



# FCC/IC Test Report

FCC EVALUATION REPORT FOR VERIFICATION	
Project Reference No.	150934
Product	Classroom Response System
Brand Name	<b>SMART</b>
Model	SMART Response XE 03-00181
Alternate Model	N/A
Tested according to	FCC Rules and Regulations Part 15 Subpart C 2008,15.247, RSS-210 ISSUE 7, ANSI C63.4-2009

Tested in period	2010-06-01 to 2010-07-22
Issued date	2010-07-30
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Tested by	<i>Zone Peng</i> 2010-07-30 <b>Zone Peng</b> <b>date</b>
Verified by	<i>Daria Liu</i> 2010-07-30 <b>Daria Liu</b> <b>date</b>

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## 1. Client Information

### 1.1 Applicant

Company Name: [SMART Technologies ULC](#)  
Company Address: [3636 Research Road NW Calgary, Alberta, Canada](#)

### 1.2 Manufacturer

Company Name: [Qingdao Haier Intelligent Electronics Co., Ltd.](#)  
Company Address: [No. 99 Chongqing south Road, Qingdao, China](#)


### 1.3 Scope

- Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission under FCC part 15.



## 2. Equipment under Test (EUT)

### 2.1 Identification of EUT

Category: SMART Response XE  
Model Name: 03-00181  
Alternate model: N/A  
Brand name:   
Technical data (Rating, etc.): As below

### 2.2 Detail spec

Spec:DC 5V from PC USB port

Operation Frequency : 2405 MHz -2480MHz

Channel Number : 16

Type of Modulation : Zigbee (QPSK)

Antenna Type : Integral PCB Antenna

Antenna Number : 2

Antenna gain : 3.3dBi

Output power: -0.21dBm

Remark: The 2 Antenna can not work together ,only can work individually.

### 2.3 Additional Information Related to Testing

CH1:2405MHz

CH2:2440MHz

CH3:2480MHz



### 3. General Test Conditions

#### 3.1 Location

These measurement tests were conducted at  
 AUDIX Technology (Shenzhen) Co.,Ltd-ELA 135  
 No. 6, Ke Feng Rd., 52 Block, Shenzhen Science & Industrial Park, Nantou,Shenzhen, Guangdong,  
 China  
 FCC Registration No.:90454  
 FCC Registration No.:794232  
 Industry Canada Registration No.: 5183  
 Note: all test are witnessed by NEMKO engineer

#### 3.2 Operating Environment

All tests and measurements were performed in a shielded enclosure or a controlled environment suitable for the tests conducted. The climatic conditions in the test area are automatically controlled and recorded continuously.

Parameters	Recording during test	Accepted deviation
Ambient temperature	22-25°C	15 – 35 °C
Relative humidity	50-56%	30 - 60%
Atmospheric pressure	101.2 kPa -101.3kPa	86-106kPa

#### 3.3 Operating During Test

Test mode :AC 120V 60Hz for PC

TM1 : ANTENNA 1 TX MODE

TM2 : ANTENNA 2 TX MODE

Remark : Ant1 is the worse case by prescan

#### 3.4 Test Equipment

The test equipments used in testing are calibrated on a regular basis. For most of the testing equipments accredited calibration is conducted once a year. For certain equipment the calibration interval is longer. Between the calibrations all test equipment are controlled and verified on a regular basis. The test equipments used are defined in each test section of this report.

##### AE Equipment:

VGA Cable : Shielded, Detachable, 1.8m(Bonded two ferrite cores)

Power Cord : Unshielded, Detachable, 1.8m (3pins)

1. PERSONAL COMPUTER

EMC CODE : Test PC G

M/N : AG017PA#AB2

S/N : CN5470G18

Manufacturer : HP

Power cord : Unshielded, Detachable, 1.8m

FCC ID : By DoC



BSMI ID : R33001

2. MONITOR

EMC CODE : Test Monitor B

M/N : E772F

S/N : CN-02W486-64180-3CE-00LA

Manufacturer : Dell

Data Cable : Shielded, Undetachabled, 1.8m

FCC ID : By DoC

BSMI ID : N/A

3. MOUSE

EMC CODE : ACS-EMC-M04R

M/N : M056UO

S/N : 512024282

Manufacturer : Dell

Data Cable : Shielded, Undetachabled, 1.8m

FCC ID : By DoC

BSMI ID : R41108

4. KEYBOARD

EMC CODE : ACS-EMC-K01R

M/N : SK-8125

Manufacturer : Dell

Data Cable : Shielded, Undetachabled, 2.0m

Add core

FCC ID : By DoC

BSMI ID : R31302

5.PERSONAL COMPUTER

EMC CODE : Test PC P; M/N : Studio 540; S/N : 124XK2X

Manufacturer : DELL

Power cord : Unshielded, Detachabled, 1.8m

FCC : DoC; BSMI ID : R33002

Display Card HD3450(VGA+DVI+HDMI)

6.Adapter

M/N : LA65NS1-00

Manufacturer : DELL

Power cord : Unshielded, Detachabled, 1.8m

FCC : DoC

**4. Measurement Uncertainty**

The Measurement Uncertainties stated were calculated in accordance with the requirements of NIST Technical Note 1297 with the confidence level of 95 %.

No.	Item	Uncertainty	Remark
1	Conducted Emission Test	1.22 dB	
2	Radiated Emission Test	3.14 dB	3m chamber
3	Radiated Emission Test	3.18 dB	10m chamber
4	RF frequency	$\pm 0.5 \times 10^{-7}$	
5	RF power ,Conducted	$\pm 3$ dB	





## 5. Radiated Electromagnetic Disturbances

### 5.1 Test Procedure

The EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber. An antenna was located 3m from the EUT on an adjustable mast.

The EUT were rotated 0 to 360 degree and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. The test result are reported as below.

For below 1GHz

RBW=120 kHz; VBW=300KHz. The frequency range from 30MHz to 1000MHz is checked and use QP detector .

For above 1GHz. The frequency range from 1GHz to 25GHz(10<sup>th</sup> harmonics) is checked.

RBW=1MHz ; VBW=1MHz,PK detector for peak emissions measurement above 1GHz  
AV value can be calculated by PK value – duty cycle factor ; and the duty cycle factor =  $20\log(1/\text{duty cycle})$ .

### 5.2 Measurement Equipment

	Equipment	Last Calibration	Type	Serial No.	Manufacturer
<input checked="" type="checkbox"/>	EMC Spectrum	May.08,10	E7405A	MY42000131	Agilent
<input checked="" type="checkbox"/>	EMC Spectrum	Oct.24,09	E7405A	MY45116588	Agilent
<input checked="" type="checkbox"/>	Test Receiver	Oct.24,09	ESCI	100842	R & S
<input checked="" type="checkbox"/>	Pre-Amplifier	May.08,10	8447D	2944A10684	Agilent
<input checked="" type="checkbox"/>	Pre-Amplifier	May.08,10	8447D	2944A07794	Agilent
<input checked="" type="checkbox"/>	Bilog Antenna	Feb.12,10	CBL6112D	25238	Schaffner
<input checked="" type="checkbox"/>	Bilog Antenna	Feb.12,10	CBL6112D	25237	Schaffner
<input checked="" type="checkbox"/>	RF Cable	May.08,10	8D-FB	10m Chamber No.1	MIYAZAKI
<input checked="" type="checkbox"/>	RF Cable	May.08,10	8D-FB	10m Chamber No.2	MIYAZAKI
<input checked="" type="checkbox"/>	Coaxial Switch	May.08,10	MP59B	6200766906	Anritsu
<input checked="" type="checkbox"/>	Coaxial Switch	May.08,10	MP59B	6200766907	Anritsu
<input checked="" type="checkbox"/>	Coaxial Switch	May.08,10	MP59B	M74389	Anritsu
<input checked="" type="checkbox"/>	Horn Antenna	May.08,10	3115	9607-4877	EMCO
<input checked="" type="checkbox"/>	Horn Antenna	May.08,10	3115	9510-4580	EMCO
<input checked="" type="checkbox"/>	Amp	May.08,10	8449B	3008A00863	HP
<input checked="" type="checkbox"/>	Signal Generator	May.08,10	83732B	6K00003262	HP
<input checked="" type="checkbox"/>	Spectrum Analyzer	Oct.05.09	E4446A	US44300459	Agilent
<input checked="" type="checkbox"/>	PREAmplifier	Oct.05.09	8449B	3008A02495	Agilent
<input checked="" type="checkbox"/>	RF Cable	Oct.05.09	SUCOFLEX 102	28620/2	Hubersuhner
<input checked="" type="checkbox"/>	RF Cable	Oct.05.09	SUCOFLEX 102	271471/4	Hubersuhner
<input checked="" type="checkbox"/>	RF Cable	Oct.05.09	SUCOFLEX 102	29086/2	Hubersuhner
<input checked="" type="checkbox"/>	RF Cable	Oct.05.09	SUCOFLEX 102	271473/4	Hubersuhner
<input checked="" type="checkbox"/>	Horn Antenna	Oct.05.09	3116	00060089	EMCO

### 5.3 Test Result

Connect mode	Antenna Polarity	Remark	Test Data	Test Result
TM1	Horizontal	30-1000MHz	Diagram 001 <sup>a</sup>	Pass
	Vertical	30-1000MHz	Diagram 002 <sup>a</sup>	Pass
TM1 CH1	Horizontal	1GHz-18GHz	Diagram 003*	Pass
	Vertical	1GHz-18GHz	Diagram 004*	Pass
TM1 CH2	Horizontal	1GHz-18GHz	Diagram 005*	Pass
	Vertical	1GHz-18GHz	Diagram 006*	Pass

TM1 CH3	Horizontal	1GHz-18GHz	Diagram 007*	Pass
	Vertical	1GHz-18GHz	Diagram 008*	Pass
TM2 CH1	Horizontal	1GHz-18GHz	Diagram 009*	Pass
	Vertical	1GHz-18GHz	Diagram 010*	Pass
TM2 CH2	Horizontal	1GHz-18GHz	Diagram 011*	Pass
	Vertical	1GHz-18GHz	Diagram 012*	Pass
TM2 CH3	Horizontal	1GHz-18GHz	Diagram 013*	Pass
	Vertical	1GHz-18GHz	Diagram 014*	Pass
TM1 CH1	Horizontal	18GHz-25GHz	Diagram 015#	Pass
	Vertical	18GHz-25GHz	Diagram 016#	Pass
TM1 CH2	Horizontal	18GHz-25GHz	Diagram 017#	Pass
	Vertical	18GHz-25GHz	Diagram 018#	Pass
TM1 CH3	Horizontal	18GHz-25GHz	Diagram 019#	Pass
	Vertical	18GHz-25GHz	Diagram 020#	Pass
TM2 CH1	Horizontal	18GHz-25GHz	Diagram 021#	Pass
	Vertical	18GHz-25GHz	Diagram 022#	Pass
TM2 CH2	Horizontal	18GHz-25GHz	Diagram 023#	Pass
	Vertical	18GHz-25GHz	Diagram 024#	Pass
TM2 CH3	Horizontal	18GHz-25GHz	Diagram 025#	Pass
	Vertical	18GHz-25GHz	Diagram 026#	Pass
RX ANT1 CH1	Horizontal	1GHz-18GHz	Diagram 027\$	Pass
	Vertical	1GHz-18GHz	Diagram 028\$	Pass
RX ANT1 CH2	Horizontal	1GHz-18GHz	Diagram 029\$	Pass
	Vertical	1GHz-18GHz	Diagram 030\$	Pass
RX ANT1 CH3	Horizontal	1GHz-18GHz	Diagram 031\$	Pass
	Vertical	1GHz-18GHz	Diagram 032\$	Pass
RX ANT2 CH1	Horizontal	1GHz-18GHz	Diagram 033\$	Pass
	Vertical	1GHz-18GHz	Diagram 034\$	Pass
RX ANT2 CH2	Horizontal	1GHz-18GHz	Diagram 035\$	Pass
	Vertical	1GHz-18GHz	Diagram 036\$	Pass
RX ANT2 CH3	Horizontal	1GHz-18GHz	Diagram 037\$	Pass
	Vertical	1GHz-18GHz	Diagram 038\$	Pass
RX	Horizontal	30-1000MHz	Diagram R-039 <sup>b</sup>	Pass
	Vertical	30-1000MHz	Diagram R-040 <sup>b</sup>	Pass

Remark: a) TM1 is the worse mode by pre-scan, and only list worse mode in report .

\*) AV value can be calculated by PK value – duty cycle factor ; and the duty cycle factor =  $20\log(1/\text{duty cycle})$  ; the duty cycle is 12.25% ,so duty cycle factor = 18.237dB

#) Because PK value is more lower than AV limit for 6dB, so only show PK diagram as below.

§)When PK value is lower than AV limit ,then AV value deemed to comply the AV limit , from18GHz to 25MHz, no spurious emission found .

b) Ant 1 CH1 is the worse mode by pre-scan ,and only list worse mode in report .



NOTES:

1. All modes were measured and the worst case emission was reported.
2. H =Horizontal V=Vertical
3. Emission = Reading +Antenna Factor + Cable Loss –Amp Factor(if exist)
4. Emission level dB  $\mu$  V = 20 log Emission level  $\mu$  V/m
5. The lower limit shall apply at the transition frequencies
6. All the emissions appearing within 15.205 Restricted bands shall not exceed the limits shown in 15.209,all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

Remark :

The limit of 15.209(a) of 3 meter distance is

Frequency MHz	Distance m	Field strength		Distance m	Field strength dB $\mu$ V/m(QP)
		$\mu$ V/m	dB $\mu$ V/m(QP)		
30-88	3	100	40.0	10	30.0
88-216	3	150	43.5	10	33.5
216-960	3	200	46.0	10	36.0
960-1000	3	500	54.0	10	44.0
Above 1000	3	74.0 dB $\mu$ V/m (PK) 54.0 dB $\mu$ V/m (AV)		/	/

15.205 Restricted bands of operation:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	( <sup>2</sup> )



RSS-210 2.7 table 1 Restricted bands of operation:

MHz
0.090-0.110
2.1735-2.1905
3.020-3.026
4.125-4.128
4.17725-4.17775
4.20725-4.20775
5.677-5.683
6.215-6.218
6.26775-6.26825
6.31175-6.31225
8.291-8.294
8.362-8.366
8.37625-8.38675
8.41425-8.41475
12.29-12.293
12.51975-12.52025
12.57675-12.57725
13.36-13.41
16.42-16.423
16.69475-16.69525
16.80425-16.80475
25.5-25.67
37.5-38.25

MHz
73-74.6
74.8-75.2
108-138
156.52475-156.52525
156.7-156.9
240-285
322-335.4
399.9-410
608-614
960-1427
1435-1626.5
1645.5-1646.5
1660-1710
1718.8-1722.2
2200-2300
2310-2390
2655-2900
3260-3267
3332-3339
3345.8-3358
3500-4400
4500-5150
5350-5460

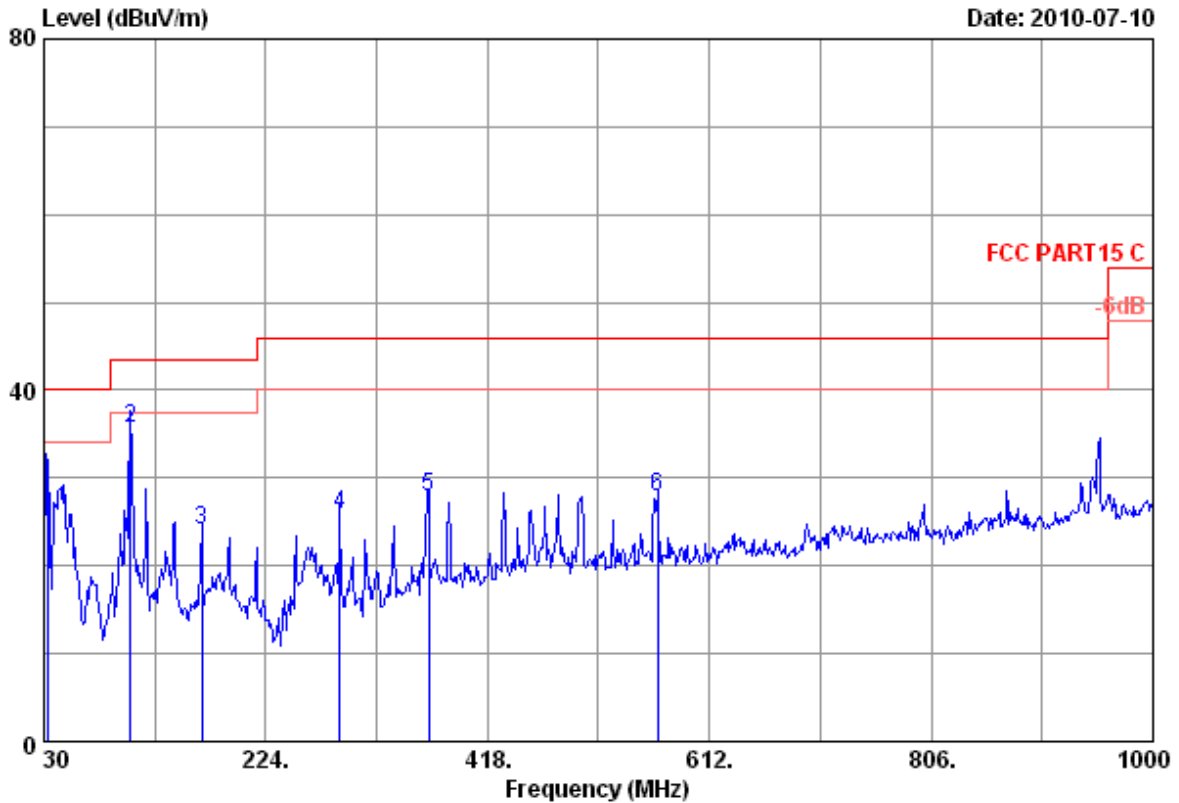
MHz
7250-7750
8025-8500

GHz
9.0-9.2
9.3-9.5
10.6-12.7
13.25-13.4
14.47-14.5
15.35-16.2
17.7-21.4
22.01-23.12
23.6-24.0
31.2-31.8
36.43-36.5
Above 38.6

**Note:** Certain frequency bands listed in Table 1 and above 38.6 GHz are designated for low-power licence-exempt applications. These frequency bands and the requirements that apply to the devices are set out in this Standard as well as in RSS-310.

5.3.1 Diagram 001



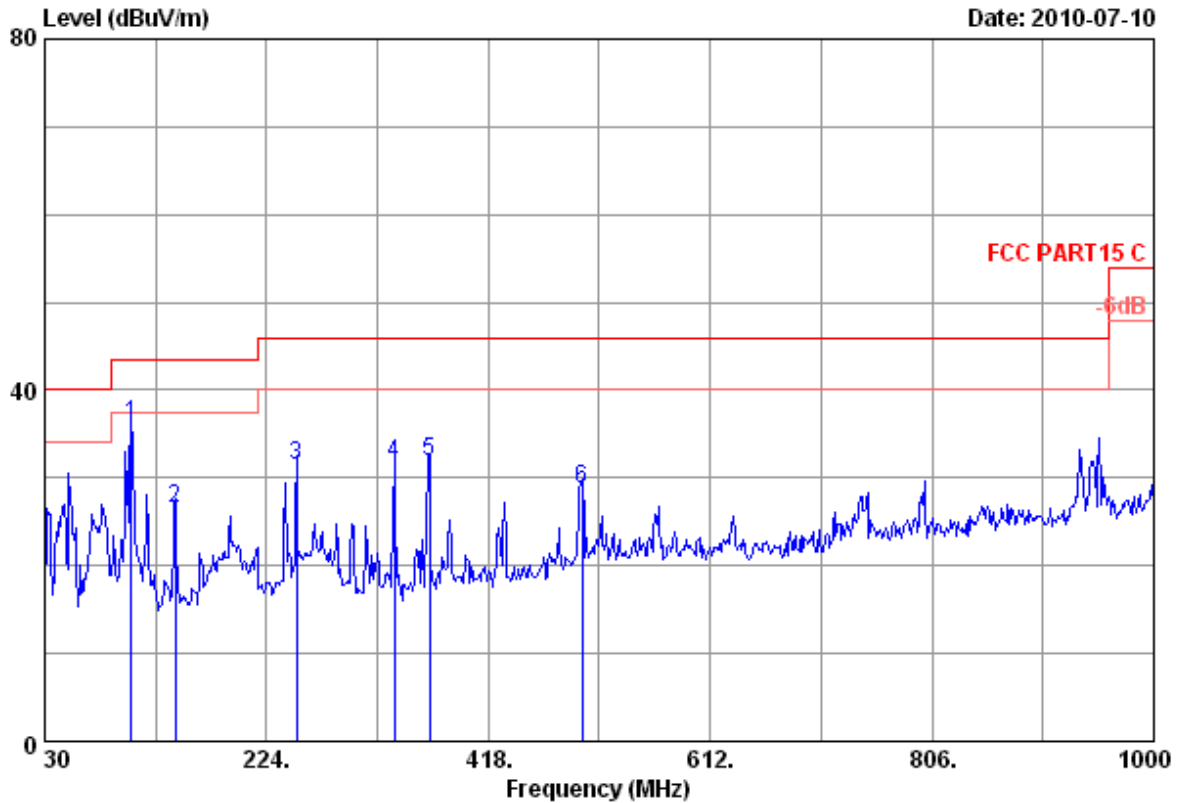
Dis. / Ant. : 3m 2768(200912) Ant. pol. : HORIZONTAL  
 Limit : FCC PART15 C  
 Env. / Ins. : 23\*C/54% Engineer : Jamy\_Yu  
 EUT : Receiver  
 Power Rating : DC 5V From PC  
 Test mode : Tx Mode  
 M/N : 03-00181

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark	
1	32.910	18.00	0.81	11.18	29.99	40.00	10.01	QP
2	105.660	11.00	1.53	23.23	35.76	43.50	7.74	QP
3	167.740	10.23	1.85	11.90	23.98	43.50	19.52	QP
4	288.990	13.50	2.50	9.96	25.96	46.00	20.04	QP
5	366.590	15.53	2.83	9.48	27.84	46.00	18.16	QP
6	566.410	19.47	3.52	4.82	27.81	46.00	18.19	QP

Remarks:

