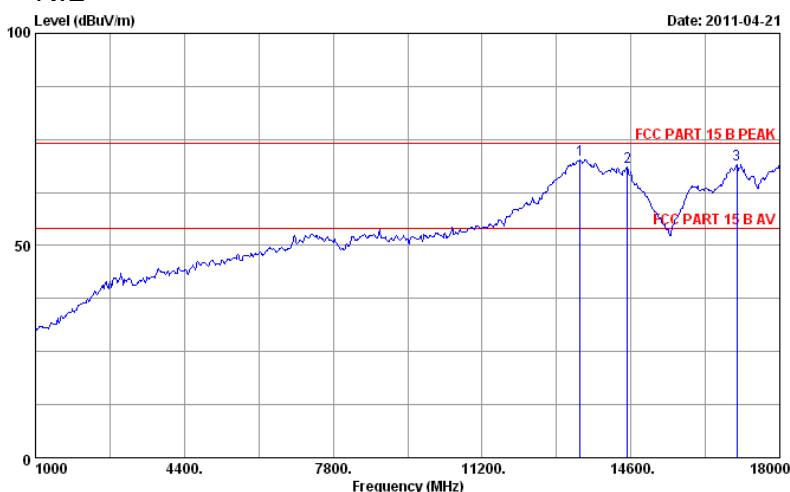
Antenna Polarity : Horizontal

Remarks : NIL

Test Result

☒ Passed

☐ Not Passed



Freq. (MHz)	Ant. Pol. H/V	Reading (dBμV/m)	Ant./CF CF(dB)	Act. (dBμV/m)	Limit (dBμV/m)	Note
13444.00	H	27.54	42.66	70.20	74.00	Peak
13444.00	H	3.92	42.66	46.58	54.00	AVG
14515.00	H	26.03	42.44	68.47	74.00	Peak
14515.00	H	2.76	42.44	45.20	54.00	AVG
17014.00	H	20.78	48.22	69.00	74.00	Peak
17014.00	H	0.28	48.22	48.50	54.00	AVG

Remark: The EUT was placed on the top of the turntable in test site area.
The resolution bandwidth setting on the test receiver was 9 KHz, Detector function peak (9kHz~30MHz).
The resolution bandwidth setting on the test receiver was 120 KHz, Detector function peak (30 MHz~1000MHz).
The resolution bandwidth setting on the test receiver was 1MHz, Detector function peak (1 GHz~5GHz).
The test shall be made in the operation mode. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
For emissions measurement, the receiving antenna was placed 3 meters far away from the turntable.
The antenna was fixed on the same height with the EUT to find each suspected emissions of both horizontal and vertical polarization.
Adjust the emission and slightly rotate the turntable to locate the position with maximum reading.
Adjust the emission and slightly height of the antenna to locate the position with maximum reading.
If the peak scan value lower limit more than 20dB, then this signal data does not show in graph
9kHz -30MHz and 18500 MHz to 26500MHz only have the background noise, the test date and graph does not show on the test report

Radiated Emission Test 30MHz – 1000MHz

Date of test : 14 April 2011

Test requirement : FCC Part 15 Section 15.209

Test method : ANSI C63.4:2003

Operating mode : DVD mode

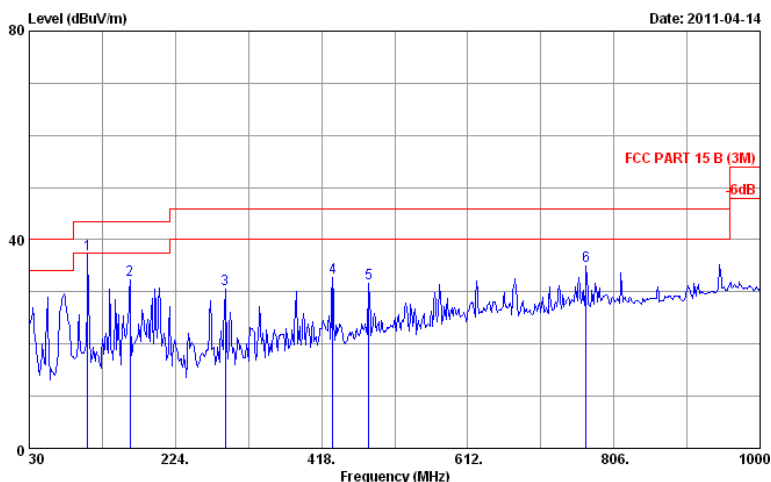
Antenna Polarity : Vertical

Remarks : NIL

Test Result

☒ Passed

☐ Not Passed



Freq. (MHz)	Ant. Pol. H/V	Reading	Ant./CF CF(dB)	Act.	Limit	Note
		QP (dBuV)		QP (dBuV)	QP (dBuV)	
107.60	V	24.89	12.32	37.21	43.50	X/F
163.86	V	20.33	12.08	32.41	43.50	X/F
289.96	V	14.42	16.02	30.44	46.00	X/F
432.55	V	12.30	20.54	32.84	46.00	X/F
481.05	V	10.13	21.54	31.67	46.00	X/F
769.14	V	8.19	26.87	35.06	46.00	X/F

Remark: The EUT was placed on the top of the turntable in test site area.

The resolution bandwidth setting on the test receiver was 9 KHz, Detector function peak (9kHz~30MHz).

The resolution bandwidth setting on the test receiver was 120 KHz, Detector function peak (30 MHz~1000MHz).

The resolution bandwidth setting on the test receiver was 1MHz, Detector function peak (1 GHz~5GHz).

The test shall be made in the operation mode. The turntable was rotated by 360 degrees to determine the position of the highest radiation.

For emissions measurement, the receiving antenna was placed 3 meters far away from the turntable.

The antenna was fixed on the same height with the EUT to find each suspected emissions of both horizontal and vertical polarization.

Adjust the emission and slightly rotate the turntable to locate the position with maximum reading.

Adjust the emission and slightly height of the antenna to locate the position with maximum reading.

If the peak scan value lower limit more than 20dB, then this signal data does not show in graph

9kHz -30MHz and 18500 MHz to 26500MHz only have the background noise, the test date and graph does not show on the test report

Radiated Emission Test 1000MHz – 6000MHz

Date of test : 21 April 2011

Test requirement : FCC Part 15 Section 15.209

Test method : ANSI C63.4:2003

Operating mode : DVD mode

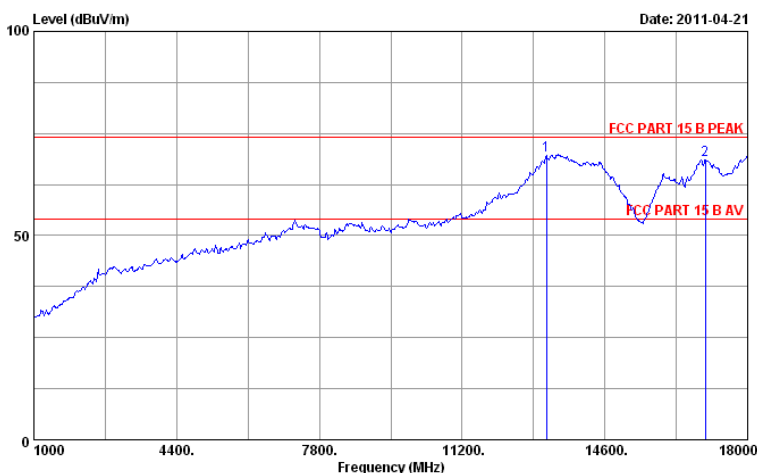
Antenna Polarity : Vertical

Remarks : NIL

Test Result

☒ Passed

☐ Not Passed



Freq. (MHz)	Ant.Pol. H/V	Reading (dBμV/m)	Ant./CF CF(dB)	Act. (dBμV/m)	Limit (dBμV/m)	Note
13206.00	V	27.53	41.98	69.51	74.00	Peak
13206.00	V	4.60	41.98	46.58	54.00	AVG
16997.00	V	20.23	48.40	68.63	74.00	Peak
16997.00	V	1.10	48.40	49.50	54.00	AVG

