Test Lab
Cert 2951.01

FCC TEST REPORT

for

ThinkOptics,Inc

Remote Conttoller

Model Number: USB HID dongle

Prepared for	:	ThinkOptics,Inc
Address	:	5568 Del Oro Dr.,San Jose,CA 94124,USA

Prepared By	:	NS Technology Co., Ltd.
Address	:	Chenwu Industrial Zone, Houjie Town, Dongguan City, Guangdong, China

Tel: +86-769-85935656
Fax: +86-769-85991080

Report Number	:	NSE-F10075120
Date of Test	:	Jul. 5~Jul. 20, 2010
Date of Report	:	Jul. 23, 2010

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NS Technology Co., Ltd.

Applicant: **Address:**	ThinkOptics,Inc 5568 Del Oro Dr.,San Jose,CA 94124,USA		
Manufacturer: **Address:**	Unisen Limited No. YuanJiangYuan market road,Changping Town,Donggguan City Guangdong,China		
E.U.T:	Remote Conttoller		
Model Number:	USB HID dongle		
Trade Name:	**ThinkOptics,Inc**	**Operating Frequency:**	2405~2480MHz
Date of Receipt:	Jun.28, 2010	**Date of Test:**	Jul.5~Jul.20, 2010
Test Specification:	FCC Part15C :2009 ANSI C63.4:2003		
Test Result:	The equipment under test was found to be compliance with the requirements of the standards applied. **Issue Date: Jul. 23, 2010**		

Tested by:	Reviewed by:	Approved by:
Jade	Iceman	Steven
Jade/ Engineer	Iceman Hu / Supervisor	Steven Lee / Manager

Other Aspects:

None.

Abbreviations: OK/P=passed fail/F=failed n.a/N=not applicable E.U.T=equipment under tested

This test report is based on a single evaluation of one sample of above mentioned products ,It is not permitted to be duplicated in extracts without written approval of NS Technology Co., Ltd.

1. GENERAL PRODUCT INFORMATION

1.1. Product Function

Details please refer to Technical Construction Form and User Manual.

1.2. Description of Device (EUT)

E.U.T.	:	Remote Conttoller
Model No.	:	USB HID dongle
Operating Frequency	:	2405~2480MHz
Number of Channels	:	16 Channels
Type of Modulation	:	DSSS
Antenna Type	:	Integral
Antenna Gain	:	0dBi
System Input Voltage	:	DC 5V from PC input AC 120V/60Hz
Temperature Range(Operating)	:	0 ~+ 40℃
I.R control line	:	Unshielded, Detachable, 1.0m

1.3. Difference between Model Numbers

1.4. Independent Operation Modes

The basic operation modes are:

1.4.1 TX CH0 (2405MHz)

1.4.2. TX CH7 (2440MHz)

1.4.3. TX CH15 (2480MHz)

1.5.Test Supporting System

1.5.1. PC

Model Number	:	5P2PM2X
Serial Number	:	D816CA00DC2
Manufacturer	:	DELL
Adapter	:	M/N:DA90PE1-00 I/P:AC 100V~240V 50/60Hz O/P:DC 15V 2A DC Line:Unshielded, Undetachable, 1.5m AC Line: Unshielded, Detachable, 1.0m

2. TEST SITES

2.1. Test Facilities

EMC Lab : Accredited by TUV Rheinland, Germany
Date of registration: July 28, 2003

Accredited by CNAS, China
Registration No.: L1744
Date of registration: November 25, 2004

Accredited by Intertek ETL SEMKO
Registration No.: TMP-013
Date of registration: June 11, 2005

Accredited by TUV/PS, Hong Kong
Date of registration: December 1, 2005

Accredited by ATCB, USA
Date of registration: August 3, 2006

Accredited by VCCI, Japan
Member No.:2115
Registration No.: R-2527, R-3012 & C-2770
Date of registration: March 23, 2007

Accredited by FCC, USA
Registration No.: 502831
Date of registration: February 9, 2009

Accredited by Industry Canada
Registration No.: 5936A
Date of registration: March 4, 2009

Accredited by American Association for Laboratory Accreditation (A2LA), USA
Certificate No.: 2951.01
Date of registration: March 31, 2010

Name of Firm : NS Technology Co., Ltd.

Site Location : Chenwu Industrial Zone, Houjie Town, Dongguan City, Guangdong, China

2.2. List of Test and Measurement Instruments

2.2.1. For conducted emission at the mains terminals test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESCS30	100199	May 30,10	May 30,11
Artificial Mains Network	Rohde&Schwarz	ESH3-Z5	100317	May 30,10	May 30,11
Artificial Mains Network (AUX)	Kyoritsu	KNW-407	8-1579-1	May 30,10	May 30,11
Pulse Limiter	Rohde&Schwarz	ESH3-Z2	100168	May 2,10	May 2,11

2.2.2. For radiated emission test (30MHz-1GHz)

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESCS30	100340	May 30,10	May 30,11
Spectrum Analyzer	HP	8593E	3448U00806	May 30,10	May 30,11
Bilog Antenna	Teseq	CBL 6111D	25758	Oct. 27,09	Oct. 27,10
Signal Amplifier	Agilent	8447D	2944A10488	May 2,10	May 2,11
50Ω Coaxial Switch	ANRITSU	MP59B	6200530577	May 2,10	May 2,11

2.2.3. For radiated emission test(1GHz-18GHz)

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Spectrum Analyzer	HP	8593E	3448U00806	May 30,10	May 30,11
Horn Antenna	EMCO	3117	00062558	Jan. 19,09	Jan. 19,11
Signal Amplifier	BURGEON	PEC-38-30M18G -12-SFF	NSEMC001	May 31,09	May 31,11

2.2.4. For output power Test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Power Meter	Rohde&Schwarz	NRVS	101732	May 30,10	May 30,11
100V Insertion Unit 50Ω	Rohde&Schwarz	URV5-Z4	100207	May 30,10	May 30,11

2.2.5. For power spectral density and 6dB bandwith Test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Spectrum Analyzer	Rohde&Schwarz	FSL3	101507	May 30,10	May 30,11

2.2.6. For Band edge compliance test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Spectrum Analyzer	HP	8593E	3448U00806	May 31,09	May 31,10
Horn Antenna	EMCO	3117	00062558	Jan. 19,09	Jan. 19,11
Signal Amplifier	BURGEON	PEC-38-30M18 G-12-SFF	NSEMC001	May 31,09	May 31,11

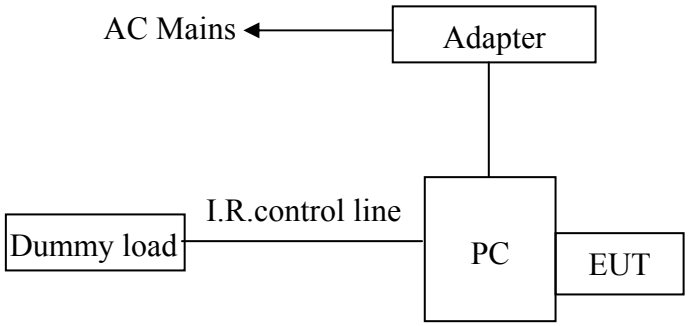
3. TEST SET-UP AND OPERATION MODES

3.1. Principle of Configuration Selection

The equipment under test (EUT) was configured to measure its highest possible radiated level. The test modes were adapted accordingly in reference to the Operating Instructions.

3.2. Block Diagram of Test Set-up

System Diagram of Connections Between EUT and Simulators



(EUT : Remote Conttoller)

***Note**: We test X-axis, Y-axis, and Z-axis,.*
The Y-axis is the worst mode, so only the worst mode test data was included in the report.

3.3. Test Operation Mode and Test Software

Refer to clause 1.4

3.4. Special Accessories and Auxiliary Equipment

None.

3.5. Countermeasures to Achieve EMC Compliance

None.

4. TEST SUMMARY

Test items and result lists

No.	Item	Standard	Results
1	Conduction Emission Test	FCC Part15C: 15.207 ANSI C63.4-2003 KDB558074	N/A
2	Radiated Emission Test	FCC Part15C: 15.209 ANSI C63.4-2003 KDB558074	PASS
3	Band Edge Compliance Test	FCC Part15: 15.247 KDB558074	PASS
4	Output Power Test	FCC Part15: 15.247 KDB558074	PASS
5	6dB Bandwith Test	FCC Part15: 15.247 KDB558074	PASS
6	Power Spectral Density Test	FCC Part15: 15.247 KDB558074	PASS
8	Antenna requirement	FCC Part 15:15.203	PASS

5. EMISSION TEST RESULTS

5.1. Conducted Emission at The Mains Terminals Test

RESULT	:	**Pass**
Test procedure	:	FCC Part 15 Subpart B
Frequency range	:	0.15～30MHz
Test Site	:	Shielded Room
Limits	:	FCC Part 15 Subpart C Class B

Test Setup

Date of test	:	Jul. 15, 2010
Input Voltage	:	DC 5V from PC input AC 120V/60Hz
Operation Mode	:	TX Mode

The EUT was put on a wooden table which was 0.8 m high above the ground and connected to the AC mains through the Artificial Mains Network (AMN). Where the mains cable supplied by the manufacture was longer than 1 m, the excess was folded back and forth parallel to the cable at the centre so as to form a bundle no longer than 0.4 m.

The EUT was kept 0.4 m from any other earthed conducting surface. Both sides of AC line were checked to find out the maximum conducted emission levels according to the test procedure during the conducted emission test.

The frequency range from 150 kHz to 30 MHz was investigated.

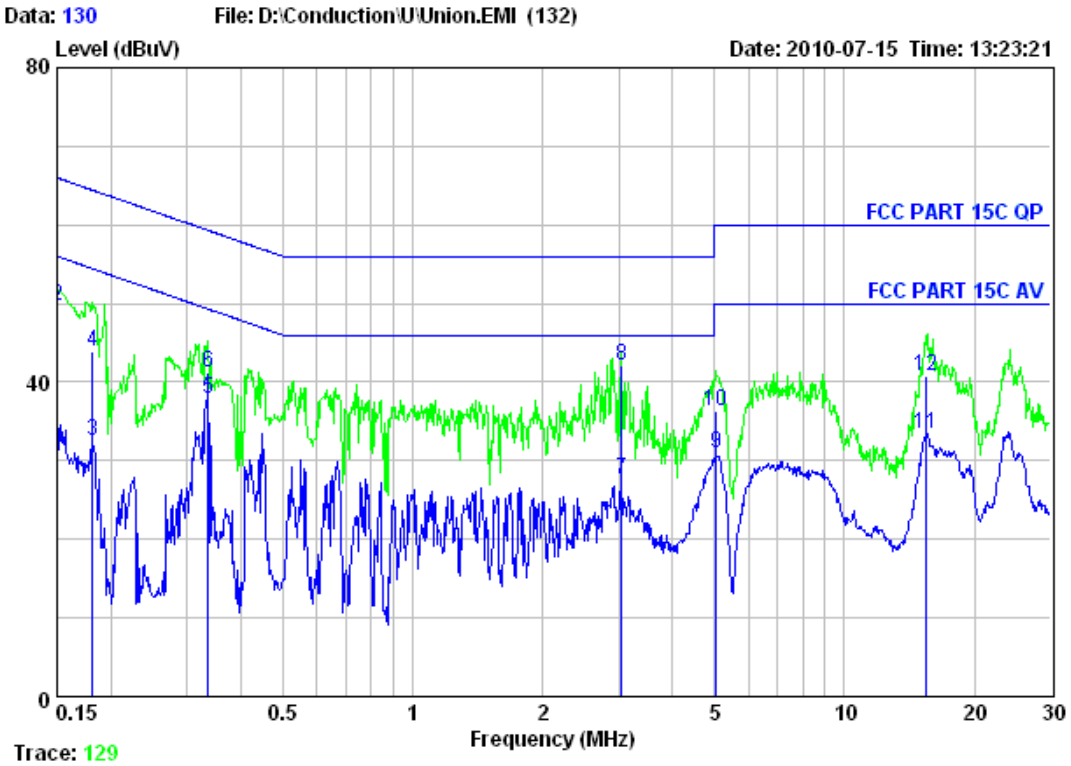
The bandwidth of the test receiver (R&S ESCS30) was set at 9 kHz.

The test data of the worst case condition(s) was reported on the following page.