1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

5.3.2 Diagram 002



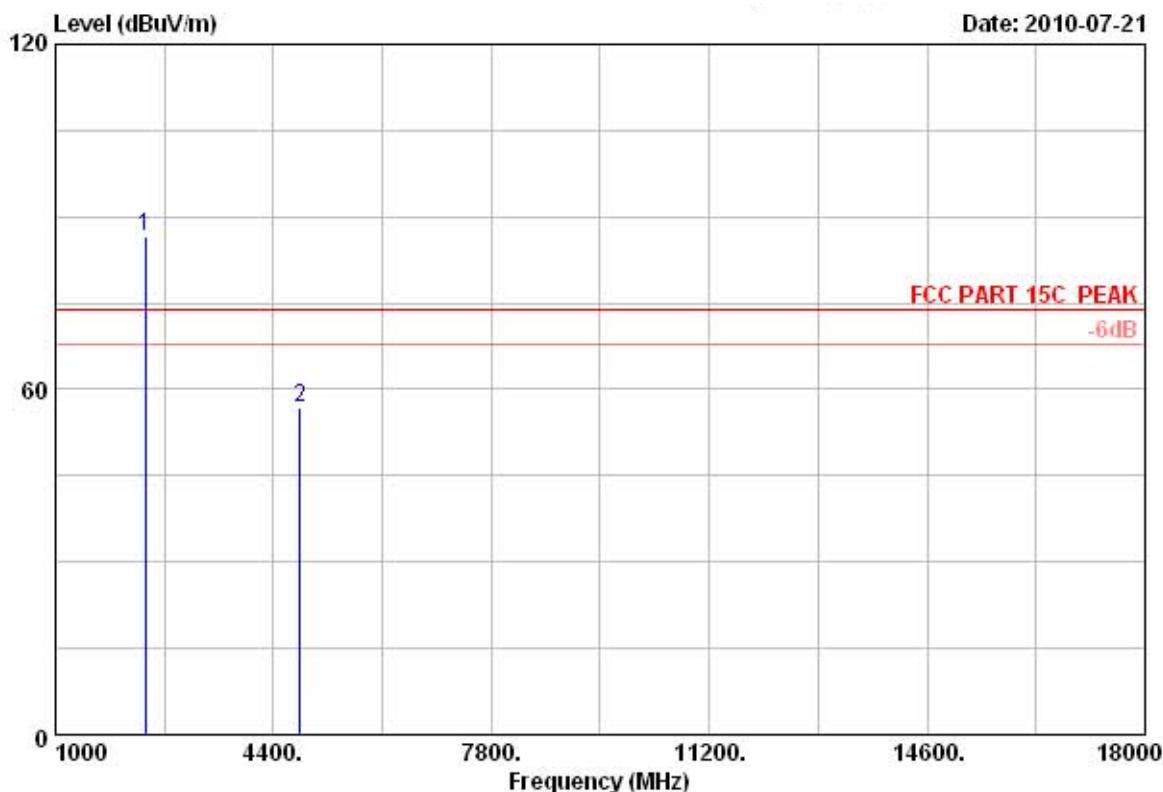
Dis. / Ant. : 3m 2768(200912) Ant. pol. : VERTICAL  
 Limit : FCC PART15 C  
 Env. / Ins. : 23°C/54% Engineer : Jamy\_Yu  
 EUT : Receiver  
 Power Rating : DC 5V From PC  
 Test mode : Tx Mode  
 M/N : 03-00181

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission		Margin (dB)	Remark	
				Level (dBuV/m)	Limits (dBuV/m)			
1	105.660	11.00	1.53	23.57	36.10	43.50	7.40	QP
2	144.460	11.80	1.75	13.06	26.61	43.50	16.89	QP
3	250.190	12.90	2.29	16.33	31.52	46.00	14.48	QP
4	335.550	14.73	2.68	14.33	31.74	46.00	14.26	QP
5	366.590	15.53	2.83	13.50	31.86	46.00	14.14	QP
6	500.450	18.24	3.36	7.22	28.82	46.00	17.18	QP

Remarks:

- Emission Level= Antenna Factor + Cable Loss + Reading.
- The emission levels that are 20dB below the official limit are not reported.

### 5.3.3 Diagram 003



```

Dis. / Ant.   : 3m  3115(0911)           Ant. pol. : HORIZONTAL
Limit        : FCC PART 15C  PEAK
Env. / Ins.   : 23*C/54%                Engineer  : Jamy_Yu
EUT         : Receiver  M/N:03-00181
Power       : DC 5V From PC
Test mode    : Tx CH Low  Antenna 1
  
```

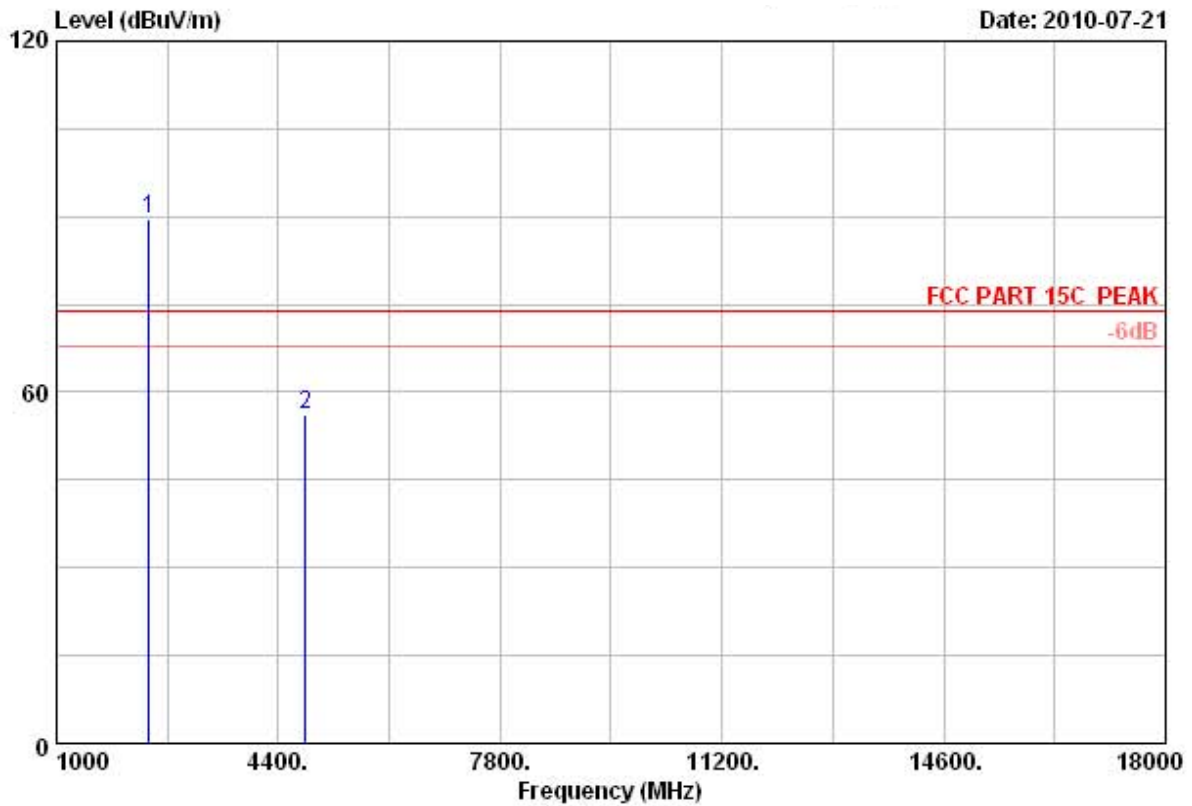
	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	29.44	7.43	36.62	86.25	86.50			Peak
2	34.30	10.62	35.10	46.98	56.80	74.00	17.20	Peak

Remarks:

- Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
- The emission levels that are 20dB below the official limit are not reported.

AV value of 4810 MHz = 56.8-18.237=38.563dBµV/m < 54 dBµV/m , so Pass.

5.3.4 Diagram 004



Dis. / Ant. : 3m 3115(O911) Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : 23\*C/54% Engineer : Jamy\_Yu  
 EUT : Receiver M/N:03-00181  
 Power : DC 5V From PC  
 Test mode : Tx CH Low Antenna 1

	Ant. Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2405.000	29.45	7.43	36.62	89.41	89.67			Peak
2	4810.000	34.30	10.62	35.10	46.20	56.02	74.00	17.98	Peak

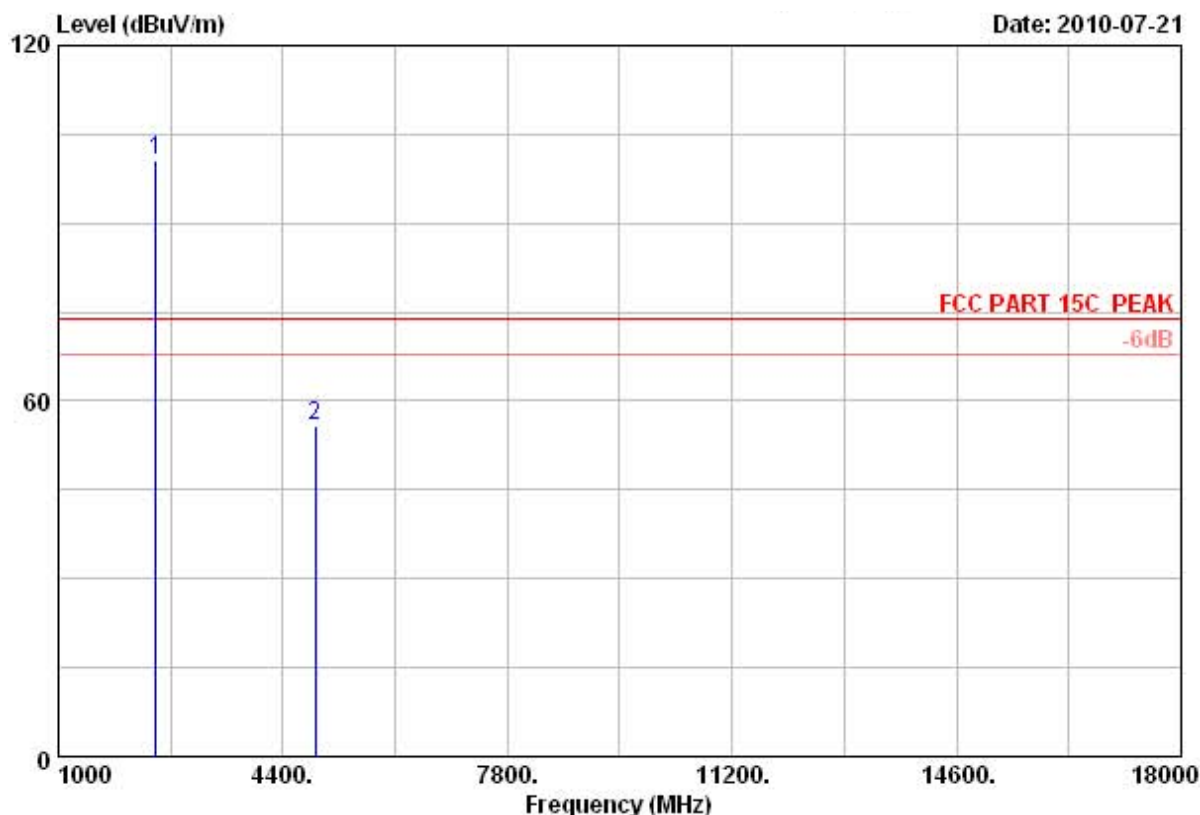
Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

AV value of 4810 MHz = 56.02-18.237=37.783dBµV/m < 54 dBµV/m , so Pass.



### 5.3.5 Diagram 005



Dis. / Ant. : 3m 3115(0911) Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : 23°C/54% Engineer : Jamy\_Yu  
 EUT : Receiver M/N:03-00181  
 Power : DC 5V From PC  
 Test mode : Tx CH Mid Antenna 1

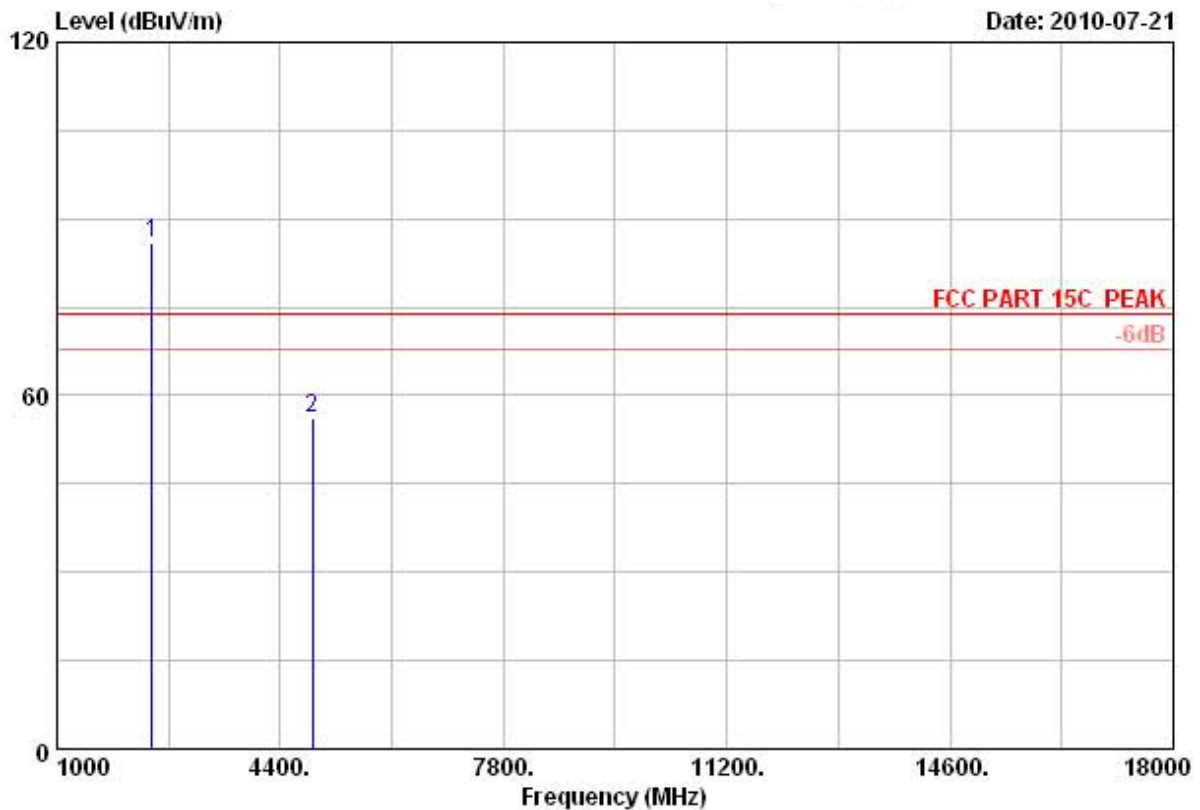
	Ant. Factor	Cable loss	Amp. Factor	Emission Reading	Emission Level	Limits	Margin	Remark
	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	29.47	7.50	36.61	98.59	98.95			Peak
2	34.41	10.71	35.03	49.17	59.26	74.00	14.74	Peak

Remarks:

- Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
- The emission levels that are 20dB below the official limit are not reported.

AV value of 4880 MHz =  $59.26 - 18.237 = 41.023 \text{ dB}\mu\text{V/m} < 54 \text{ dB}\mu\text{V/m}$  , so Pass.

5.3.6 Diagram 006



Dis. / Ant. : 3m 3115(0911) Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : 23\*C/54% Engineer : Jamy\_Yu  
 EUT : Receiver M/N:03-00181  
 Power : DC 5V From PC  
 Test mode : Tx CH Mid Antenna 1

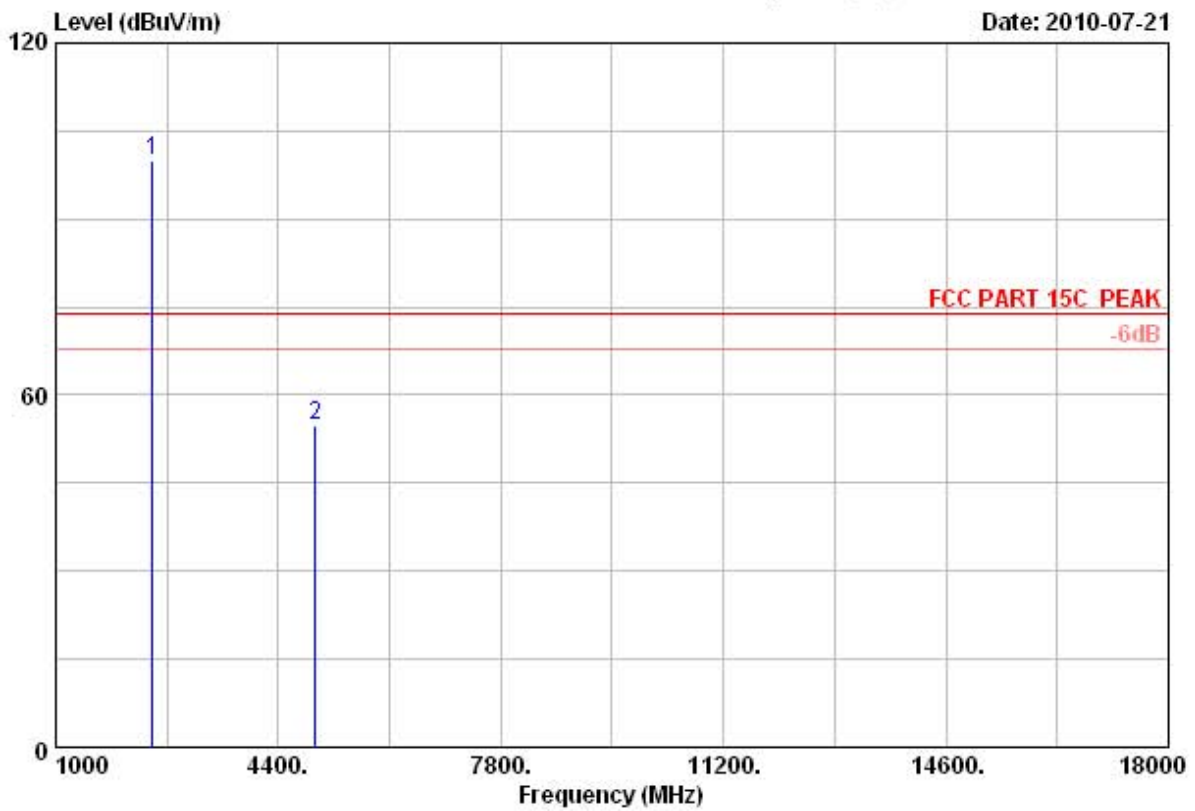
	Ant. Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2445.000	29.47	7.50	36.61	85.62	85.98			Peak
2	4890.000	34.43	10.71	35.00	45.89	56.03	74.00	17.97	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

AV value of 4890 MHz = 56.03-18.237= 37.793dBµV/m < 54 dBµV/m , so Pass.

5.3.7 Diagram 007



Dis. / Ant. : 3m 3115(0911) Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : 23°C/54% Engineer : Jamy\_Yu  
 EUT : Receiver M/N:03-00181  
 Power : DC 5V From PC  
 Test mode : Tx CH High Antenna 1

	Ant. Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.000	29.49	7.58	36.60	99.59	100.06			Peak
2	4960.000	34.54	10.80	34.95	44.43	54.82	74.00	19.18	Peak

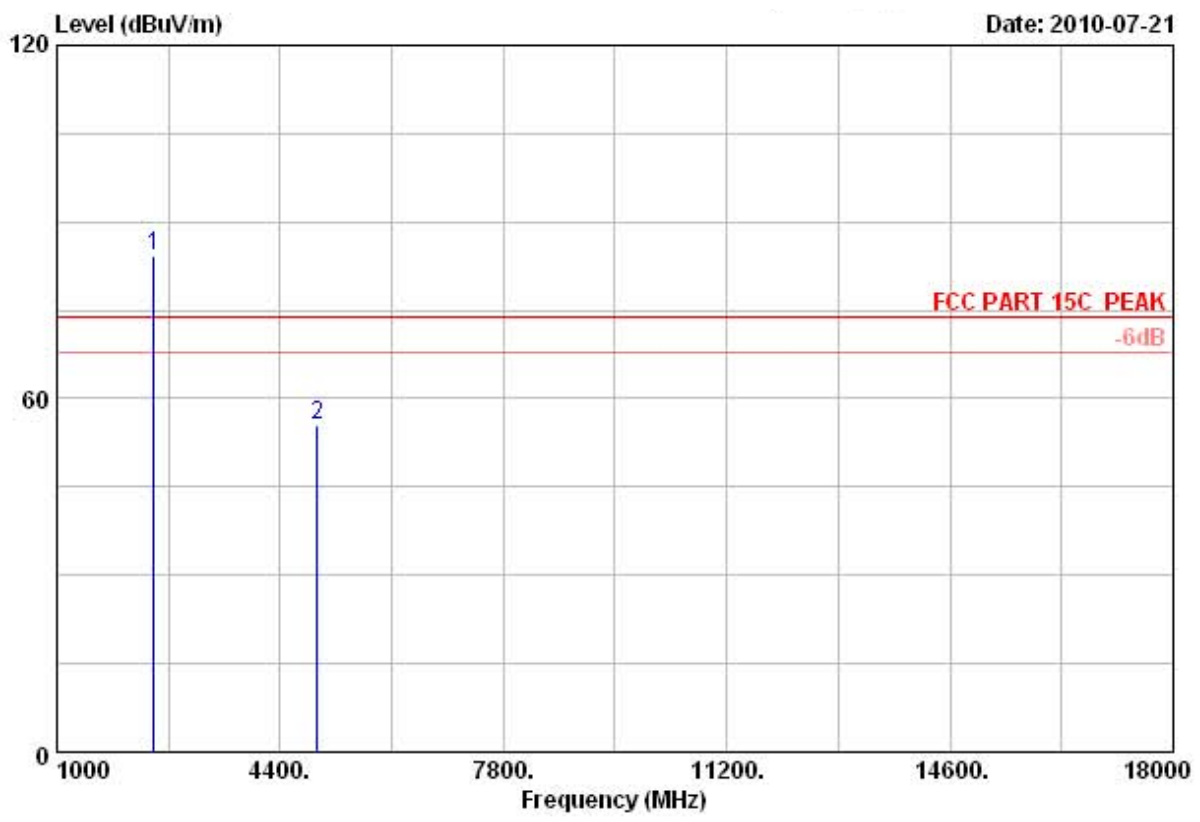
Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

AV value of 4960 MHz = 54.82-18.237= 36.583dBµV/m < 54 dBµV/m , so Pass.