Remark: The EUT was placed on the top of the turntable in test site area.
The resolution bandwidth setting on the test receiver was 9 KHz, Detector function peak (9kHz~30MHz).
The resolution bandwidth setting on the test receiver was 120 KHz, Detector function peak (30 MHz~1000MHz).
The resolution bandwidth setting on the test receiver was 1MHz, Detector function peak (1 GHz~5GHz).
The test shall be made in the operation mode. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
For emissions measurement, the receiving antenna was placed 3 meters far away from the turntable.
The antenna was fixed on the same height with the EUT to find each suspected emissions of both horizontal and vertical polarization.
Adjust the emission and slightly rotate the turntable to locate the position with maximum reading.
Adjust the emission and slightly height of the antenna to locate the position with maximum reading.
If the peak scan value lower limit more than 20dB, then this signal data does not show in graph
9kHz -30MHz and 18500 MHz to 26500MHz only have the background noise, the test date and graph does not show on the test report

Test Equipment List

Radiated Emission Test

Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
Antenna	EMCO	3142C	00066462	Jun .08.2011
Antenna	EMCO	3142C	00066464	Jun .08.2011
Amplifier	Agilent	8447D	2944A11203	Nov.26.2011
Amplifier	Agilent	8447D	2944A11204	Nov.26.2011
Spectrum Analyzer	Agilent	E4443A	MY48250370	Nov.26.2011
RF Pre-selector	Agilent	N9039A	MY46520201	Nov.26.2011
Test Cable	N/A	Cable_5m_8m_15m	N/A	Feb.04.2011
Test Cable	N/A	Cable_5m_11m_15m	N/A	Feb.04.2011
Spectrum Analyzer	Agilent	E4447A	MY48250208	Nov.26.2011
RF Pre-selector	Agilent	N9039A	MY46520214	Nov.26.2011
Multi-Device Controller	ETS-Lindgren	2090	N/A	N/A
Spectrum Analyzer	R&S	FSP 40	100185	Nov.26.2011
Signal Generator	R&S	SMR 40	3008A02274	May.26.2011
Signal Generator	HP	8648A	3636A02964	May.26.2011
Amplifier	Agilent	8447D	2944A11203	May.26.2011
Amplifier	Agilent	8449B	3008A02274	May.26.2011
Double Ridged Guide Antenna	ETS-LINDGREN	3115	00075846	May.27.2011
Antenna	SCHWARZBECK	VULB 9160	9160-3231	Jun .08.2011
Test Cable	N/A	CL-CB02-001	N/A	Dec.06.2011
Test Cable	N/A	CL-CB02-004	N/A	Dec.06.2011
Test Cable	N/A	CL-CB02-006	N/A	Dec.06.2011
Controller	CT	SC100	N/A	N/A
Wireband Power sensor	Agilent	N1921A	MY45240824	May.26.2011
DC power supply	GW Instek	GPC-30300N	EK880675	Oct.18.2011
Horn Antenna	Schwarbeck	VULB9160	9160-3232	May.26.2011
Horn Antenna	Schwarbeck	BBHA9170	9170187	Oct. 22. 2011
Broad-Band Horn Antenna	ETS	3115	00075789	May,12.2011
Triple Loop Antenna	R&S	HFH2-Z2	830749/020	May.27.2011

6.2 20dB Bandwidth measurement

Date of test : 26 October 2010

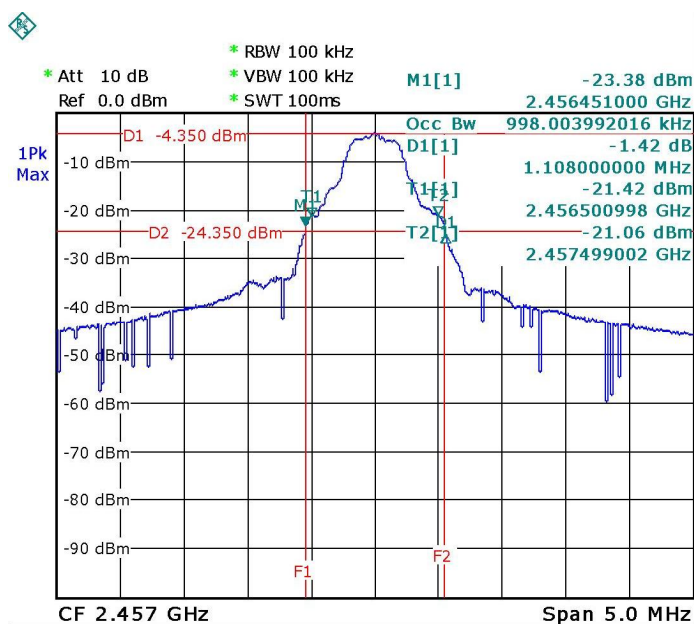
Test requirement : FCC Part 15 Section 15.249

Test method : ANSI C63.4:2003

Operating mode : On mode

Remarks : NIL

Test Result	
☒	Passed
☐	Not Passed



Remark: Use the following spectrum analyzer settings:
 Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel
 RBW $\geq$ 1% of the 20 dB bandwidth
 VBW $\geq$ RBW Sweep = auto
 Detector function = peak
 Trace = max hold
 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. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the marker delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section.

6.3 Duty cycle measurement

Date of test : 26 October 2010

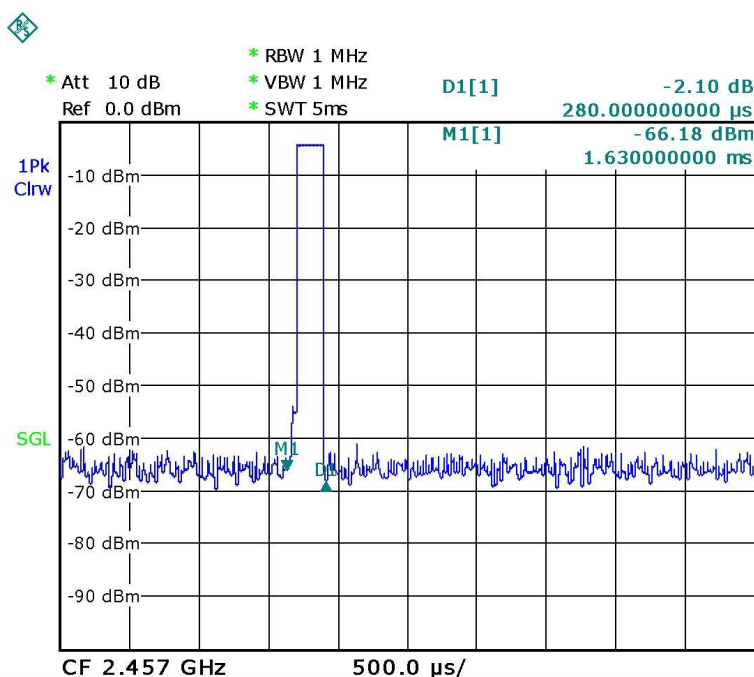
Test requirement : FCC Part 15 Section 15.231

Test method : ANSI C63.4:2003

Operating mode : On mode

Remarks : Detector function = peak

Test Result

☒ Passed
☐ Not Passed


EUT data packet 1 has the period of 0.28ms

Duty cycle measurement

Date of test : 26 October 2010

Test requirement : FCC Part 15 Section 15.231

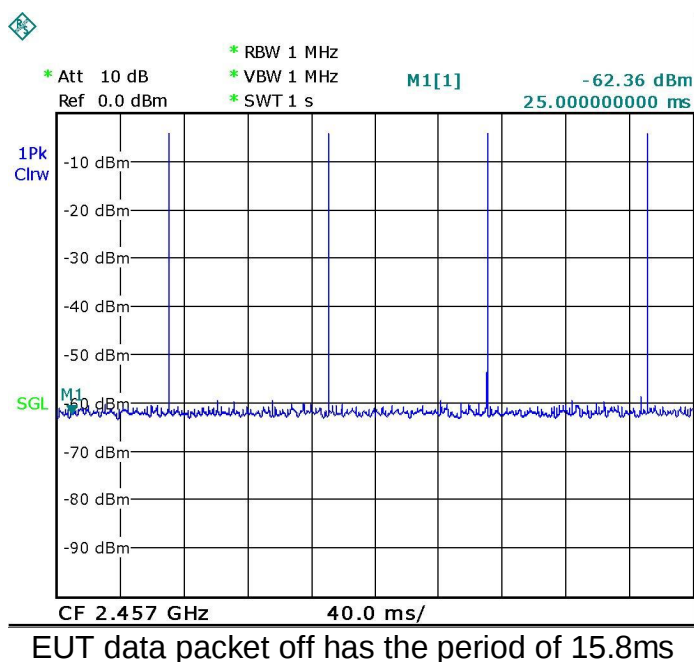
Test method : ANSI C63.4:2003

Operating mode : On mode

Remarks : Detector function = peak

Test Result

☒ Passed
☐ Not Passed



Therefore, the total signal "on" time of on successful period is = 250 ms(exceed 100ms).