Note: Test uncertainty: ±2.54dB at a level of confidence of 95%.:

NS Technology

Chenwu Industrial Zone,Houjie Town,
Dongguan,Guangdong,China
Tel:+86-769-85935656
Fax:+86-769-85991080



Test Site : 843 Shielded Room
Limit : FCC PART 15C QP LINE Phase:LINE
EUT : Remote Conttoller
Power : DC 5V from PC input AC 120V/60Hz
M/N : USB HID dongle
Test Engineer: Jade
Comment : Temp:25.3'C Humi:55% Press:101.52kPa
Test Mode : TX Mode

	Freq. (MHz)	Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.15	34.92	56.00	21.08	Average
2	0.15	49.60	66.00	16.40	QP
3	0.18	32.43	54.42	21.99	Average
4	0.18	43.90	64.42	20.52	QP
5	0.34	37.94	49.31	11.37	Average
6	0.34	41.30	59.31	18.01	QP
7	3.04	27.57	46.00	18.43	Average
8	3.04	42.20	56.00	13.80	QP
9	5.06	30.95	50.00	19.05	Average
10	5.06	36.30	60.00	23.70	QP
11	15.47	33.53	50.00	16.47	Average
12	15.47	40.80	60.00	19.20	QP

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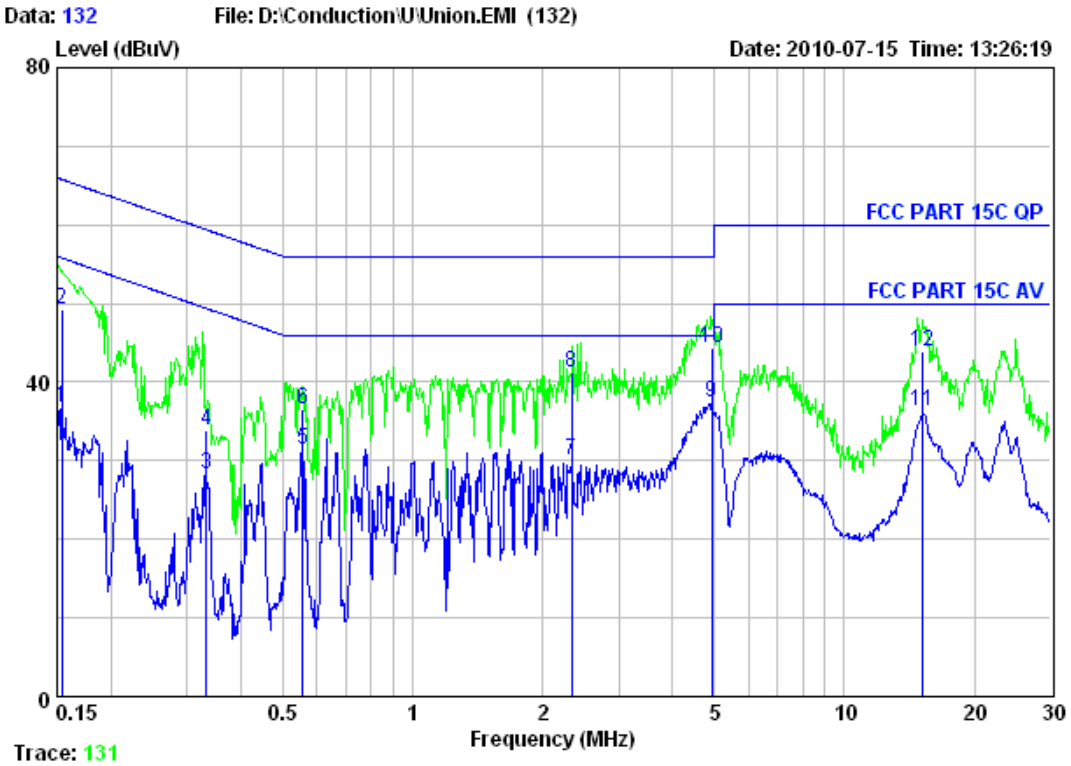
Chenwu Industrial Zone,Houjie Town,
Dongguan,Guangdong,China
Tel:+86-769-85935656
Fax:+86-769-85991080



Test Site : 843 Shielded Room
Limit : FCC PART 15C QP LINE Phase:NEUTRAL
EUT : Remote Conttoller
Power : DC 5V from PC input AC 120V/60Hz
M/N : USB HID dongle
Test Engineer: Jade
Comment : Temp:25.3'C Humi:55% Press:101.52kPa
Test Mode : TX Mode

	Freq. (MHz)	Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.15	36.73	55.78	19.05	Average
2	0.15	49.30	65.78	16.48	QP
3	0.33	28.22	49.40	21.18	Average
4	0.33	33.90	59.40	25.50	QP
5	0.56	31.47	46.00	14.53	Average
6	0.56	36.50	56.00	19.50	QP
7	2.33	30.19	46.00	15.81	Average
8	2.33	41.20	56.00	14.80	QP
9	4.93	37.48	46.00	8.52	Average
10	4.93	44.30	56.00	11.70	QP
11	15.23	36.35	50.00	13.65	Average
12	15.23	43.90	60.00	16.10	QP

5.2. Radiated Emission

5.2.1. Test limits

1) FCC PART 15C 15.209

5.2.2.Test procedure

The EUT was placed on a turn table which was 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna which was mounted on a antenna tower. At the frequency band of 30MHz to 1GHz,The measuring antenna moved up and down to find out the maximum emission level. It moved from 1 to 4 m for horizontal and vertical polarizations. The broadband antenna was used as a receiving antenna. At the frequency band of 1GHz to 25GHz,The measuring antenna moved from 1 to 4 m for horizontal and vertical polarization. The horn antenna was used as a receiving antenna.

The resolution bandwidth and video bandwidth of the test receiver was 120 kHz and 300kHz for Quasi-peak detection at frequency below 1GHz.

The resolution bandwidth and video bandwidth of the test receiver was1MHz and 1MHz for Peak detection at frequency above 1GHz.

For Average measurement at frequency above 1GHz.The resolution bandwidth of the test receiver was 1MHz ; due to the shortest pulse width T is 116us, according the video bandwidth should not smaller than 1/T,so the video bandwidth is 10Hz.

In 18GHz to 25GHz, The EUT was checked by Horn ANT . But the test result is background.

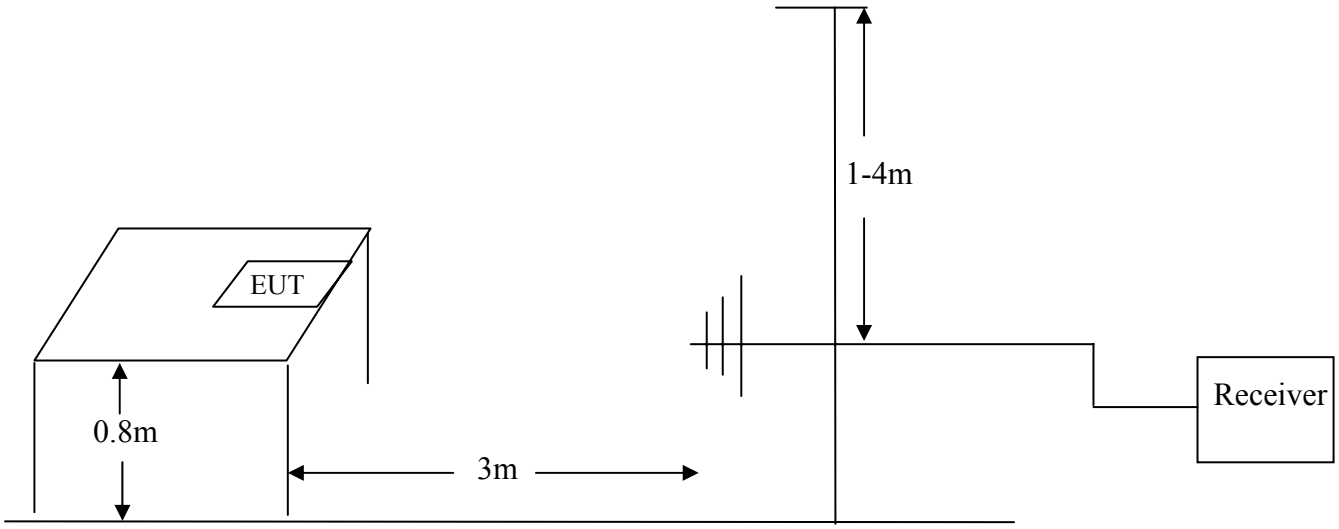
The EUT position(X. Y. Z) were checked and worse case was happened in Y position. So Y position was chose for find measurement.

The EUT was tested in Chamber Site.

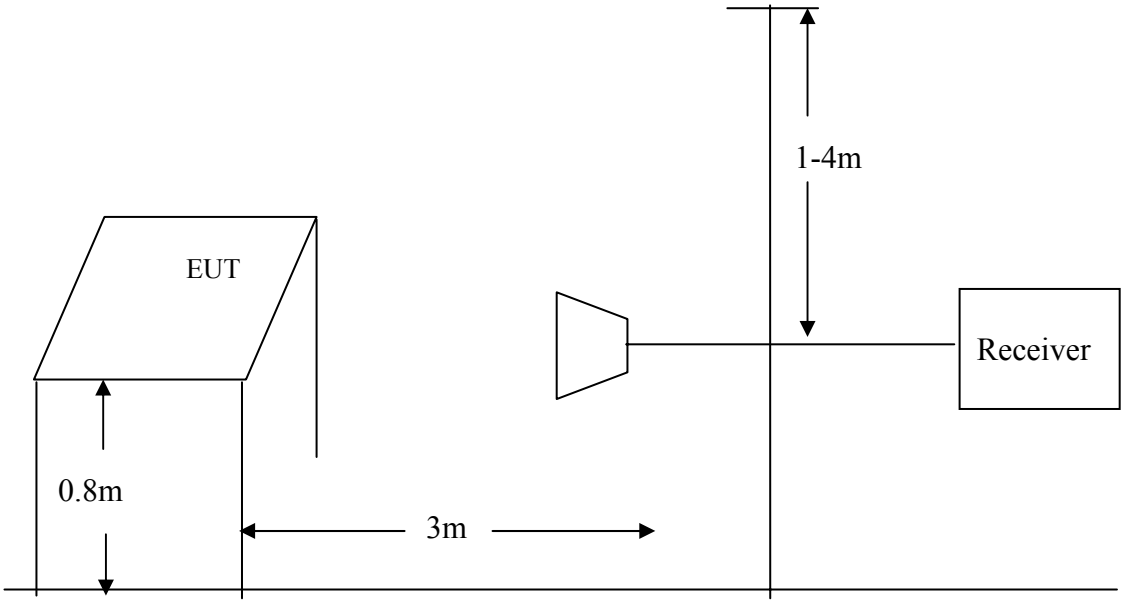
Note: Test uncertainty: ±2.62dB at a level of confidence of 95%.:

5.2.3.Test Setup Diagram

5.1.3.1. Frequency range: 30MHz-1000MHz



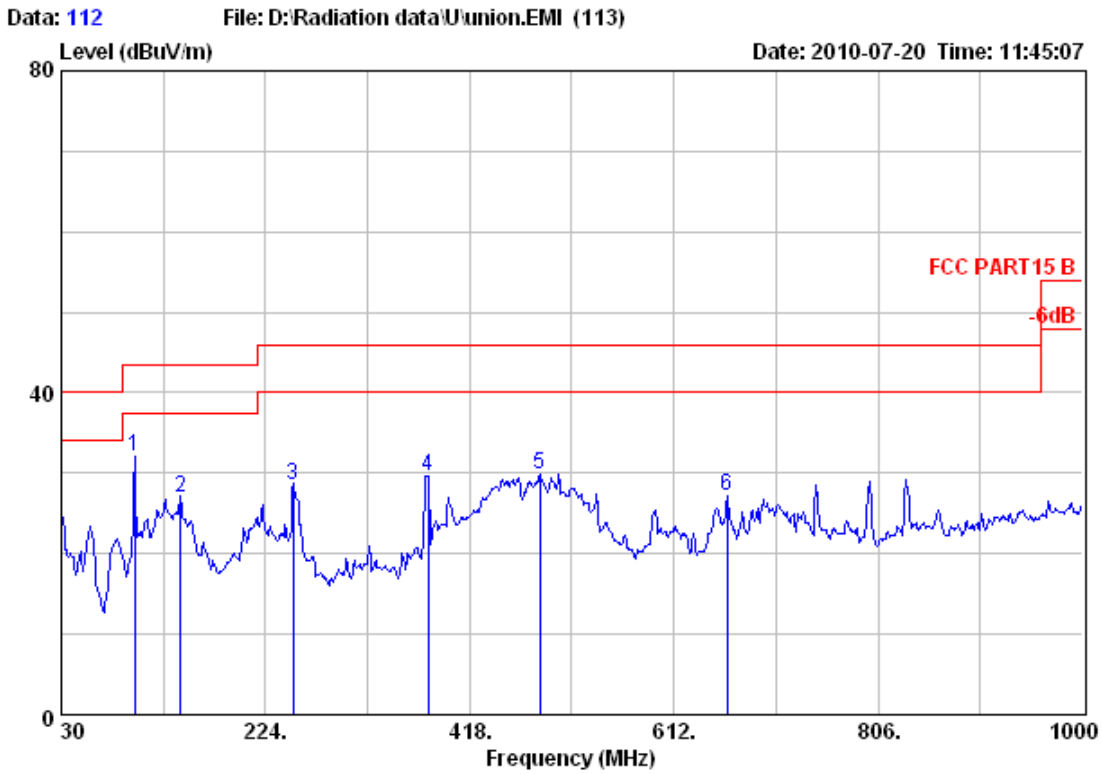
5.1.3.2. Frequency range: 1 GHz -25GHz



The test plots as following:

NS Technology

Chenwu Industrial Zone,Houjie Town,
Dongguan,Guangdong,China
Tel:+86-769-85935656
Fax:+86-769-85991080



Test Site : 10m Chamber
Limit : FCC PART15 B
Dis. / Ant. : 3m 25758-3 Ant. Pol.: VERTICAL
EUT : Remote Conttoller
M/N : USB HID dongle
Power : DC 5V from PC input AC 120V/60Hz
Test Engineer : Jade
Comment : Temp:25.2'C Humi:56% Press:101.52kPa
Test Mode : TX Mode

	Freq. (MHz)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading (dBuV)	Ant. Factor (dB/m)	Cable Loss (dB)	Remark
1	99.84	31.98	43.50	11.52	20.62	10.30	1.06	QP
2	143.49	27.06	43.50	16.44	13.91	11.88	1.27	QP
3	250.19	28.62	46.00	17.38	14.11	12.80	1.71	QP
4	378.23	29.69	46.00	16.31	11.71	15.88	2.10	QP
5	484.93	29.75	46.00	16.25	9.14	18.20	2.41	QP
6	662.44	27.15	46.00	18.85	3.24	21.05	2.86	QP