5.3.8 Diagram 008



Dis. / Ant. : 3m 3115(0911) Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : 23\*C/54% Engineer : Jamy\_Yu  
 EUT : Receiver M/N:03-00181  
 Power : DC 5V From PC  
 Test mode : Tx CH High Antenna 1

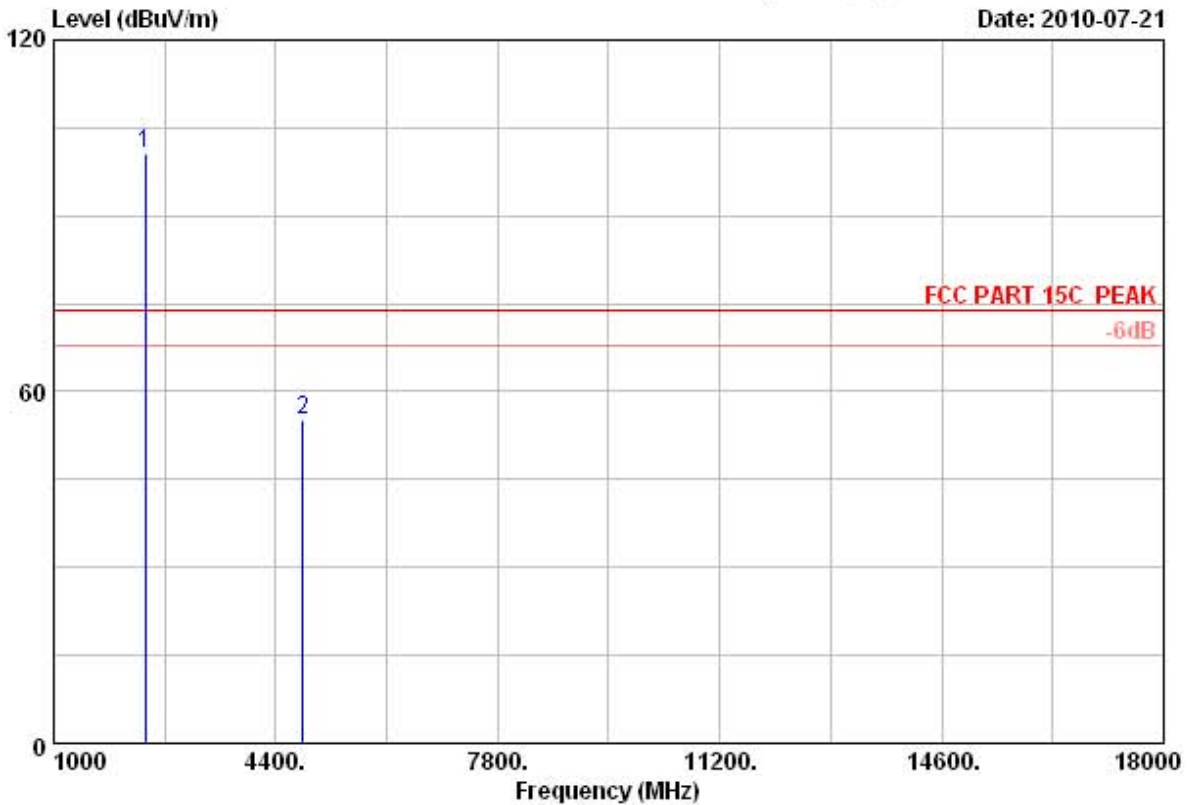
	Ant. Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.000	29.49	7.58	36.60	83.89	84.36			Peak
2	4960.000	34.54	10.80	34.95	45.22	55.61	74.00	18.39	Peak

Remarks:  
 1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

AV value of 4960 MHz = 55.61-18.237=37.373dBμV/m < 54 dBμV/m , so Pass.



5.3.9 Diagram 009



Dis. / Ant. : 3m 3115(0911) Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : 23°C/54% Engineer : Jamy\_Yu  
 EUT : Receiver M/N:03-00181  
 Power : DC 5V From PC  
 Test mode : Tx CH Low Antenna 2

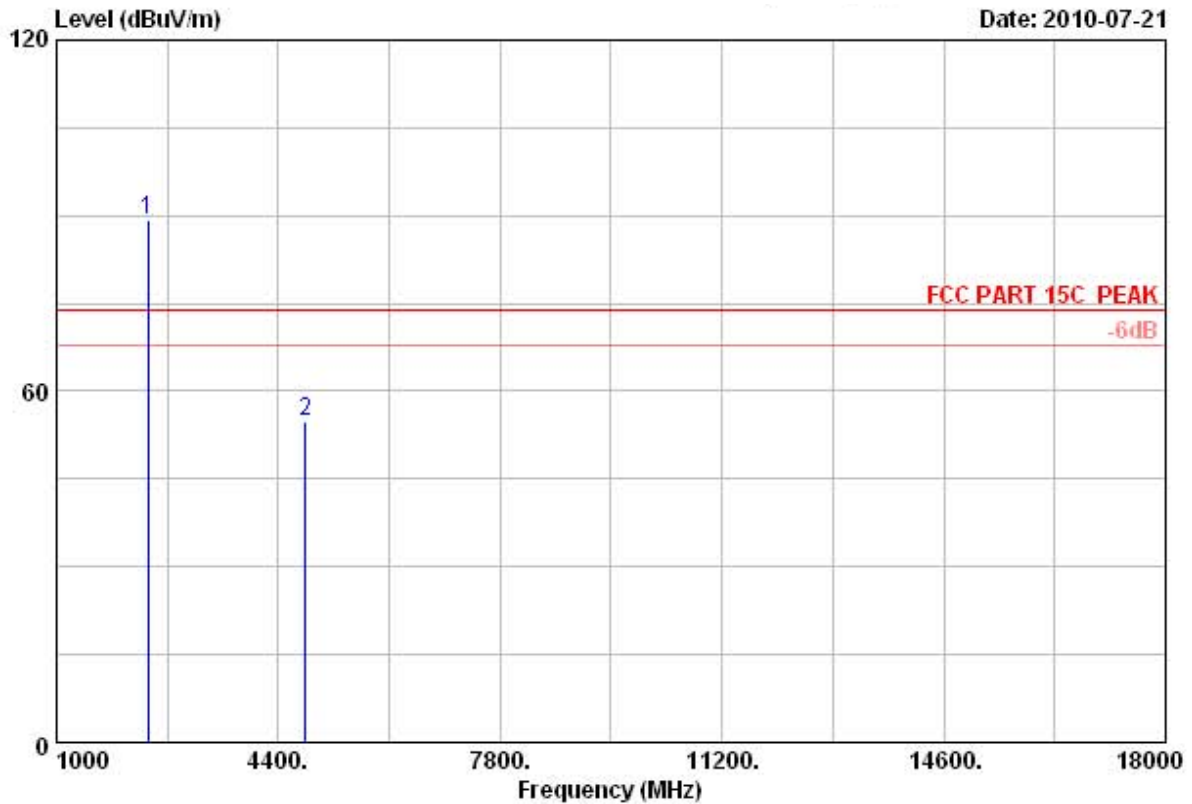
	Ant. Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBUV)	Emission Level (dBUV/m)	Limits (dBUV/m)	Margin (dB)	Remark
1	2405.000	29.45	7.43	36.62	100.50	100.76			Peak
2	4810.000	34.30	10.62	35.10	45.19	55.01	74.00	18.99	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

AV value of 4810 MHz = 55.01-18.237=36.773dBUV/m < 54 dBUV/m , so Pass.

5.3.10 Diagram 010



Dis. / Ant. : 3m 3115(0911) Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : 23\*C/54% Engineer : Jamy\_Yu  
 EUT : Receiver M/N:03-00181  
 Power : DC 5V From PC  
 Test mode : Tx CH Low Antenna 2

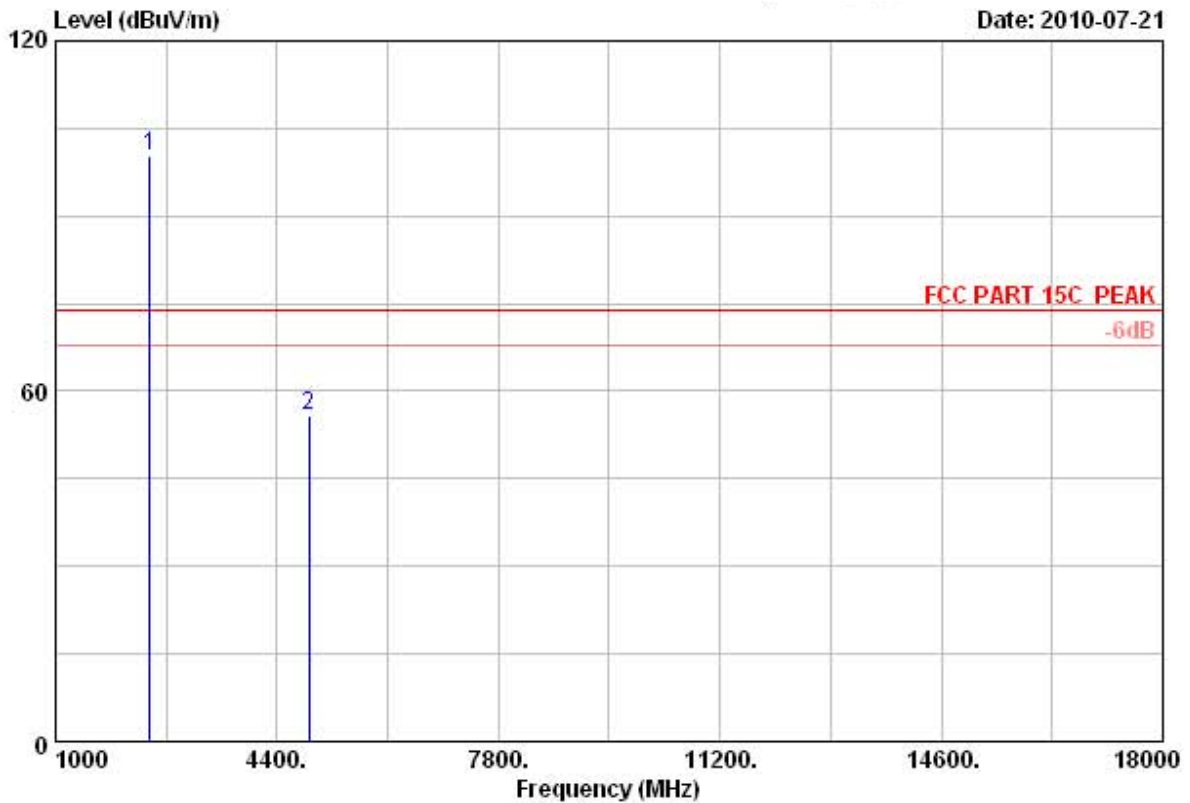
	Ant. Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2405.000	29.45	7.43	36.62	88.99	89.25			Peak
2	4810.000	34.30	10.62	35.10	45.12	54.94	74.00	19.06	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

AV value of 4810 MHz = 54.94-18.237=36.703dBµV/m < 54 dBµV/m , so Pass.

5.3.11 Diagram 011



Dis. / Ant. : 3m 3115(0911) Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : 23\*C/54% Engineer : Jamy\_Yu  
 EUT : Receiver M/N:03-00181  
 Power : DC 5V From PC  
 Test mode : Tx CH Mid Antenna 2

	Ant.	Cable	Amp.	Emission				
Freq.	Factor	loss	Factor	Reading	Level	Limits	Margin	Remark
(MHz)	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	2445.000	29.47	7.50	36.61	99.80	100.16		Peak
2	4890.000	34.43	10.71	35.00	45.85	55.99	74.00	18.01 Peak

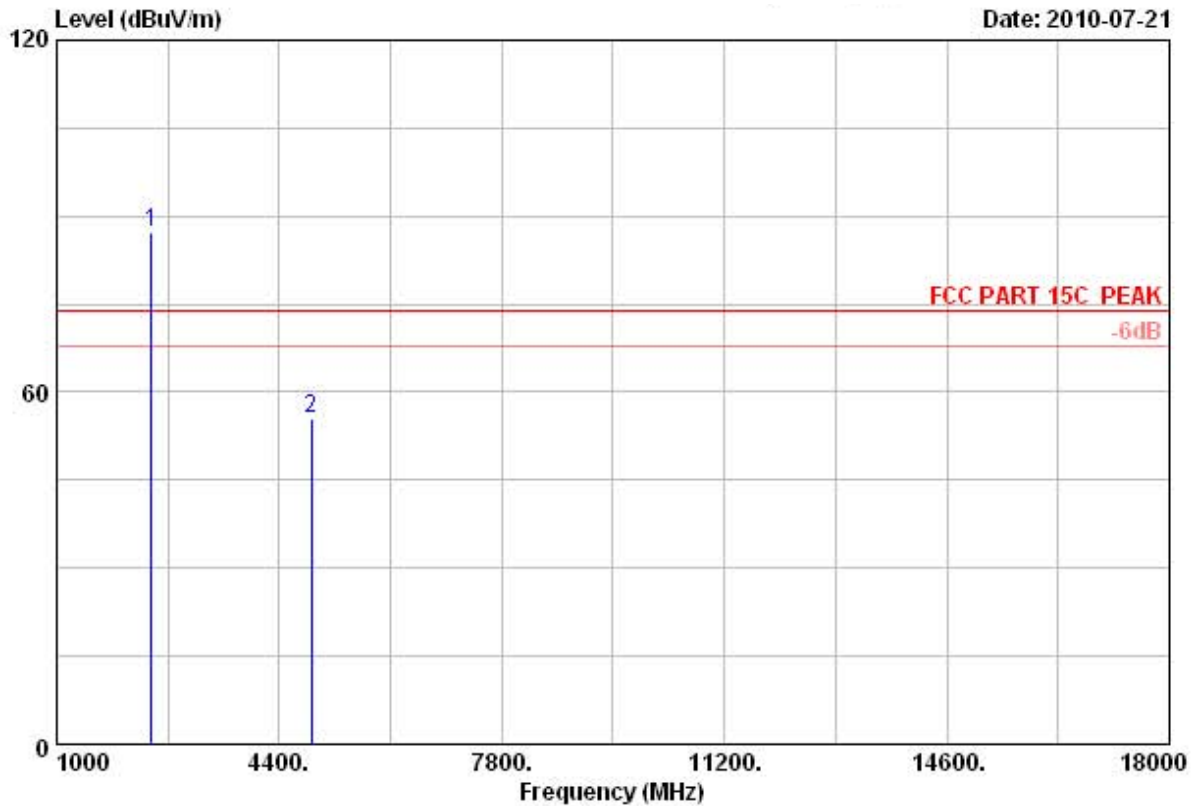
Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

AV value of 4890 MHz = 55.99-18.237=37.753dBµV/m < 54 dBµV/m , so Pass.



5.3.12 Diagram 012



Dis. / Ant. : 3m 3115(0911) Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : 23\*C/54% Engineer : Jamy\_Yu  
 EUT : Receiver M/N:03-00181  
 Power : DC 5V From PC  
 Test mode : Tx CH Mid Antenna 2

	Ant. Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2445.000	29.47	7.50	36.61	86.75	87.11			Peak
2	4890.000	34.43	10.71	35.00	45.43	55.57	74.00	18.43	Peak

Remarks:

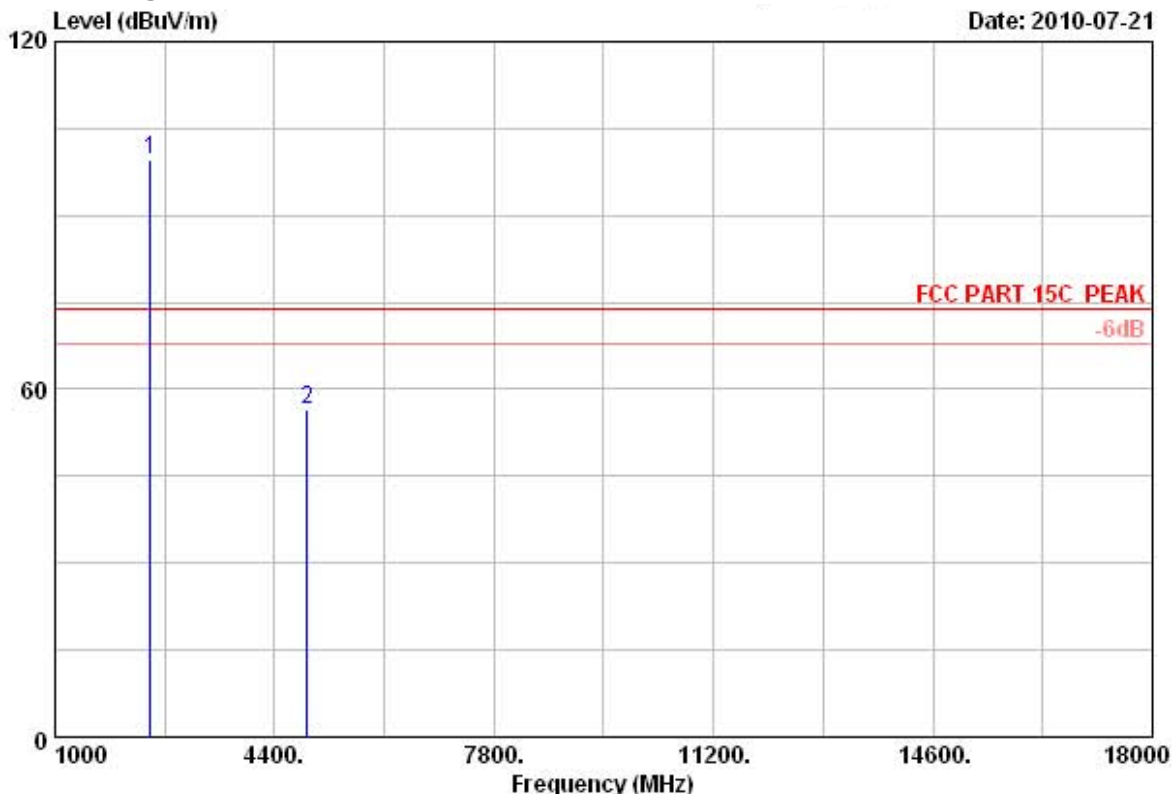
1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

AV value of 4890 MHz = 55.57-18.237=37.333dBμV/m < 54 dBμV/m , so Pass.





5.3.13 Diagram 013



Dis. / Ant. : 3m 3115(0911) Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : 23\*C/54% Engineer : Jamy\_Yu  
 EUT : Receiver M/N:03-00181  
 Power : DC 5V From PC  
 Test mode : Tx CH High Antenna 2

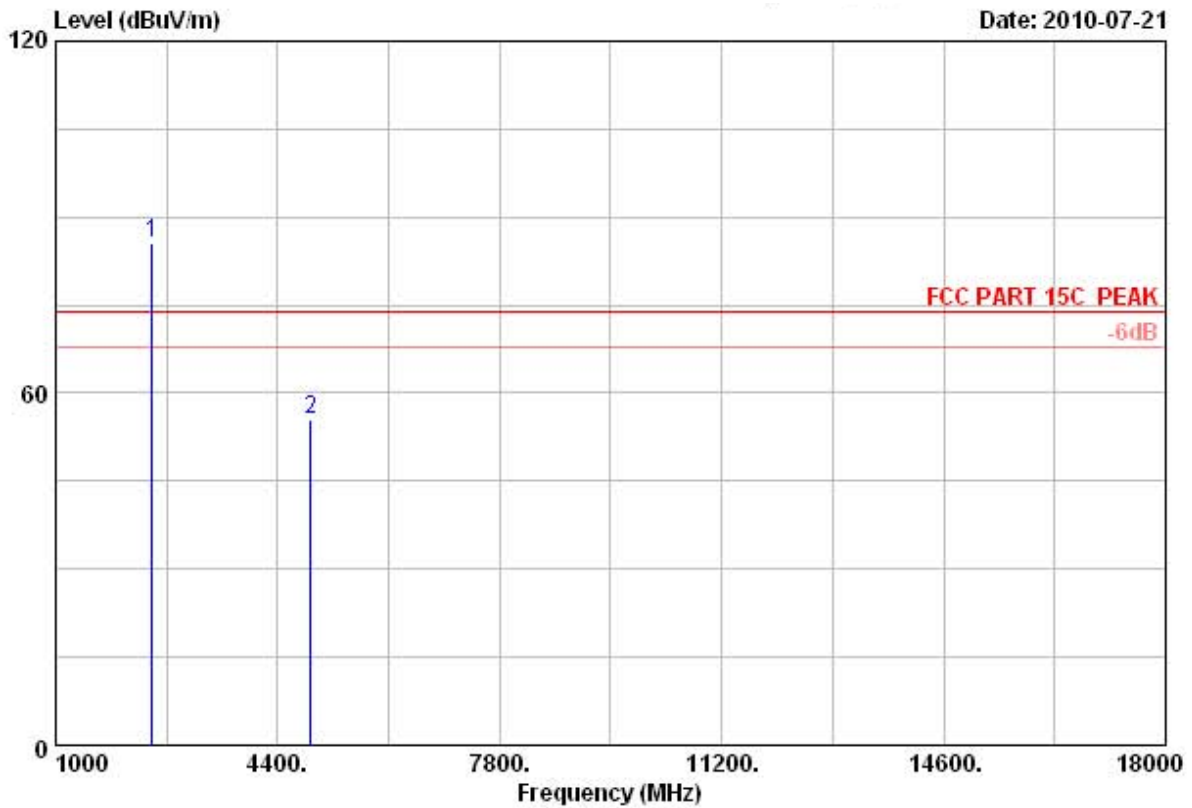
	Ant. Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.000	29.49	7.58	36.60	99.23	99.70			Peak
2	4910.000	34.46	10.74	35.00	46.23	56.43	74.00	17.57	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

AV value of 4910 MHz = 56.43-18.237=38.193dBμV/m < 54 dBμV/m , so Pass.