Average factor: $20 \log 1/(0.28/100) = 51.05 \text{ dB}$ Average = Peak – Average Factor

6.4 Bandedge measurement

Date of test : 26 October 2010

Test requirement : FCC Part 15 Section 15.249

Test method : ANSI C63.4:2003

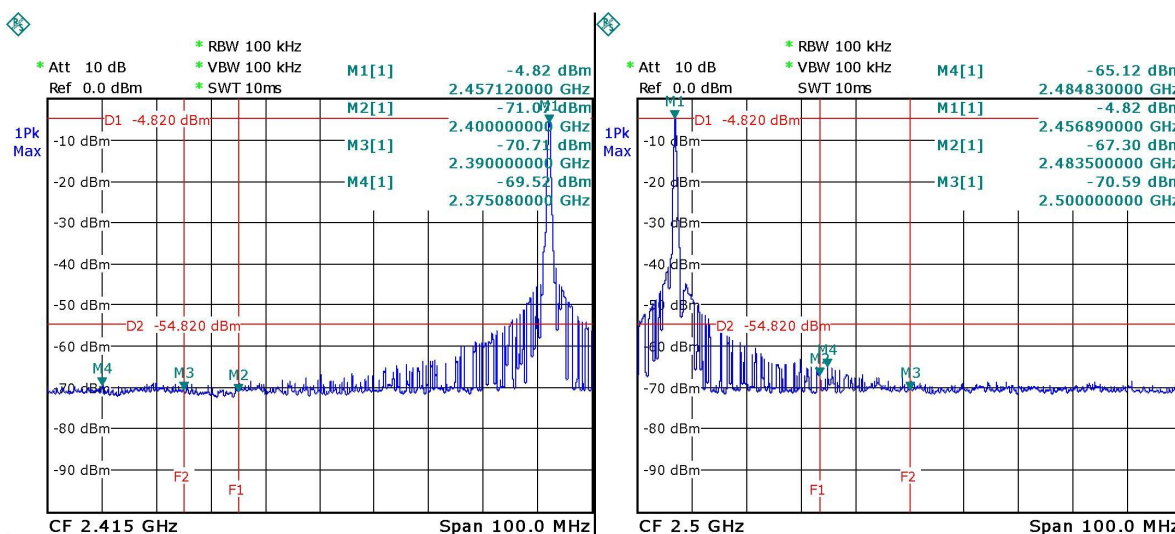
Operating mode : On mode

Remarks : NIL

Test Result

☒ Passed

☐ Not Passed



Date: 20.JAN.2011 20:49:01

Date: 20.JAN.2011 20:25:12

Remark: Use the following spectrum analyzer settings:

- Span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation
- RBW $\geq$ 1% of the span
- VBW $\geq$ RBW
- Sweep = auto
- Detector function = peak
- Trace = max hold

Allow the trace to stabilize. Set the marker on the emission at the bandedge, or on the highest modulation product outside of the band, if this level is greater than that at the bandedge. Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission. The marker-delta value now displayed must comply with the limit specified in this Section. Submit this plot. Now, using the same instrument settings, enable the hopping function of the EUT. Allow the trace to stabilize. Follow the same procedure listed above to determine if any spurious emissions caused by the hopping function also comply with the specified limit. Submit this plot.

Test Equipment List

Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
Antenna	EMCO	3142C	00066462	Jun .08.2011
Antenna	EMCO	3142C	00066464	Jun .08.2011
Amplifier	Agilent	8447D	2944A11203	Nov.26.2011
Amplifier	Agilent	8447D	2944A11204	Nov.26.2011
Spectrum Analyzer	Agilent	E4443A	MY48250370	Nov.26.2011
RF Pre-selector	Agilent	N9039A	MY46520201	Nov.26.2011
Test Cable	N/A	Cable_5m_8m_15m	N/A	Feb.04.2011
Test Cable	N/A	Cable_5m_11m_15m	N/A	Feb.04.2011
Spectrum Analyzer	Agilent	E4447A	MY48250208	Nov.26.2011
RF Pre-selector	Agilent	N9039A	MY46520214	Nov.26.2011
Multi-Device Controller	ETS-Lindgren	2090	N/A	N/A
Spectrum Analyzer	R&S	FSP 40	100185	Nov.26.2011
Signal Generator	R&S	SMR 40	3008A02274	May.26.2011
Signal Generator	HP	8648A	3636A02964	May.26.2011
Amplifier	Agilent	8447D	2944A11203	May.26.2011
Amplifier	Agilent	8449B	3008A02274	May.26.2011
Double Ridged Guide Antenna	ETS-LINDGREN	3115	00075846	May.27.2011
Antenna	SCHWARZBECK	VULB 9160	9160-3231	Jun .08.2011
Test Cable	N/A	CL-CB02-001	N/A	Dec.06.2011
Test Cable	N/A	CL-CB02-004	N/A	Dec.06.2011
Test Cable	N/A	CL-CB02-006	N/A	Dec.06.2011
Controller	CT	SC100	N/A	N/A
Wireband Power sensor	Agilent	N1921A	MY45240824	May.26.2011
DC power supply	GW Instek	GPC-30300N	EK880675	Oct.18.2011
Horn Antenna	Schwarbeck	VULB9160	9160-3232	May.26.2011
Broad-Band Horn Antenna	ETS	3115	00075789	May,12.2011
Triple Loop Antenna	R&S	HFH2-Z2	830749/020	May.27.2011

7.7 Conducted Emission Test 150kHz – 30MHz

Date of test : 11 April 2011

Test requirement : FCC Part 15 Section 15.207

Test method : ANSI C63.4:2003

Operating mode : Stand alone

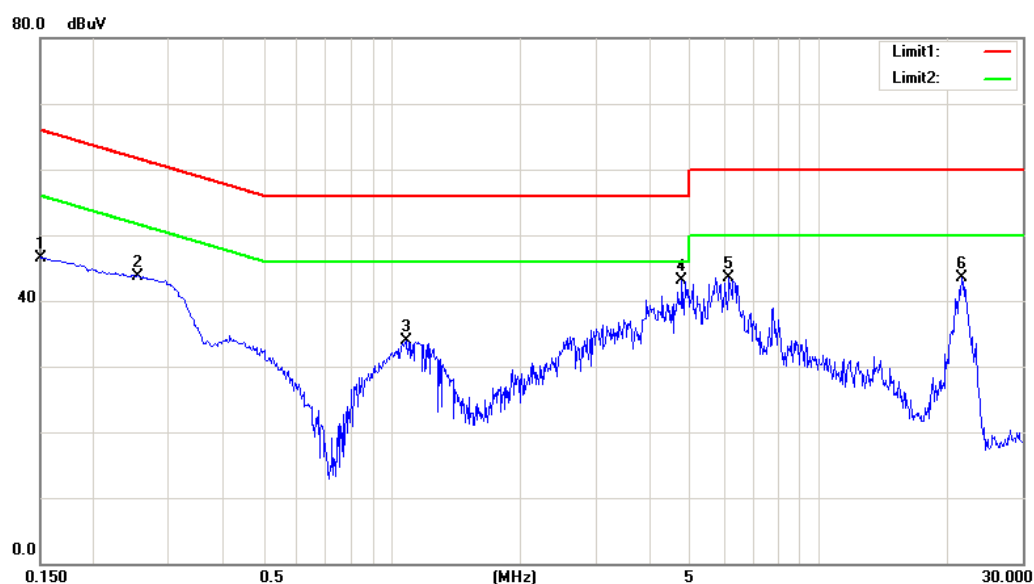
Tested on : AC Mains, Live

Remarks : NIL

Test Result

☒ Passed

☐ Not Passed



f/MHz	Reading	Factor	Act (dBuV)	Limit	Margin	Note
0.1500	36.75	9.85	46.60	66.00	-19.40	QP
0.2540	33.94	9.86	43.80	61.63	-17.83	QP
1.0820	23.99	9.83	33.82	56.00	-22.18	QP
4.7780	33.03	9.98	43.01	56.00	-12.99	QP
6.1780	33.50	10.04	43.54	60.00	-16.46	QP
21.6460	32.57	10.85	43.42	60.00	-16.58	QP