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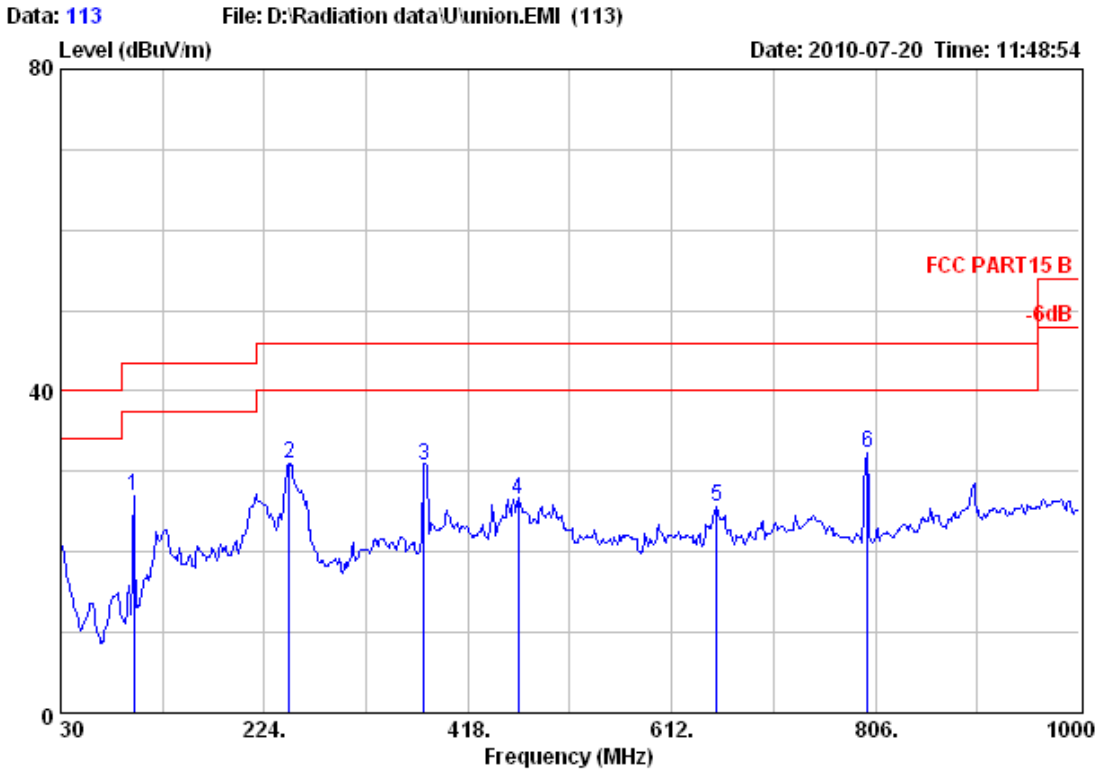
Dongguan,Guangdong,China
Tel:+86-769-85935656
Fax:+86-769-85991080



Test Site : 10m Chamber
Limit : FCC PART15 B
Dis. / Ant. : 3m 25758-3 Ant. Pol.: HORIZONTAL
EUT : Remote Conttoller
M/N : USB HID dongle
Power : DC 5V from PC input AC 120V/60Hz
Test Engineer : Jade
Comment : Temp:25.2'C Humi:56% Press:101.52kPa
Test Mode : TX Mode

	Freq. (MHz)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading (dBuV)	Ant. Factor (dB/m)	Cable Loss (dB)	Remark
1	99.84	27.01	43.50	16.49	15.65	10.30	1.06	QP
2	247.28	30.87	46.00	15.13	17.15	12.02	1.70	QP
3	376.29	30.84	46.00	15.16	12.99	15.76	2.09	QP
4	465.53	26.62	46.00	19.38	6.45	17.84	2.33	QP
5	654.68	25.57	46.00	20.43	1.83	20.90	2.84	QP
6	798.24	32.26	46.00	13.74	6.95	22.14	3.17	QP

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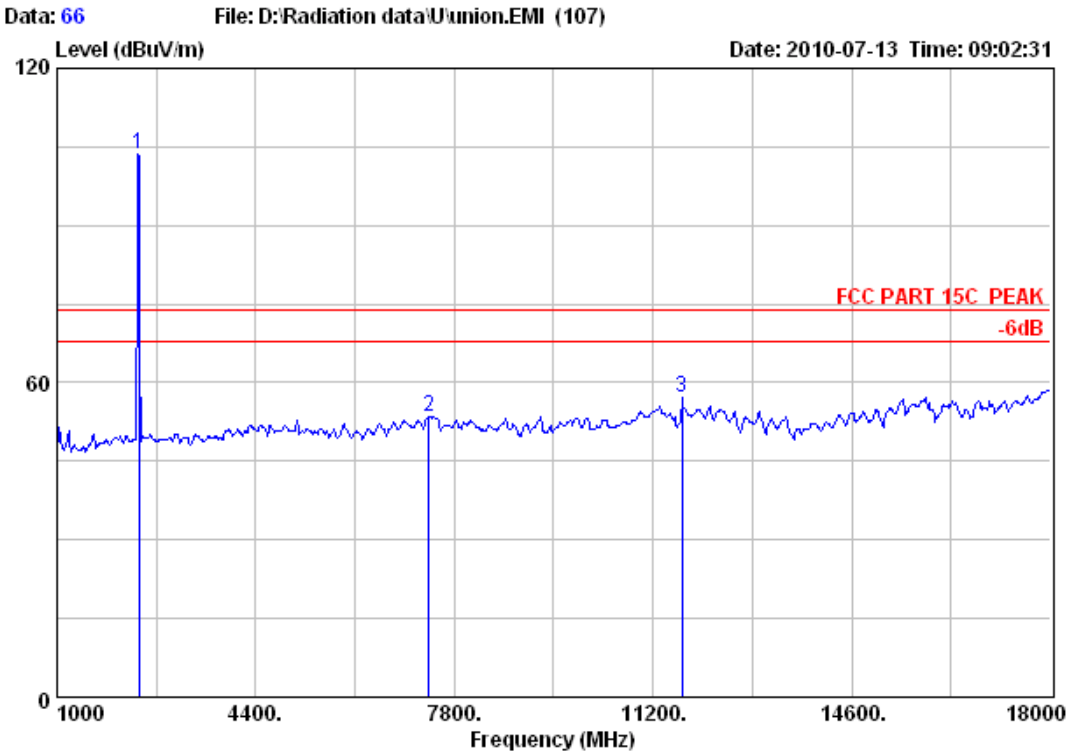
Fax:+86-769-85991080



Test Site : 10m Chamber
Limit : FCC PART 15C PEAK
Dis. / Ant. : 3m 3117 Ant. Pol.: HORIZONTAL
EUT : Remote Conttoller
M/N : USB HID dongle
Power : DC 5V from PC input AC 120V/60Hz
Test Engineer : Jade
Comment : Temp:25.2'C Humi:56% Press:101.52kPa
Test Mode : TX 2405MHz

	Freq. (MHz)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading (dBuV)	Ant. Factor (dB/m)	Cable Loss (dB)	Remark
1	2405.00	103.66	74.00	-29.66	69.93	31.50	2.23	Peak
2	7358.00	53.50	74.00	20.50	14.14	36.83	2.53	Peak
	311693.00	57.01	74.00	16.99	14.84	39.37	2.80	Peak

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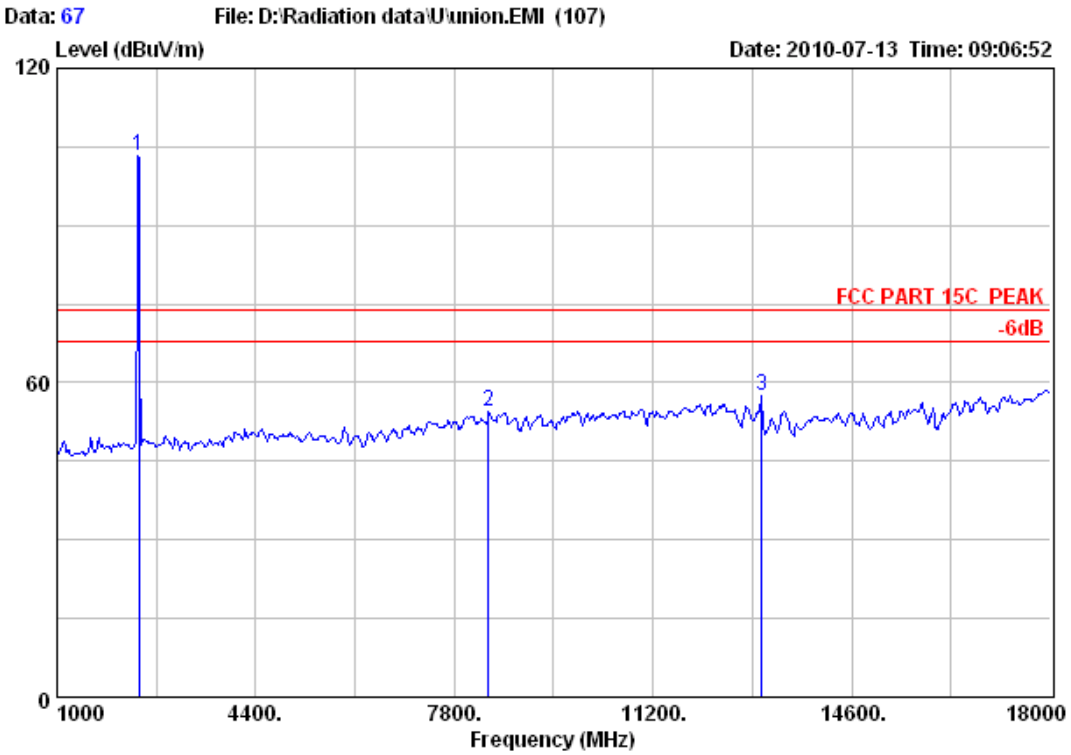
Fax:+86-769-85991080




```
Test Site      : 10m Chamber
Limit          : FCC PART 15C  PEAK
Dis. / Ant.    : 3m   3117                Ant. Pol.: VERTICAL
EUT            : Remote Conttoller
M/N            : USB HID dongle
Power          : DC 5V from PC input AC 120V/60Hz
Test Engineer  : Jade
Comment        : Temp:25.2'C   Humi:56%   Press:101.52kPa
Test Mode      : TX 2405MHz
```

	Freq. (MHz)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading (dBuV)	Ant. Factor (dB/m)	Cable Loss (dB)	Remark
1	2405.00	103.41	74.00	-29.41	69.68	31.50	2.23	Peak
2	8378.00	54.32	74.00	19.68	14.79	36.93	2.60	Peak
	313053.00	57.42	74.00	16.58	14.23	40.31	2.88	Peak

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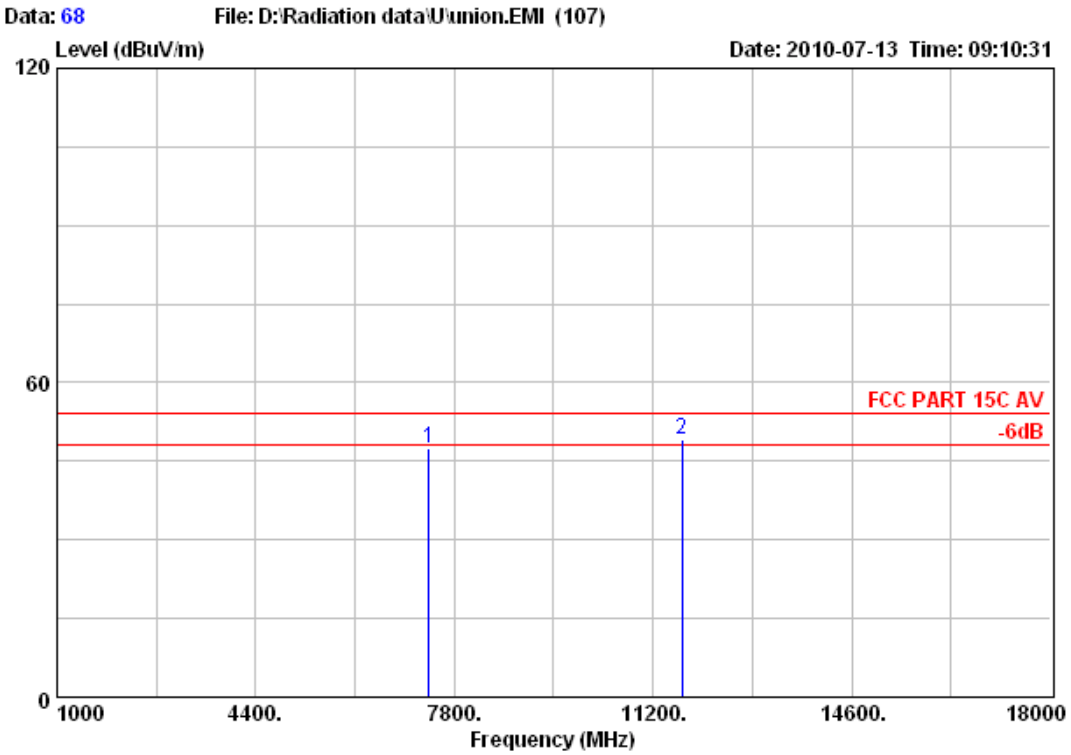

Test Site : 10m Chamber
Limit : FCC PART 15C AV
Dis. / Ant. : 3m 3117 Ant. Pol.: HORIZONTAL
EUT : Remote Conttoller
M/N : USB HID dongle
Power : DC 5V from PC input AC 120V/60Hz
Test Engineer : Jade
Comment : Temp:25.2'C Humi:56% Press:101.52kPa
Test Mode : TX 2405MHz

	Freq. (MHz)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading (dBuV)	Ant. Factor (dB/m)	Cable Loss (dB)	Remark
1	7358.00	47.50	54.00	6.50	8.14	36.83	2.53	Average
	211693.00	49.01	54.00	4.99	6.84	39.37	2.80	Average

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Chenwu Industrial Zone,Houjie Town,
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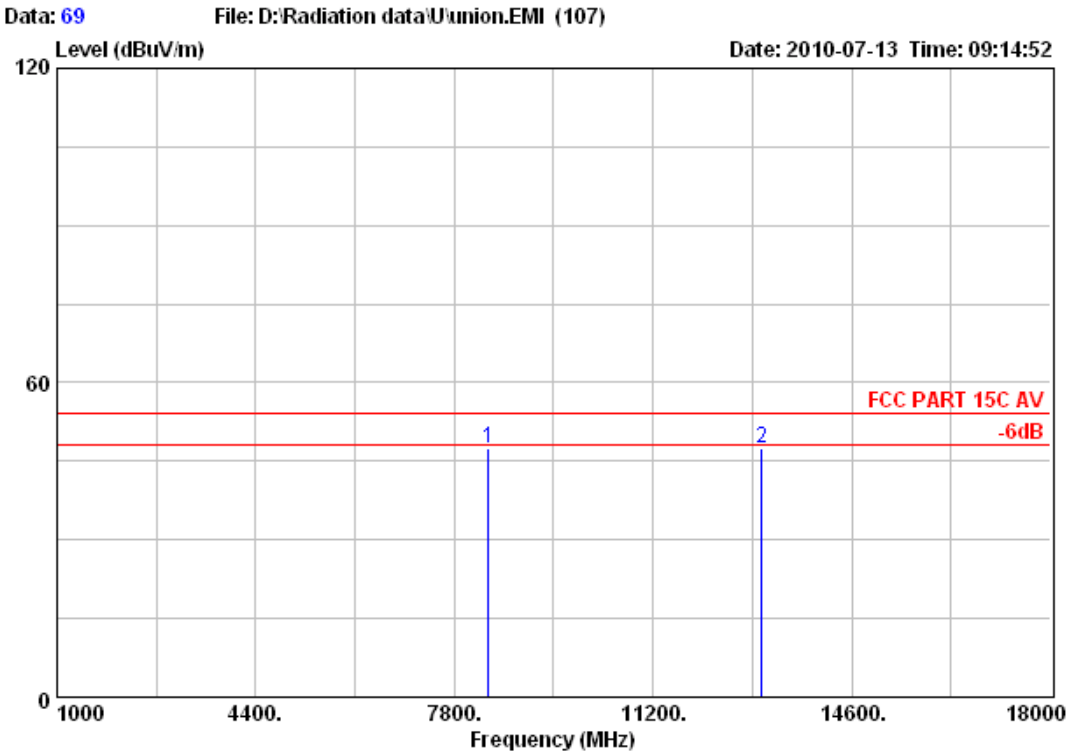
Fax:+86-769-85991080