5.3.14 Diagram 014



Dis. / Ant. : 3m 3115(0911) Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : 23\*C/54% Engineer : Jamy\_Yu  
 EUT : Receiver M/N:03-00181  
 Power : DC 5V From PC  
 Test mode : Tx CH High Antenna 2

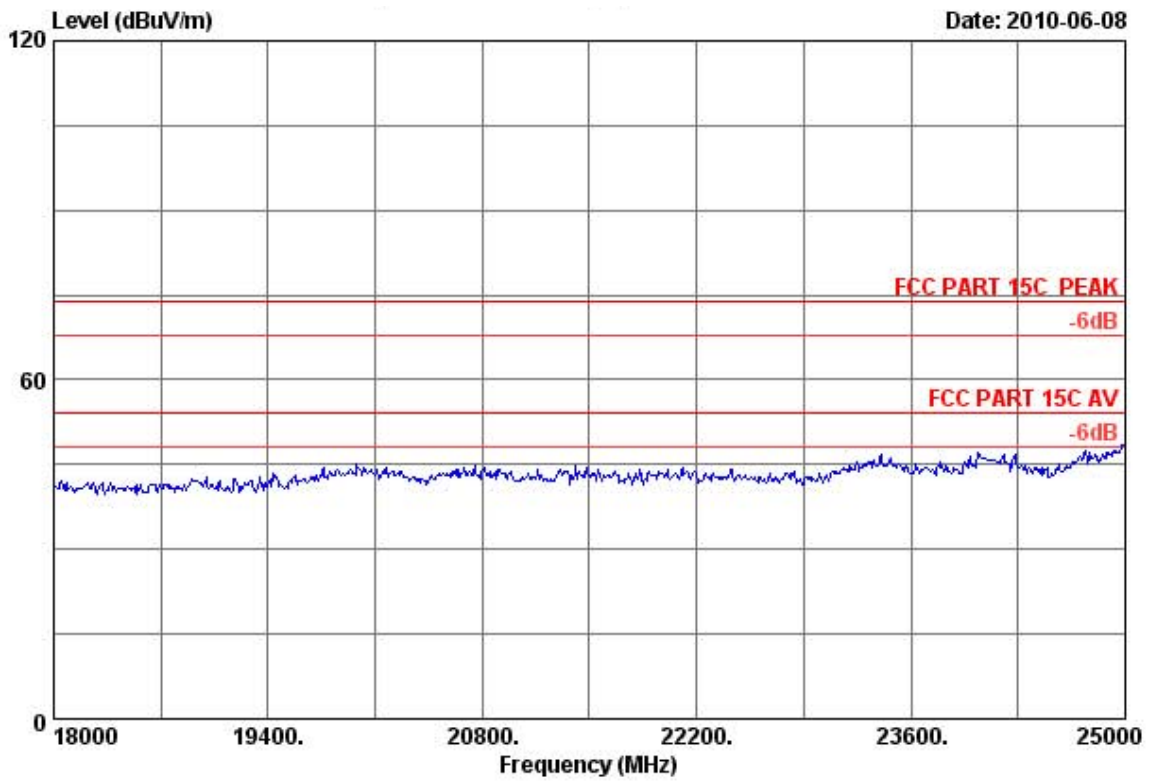
	Ant. Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.000	29.49	7.58	36.60	85.13	85.60			Peak
2	4910.000	34.46	10.74	35.00	45.30	55.50	74.00	18.50	Peak

Remarks:

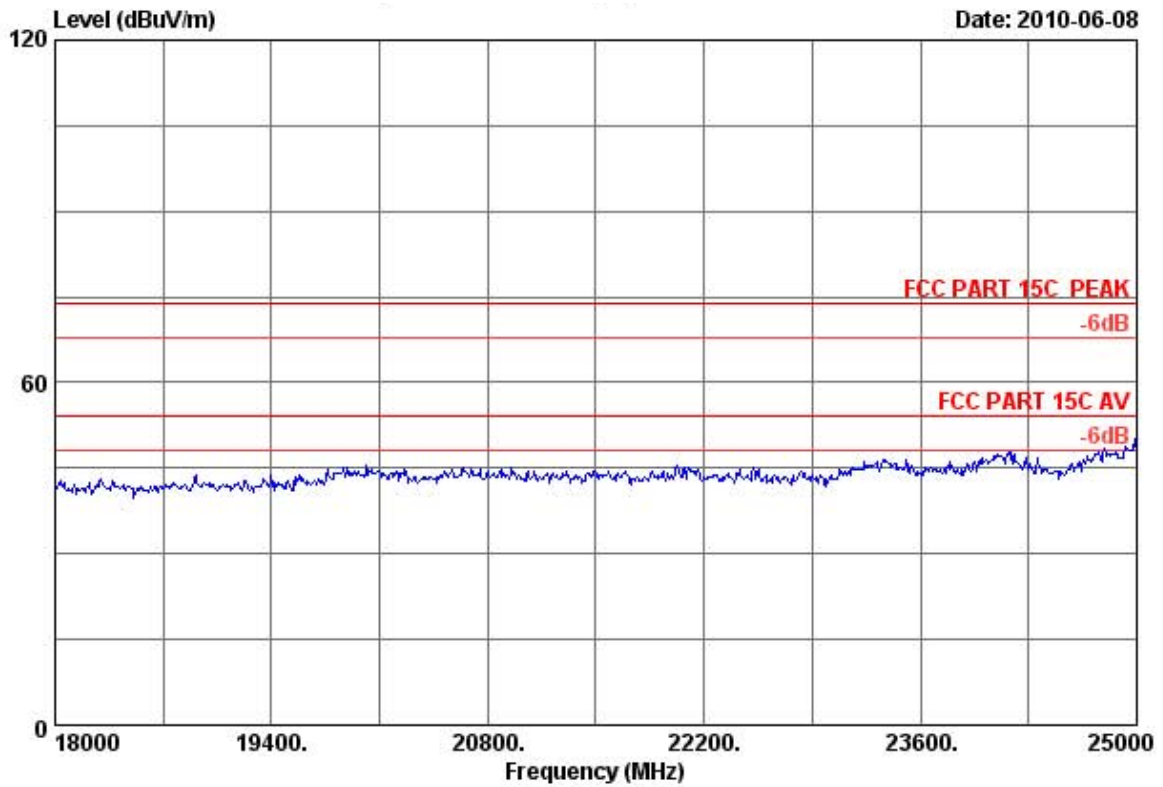
1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

AV value of 4910 MHz = 55.5-18.237=37.263dBµV/m < 54 dBµV/m , so Pass.