P.S. : If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured
IF bandwidth 9kHz, RBW, 9kHz, VBW, 9kHz

Conducted Emission Test 150kHz – 30MHz

Date of test : 11 April 2011

Test requirement : FCC Part 15 Section 15.207

Test method : ANSI C63.4:2003

Operating mode : Stand alone

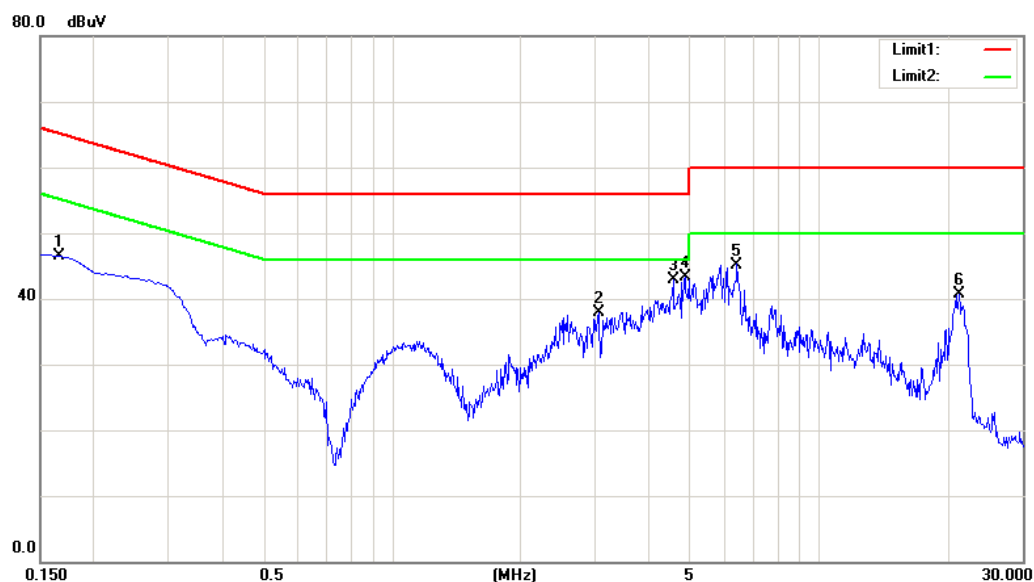
Tested on : AC Mains; Neutral

Remarks : NIL

Test Result

☒ Passed

☐ Not Passed



f/MHz	Reading	Factor	Act (dBuV)	Limit	Margin	Note
0.1660	36.58	9.95	46.53	65.16	-18.63	QP
3.0460	27.86	10.14	38.00	56.00	-18.00	QP
4.5620	32.77	10.17	42.94	56.00	-13.06	QP
4.8580	33.21	10.18	43.39	56.00	-12.61	QP
6.4380	35.00	10.20	45.20	60.00	-14.80	QP
21.2940	29.85	10.78	40.63	60.00	-19.37	QP

P.S. : If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured
IF bandwidth 9kHz, RBW, 9kHz, VBW, 9kHz

Conducted Emission Test 150kHz – 30MHz

Date of test : 11 April 2011

Test requirement : FCC Part 15 Section 15.107

Test method : ANSI C63.4:2003

Operating mode : PC

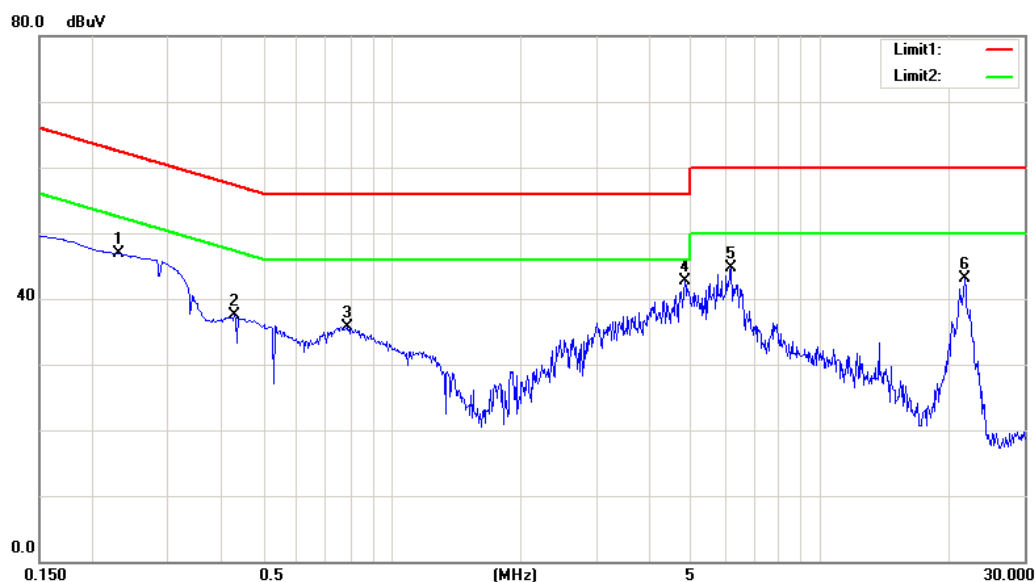
Tested on : AC Mains, Live

Remarks : NIL

Test Result

☒ Passed

☐ Not Passed



f/MHz	Reading	Factor	Act (dBuV)	Limit	Margin	Note
0.2304	37.05	9.87	46.92	62.44	-15.52	QP
0.4300	27.56	9.86	37.42	57.25	-19.83	QP
0.7860	25.85	9.84	35.69	56.00	-20.31	QP
4.8460	32.72	9.99	42.71	56.00	-13.29	QP
6.1940	34.57	10.04	44.61	60.00	-15.39	QP
21.7980	32.20	10.87	43.07	60.00	-16.93	QP

P.S. : If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured
IF bandwidth 9kHz, RBW, 9kHz, VBW, 9kHz