Test Site : 10m Chamber
Limit : FCC PART 15C AV
Dis. / Ant. : 3m 3117 Ant. Pol.: VERTICAL
EUT : Remote Conttoller
M/N : USB HID dongle
Power : DC 5V from PC input AC 120V/60Hz
Test Engineer : Jade
Comment : Temp:25.2'C Humi:56% Press:101.52kPa
Test Mode : TX 2405MHz

	Freq. (MHz)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading (dBuV)	Ant. Factor (dB/m)	Cable Loss (dB)	Remark
1	8378.00	47.32	54.00	6.68	7.79	36.93	2.60	Average
	213053.00	47.42	54.00	6.58	4.23	40.31	2.88	Average

NS Technology

Chenwu Industrial Zone,Houjie Town,
Dongguan,Guangdong,China
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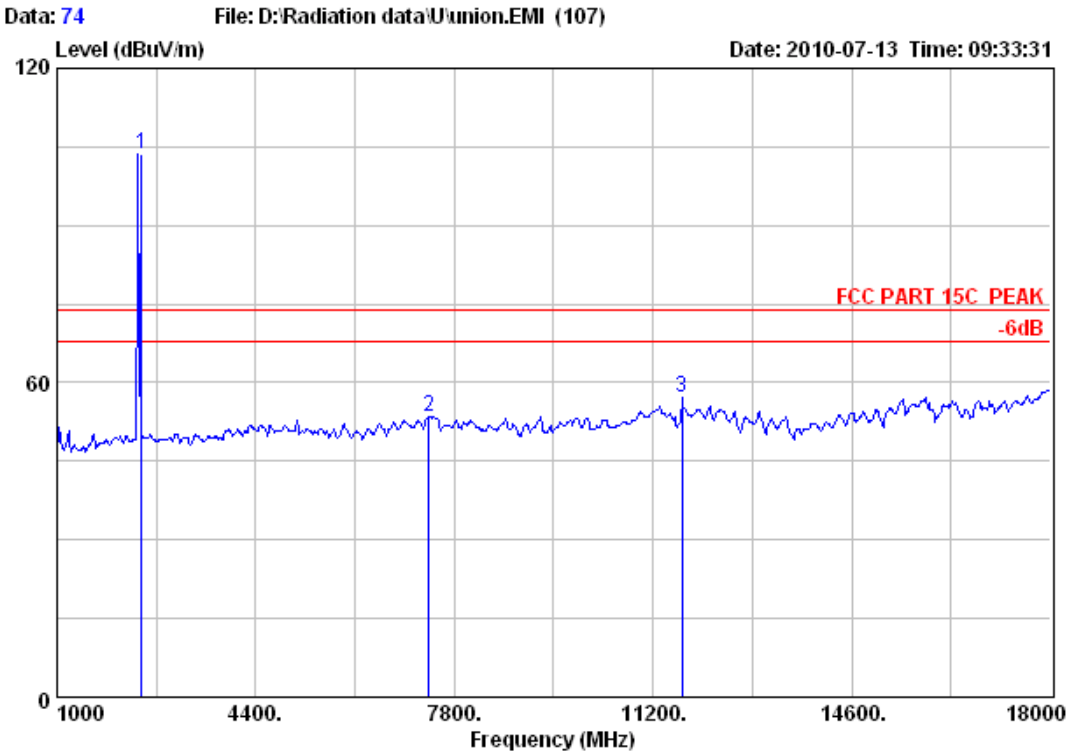
Fax:+86-769-85991080



Test Site : 10m Chamber
Limit : FCC PART 15C PEAK
Dis. / Ant. : 3m 3117 Ant. Pol.: HORIZONTAL
EUT : Remote Conttoller
M/N : USB HID dongle
Power : DC 5V from PC input AC 120V/60Hz
Test Engineer : Jade
Comment : Temp:25.2'C Humi:56% Press:101.52kPa
Test Mode : TX 2440MHz

	Freq. (MHz)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading (dBuV)	Ant. Factor (dB/m)	Cable Loss (dB)	Remark
1	2440.00	103.66	74.00	-29.66	69.89	31.54	2.23	Peak
2	7358.00	53.50	74.00	20.50	14.14	36.83	2.53	Peak
	311693.00	57.01	74.00	16.99	14.84	39.37	2.80	Peak

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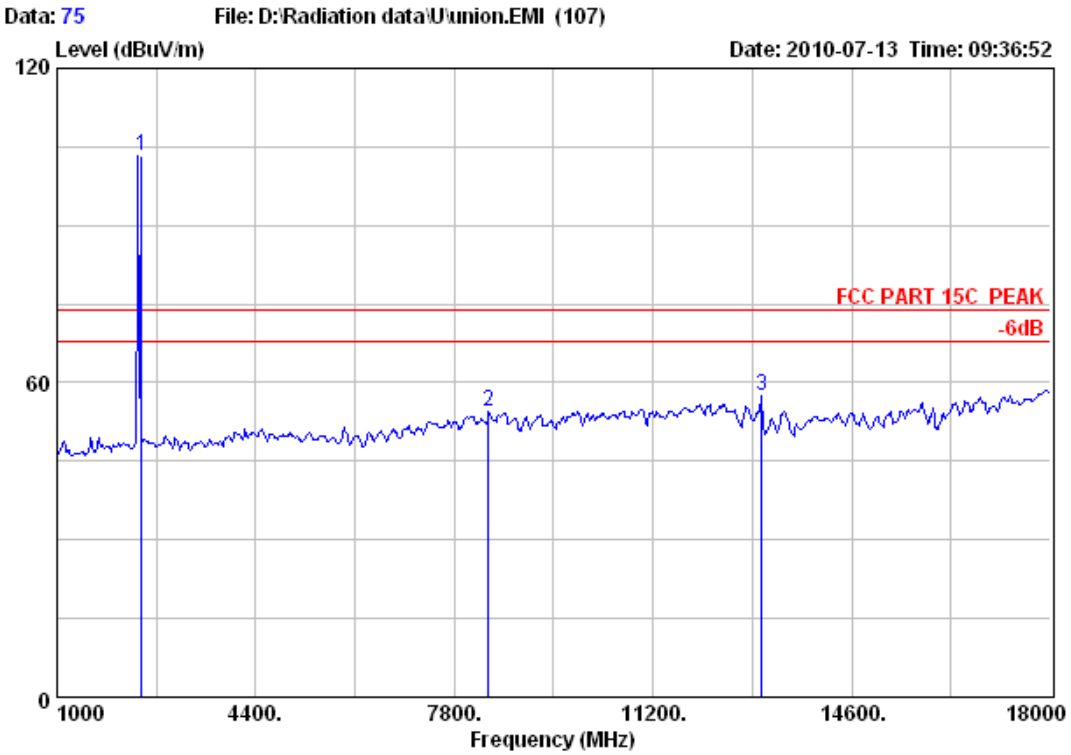

Test Site : 10m Chamber
Limit : FCC PART 15C PEAK
Dis. / Ant. : 3m 3117 Ant. Pol.: VERTICAL
EUT : Remote Conttoller
M/N : USB HID dongle
Power : DC 5V from PC input AC 120V/60Hz
Test Engineer : Jade
Comment : Temp:25.2'C Humi:56% Press:101.52kPa
Test Mode : TX 2440MHz

	Freq. (MHz)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading (dBuV)	Ant. Factor (dB/m)	Cable Loss (dB)	Remark
1	2440.00	103.41	74.00	-29.41	69.64	31.54	2.23	Peak
2	8378.00	54.32	74.00	19.68	14.79	36.93	2.60	Peak
	313053.00	57.42	74.00	16.58	14.23	40.31	2.88	Peak

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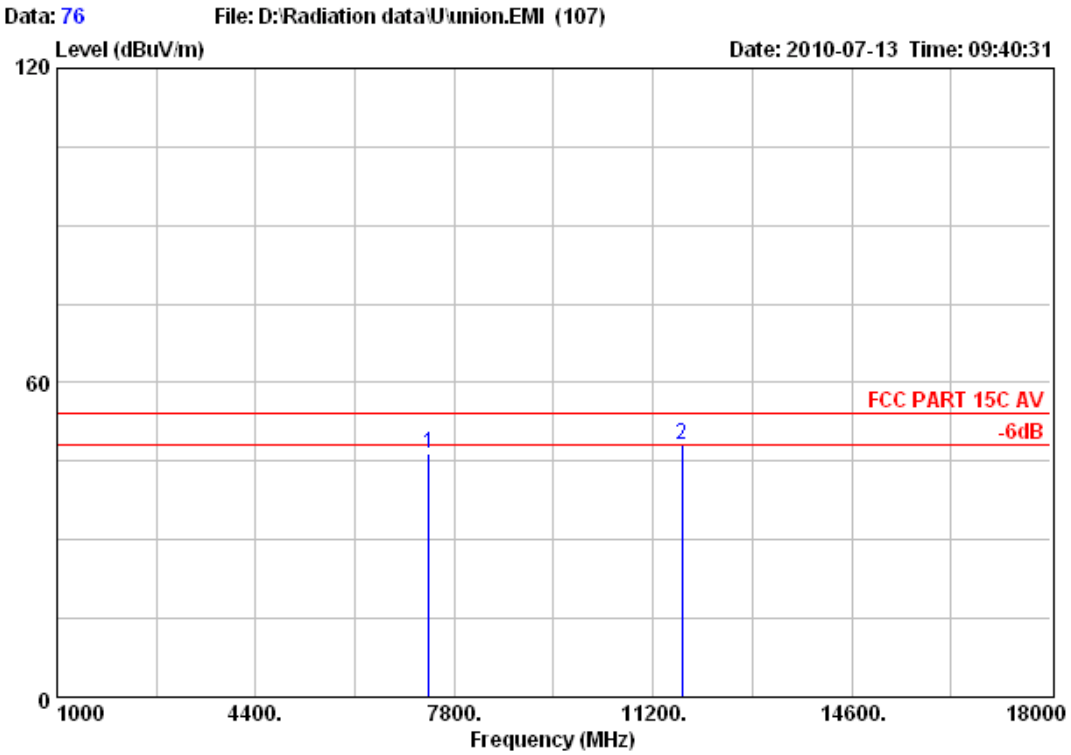

Test Site : 10m Chamber
Limit : FCC PART 15C AV
Dis. / Ant. : 3m 3117 Ant. Pol.: HORIZONTAL
EUT : Remote Conttoller
M/N : USB HID dongle
Power : DC 5V from PC input AC 120V/60Hz
Test Engineer : Jade
Comment : Temp:25.2'C Humi:56% Press:101.52kPa
Test Mode : TX 2440MHz

	Freq. (MHz)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading (dBuV)	Ant. Factor (dB/m)	Cable Loss (dB)	Remark
1	7358.00	46.50	54.00	7.50	7.14	36.83	2.53	Average
	211693.00	48.01	54.00	5.99	5.84	39.37	2.80	Average

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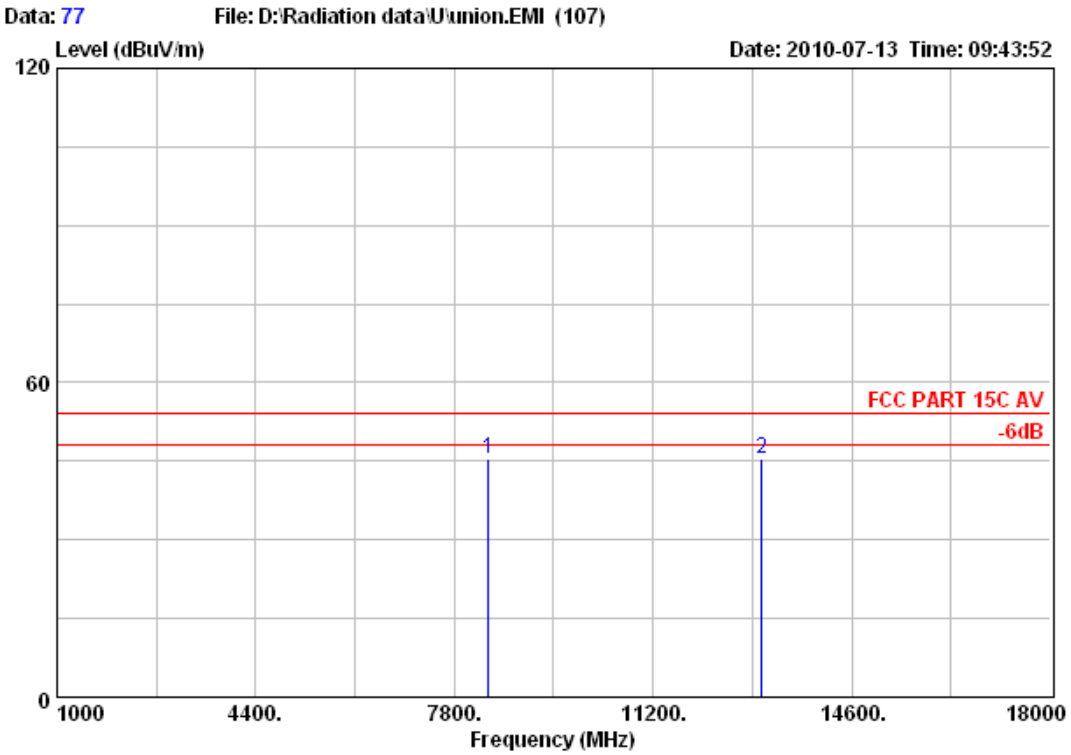