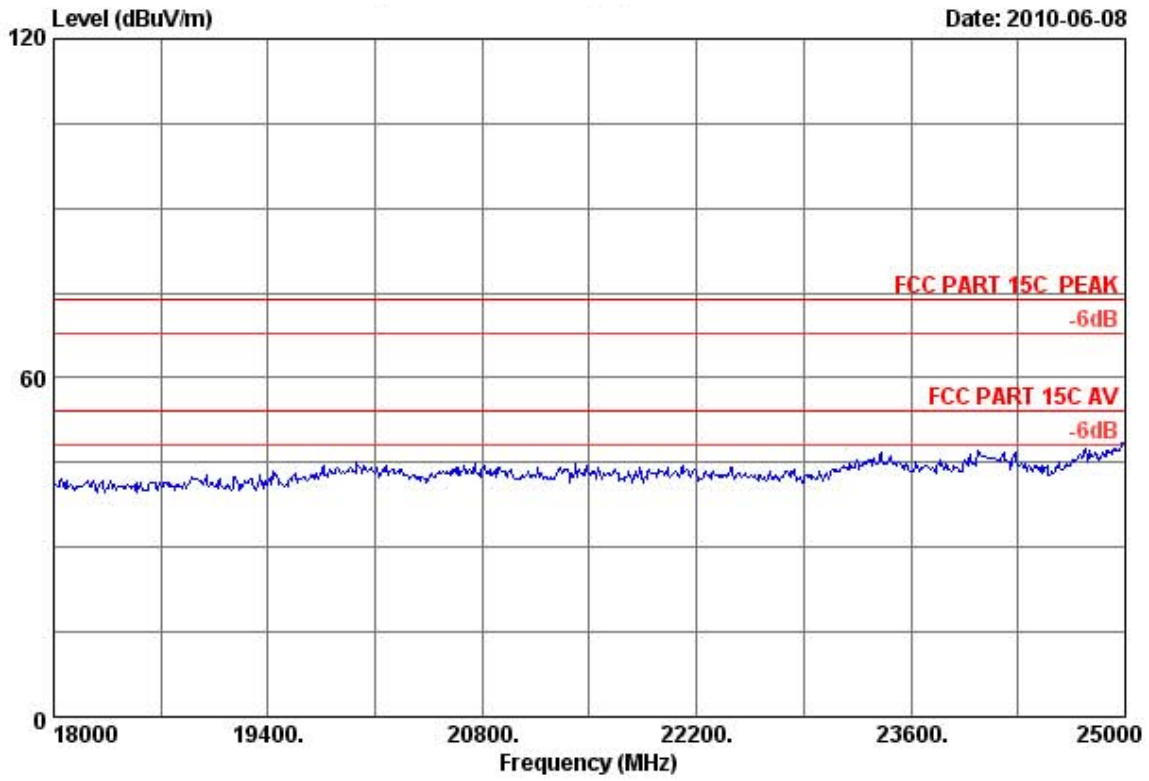
5.3.15 Diagram 015



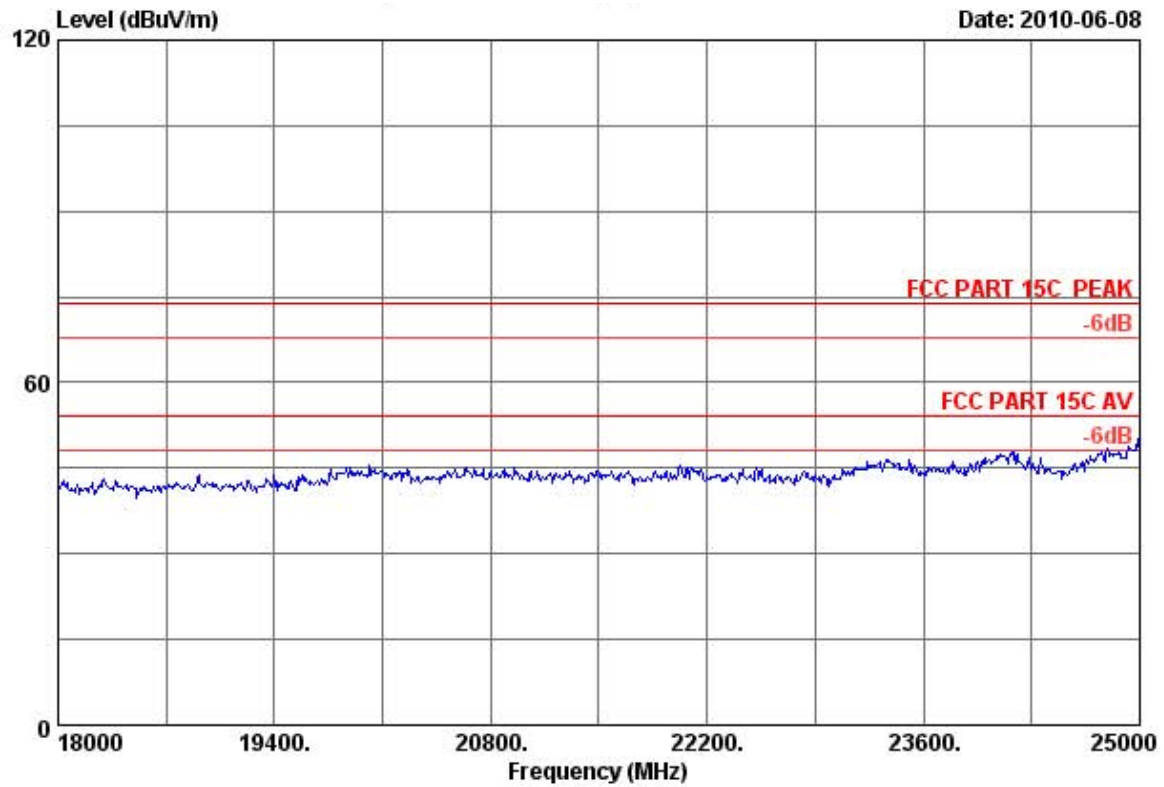
5.3.16 Diagram 016



5.3.17 Diagram 017

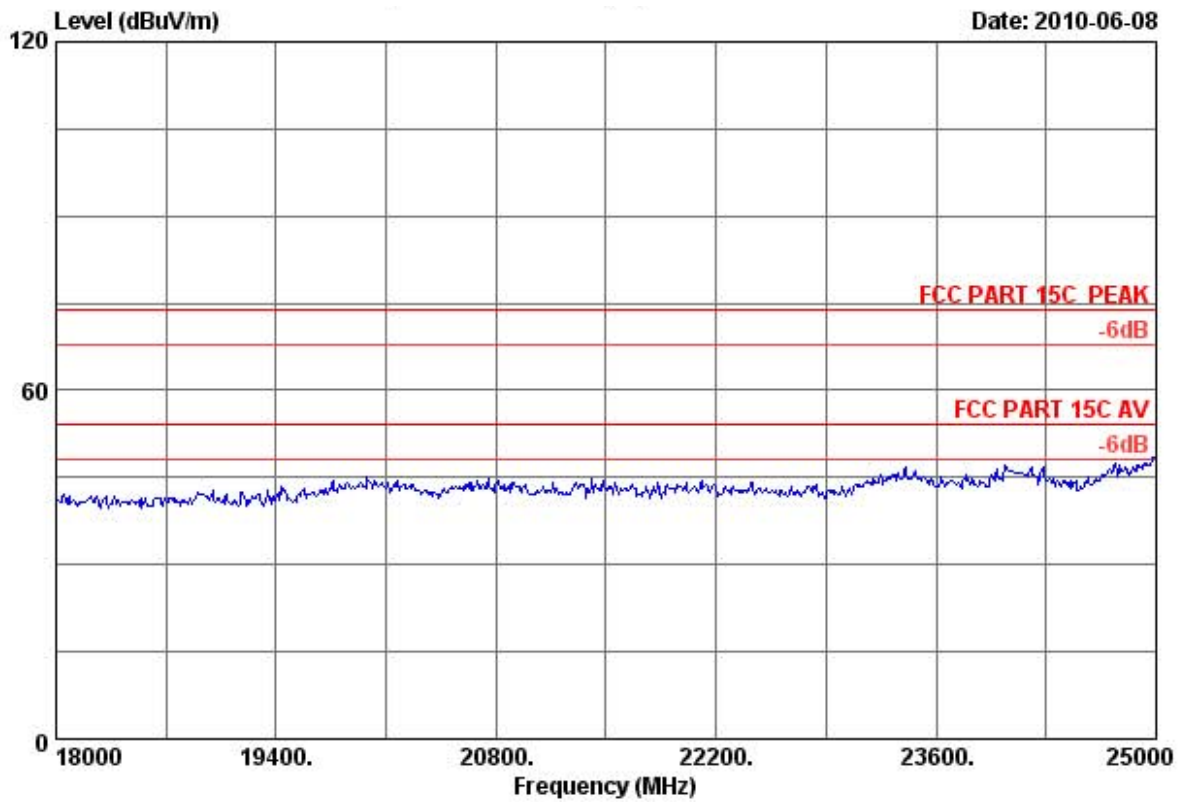


5.3.18 Diagram 018

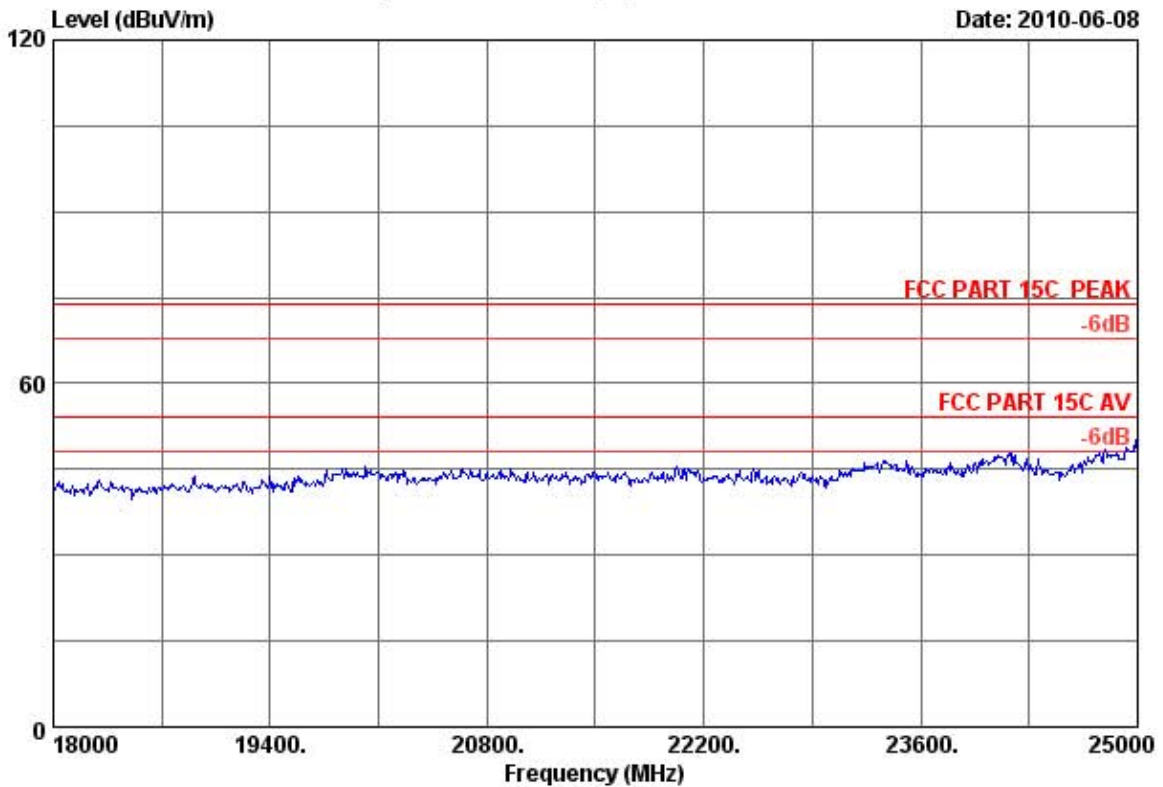




### 5.3.19 Diagram 019

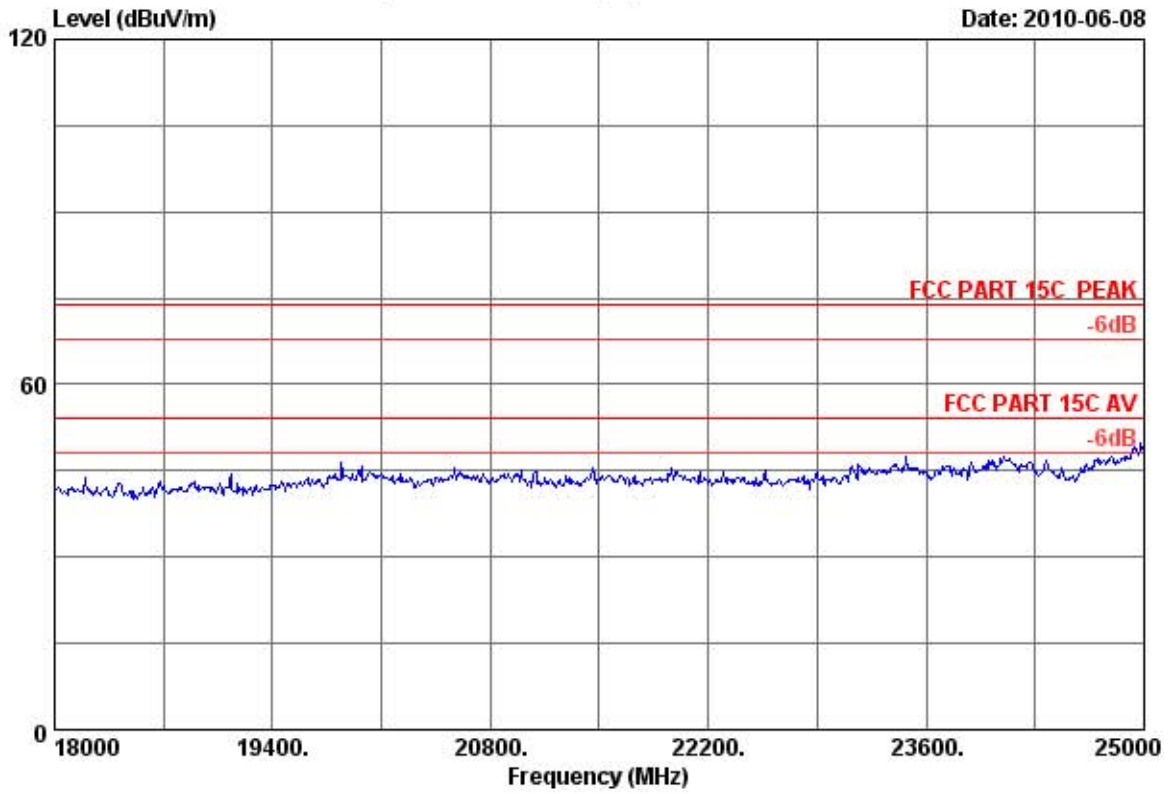


### 5.3.20 Diagram 020

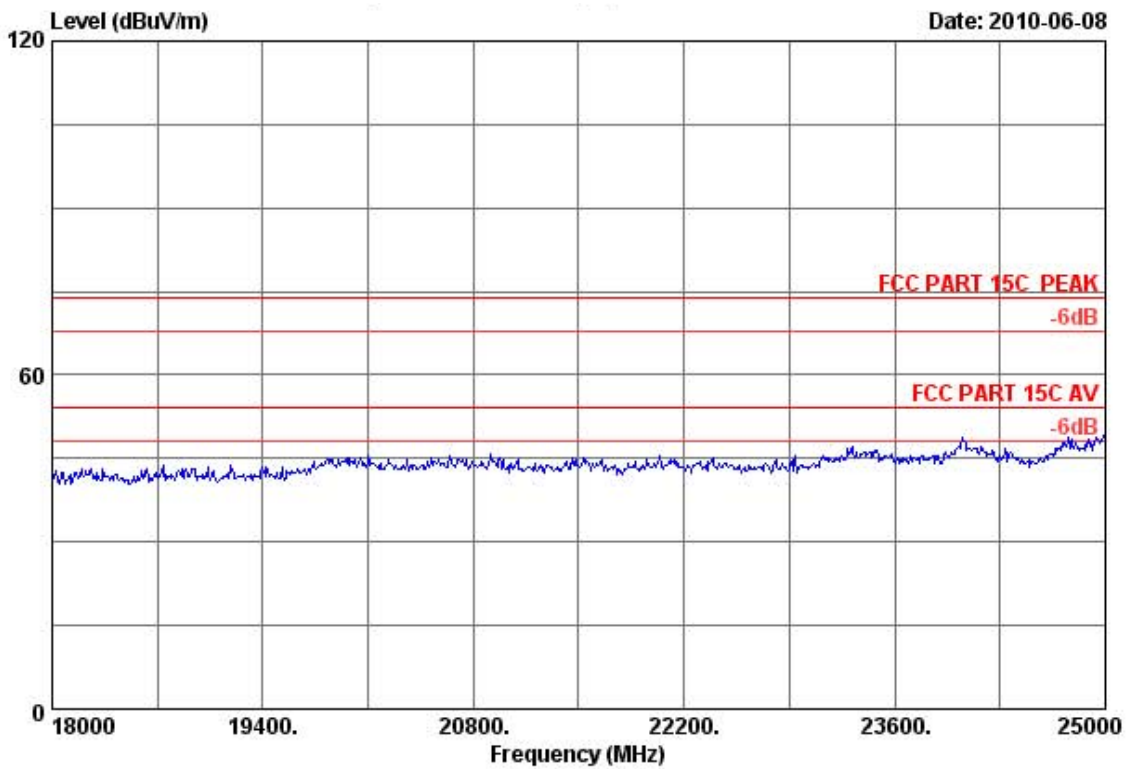




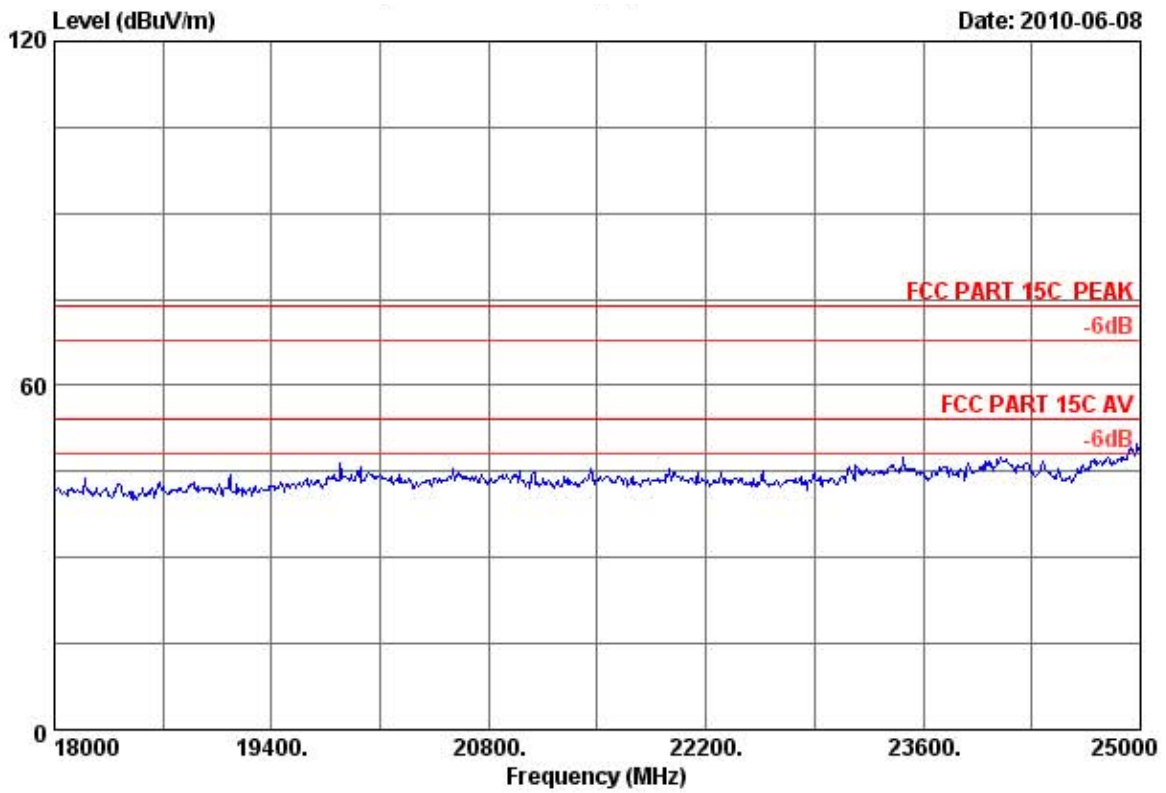
5.3.21 Diagram 021



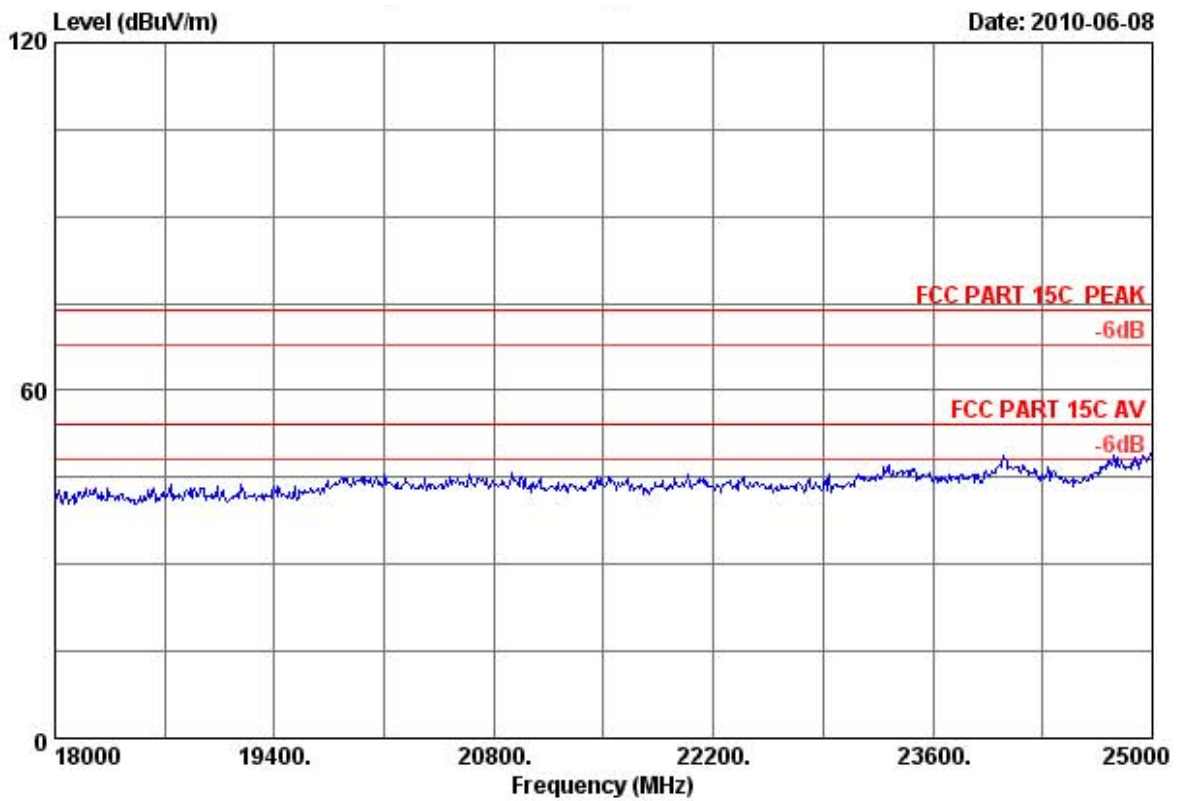
5.3.22 Diagram 022



### 5.3.23 Diagram 023

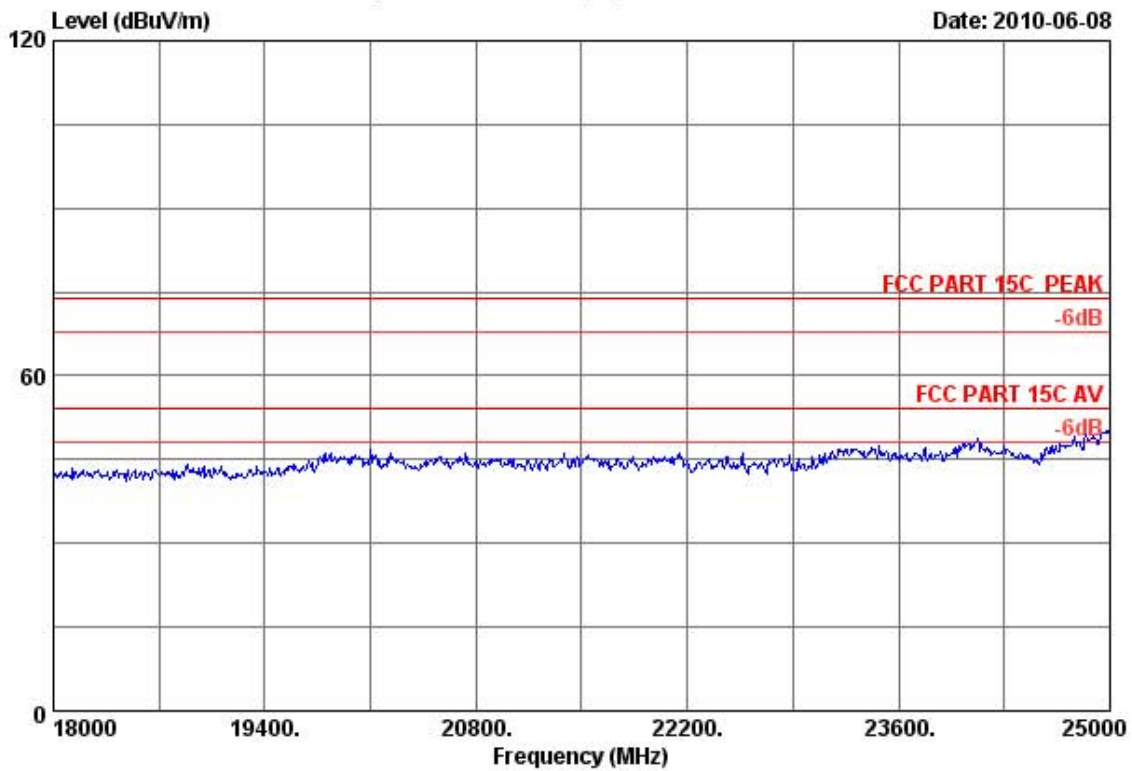


### 5.3.24 Diagram 024

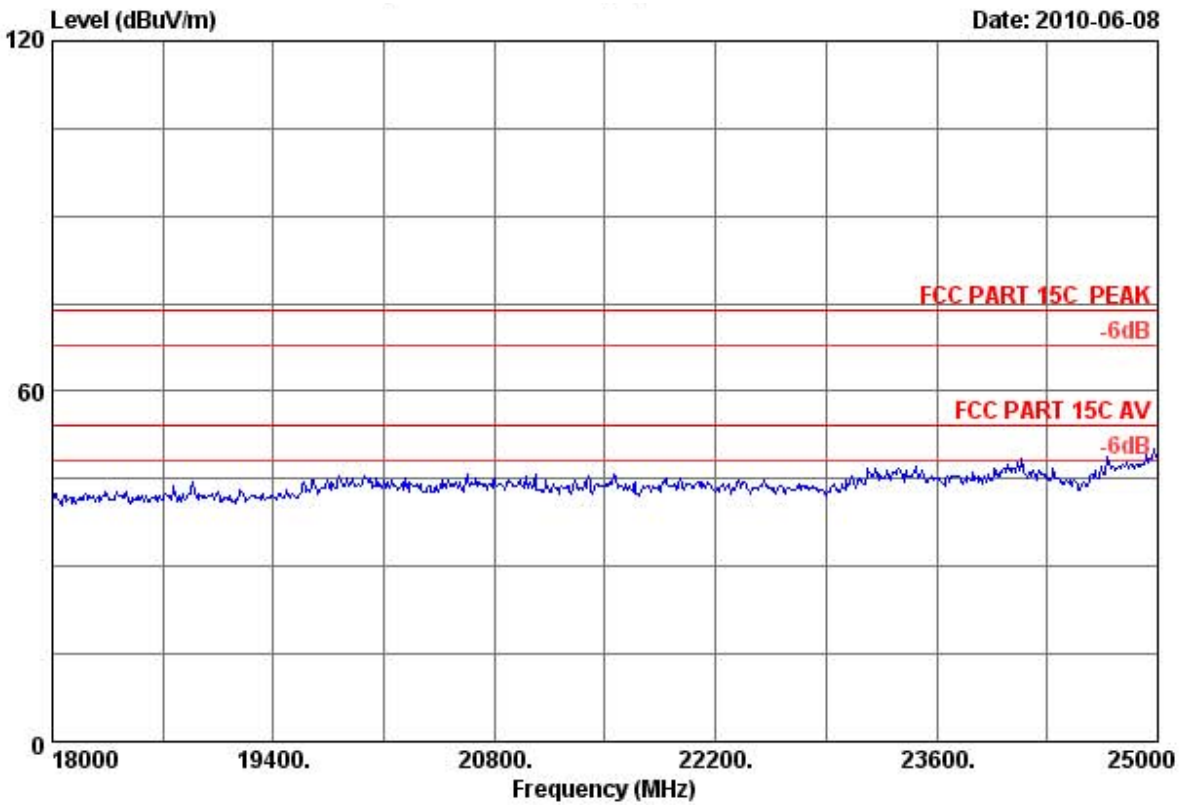




### 5.3.25 Diagram 025



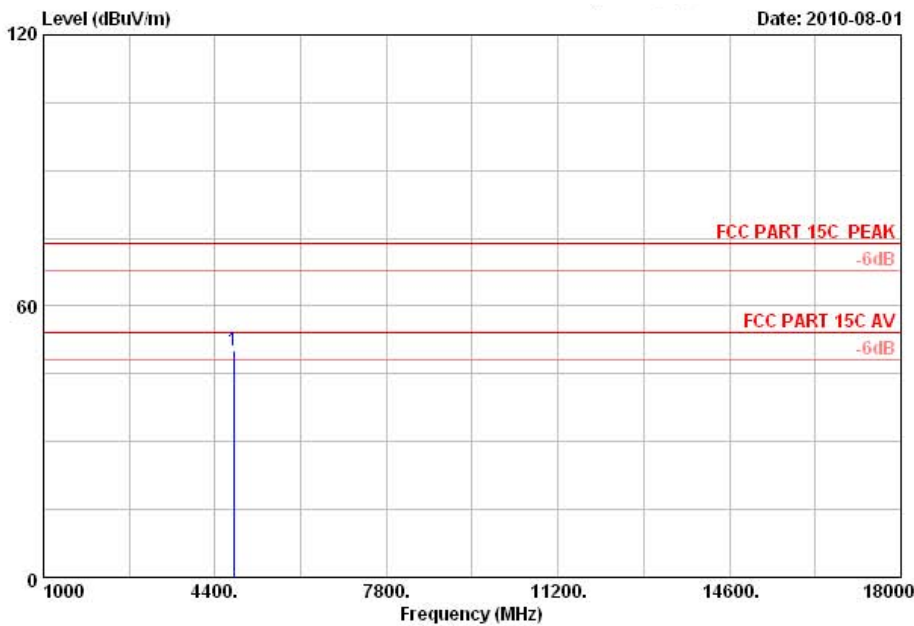
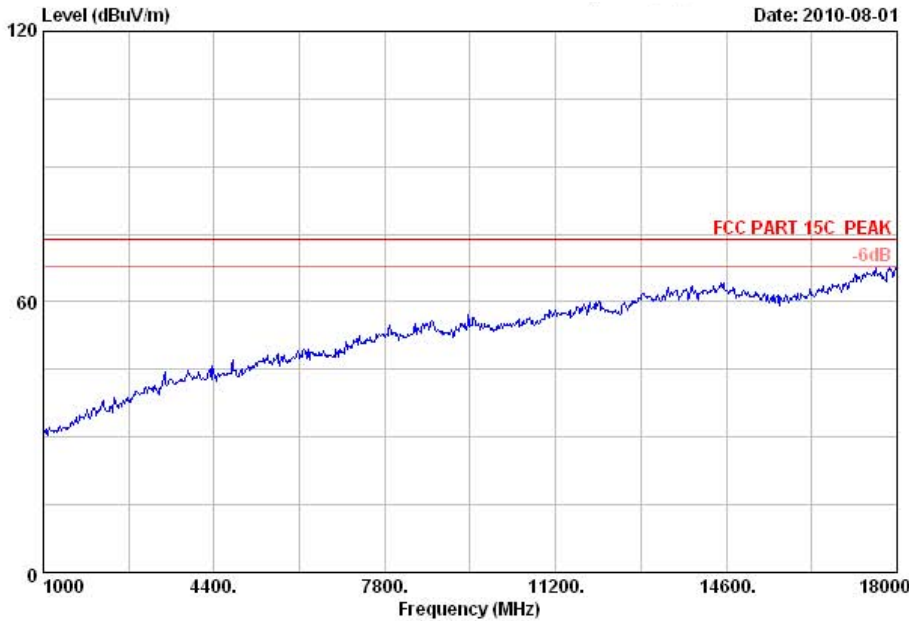
### 5.3.26 Diagram 026







5.3.27 Diagram 027



Dis. / Ant. : 3m 3115(0911) Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : 23\*C/54% Engineer : Jamy\_Yu  
 EUT : Receiver M/N:03-00181  
 Power : DC 5V From PC  
 Test mode : Rx CH Low Antenna 1

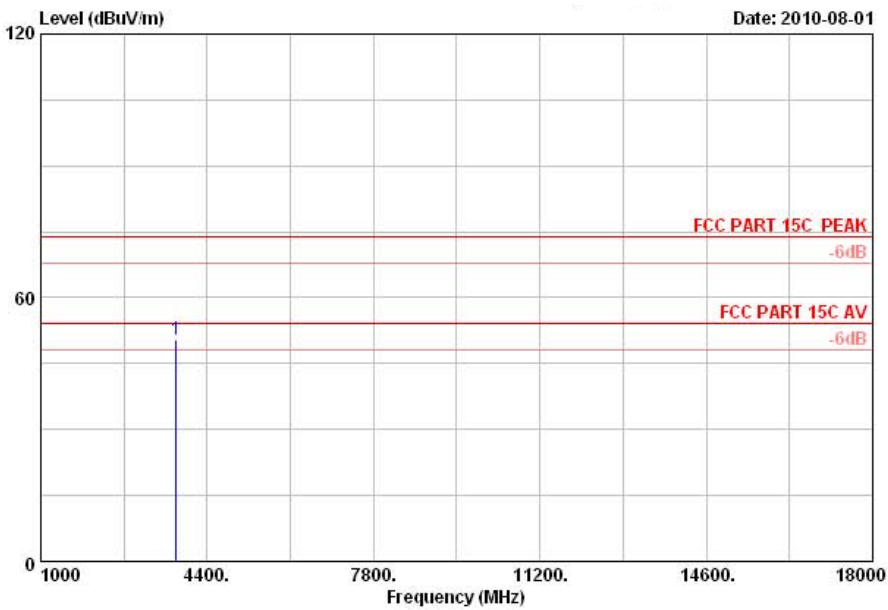
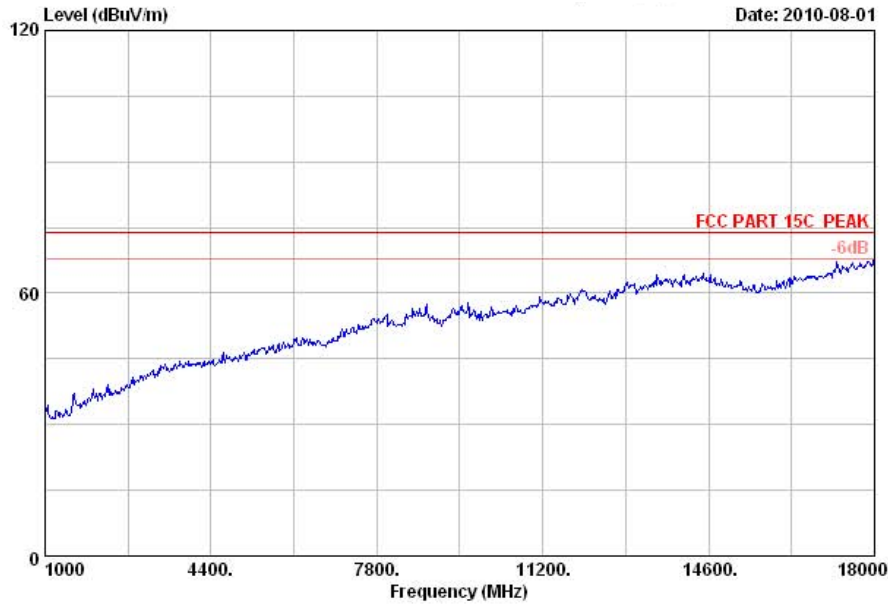
	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	4774.000	34.24	10.58	35.12	40.58	50.28	74.00	23.72	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



5.3.28 Diagram 028



Dis. / Ant. : 3m 3115(0911) Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : 23\*C/54% Engineer : Jamy\_Yu  
 EUT : Receiver M/N:03-00181  
 Power : DC 5V From PC  
 Test mode : Rx CH Low Antenna 1

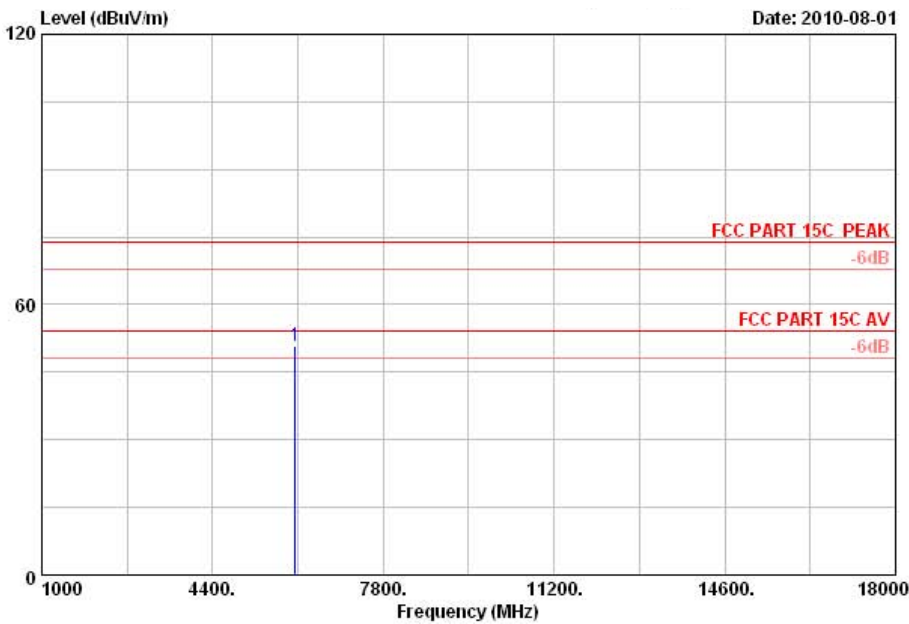
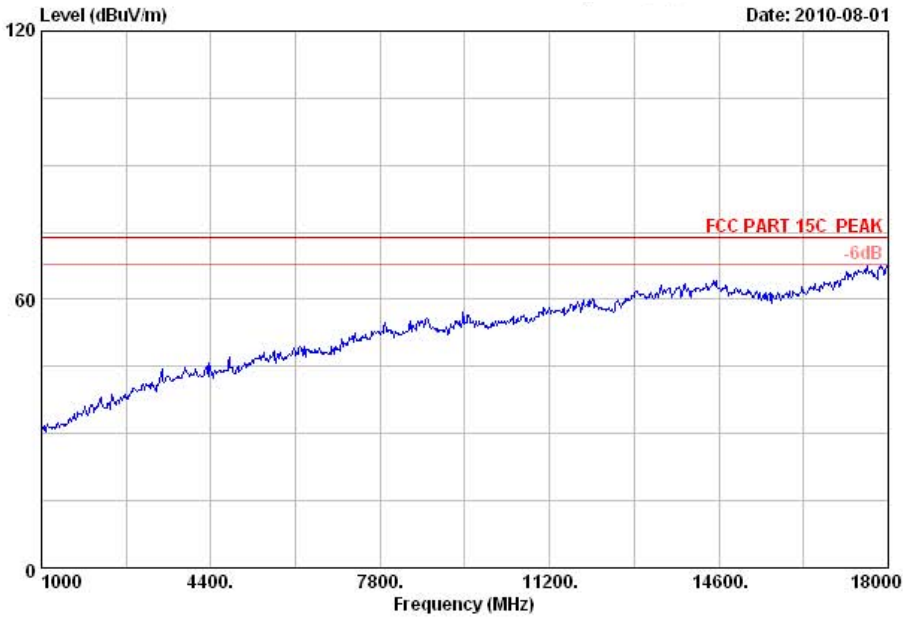
	Ant.	Cable	Amp.	Emission					
Freq.	Factor	loss	Factor	Reading	Level	Limits	Margin	Remark	
(MHz)	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)		
1 3771.000	33.69	9.43	35.78	43.01	50.35	74.00	23.65	Peak	