Conducted Emission Test 150kHz – 30MHz

Date of test : 11 April 2011

Test requirement : FCC Part 15 Section 15.107

Test method : ANSI C63.4:2003

Operating mode : PC

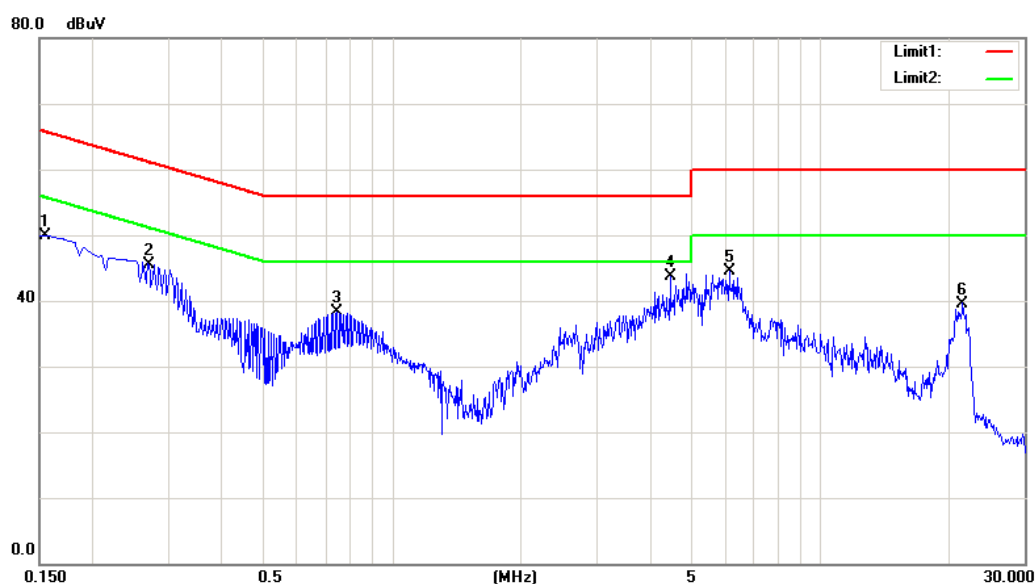
Tested on : AC Mains; Neutral

Remarks : NIL

Test Result

☒ Passed

☐ Not Passed



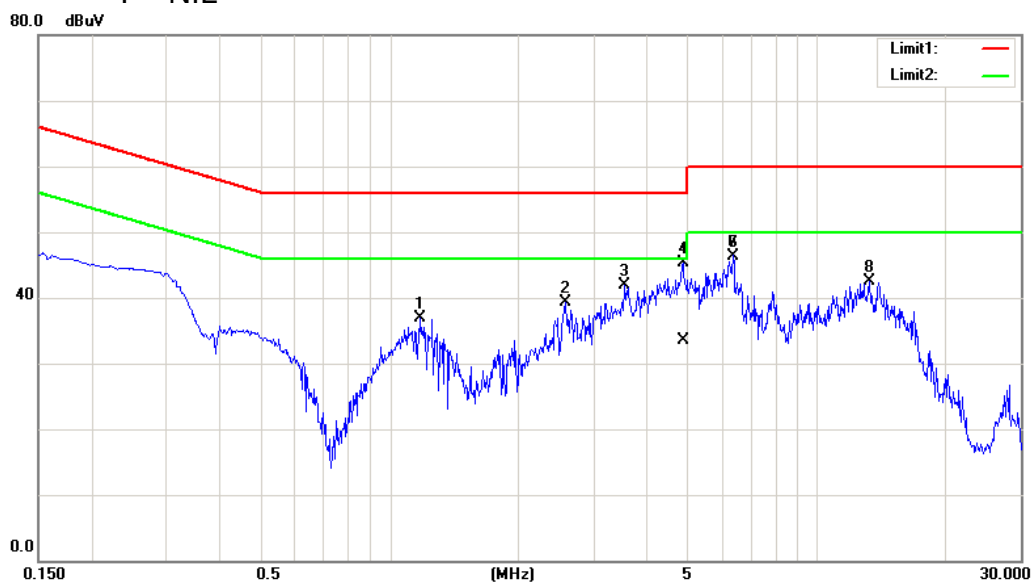
f/MHz	Reading	Factor	Act (dBuV)	Limit	Margin	Note
0.1548	40.00	9.97	49.97	65.74	-15.77	QP
0.2701	35.61	9.92	45.53	61.11	-15.58	QP
0.7460	28.46	9.88	38.34	56.00	-17.66	QP
4.4660	33.54	10.17	43.71	56.00	-12.29	QP
6.1300	34.39	10.20	44.59	60.00	-15.41	QP
21.5700	28.79	10.81	39.60	60.00	-20.40	QP

P.S. : If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured
IF bandwidth 9kHz, RBW, 9kHz, VBW, 9kHz

Conducted Emission Test 150kHz – 30MHz

Date of test : 11 April 2011
Test requirement : FCC Part 15 Section 15.207
Test method : ANSI C63.4:2003
Operating mode : DVD
Tested on : AC Mains, Live
Remarks : NIL

Test Result
☒ Passed
☐ Not Passed



f/MHz	Reading	Factor	Act (dBuV)	Limit	Margin	Note
1.1820	27.11	9.84	36.95	56.00	-19.05	QP
2.5900	29.39	9.89	39.28	56.00	-16.72	QP
3.5500	31.95	9.94	41.89	56.00	-14.44	QP
4.8660	35.39	9.99	45.38	56.00	-10.62	QP
4.8660	23.60	9.99	33.59	46.00	-12.41	AVG
6.3660	36.35	10.05	46.40	60.00	-13.60	QP
13.2940	31.92	10.53	42.45	60.00	-17.55	QP

P.S. : If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured
IF bandwidth 9kHz, RBW, 9kHz, VBW, 9kHz

Conducted Emission Test 150kHz – 30MHz

Date of test : 11 April 2011

Test requirement : FCC Part 15 Section 15.207

Test method : ANSI C63.4:2003

Operating mode : DVD

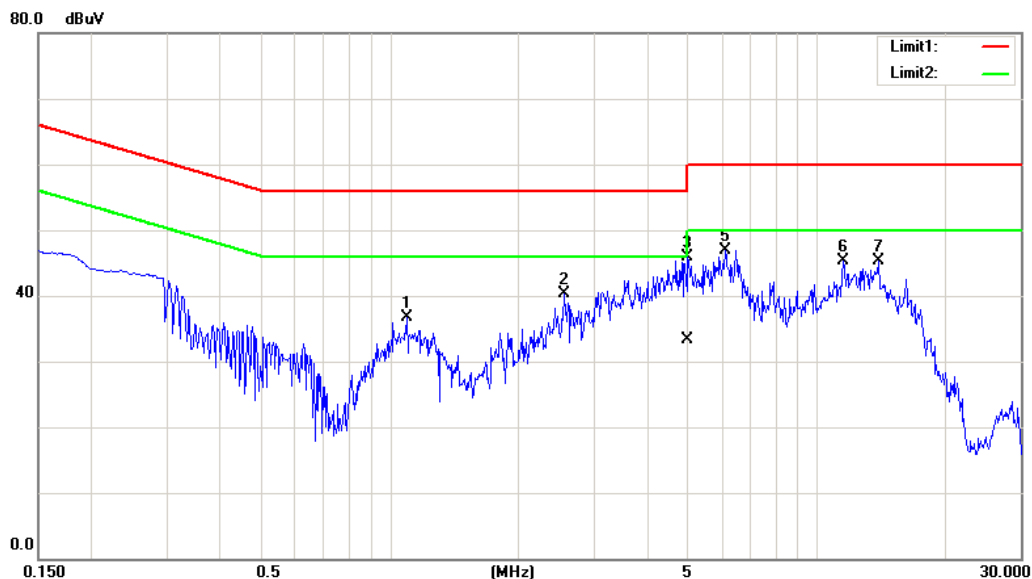
Tested on : AC Mains; Neutral

Remarks : NIL

Test Result

☒ Passed

☐ Not Passed



f/MHz	Reading	Factor	Act (dBuV)	Limit	Margin	Note
1.0940	26.77	9.88	36.65	56.00	-19.35	QP
2.5620	30.11	10.14	40.25	56.00	-15.75	QP
4.9860	35.68	10.18	45.86	56.00	-10.14	QP
4.9860	23.20	10.18	33.38	46.00	-12.62	AVG
6.1180	36.65	10.20	46.85	60.00	-13.15	QP
11.5020	34.99	10.40	45.39	60.00	-14.61	QP
13.9180	34.79	10.44	45.23	60.00	-14.77	QP

P.S. : If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured
IF bandwidth 9kHz, RBW, 9kHz, VBW, 9kHz

Test Equipment List

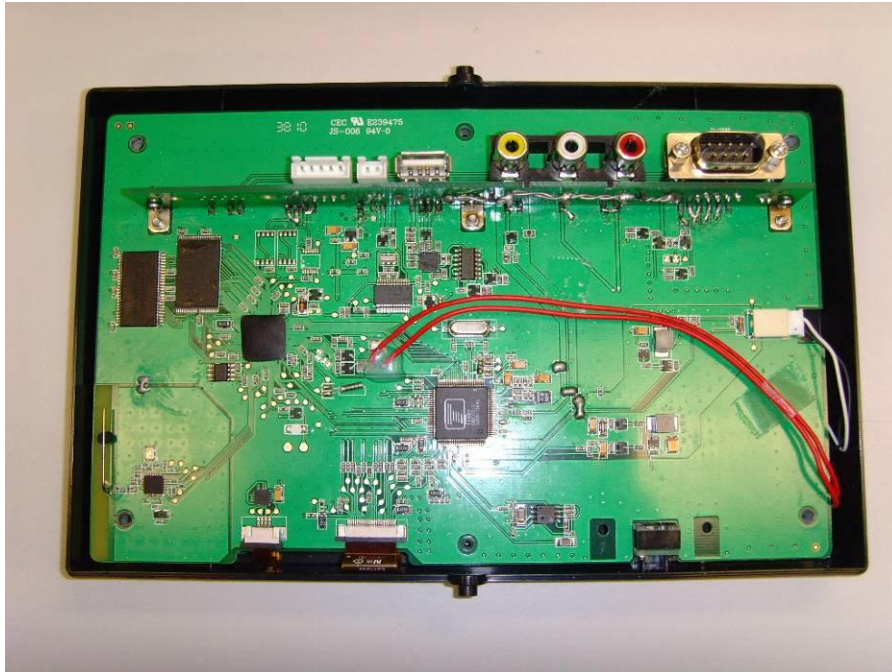
Conducted Emission Test

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DATE	CAL.DUE DATE
60-7/63-06-006	EMI Test Receiver	Rohde & Schwarz	ESCI	100427	29-Mar-11	29-Mar-12
60-7/65-08-014	Coaxial Cable	N/A	N/A	N/A	15-Jun-10	15-Jun-11
60-7/60-08-002	LISN	Rohde & Schwarz	ENV 216	100432	25-Mar-11	25-Mar-12