Test Site : 10m Chamber
Limit : FCC PART 15C AV
Dis. / Ant. : 3m 3117 Ant. Pol.: VERTICAL
EUT : Remote Conttoller
M/N : USB HID dongle
Power : DC 5V from PC input AC 120V/60Hz
Test Engineer : Jade
Comment : Temp:25.2'C Humi:56% Press:101.52kPa
Test Mode : TX 2440MHz

	Freq. (MHz)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading (dBuV)	Ant. Factor (dB/m)	Cable Loss (dB)	Remark
1	8378.00	45.32	54.00	8.68	5.79	36.93	2.60	Average
	213053.00	45.42	54.00	8.58	2.23	40.31	2.88	Average

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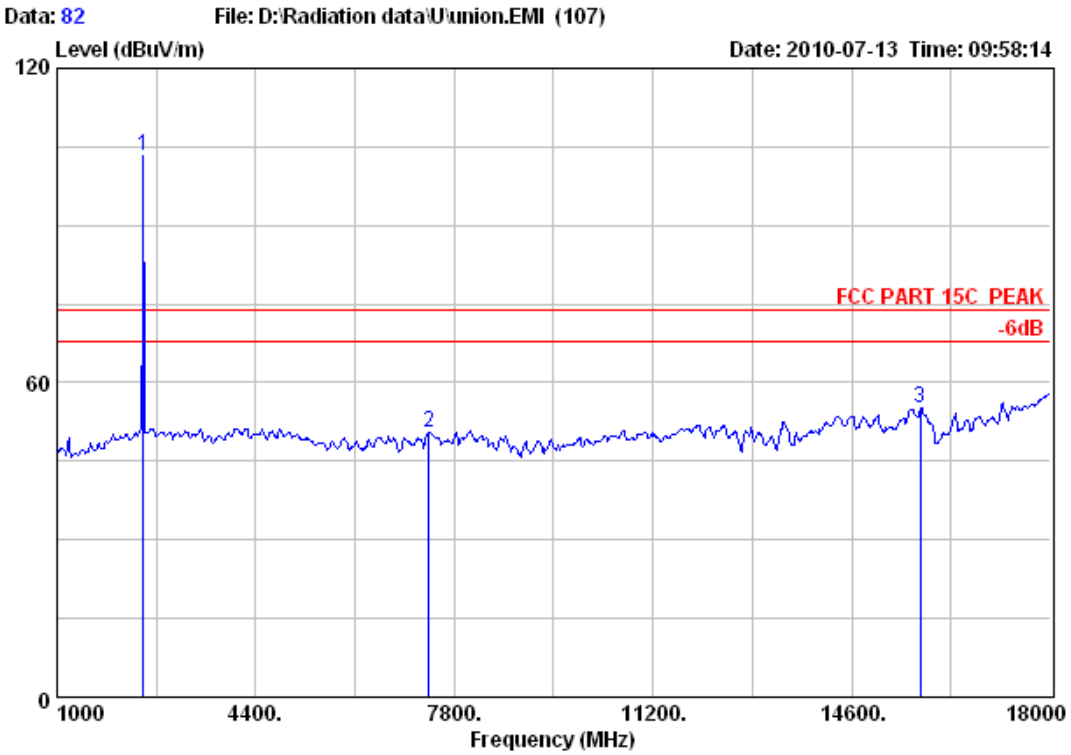

Test Site : 10m Chamber
Limit : FCC PART 15C PEAK
Dis. / Ant. : 3m 3117 Ant. Pol.: VERTICAL
EUT : Remote Conttoller
M/N : USB HID dongle
Power : DC 5V from PC input AC 120V/60Hz
Test Engineer : Jade
Comment : Temp:25.2'C Humi:56% Press:101.52kPa
Test Mode : TX 2480MHz

	Freq. (MHz)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading (dBuV)	Ant. Factor (dB/m)	Cable Loss (dB)	Remark
1	2480.00	103.29	74.00	-29.29	69.48	31.58	2.23	Peak
2	7358.00	50.62	74.00	23.38	11.26	36.83	2.53	Peak
	315773.00	55.03	74.00	18.97	9.88	42.10	3.05	Peak

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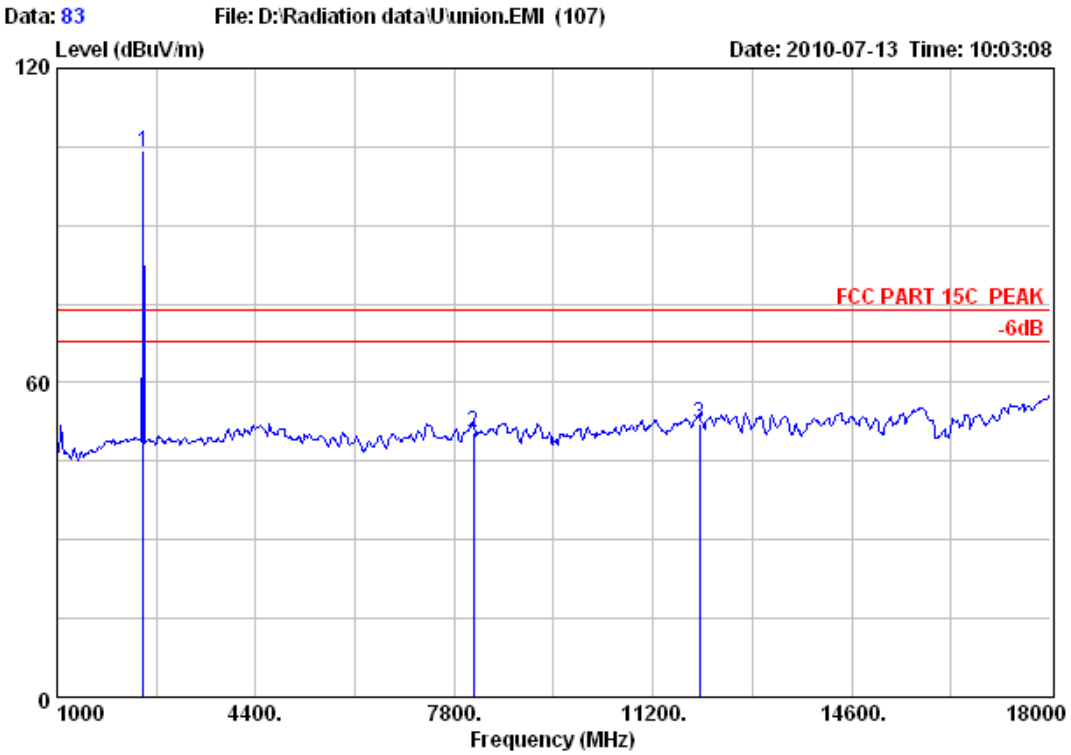

Test Site : 10m Chamber
Limit : FCC PART 15C PEAK
Dis. / Ant. : 3m 3117 Ant. Pol.: HORIZONTAL
EUT : Remote Conttoller
M/N : USB HID dongle
Power : DC 5V from PC input AC 120V/60Hz
Test Engineer : Jade
Comment : Temp:25.2'C Humi:56% Press:101.52kPa
Test Mode : TX 2480MHz

	Freq. (MHz)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading (dBuV)	Ant. Factor (dB/m)	Cable Loss (dB)	Remark
1	2480.00	103.95	74.00	-29.95	70.14	31.58	2.23	Peak
2	8123.00	50.38	74.00	23.62	51.82	36.97	2.58	Peak
	311999.00	52.18	74.00	21.82	45.59	39.80	2.82	Peak

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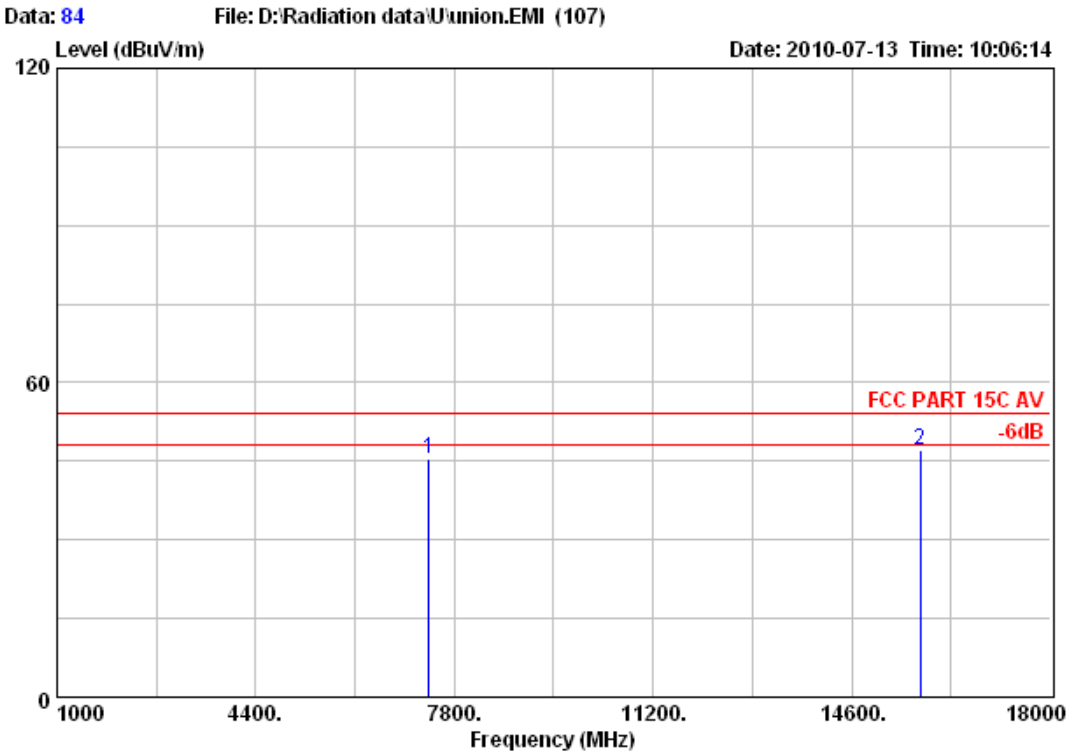

Test Site : 10m Chamber
Limit : FCC PART 15C AV
Dis. / Ant. : 3m 3117 Ant. Pol.: VERTICAL
EUT : Remote Conttoller
M/N : USB HID dongle
Power : DC 5V from PC input AC 120V/60Hz
Test Engineer : Jade
Comment : Temp:25.2'C Humi:56% Press:101.52kPa
Test Mode : TX 2480MHz

	Freq. (MHz)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading (dBuV)	Ant. Factor (dB/m)	Cable Loss (dB)	Remark
1	7358.00	45.62	54.00	8.38	6.26	36.83	2.53	Average
	215773.00	47.03	54.00	6.97	1.88	42.10	3.05	Average

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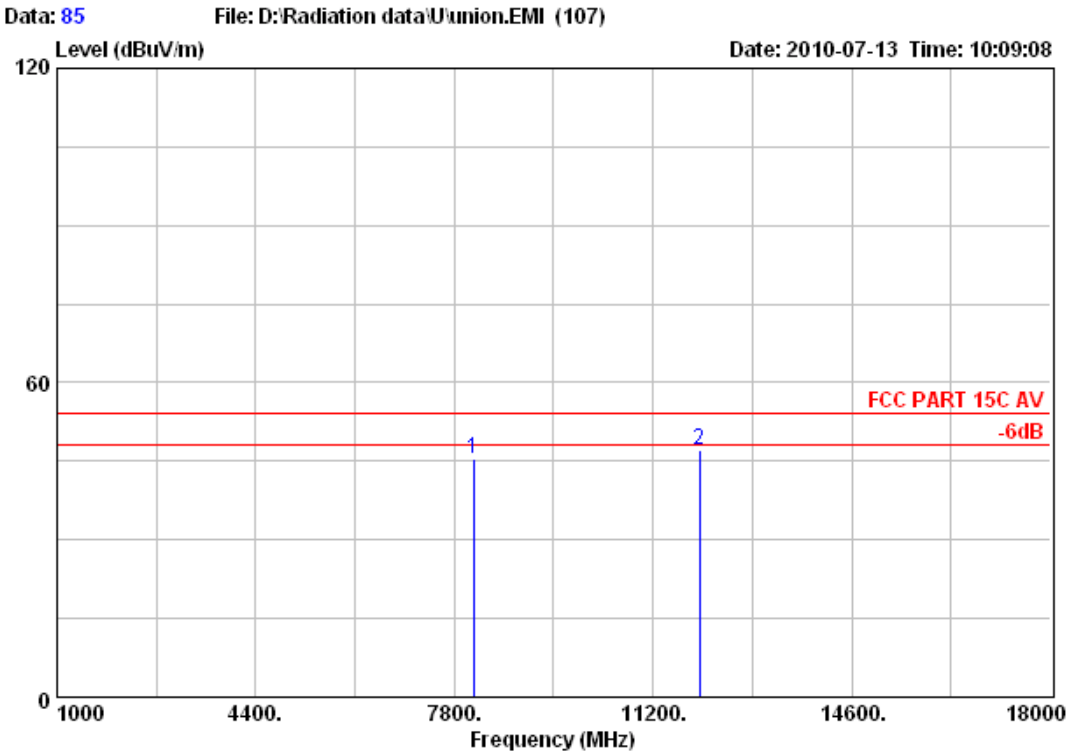


Test Site : 10m Chamber
Limit : FCC PART 15C AV
Dis. / Ant. : 3m 3117 Ant. Pol.: HORIZONTAL
EUT : Remote Conttoller
M/N : USB HID dongle
Power : DC 5V from PC input AC 120V/60Hz
Test Engineer : Jade
Comment : Temp:25.2'C Humi:56% Press:101.52kPa
Test Mode : TX 2480MHz

	Freq. (MHz)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading (dBuV)	Ant. Factor (dB/m)	Cable Loss (dB)	Remark
1	8123.00	45.38	54.00	8.62	5.83	36.97	2.58	Average
	211999.00	47.18	54.00	6.82	4.56	39.80	2.82	Average

5.3. Conducted emission test data

5.3.1.Test limits

20 dB below that the highest level.