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



5.3.29 Diagram 029



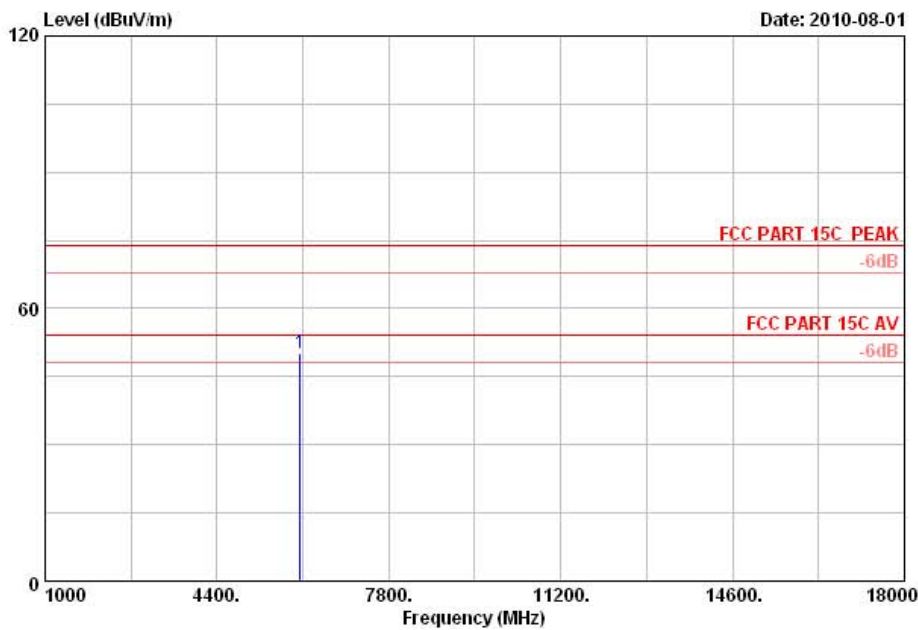
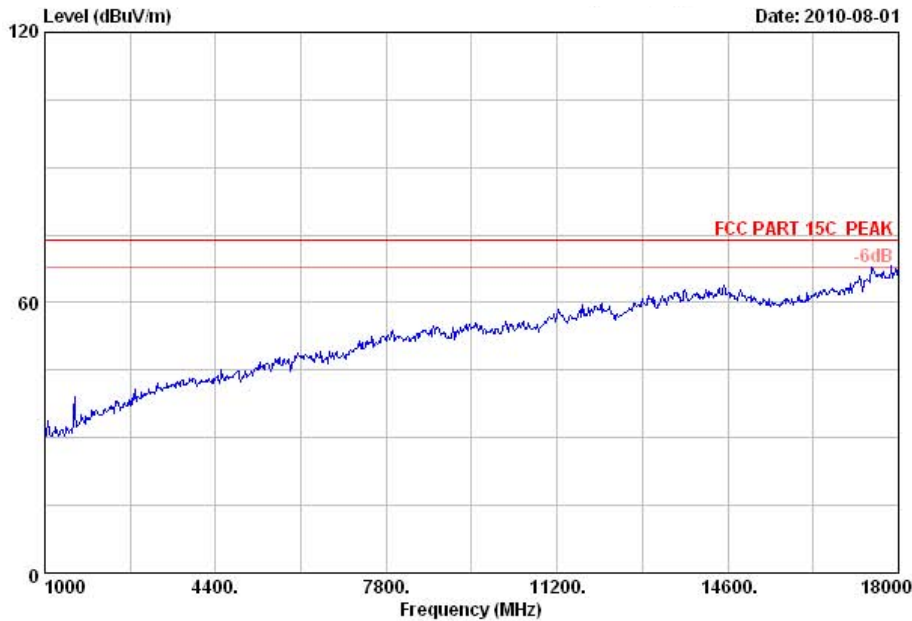
Dis. / Ant. : 3m 3115(0911) Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : 23°C/54% Engineer : Jamy\_Yu  
 EUT : Receiver M/N:03-00181  
 Power : DC 5V From PC  
 Test mode : Rx CH Mid Antenna 1

	Ant. Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	6049.000	35.98	12.04	34.37	37.24	50.89	74.00	23.11	Peak

Remarks:  
 1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



5.3.30 Diagram 030



Dis. / Ant. : 3m 3115(0911) Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : 23°C/54% Engineer : Jamy\_Yu  
 EUT : Receiver M/N:03-00181  
 Power : DC 5V From PC  
 Test mode : Rx CH Mid Antenna 1

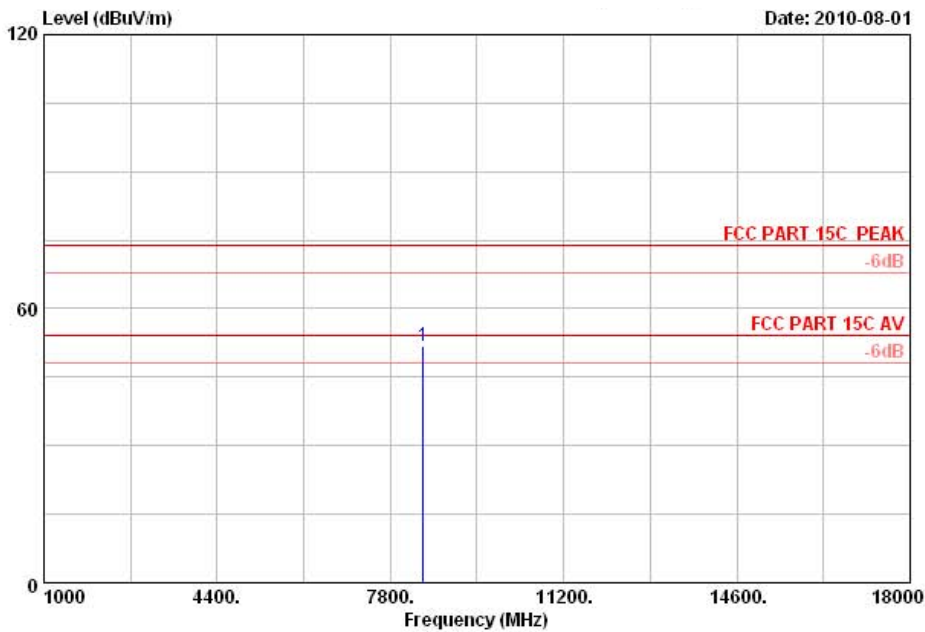
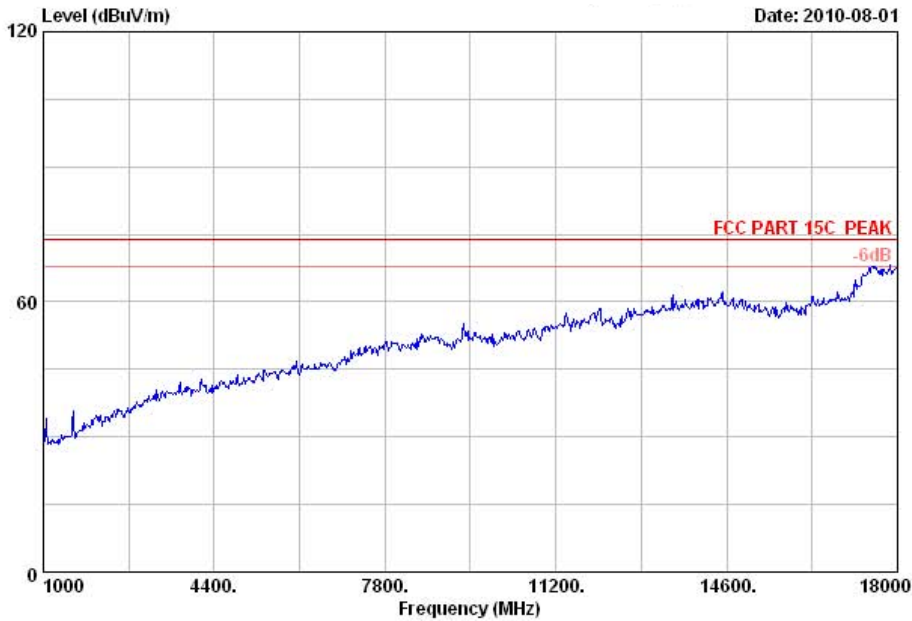
	Ant. Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Emission Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	6049.000	35.98	12.04	34.37	36.52	50.17	74.00	23.83	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



5.3.31 Diagram 031



Dis. / Ant. : 3m 3115(0911) Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : 23\*C/54% Engineer : Jany\_Yu  
 EUT : Receiver M/N:03-00181  
 Power : DC 5V From PC  
 Test mode : Rx CH High Antenna 1

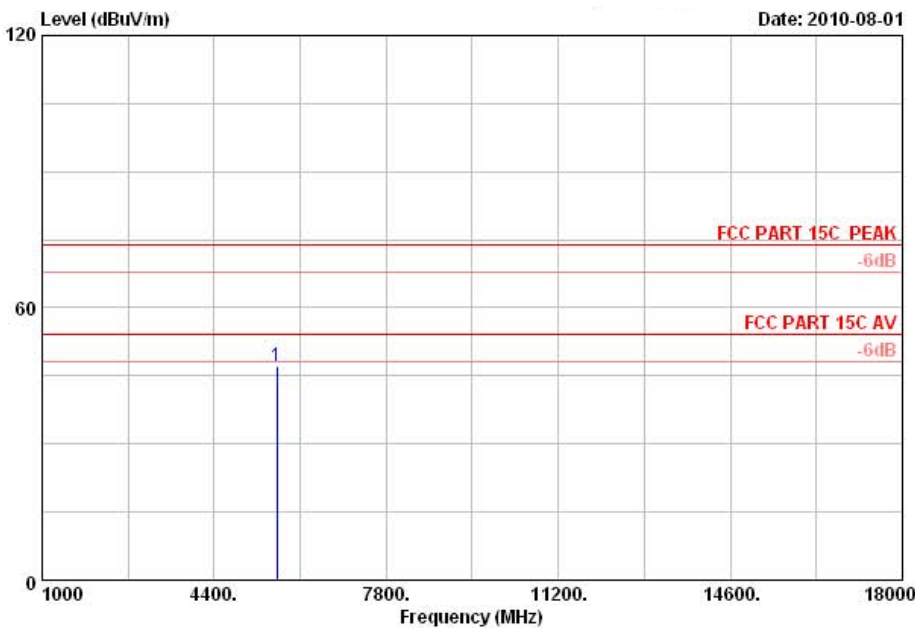
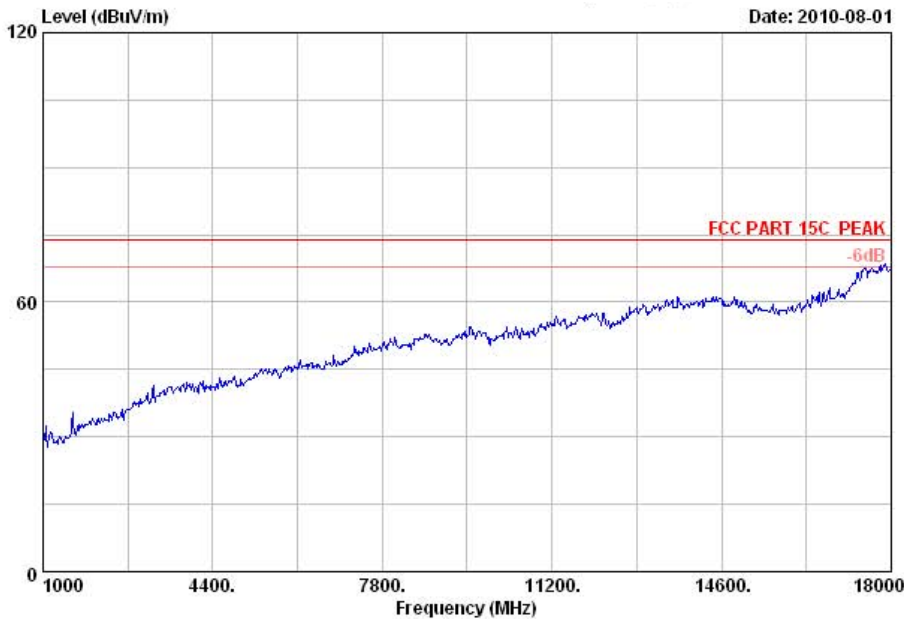
	Ant. Freq. (MHz)	Cable Factor (dB/m)	Amp. loss (dB)	Amp. Factor (dB)	Emission Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	8446.000	39.62	14.40	34.62	32.38	51.78	74.00	22.22	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



5.3.32 Diagram 032



Dis. / Ant. : 3m 3115(0911) Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : 23°C/54% Engineer : Jamy\_Yu  
 EUT : Receiver M/N:03-00181  
 Power : DC 5V From PC  
 Test mode : Rx CH High Antenna 1

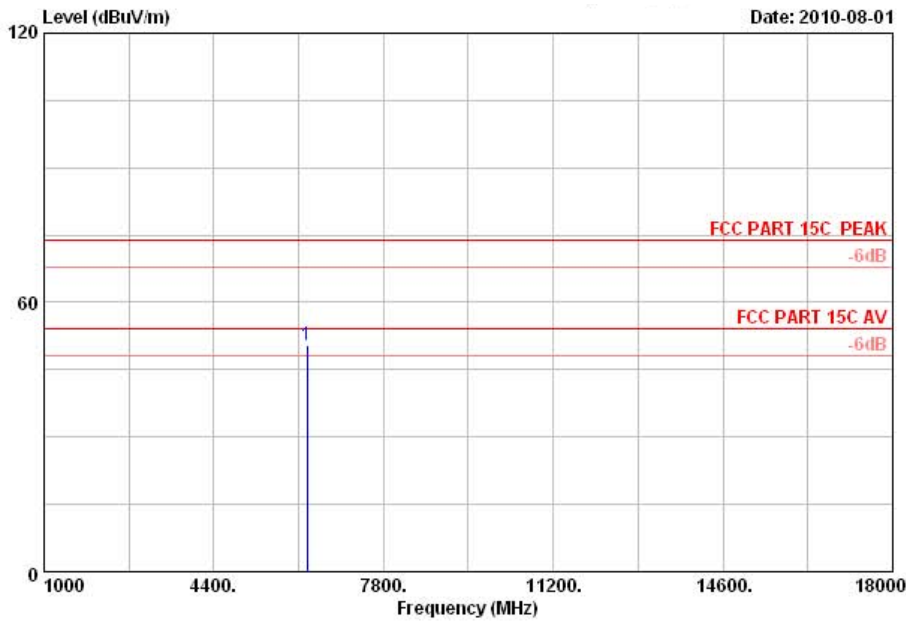
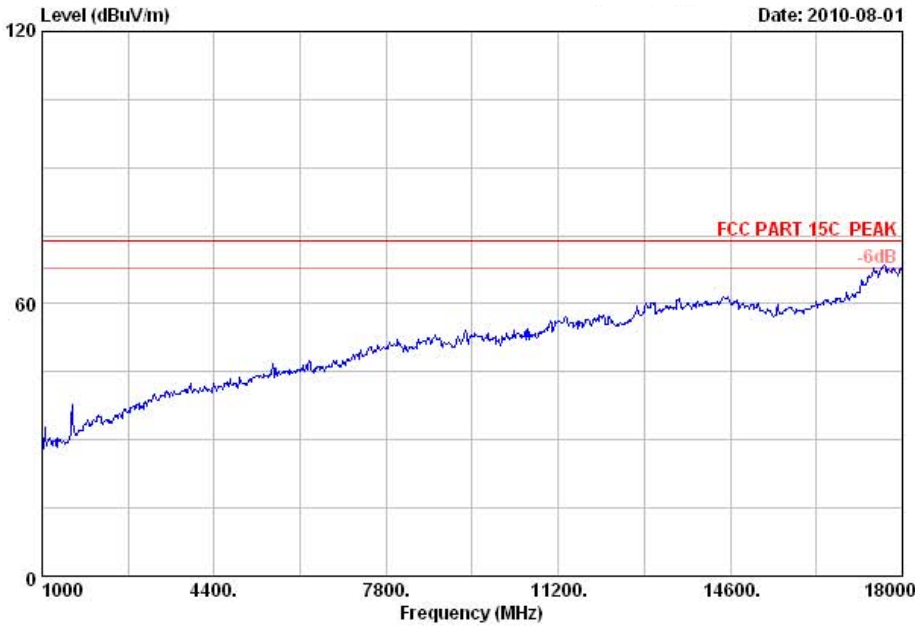
	Ant. Freq. (MHz)	Cable Factor (dB/m)	Amp. loss (dB)	Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	5641.000	36.00	11.58	34.54	34.13	47.17	74.00	26.83	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



5.3.33 Diagram 033



Dis. / Ant. : 3m 3115(0911) Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : 23\*C/54% Engineer : Jany\_Yu  
 EUT : Receiver M/N:03-00181  
 Power : DC 5V From PC  
 Test mode : Rx CH Low Antenna 2

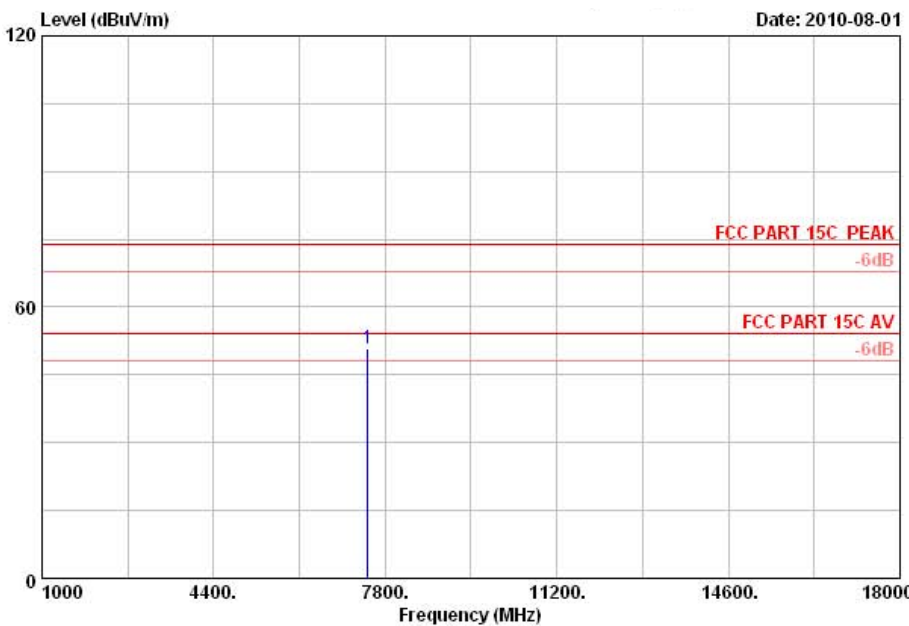
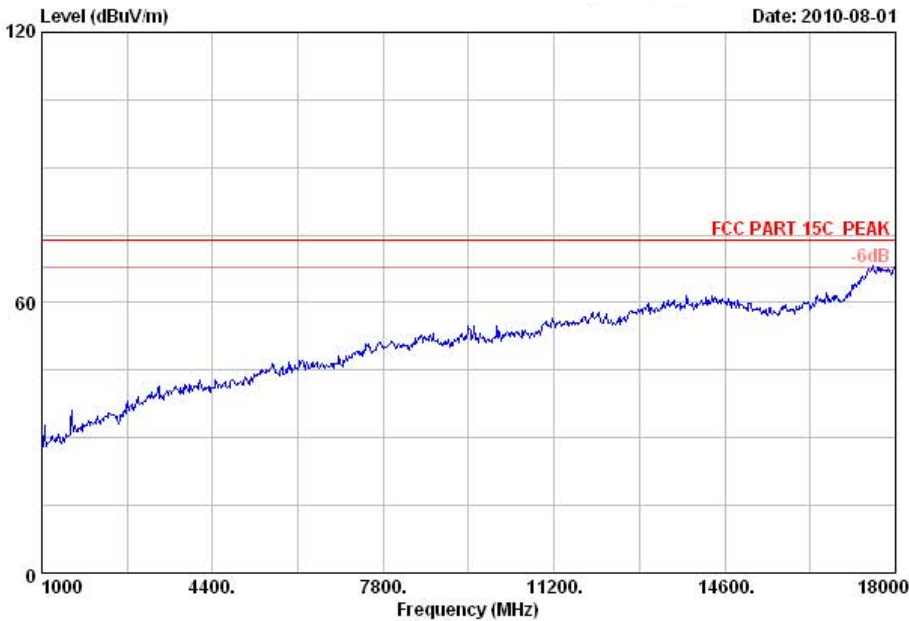
	Ant. Freq. (MHz)	Cable Factor (dB/m)	Amp. loss (dB)	Amp. Factor (dB)	Emission Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	6270.000	35.89	12.29	34.24	36.45	50.39	74.00	23.61	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



5.3.34 Diagram 034



Dis. / Ant. : 3m 3115(0911) Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : 23°C/54% Engineer : Jamy\_Yu  
 EUT : Receiver M/N:03-00181  
 Power : DC 5V From PC  
 Test mode : Rx CH Low Antenna 2

	Ant. Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Emission Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	7460.000	38.11	13.54	33.91	33.22	50.96	74.00	23.04	Peak

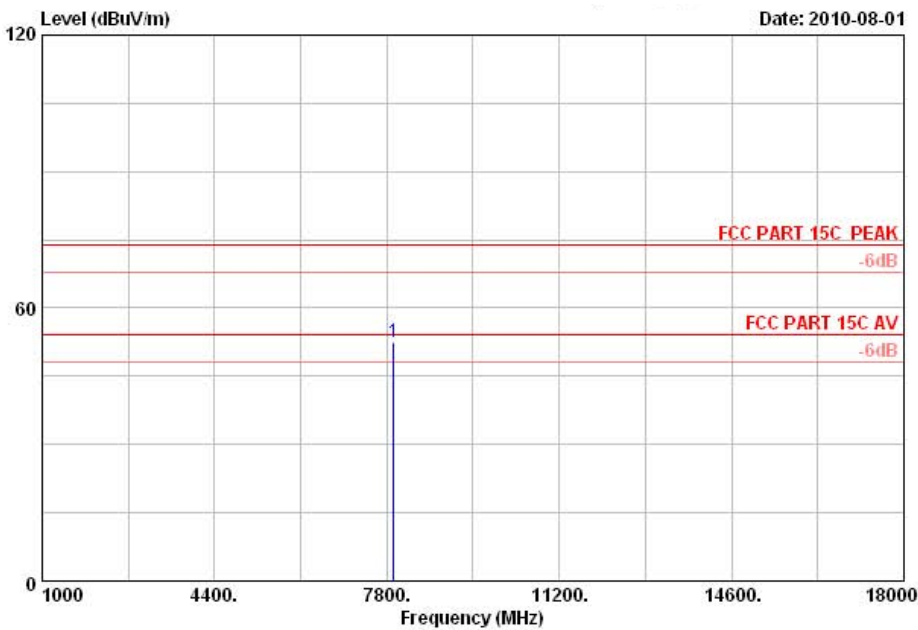
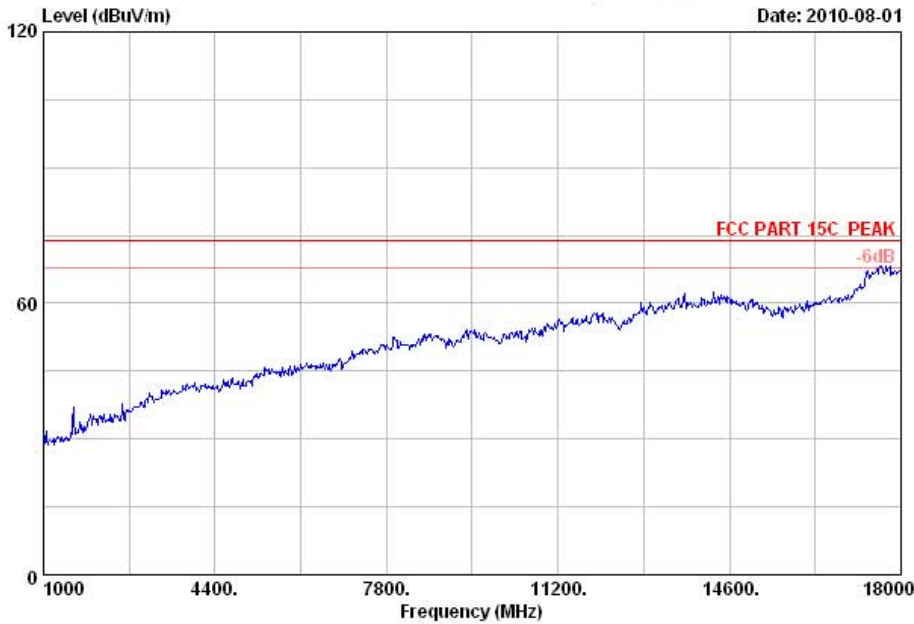
Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.