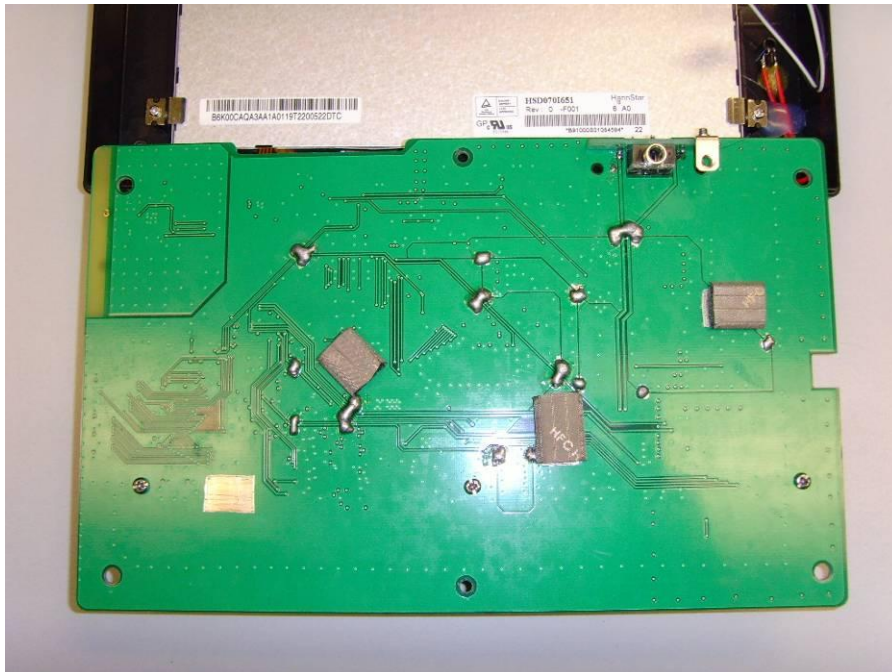
7 Appendix A



Appendix A

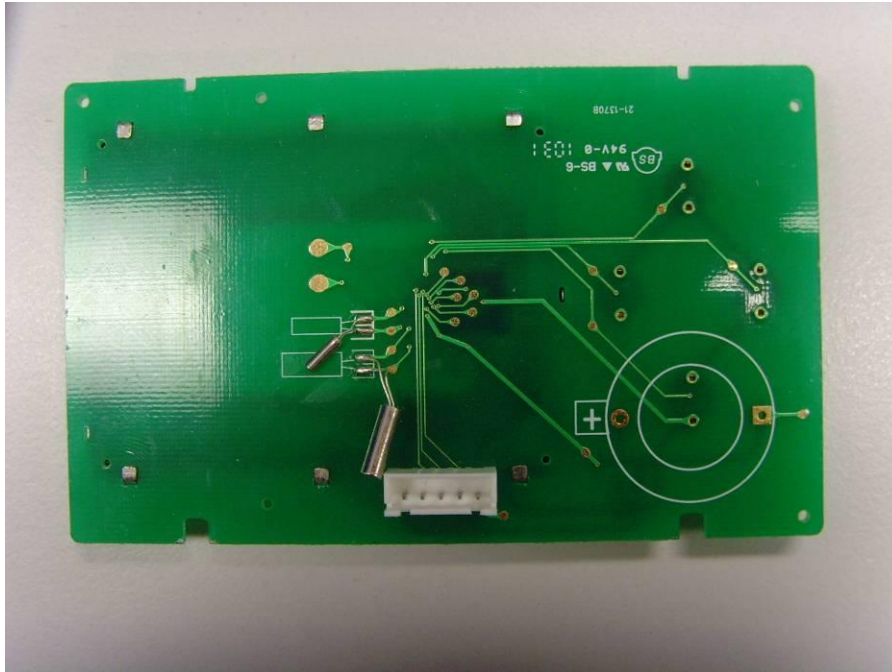


Main Unit

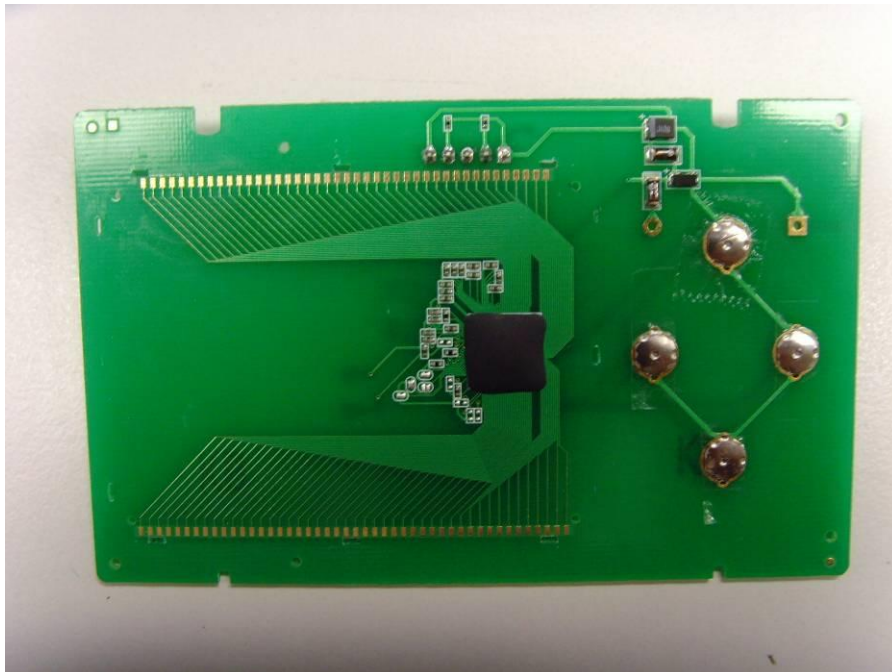


Main Unit

Appendix A

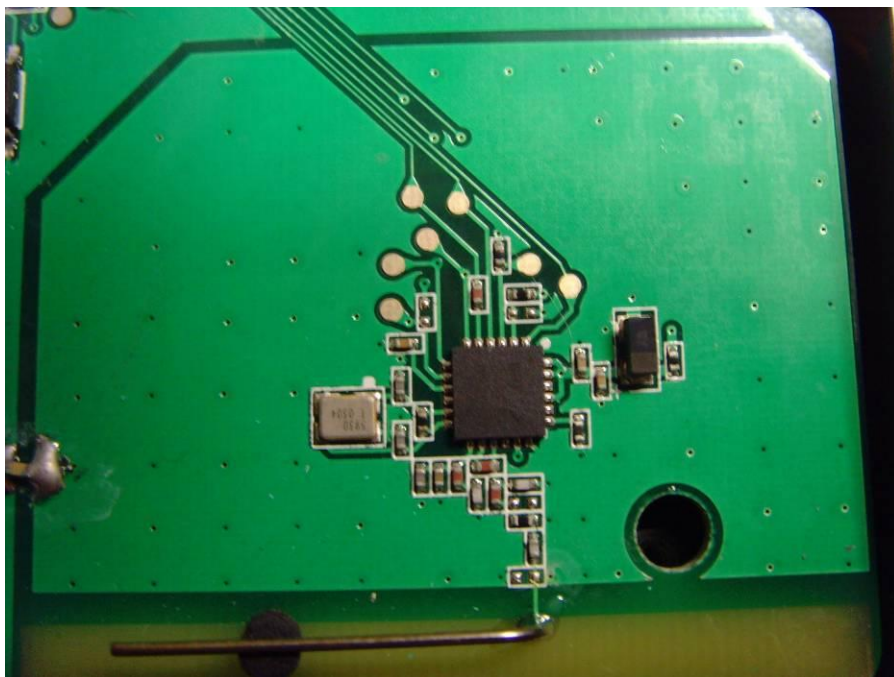


Control Unit