5.3.2.Test procedure

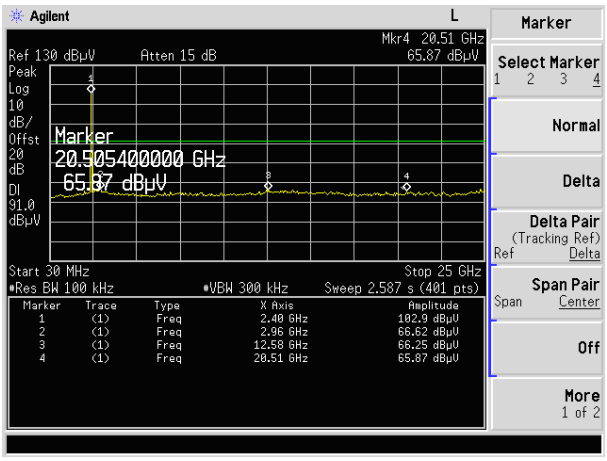
1. The EUT was placed on a table which is 0.8m above ground plane.
2. Connect EUT RF output port to the spectrum analyzer through an RF attenuator.
3. Set SA trace max hold, then view.

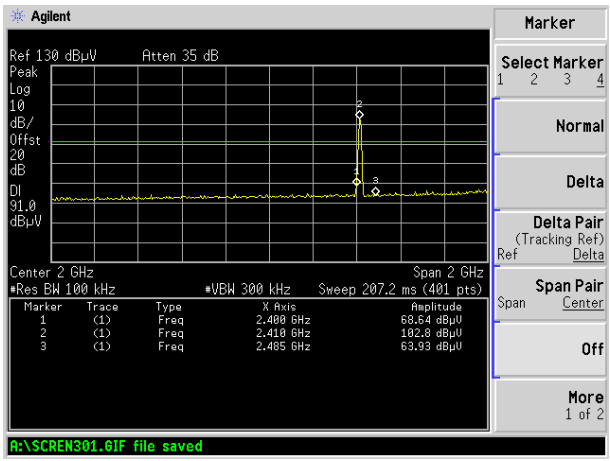
5.3.3.Test result

Pass

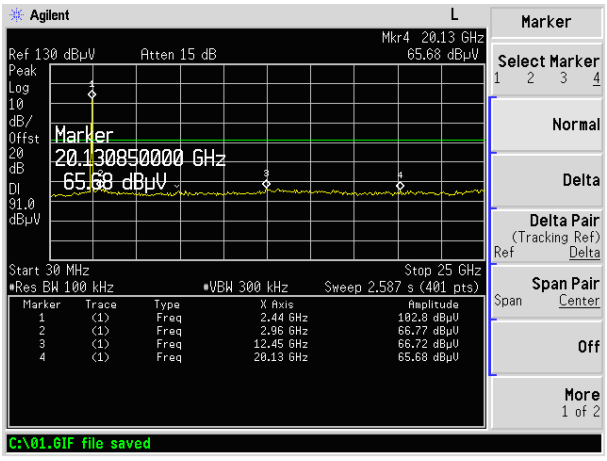
The test plots as following:

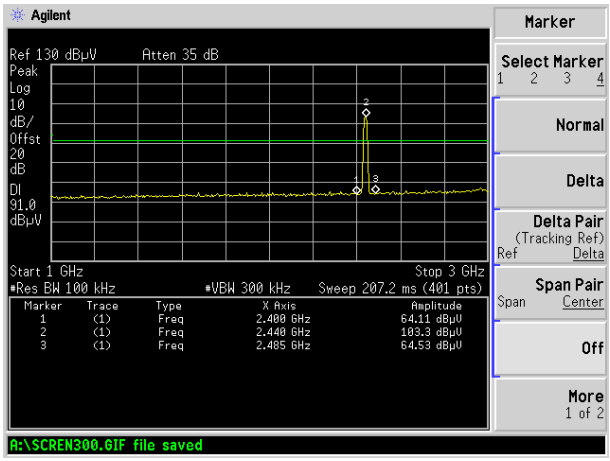
CH0 2405MHz



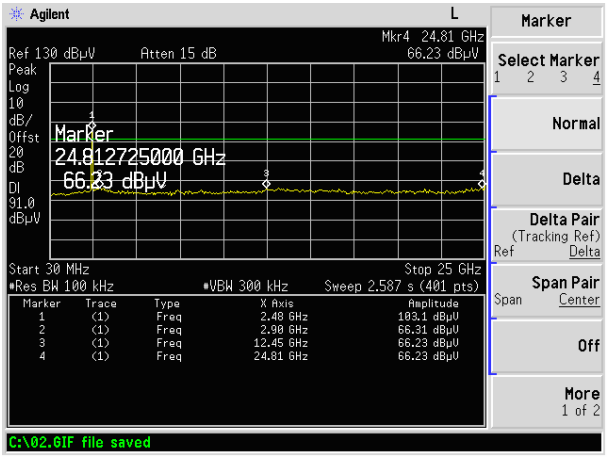


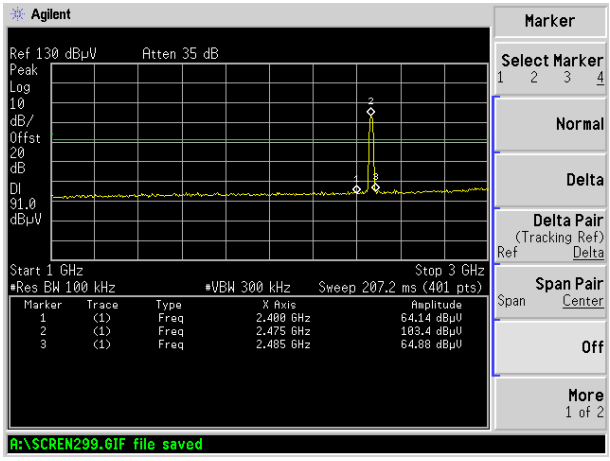
CH7 2440MHz





CH15 2480MHz





5.4. 6dB Bandwidth

5.4.1. Test limits

>500kHz.

5.4.2. Test procedure

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Connect EUT RF output port to the spectrum analyzer through an RF attenuator.
3. Set SA trace max hold, then view.

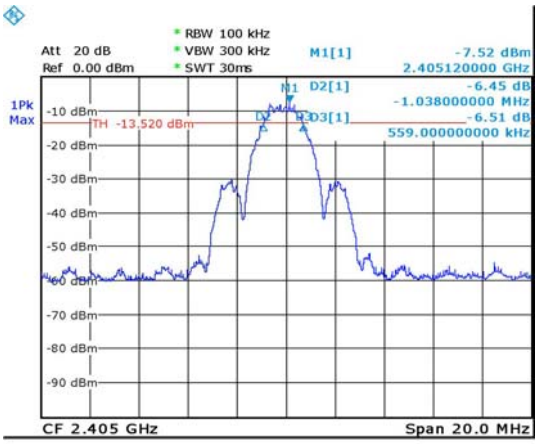
5.4.3. Test result

Pass

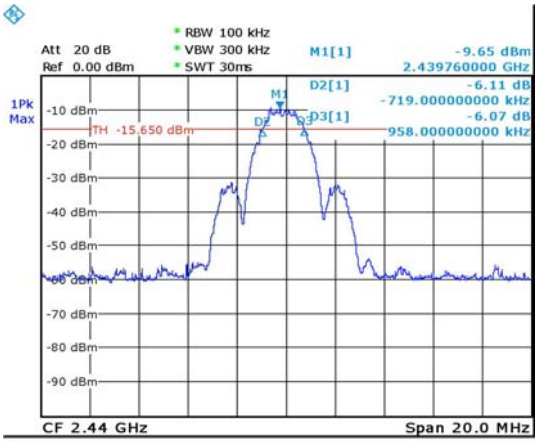
Test Channel	Frequency MHz	6dB bandwidth MHz	Conclusion
CH0	2405MHz	1.597	Pass
CH7	2440MHz	1.677	Pass
CH15	2480MHz	1.677	Pass

The test plots as following:

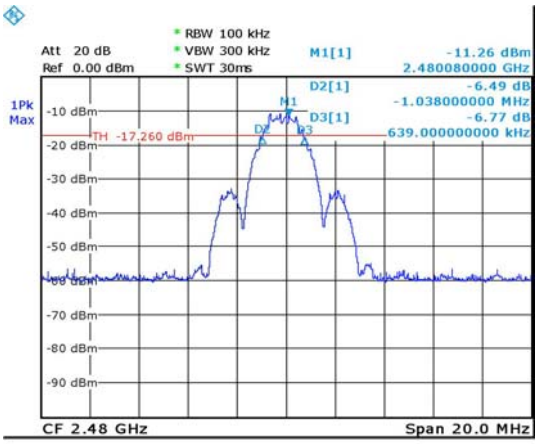
CH0 2405MHz



CH7 2440MHz



CH15 2480MHz



5.5. Power Spectral Density Test

5.5.1.Test procedure

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Connect EUT RF output port to the spectrum analyzer through an RF attenuator.
3. Set SA Center Frequency = Operation frequency, RBW=3kHz,VBW=30kHz.
4. Set SA trace max hold, then view.

5.5.2. Test result

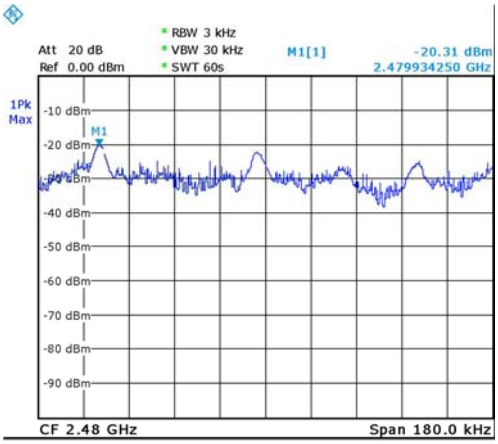
Pass

Test Channel	Frequency MHz	Read (dBm)	Factor (dB)	Result (dBm)	Limit
CH0	2405MHz	-17.45	3	-14.45	8.0
CH7	2440MHz	-19.49	3	-16.49	8.0
CH15	2480MHz	-20.31	3	-17.31	8.0

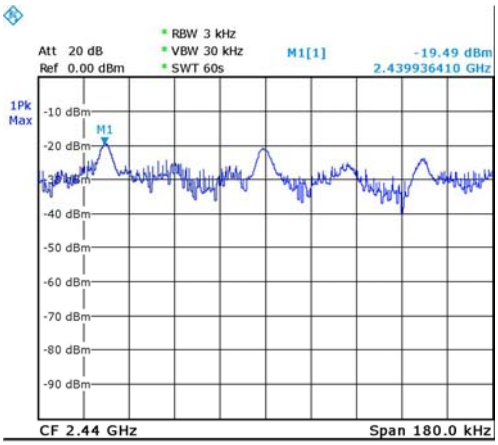
Note:Result=Read+Factor

The test plots as following:

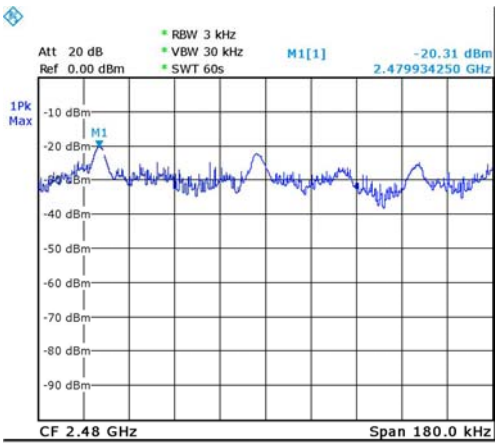
CH0 2405MHz



CH7 2440MHz



CH15 2480MHz



5.6. Output Power Test

5.6.1. Test procedure

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Connect EUT RF output port to the Power meter through an RF attenuator.

5.6.2. Test result

Pass

Test Channel	Frequency MHz	Read (dBm)	Factor (dB)	Result (dBm)	Limit
CH0	2405MHz	-6.06	3	-3.03	30.0
CH7	2440MHz	-6.45	3	-3.45	30.0
CH15	2480MHz	-6.83	3	-3.83	30.0

Note: Result=Read+Factor
The test plots as following:

5.7. Band Edge

5.7.1. Test limits

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 FCC Part 15C, whichever is the lesser attenuation.

5.7.2. Test procedure

The EUT was placed on a turn table which was 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna which was mounted on a antenna tower. At the frequency band of 1G Hz to 18GHz,The measuring antenna moved from 1 to 4 m for horizontal and vertical polarization. The horn antenna was used was a receiving antenna.

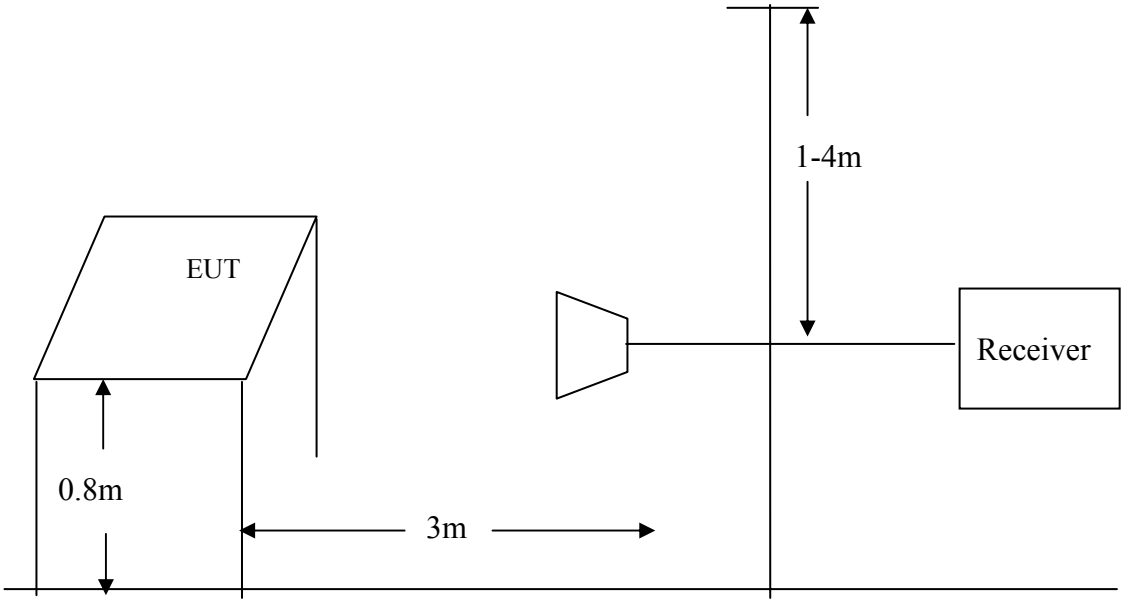
The resolution bandwidth and video bandwidth of the test receiver was1MHz and 1MHz for Peak detection at frequency above 1GHz.