5.3.35 Diagram 035



Dis. / Ant. : 3m 3115(O911) Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : 23°C/54% Engineer : Jamy\_Yu  
 EUT : Receiver M/N:03-00181  
 Power : DC 5V From PC  
 Test mode : Rx CH Mid Antenna 2

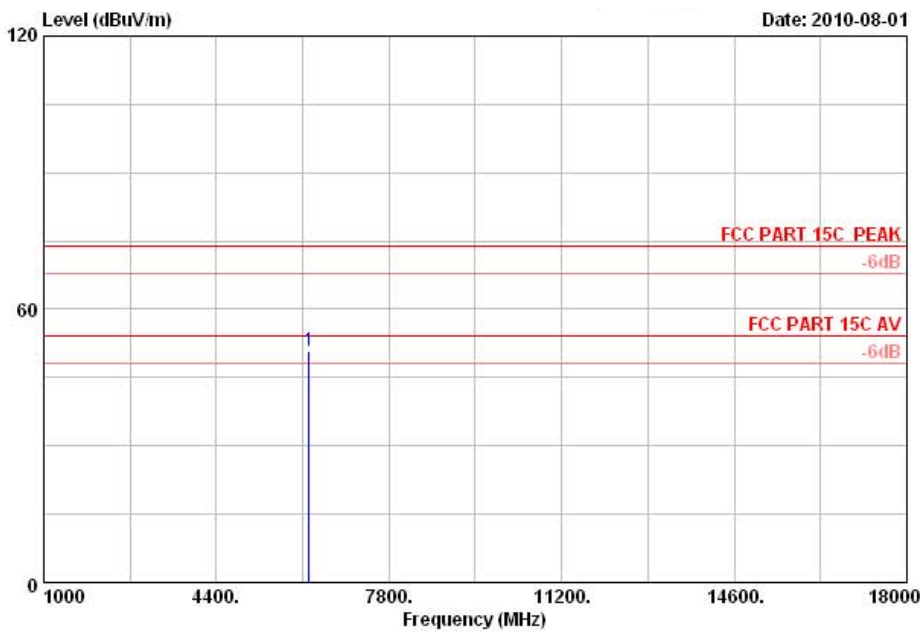
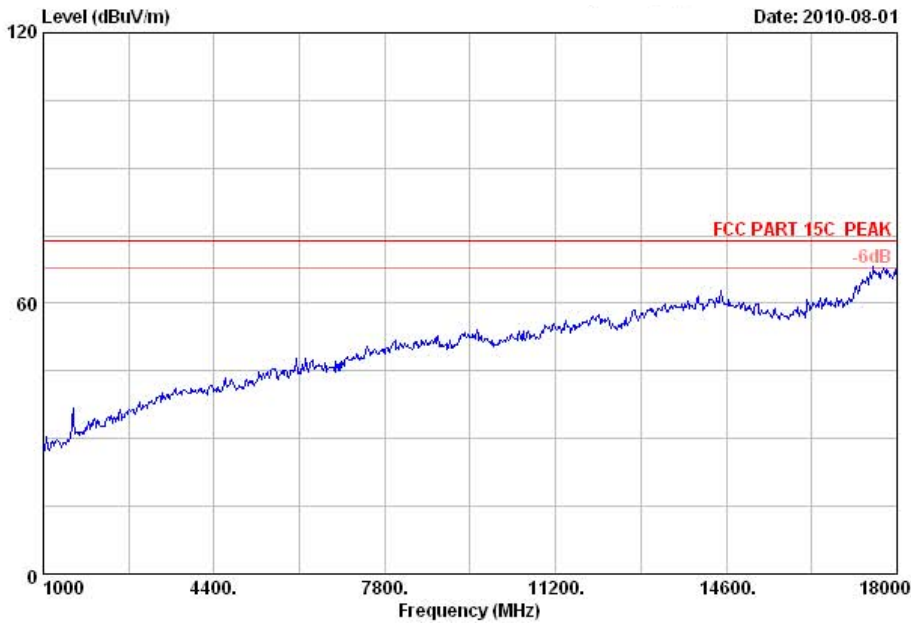
	Ant. Freq. (MHz)	Cable Factor (dB/m)	Amp. loss (dB)	Amp. Factor (dB)	Emission Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	7936.000	38.82	13.94	34.67	34.45	52.54	74.00	21.46	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



5.3.36 Diagram 036



Dis. / Ant. : 3m 3115(0911) Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : 23\*C/54% Engineer : Jamy\_Yu  
 EUT : Receiver M/N:03-00181  
 Power : DC 5V From PC  
 Test mode : Rx CH Mid Antenna 2

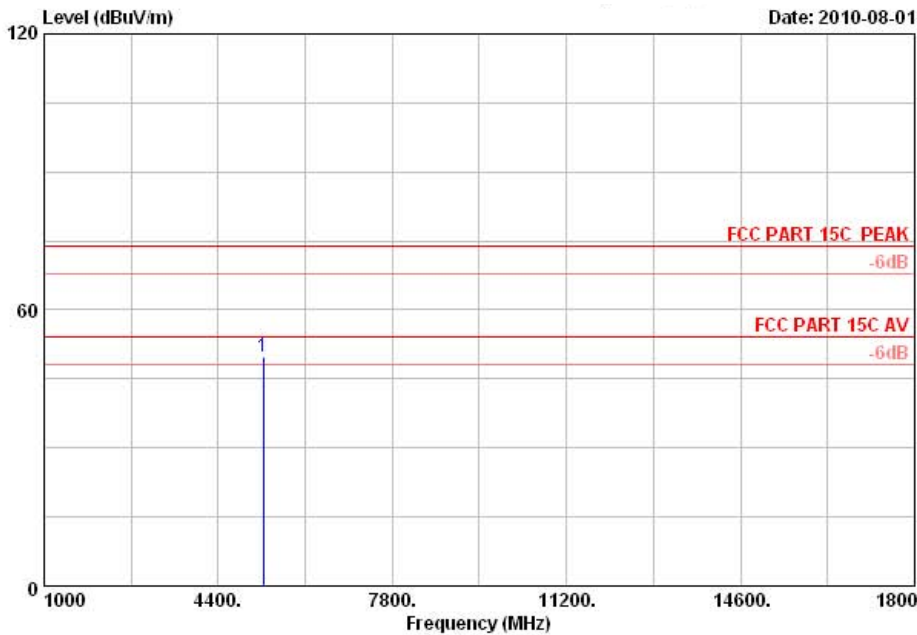
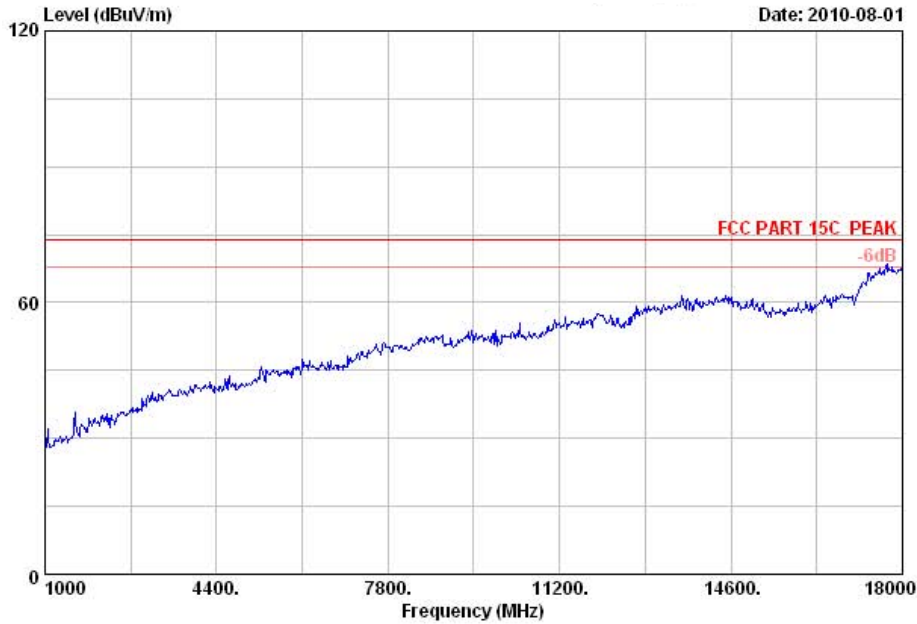
	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	6219.000	35.91	12.25	34.26	37.00	50.90	74.00	23.10	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



5.3.37 Diagram 037



Dis. / Ant. : 3m 3115(0911) Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : 23\*C/54% Engineer : Jamy\_Yu  
 EUT : Receiver M/N:03-00181  
 Power : DC 5V From PC  
 Test mode : Rx CH High Antenna 2

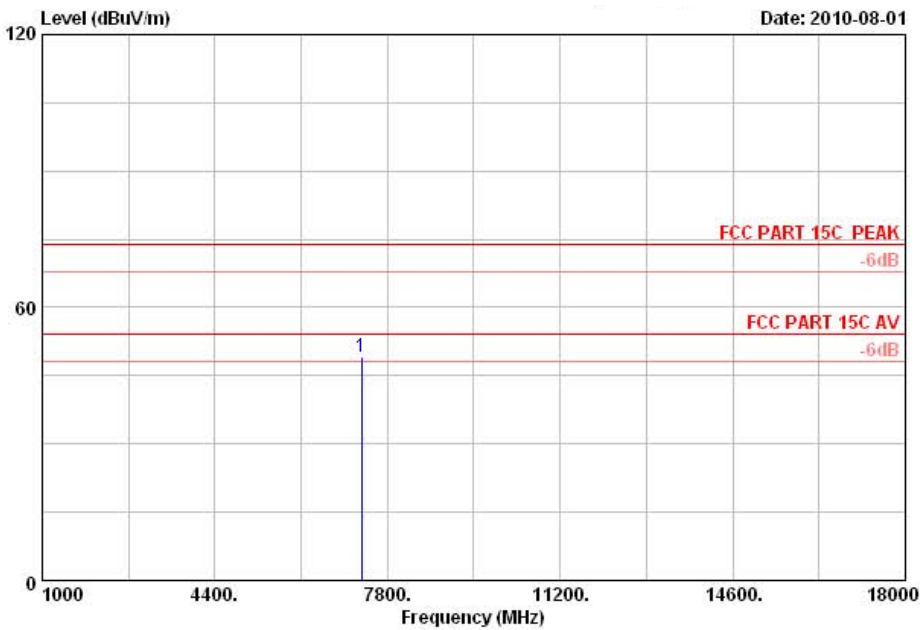
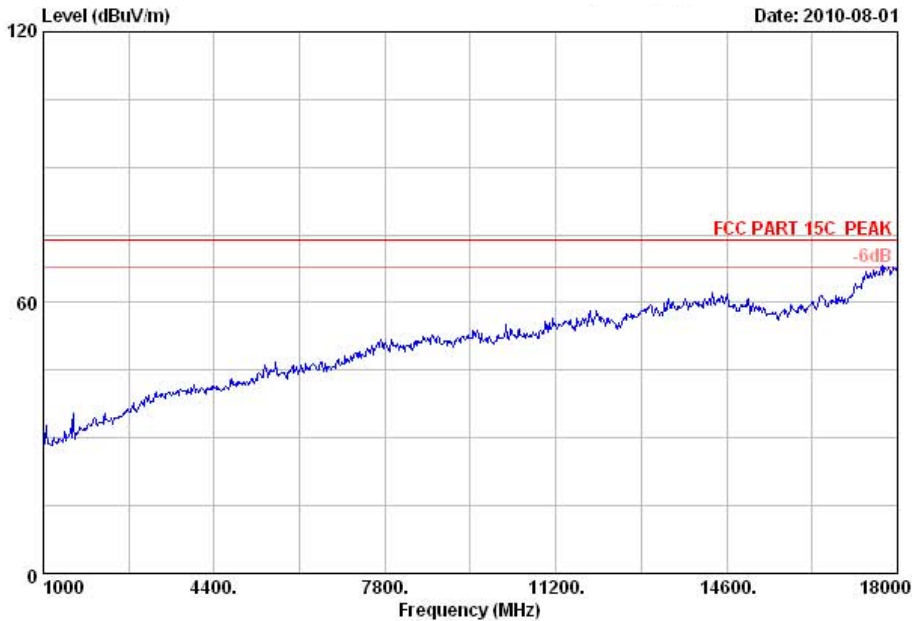
	Ant. Freq. (MHz)	Cable Factor (dB/m)	Amp. loss (dB)	Emission Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	5284.000	35.39	11.17	37.89	49.72	74.00	24.28	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



5.3.38 Diagram 038



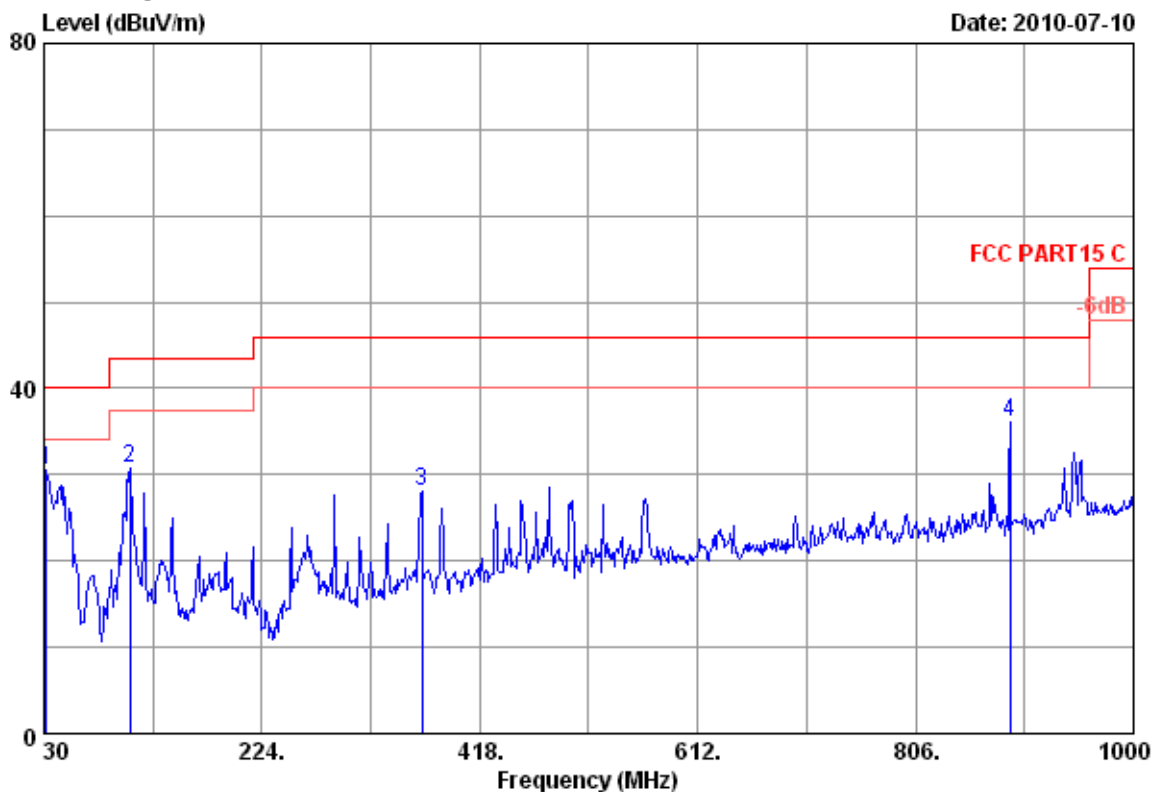
Dis. / Ant. : 3m 3115(0911) Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : 23°C/54% Engineer : Jamy\_Yu  
 EUT : Receiver M/N:03-00181  
 Power : DC 5V From PC  
 Test mode : Rx CH High Antenna 2

	Ant. Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Emission Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	7290.000	37.18	13.38	33.94	32.66	49.28	74.00	24.72	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

5.3.39 Diagram R-039



Dis. / Ant. : 3m 2768(200912) Ant. pol. : HORIZONTAL  
 Limit : FCC PART15 C  
 Env. / Ins. : 23\*C/54% Engineer : Jamy\_Yu  
 EUT : Receiver  
 Power Rating : DC 5V From PC  
 Test mode : Rx Mode  
 M/N : 03-00181

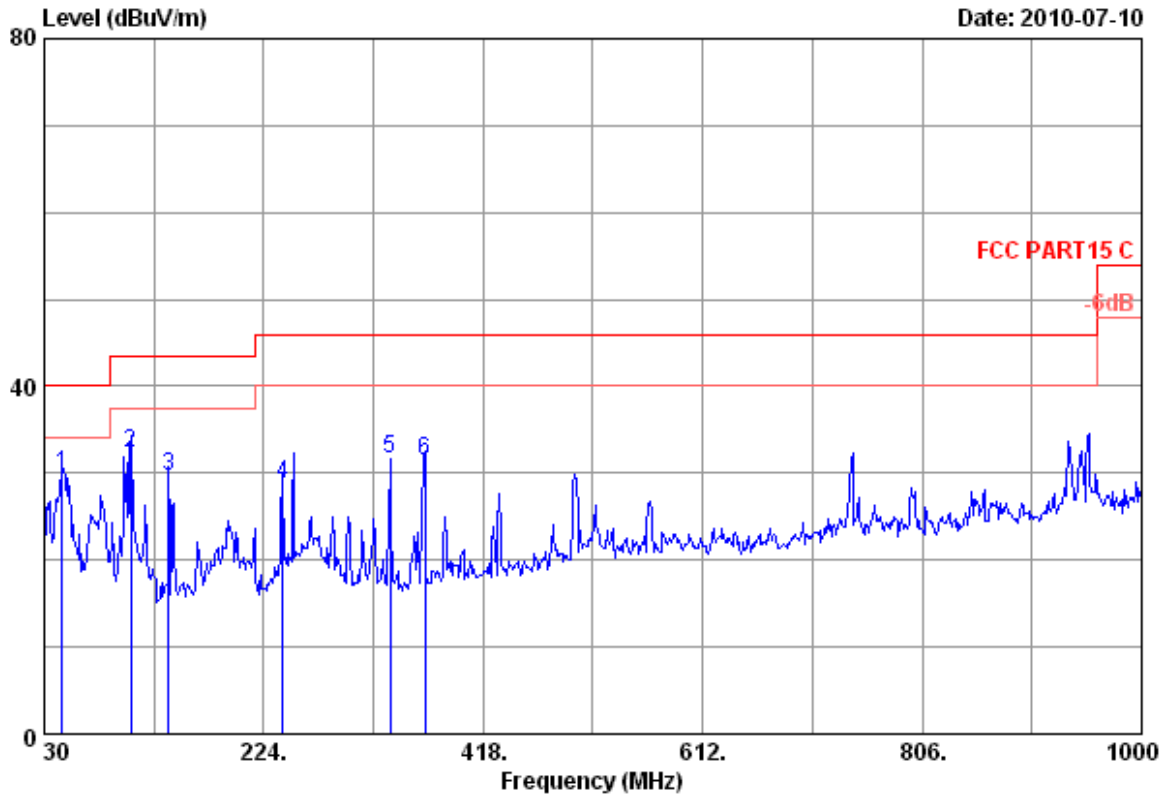
	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	31.940	18.90	0.81	10.77	30.48	40.00	9.52	QP
2	106.630	11.10	1.53	18.16	30.79	43.50	12.71	QP
3	366.590	15.53	2.83	9.66	28.02	46.00	17.98	QP
4	890.390	22.80	4.41	8.89	36.10	46.00	9.90	QP

Remarks:

1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



5.3.40 Diagram R-040



Dis. / Ant. : 3m 2768(200912) Ant. pol. : VERTICAL  
 Limit : FCC PART15 C  
 Env. / Ins. : 23°C/54% Engineer : Jamy\_Yu  
 EUT : Receiver  
 Power Rating : DC 5V From PC  
 Test mode : Rx Mode  
 M/N : 03-00181

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBUV)	Emission Level (dBUV/m)	Limits (dBUV/m)	Margin (dB)	Remark
1	45.520	11.70	1.08	17.17	29.95	40.00	10.05	QP
2	106.630	11.10	1.53	19.64	32.27	43.50	11.23	QP
3	139.610	12.00	1.64	16.07	29.71	43.50	13.79	QP
4	240.490	11.70	2.29	14.76	28.75	46.00	17.25	QP
5	335.550	14.73	2.68	14.33	31.74	46.00	14.26	QP
6	366.590	15.53	2.83	13.12	31.48	46.00	14.52	QP

Remarks:  
 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



## 6. 6dB Bandwidth and 99% bandwidth Test

### 6.1 Test Procedure

For 6dB bandwidth:

Systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

The transmitter output was connected to a spectrum analyzer. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 KHz RBW and 300 KHz VBW. The 6dB bandwidth is defined as the total spectrum with the power of which is lower than peak power for 6dB.