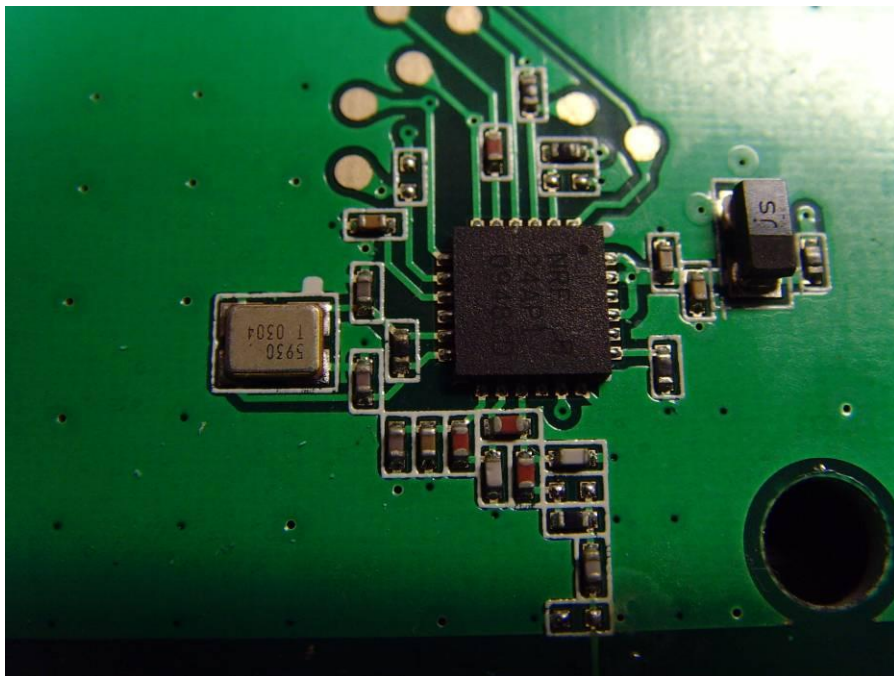


Control Unit

Appendix A

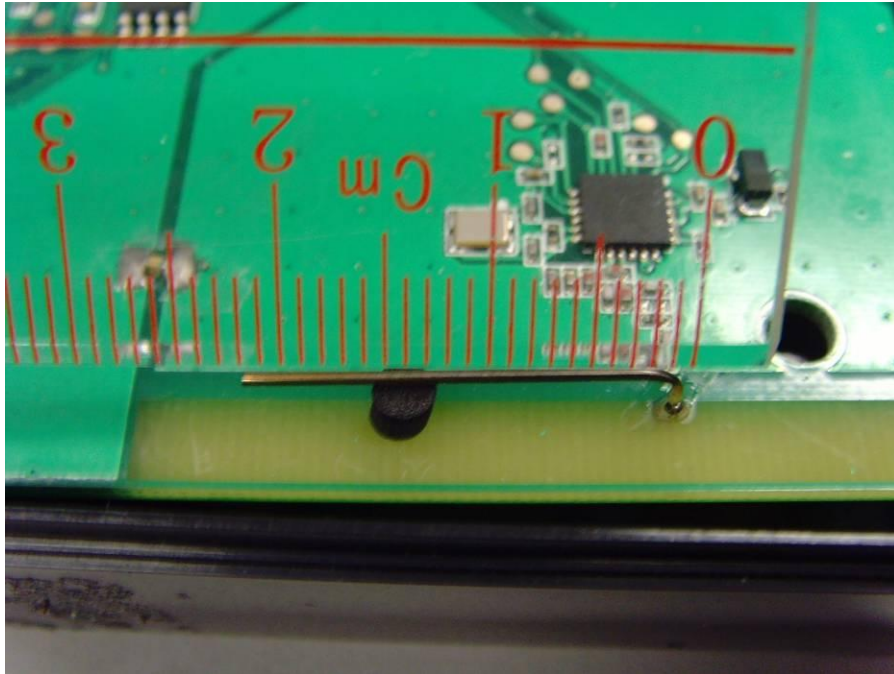


Main Unit (RF part)



Main Unit (RF part)

Appendix A

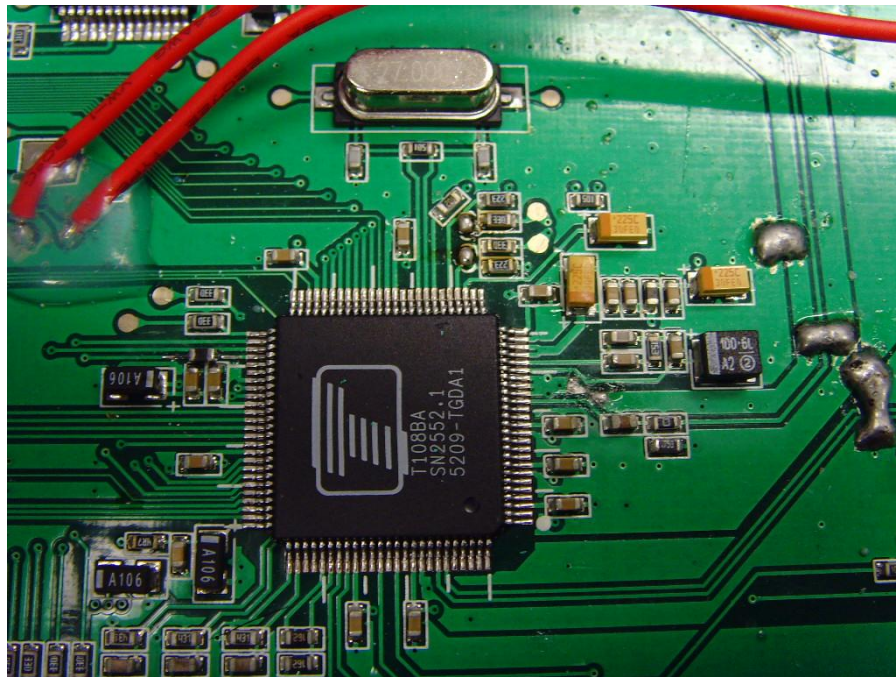


Main Unit (RF part antenna)