The resolution bandwidth was1MHz and video bandwidth was 10Hz of the test receiver for Average detection at frequency above 1GHz.

The EUT position(X. Y. Z) were checked and worse case was happened in Y position. So Y position was chose for find measurement.

The EUT was tested in Chamber Site.

5.7.3. Test Setup Diagram



5.7.4. Test result

PASS.

The test plots as following:

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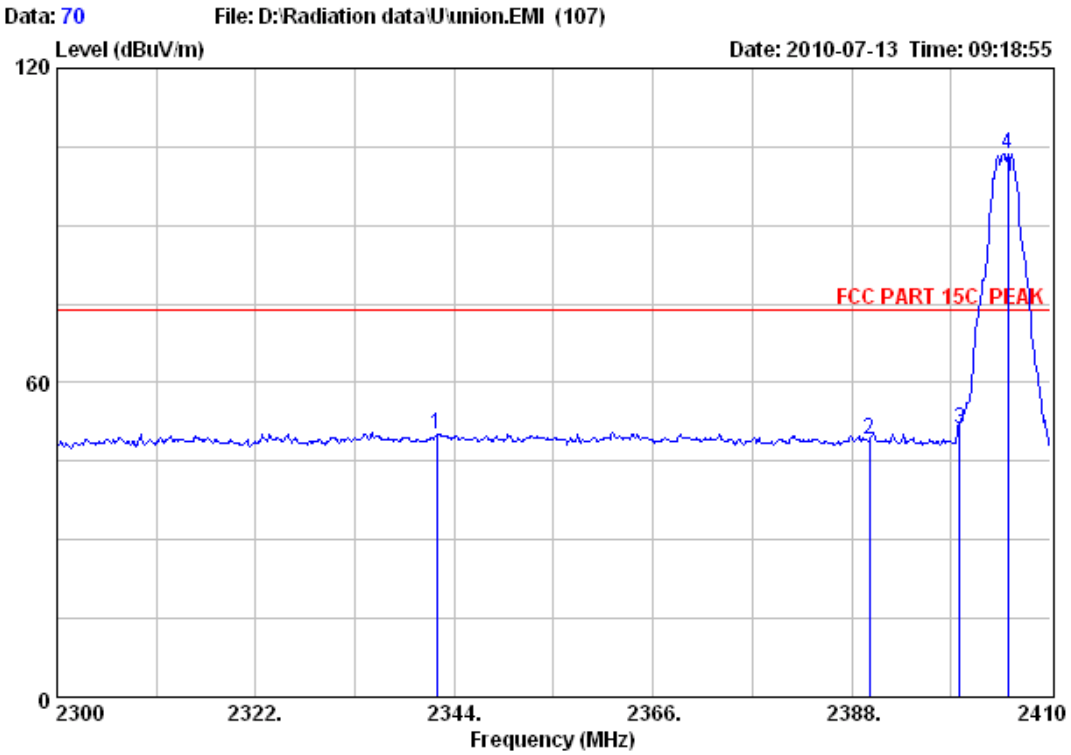

Test Site : 10m Chamber
Limit : FCC PART 15C PEAK
Dis. / Ant. : 3m 3117 Ant. Pol.: VERTICAL
EUT : Remote Conttoller
M/N : USB HID dongle
Power : DC 5V from PC input AC 120V/60Hz
Test Engineer : Jade
Comment : Temp:25.2'C Humi:56% Press:101.52kPa
Test Mode : TX 2405MHz

	Freq. (MHz)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading (dBuV)	Ant. Factor (dB/m)	Cable Loss (dB)	Remark
1	2342.02	50.21	74.00	23.79	16.54	31.45	2.22	Peak
2	2390.00	49.12	74.00	24.88	15.42	31.48	2.22	Peak
3	2400.00	51.01	74.00	22.99	17.28	31.50	2.23	Peak
4	2405.27	103.78	74.00	-29.78	70.05	31.50	2.23	Peak

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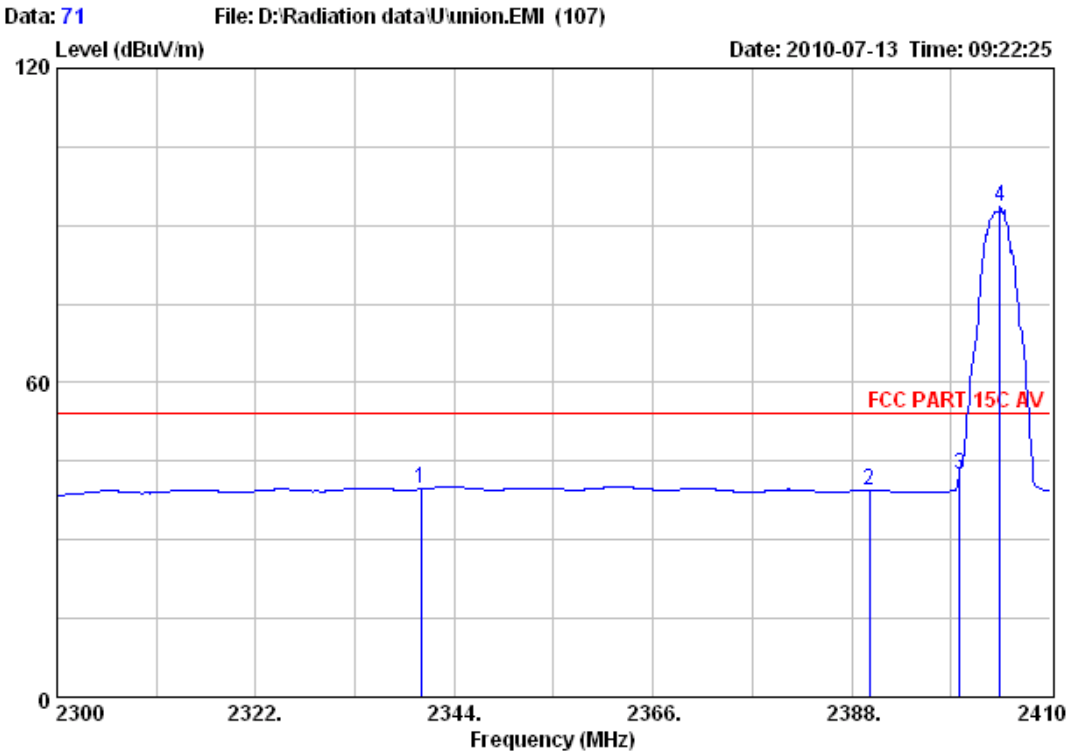

Test Site : 10m Chamber
Limit : FCC PART 15C AV
Dis. / Ant. : 3m 3117 Ant. Pol.: VERTICAL
EUT : Remote Conttoller
M/N : USB HID dongle
Power : DC 5V from PC input AC 120V/60Hz
Test Engineer : Jade
Comment : Temp:25.2'C Humi:56% Press:101.52kPa
Test Mode : TX 2405MHz

	Freq. (MHz)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading (dBuV)	Ant. Factor (dB/m)	Cable Loss (dB)	Remark
1	2340.26	39.66	54.00	14.34	5.99	31.45	2.22	Average
2	2390.00	39.52	54.00	14.48	5.82	31.48	2.22	Average
3	2400.00	42.42	54.00	11.58	8.69	31.50	2.23	Average
4	2404.39	93.58	54.00	-39.58	59.85	31.50	2.23	Average

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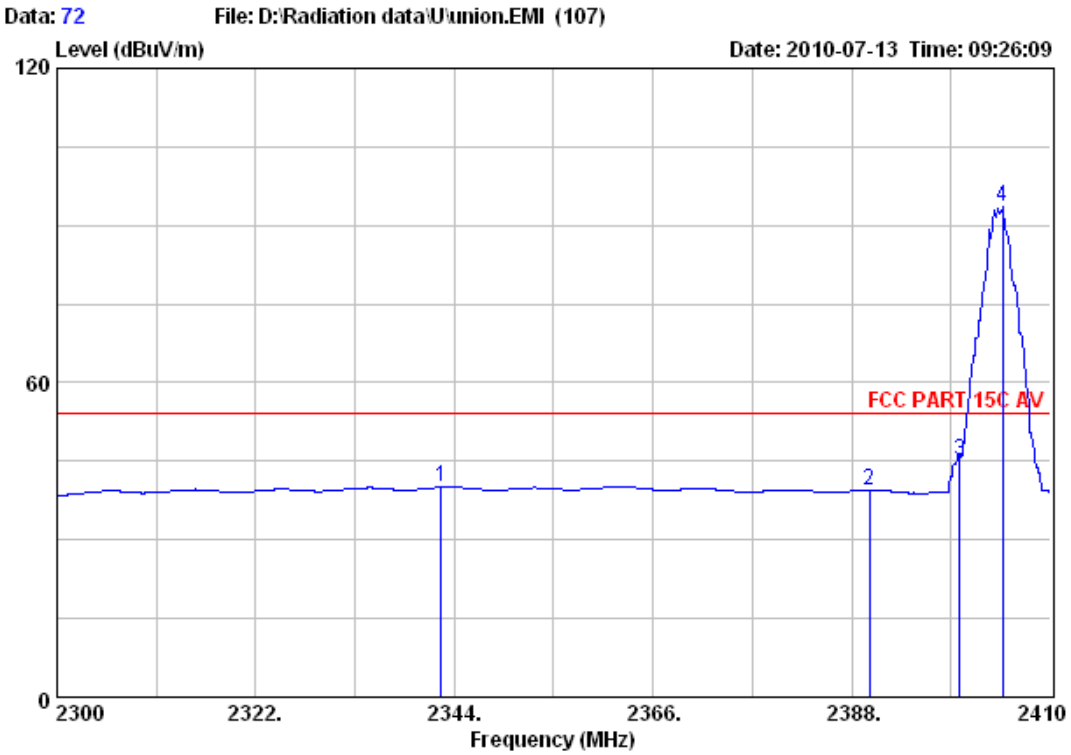

Test Site : 10m Chamber
Limit : FCC PART 15C AV
Dis. / Ant. : 3m 3117 Ant. Pol.: HORIZONTAL
EUT : Remote Conttoller
M/N : USB HID dongle
Power : DC 5V from PC input AC 120V/60Hz
Test Engineer : Jade
Comment : Temp:25.2'C Humi:56% Press:101.52kPa
Test Mode : TX 2405MHz

	Freq. (MHz)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading (dBuV)	Ant. Factor (dB/m)	Cable Loss (dB)	Remark
1	2342.57	40.02	54.00	13.98	6.35	31.45	2.22	Average
2	2390.00	39.54	54.00	14.46	5.84	31.48	2.22	Average
3	2400.00	45.29	54.00	8.71	11.56	31.50	2.23	Average
4	2404.72	93.45	54.00	-39.45	59.72	31.50	2.23	Average

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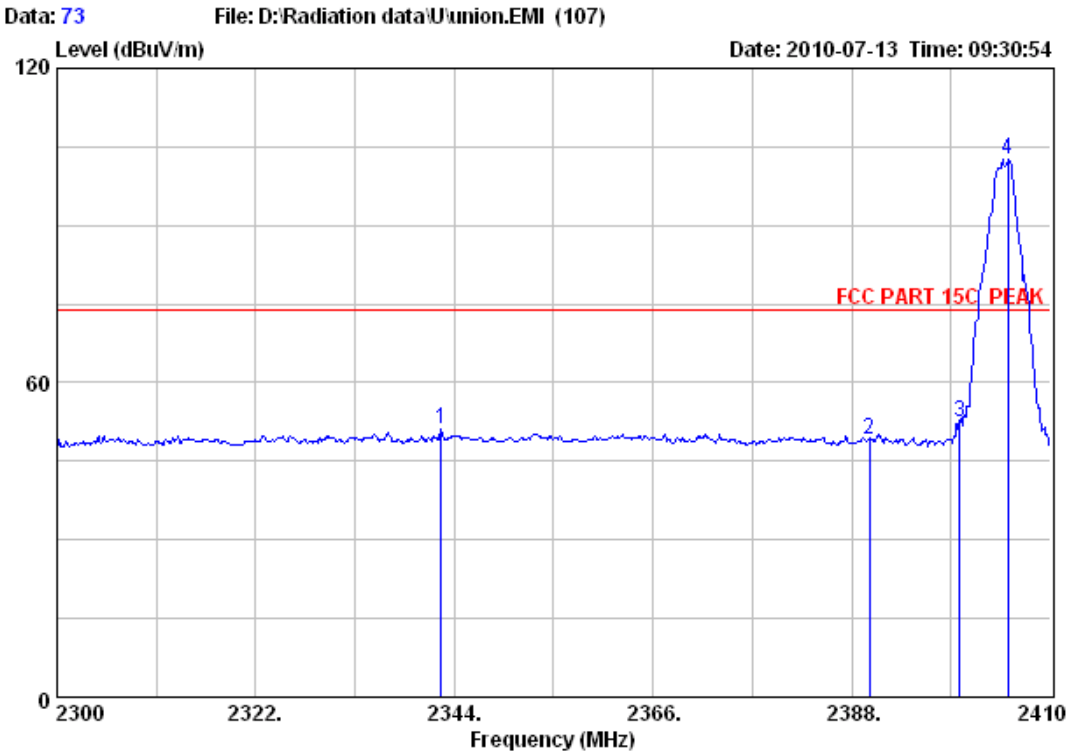


```
Test Site      : 10m Chamber
Limit          : FCC PART 15C  PEAK
Dis. / Ant.    : 3m   3117                Ant. Pol.: HORIZONTAL
EUT            : Remote Conttoller
M/N            : USB HID dongle
Power          : DC 5V from PC input AC 120V/60Hz
Test Engineer  : Jade
Comment        : Temp:25.2'C   Humi:56%   Press:101.52kPa
Test Mode      : TX 2405MHz
```

	Freq. (MHz)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading (dBuV)	Ant. Factor (dB/m)	Cable Loss (dB)	Remark
1	2342.57	51.02	74.00	22.98	17.35	31.45	2.22	Peak
2	2390.00	49.30	74.00	24.70	15.60	31.48	2.22	Peak
3	2400.00	52.40	74.00	21.60	18.67	31.50	2.23	Peak
4	2405.27	102.64	74.00	-28.64	68.91	31.50	2.23	Peak

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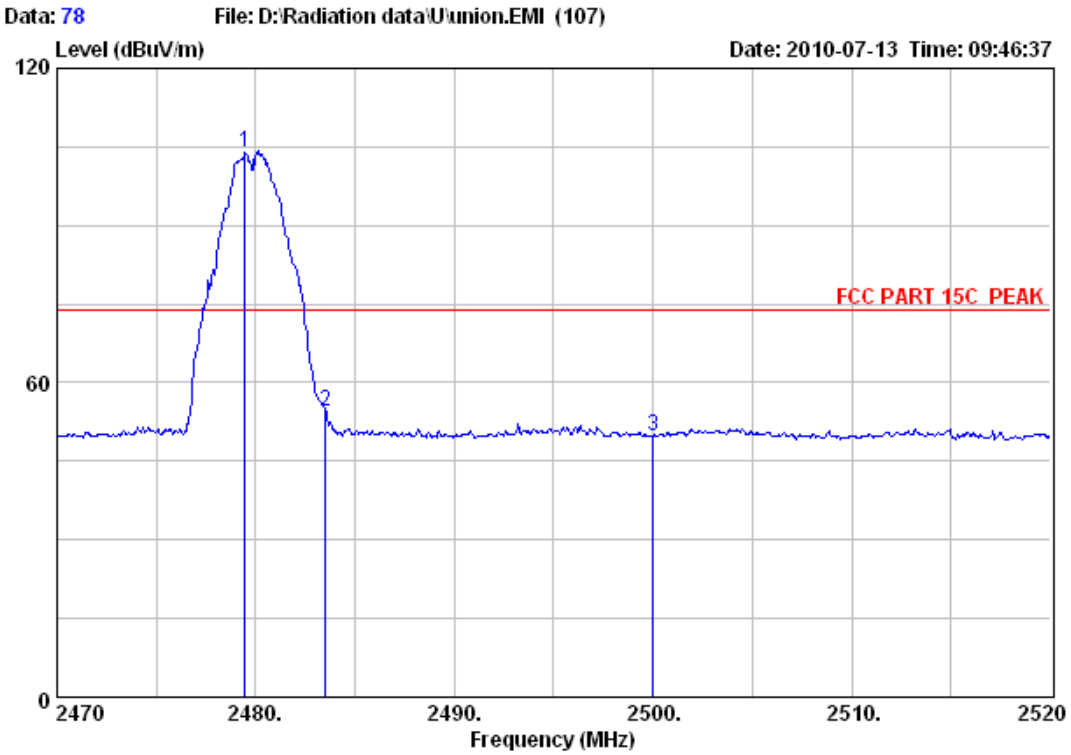
Chenwu Industrial Zone,Houjie Town,
Dongguan,Guangdong,China
Tel:+86-769-85935656
Fax:+86-769-85991080



Test Site : 10m Chamber
Limit : FCC PART 15C PEAK
Dis. / Ant. : 3m 3117 Ant. Pol.: HORIZONTAL
EUT : Remote Conttoller
M/N : USB HID dongle
Power : DC 5V from PC input AC 120V/60Hz
Test Engineer : Jade
Comment : Temp:25.2'C Humi:56% Press:101.52kPa
Test Mode : TX 2480MHz

	Freq. (MHz)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading (dBuV)	Ant. Factor (dB/m)	Cable Loss (dB)	Remark
1	2479.45	103.98	74.00	-29.98	70.17	31.58	2.23	Peak
2	2483.50	54.63	74.00	19.37	20.82	31.58	2.23	Peak
3	2500.00	49.79	74.00	24.21	15.96	31.60	2.23	Peak

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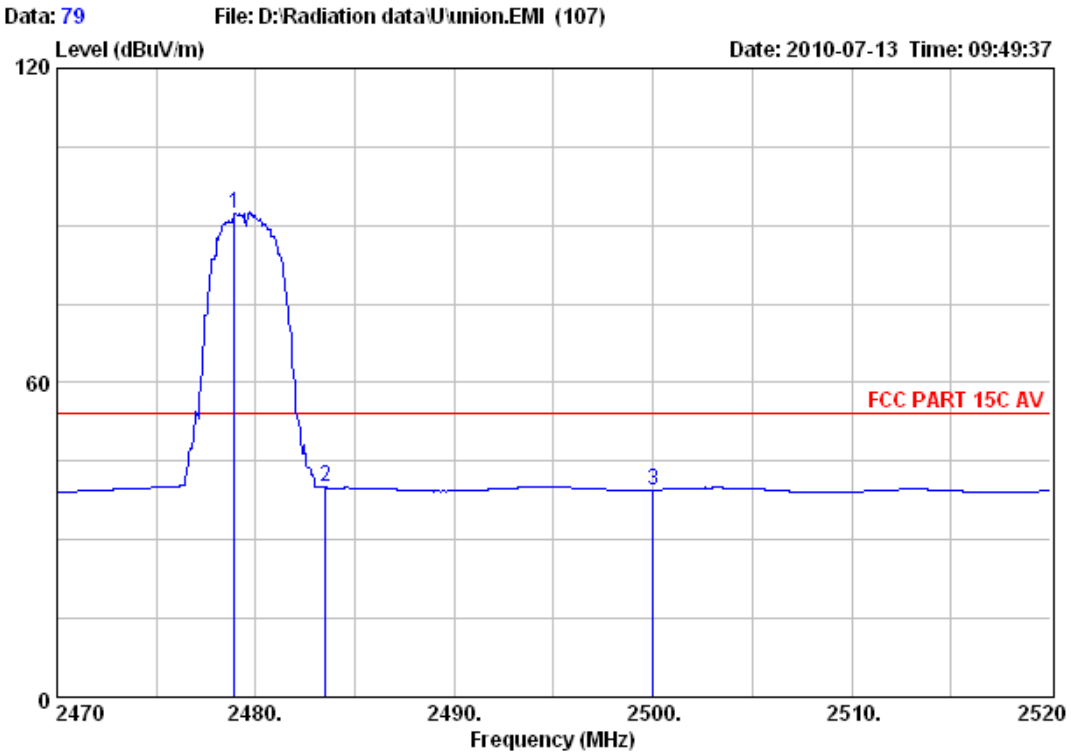

Test Site : 10m Chamber
Limit : FCC PART 15C AV
Dis. / Ant. : 3m 3117 Ant. Pol.: HORIZONTAL
EUT : Remote Conttoller
M/N : USB HID dongle
Power : DC 5V from PC input AC 120V/60Hz
Test Engineer : Jade
Comment : Temp:25.2'C Humi:56% Press:101.52kPa
Test Mode : TX 2480MHz

	Freq. (MHz)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading (dBuV)	Ant. Factor (dB/m)	Cable Loss (dB)	Remark
1	2478.95	92.40	54.00	-38.40	58.59	31.58	2.23	Average
2	2483.50	39.96	54.00	14.04	6.15	31.58	2.23	Average
3	2500.00	39.54	54.00	14.46	5.71	31.60	2.23	Average

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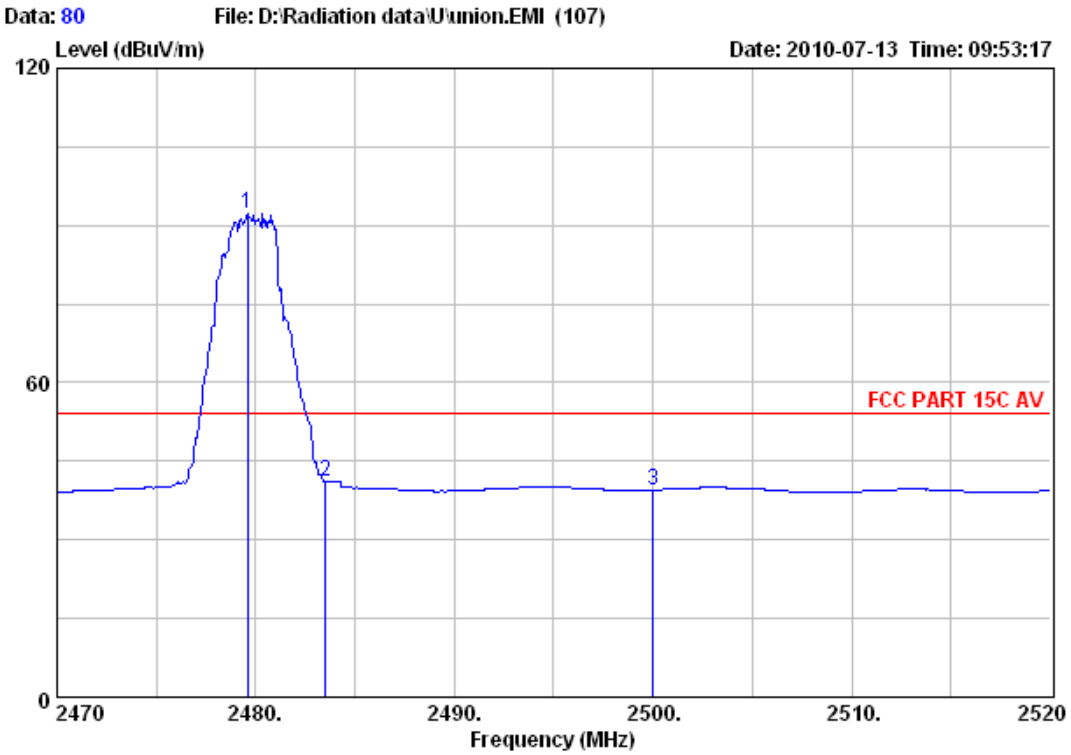
Fax:+86-769-85991080



Test Site : 10m Chamber
Limit : FCC PART 15C AV
Dis. / Ant. : 3m 3117 Ant. Pol.: VERTICAL
EUT : Remote Conttoller
M/N : USB HID dongle
Power : DC 5V from PC input AC 120V/60Hz
Test Engineer : Jade
Comment : Temp:25.2'C Humi:56% Press:101.52kPa
Test Mode : TX 2480MHz

	Freq. (MHz)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading (dBuV)	Ant. Factor (dB/m)	Cable Loss (dB)	Remark
1	2479.60	92.28	54.00	-38.28	58.47	31.58	2.23	Average
2	2483.50	41.21	54.00	12.79	7.40	31.58	2.23	Average
3	2500.00	39.54	54.00	14.46	5.71	31.60	2.23	Average

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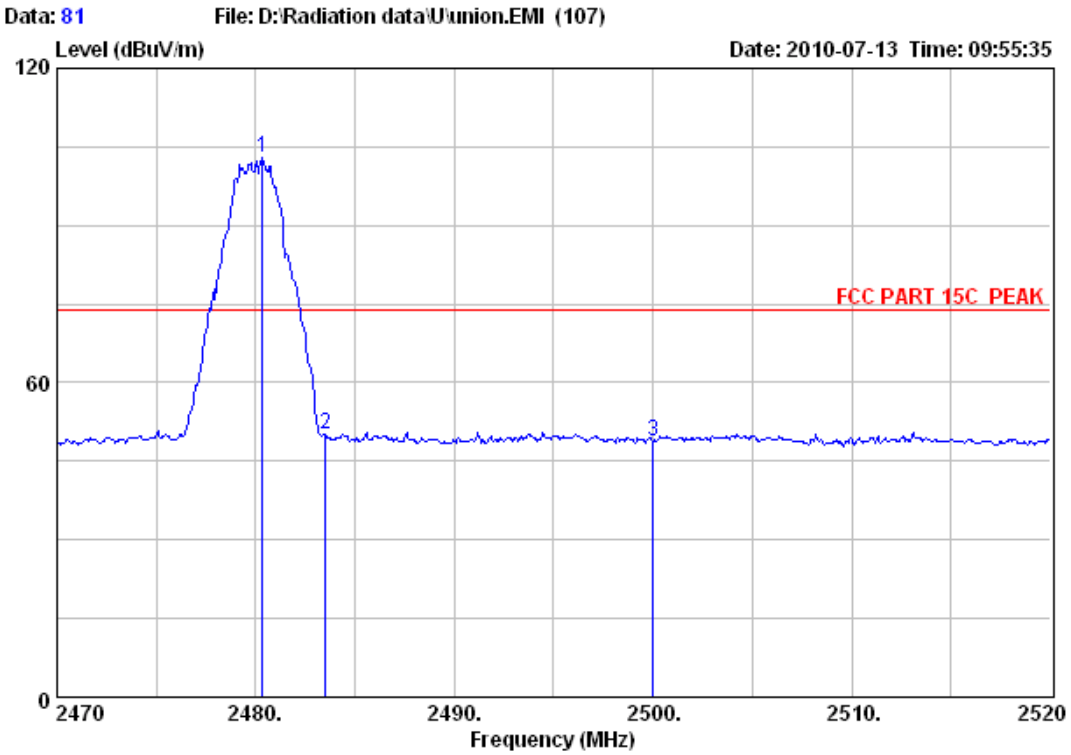

Test Site : 10m Chamber
Limit : FCC PART 15C PEAK
Dis. / Ant. : 3m 3117 Ant. Pol.: VERTICAL
EUT : Remote Conttoller
M/N : USB HID dongle
Power : DC 5V from PC input AC 120V/60Hz
Test Engineer : Jade
Comment : Temp:25.2'C Humi:56% Press:101.52kPa
Test Mode : TX 2480MHz

	Freq. (MHz)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Reading (dBuV)	Ant. Factor (dB/m)	Cable Loss (dB)	Remark
1	2480.35	103.00	74.00	-29.00	69.19	31.58	2.23	Peak
2	2483.50	50.06	74.00	23.94	16.25	31.58	2.23	Peak
3	2500.00	48.78	74.00	25.22	14.95	31.60	2.23	Peak

5.8. ANTENNA REQUIREMENT

5.8.1.STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 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. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

5.8.2. ANTENNA CONNECTED CONSTRUCTION

The antenna used for this product is PCB antenna (see EUT photo) that no antenna other than that furnished by the responsible party shall be used with the device, The maximum peak gain of this antenna is only 0dBi.