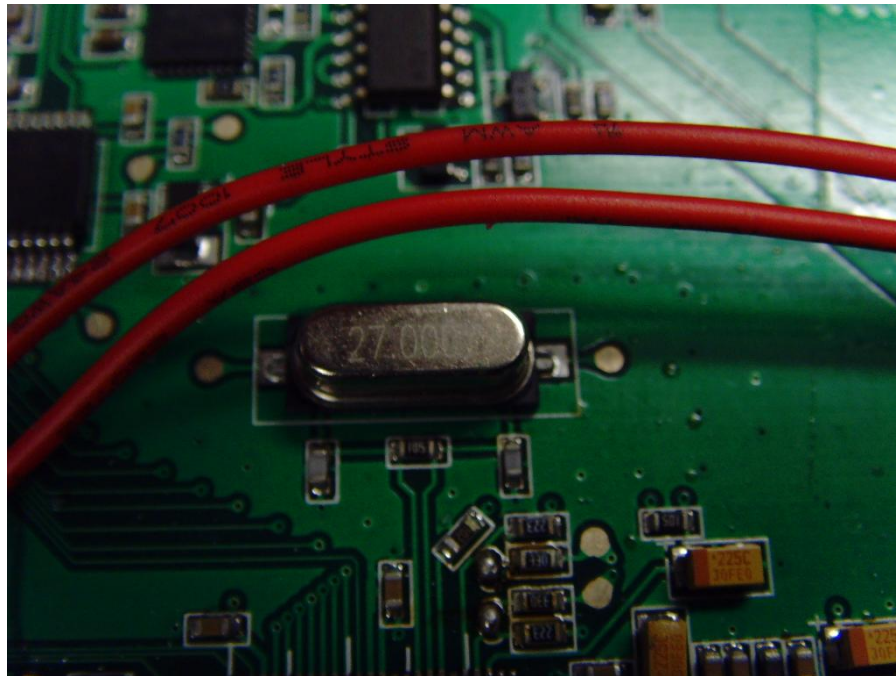


Main Unit

Appendix A

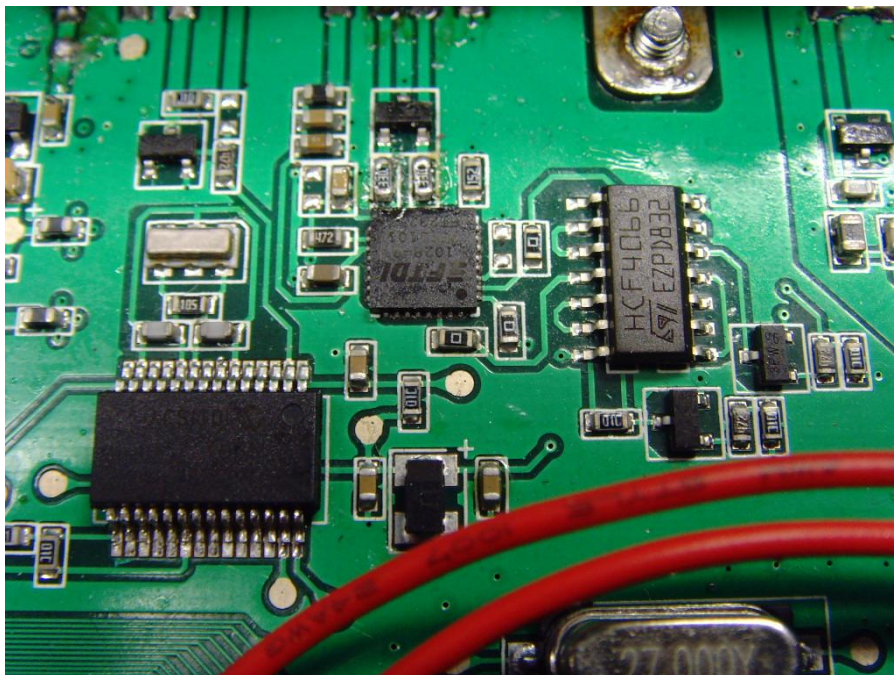
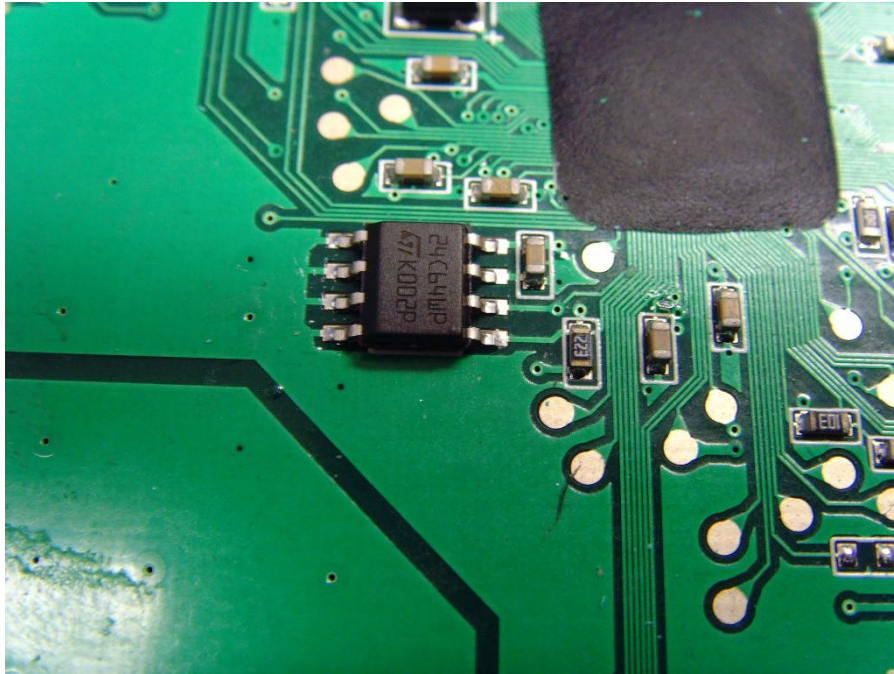


Main Unit



Main Unit

Appendix A



8 Appendix B

Radiated Emission Test Set Up

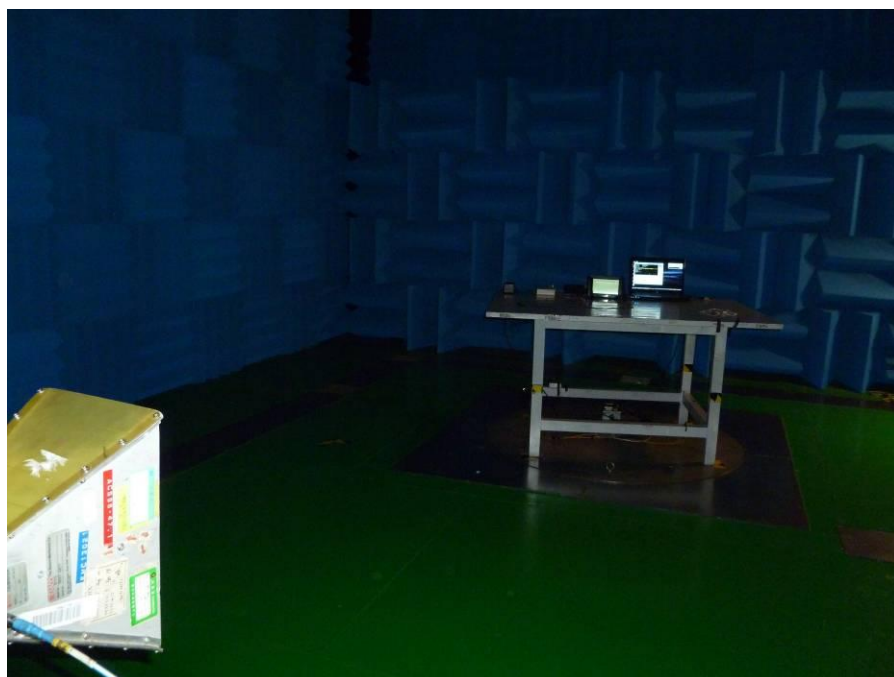


9kHz-30MHz



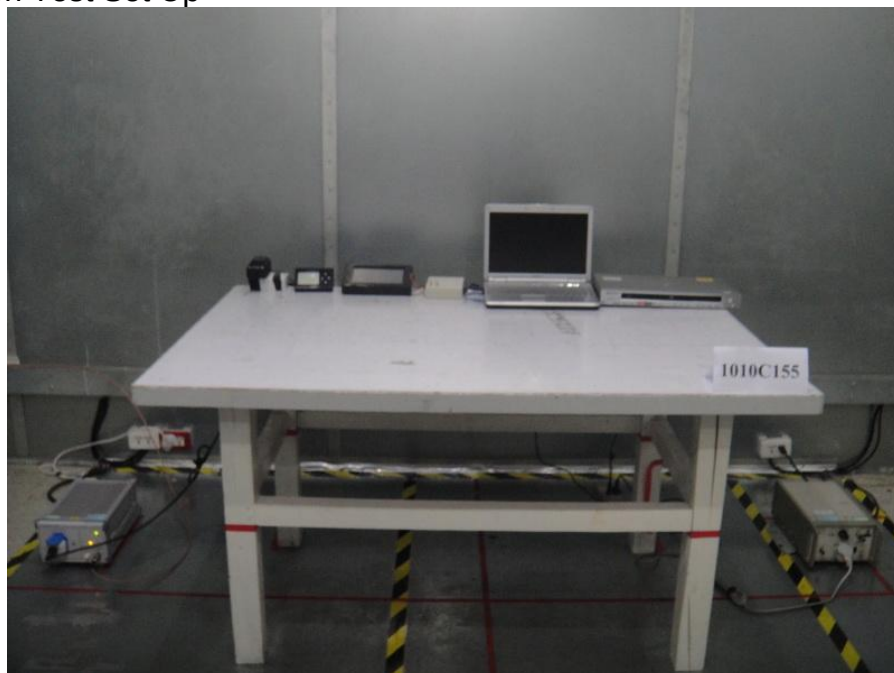
30MHz-1GHz

Appendix B



1GHz above

Conduct Emission Test Set Up



9 Appendix C

Sunlighten™

MODEL: CONTROL PANEL

FCC ID: O4GSNINTP

MADE IN CHINA