For 99% bandwidth:

When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured.

The transmitter shall be operated at its maximum carrier power measured under normal test conditions. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak hold, may produce a wider bandwidth than actual.

The trace data points are recovered and are directly summed in linear terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points. This frequency is recorded. The span between the two recorded frequencies is the occupied bandwidth.

### 6.2 Measurement Equipment

	Equipment	Last Calibration	Type	Serial No.	Manufacturer
<input checked="" type="checkbox"/>	Spectrum	May 15, 10	E4407B	MY41440292	Agilent
<input checked="" type="checkbox"/>	Amp	May 15, 10	8449B	3008A00863	HP
<input checked="" type="checkbox"/>	Antenna	Jan. 23, 10	3115	9607-4877	EMCO
<input checked="" type="checkbox"/>	HF Cable	May 15, 10	Sucoflex104	N/A	Hubersuhne

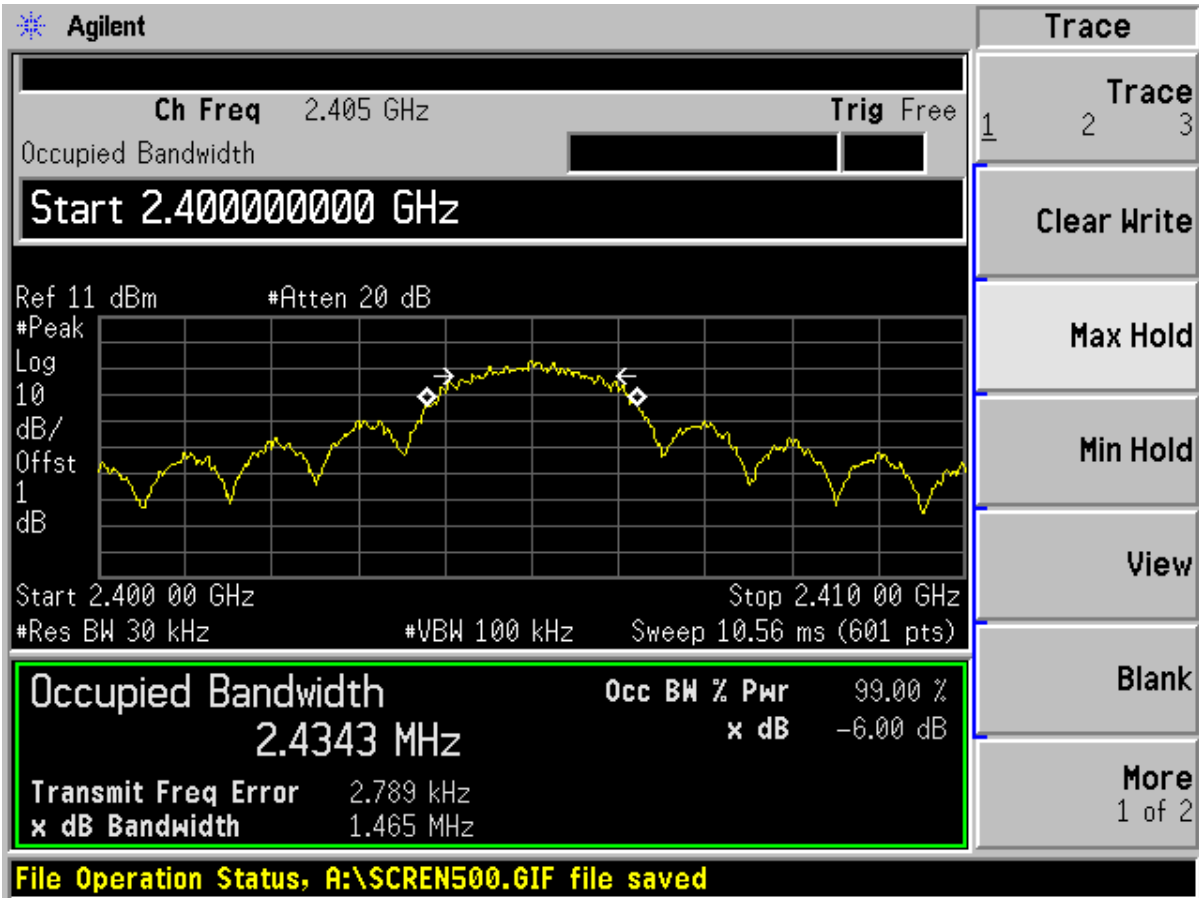
### 6.3 Test Result

TM1:

CH	Diagram	6dB bandwidth MHz	6dB bandwidth Limit MHz	Result	99% bandwidth MHz
1	039	1.465	$\geq 0.5$	Pass	2.4343
2	040	1.569	$\geq 0.5$	Pass	2.4909
3	041	1.599	$\geq 0.5$	Pass	2.5185

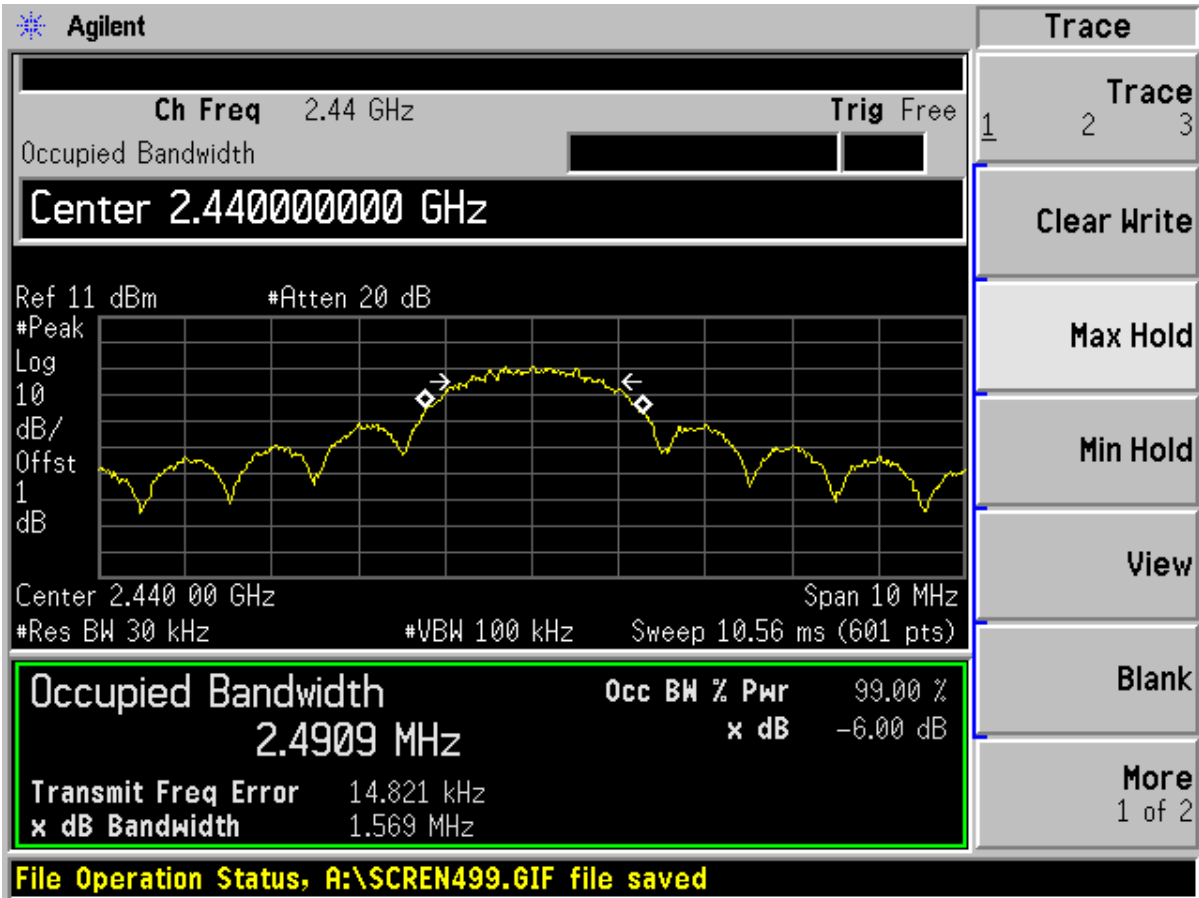
Remark: TM1 is the worse case by pre-scan .

6.3.1 Diagram 039

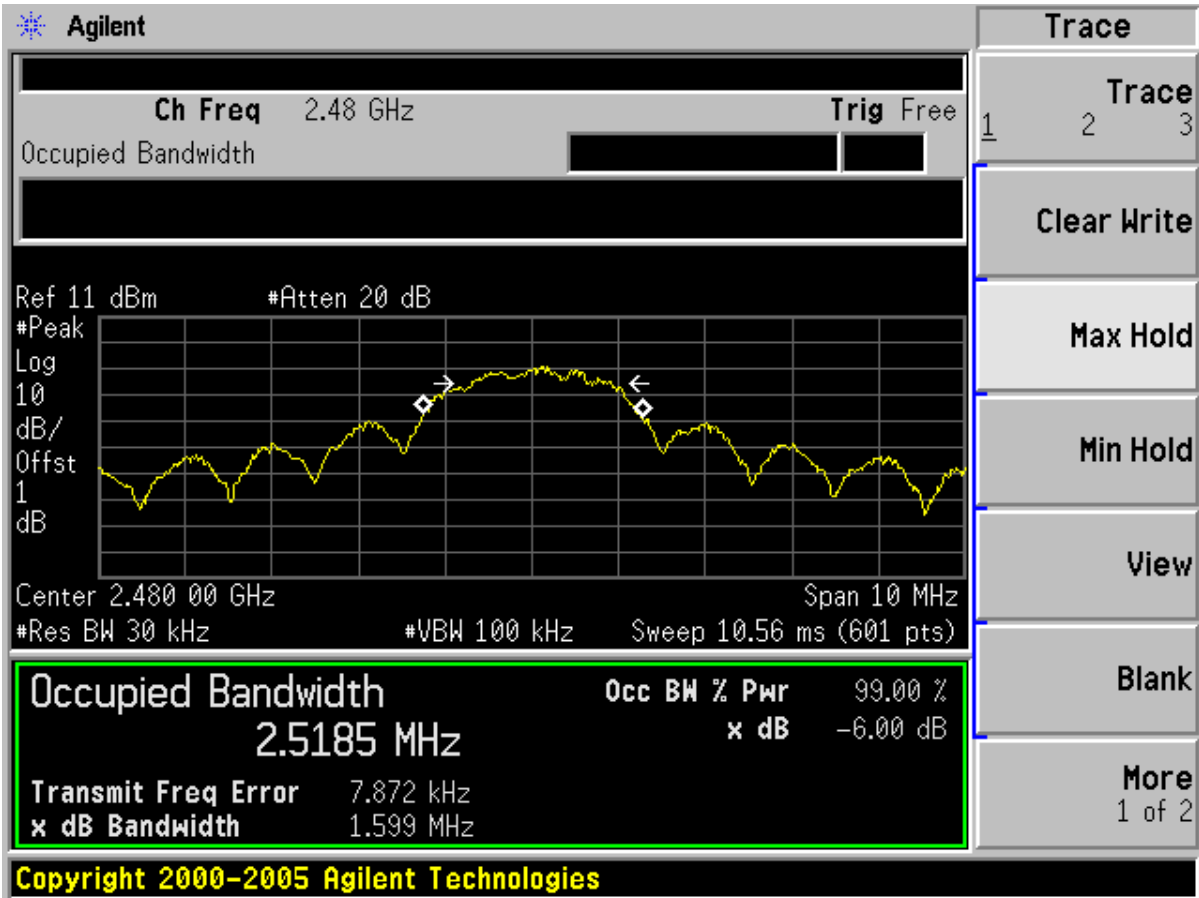




6.3.2 Diagram 040



6.3.3 Diagram 041





## 7. Band Edge Compliance Test

### 7.1 Test Procedure

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a).

The EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber. An antenna was located 3m from the EUT on an adjustable mast.

The EUT were rotated 0 to 360 degree and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. The test result are reported as below.

RBW=1MHz ; VBW=1MHz, Sweep=AUTO, PK detector for peak emissions measurement

AV value can be calculated by PK value – duty cycle factor ; and the duty cycle factor =

$20\log(1/\text{duty cycle})$  ; the duty cycle is 12.25% ,so duty cycle factor = 18.237dB

### 7.2 Measurement Equipment

	Equipment	Last Calibration	Type	Serial No.	Manufacturer
<input checked="" type="checkbox"/>	Spectrum	May 15, 10	E4407B	MY41440292	Agilent
<input checked="" type="checkbox"/>	Amp	May 15, 10	8449B	3008A00863	HP
<input checked="" type="checkbox"/>	Antenna	Jan. 23, 10	3115	9607-4877	EMCO
<input checked="" type="checkbox"/>	HF Cable	May 15, 10	Sucoflex104	N/A	Hubersuhne

### 7.3 Test Result

Connect mode	Antenna Polarity	Remark	Test Data	Test Result
TM1 CH1	Horizontal	PK	Diagram 042	Pass
	Vertical	PK	Diagram 043	Pass
TM1 CH3	Horizontal	PK	Diagram 044	Pass
	Vertical	PK	Diagram 045	Pass
TM2 CH1	Horizontal	PK	Diagram 046	Pass
	Vertical	PK	Diagram 047	Pass
TM2 CH3	Horizontal	PK	Diagram 048	Pass
	Vertical	PK	Diagram 049	Pass



NOTES:

1. All modes were measured and the worst case emission was reported.
2. H =Horizontal V=Vertical
3. Emission = Reading +Antenna Factor + Cable Loss –Amp Factor(if exist)
4. Emission level dB  $\mu$  V = 20 log Emission level  $\mu$  V/m
5. All the emissions appearing within 15.205 Restricted bands shall not exceed the limits shown in 15.209,all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

Remark :

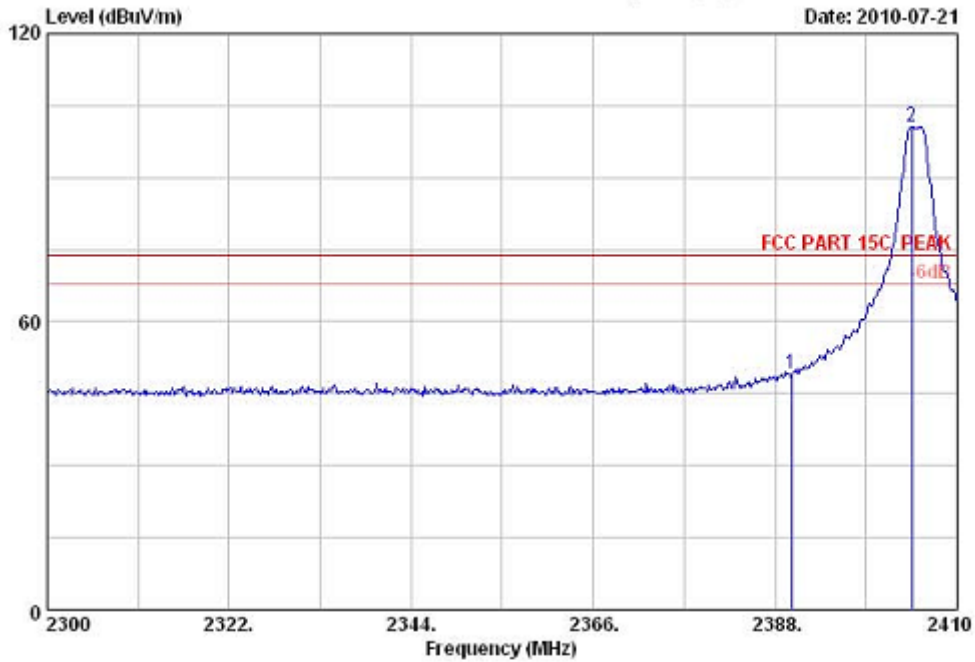
The limit of 15.209(a) of 3 meter distance is

Frequency MHz	Distance m	Field strength		Distance m	Field strength
		$\mu$ V/m	dB $\mu$ V/m(QP)		dB $\mu$ V/m(QP)
30-88	3	100	40.0	10	30.0
88-216	3	150	43.5	10	33.5
216-960	3	200	46.0	10	36.0
960-1000	3	500	54.0	10	44.0
Above 1000	3	74.0 dB $\mu$ V/m (PK) 54.0 dB $\mu$ V/m (AV)		/	/

15.205 Restricted bands of operation:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	( <sup>2</sup> )

7.3.1 Diagram 042



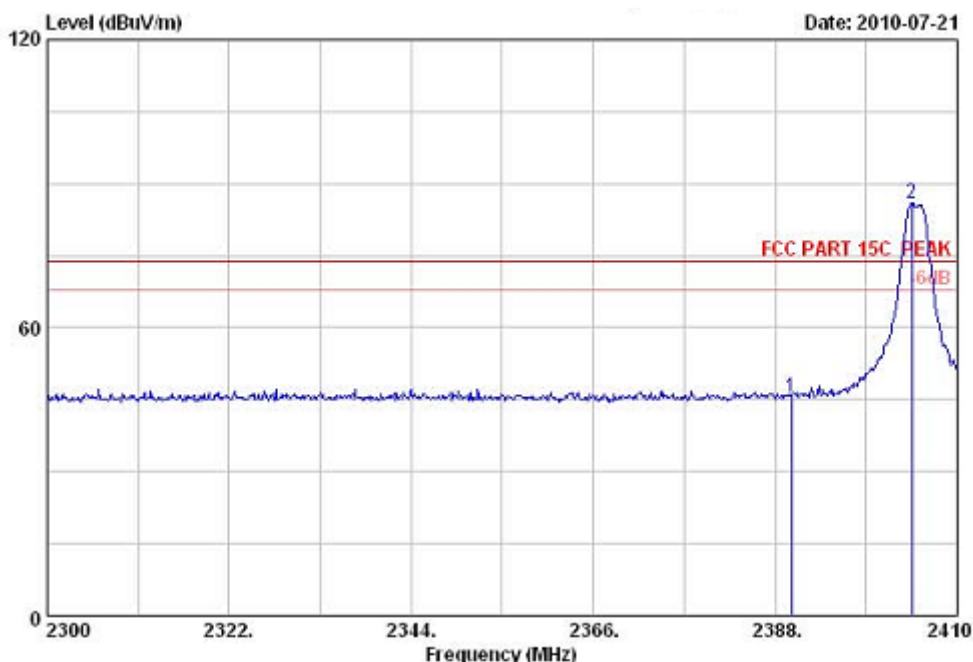
Site no. : 3m Chamber Data no. : 19  
 Dis. / Ant. : 3m 3115(0911) Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : 23°C/54% Engineer : Jamy\_Yu  
 EUT : Receiver M/N:03-00181  
 Power : DC 5V From PC  
 Test mode : Tx CH Low Antenna 1

	Ant. Freq. (MHz)	Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	29.44	7.39	36.62	48.96	49.17	74.00	24.83	Peak
2	2404.500	29.45	7.43	36.62	100.51	100.77			Peak

Remarks:  
 1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



7.3.2 Diagram 043



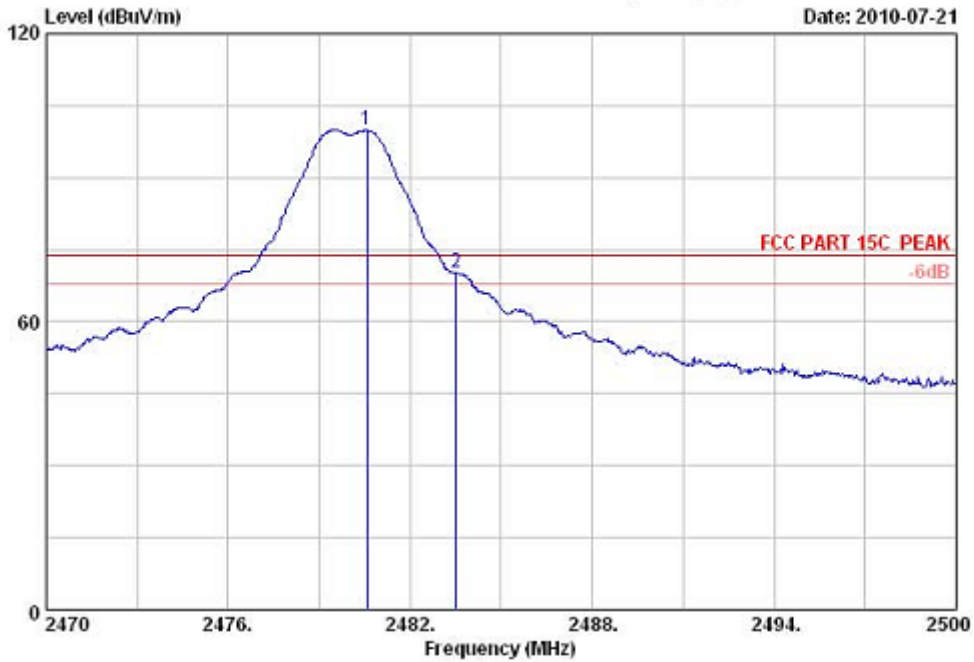
Site no. : 3m Chamber                      Data no. : 18  
 Dis. / Ant. : 3m 3115(0911)              Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : 23°C/54%                  Engineer : Jamy\_Yu  
 EUT : Receiver M/N:03-00181  
 Power : DC 5V From PC  
 Test mode : Tx CH Low Antenna 1

	Ant.	Cable	Amp.		Emission				
Freq.	Factor	loss	Factor	Reading	Level	Limits	Margin	Remark	
(MHz)	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)		
1	2390.000	29.44	7.39	36.62	45.23	45.44	74.00	28.56	Peak
2	2404.500	29.45	7.43	36.62	85.56	85.82			Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

7.3.3 Diagram 044



Site no. : 3m Chamber Data no. : 20  
 Dis. / Ant. : 3m 3115(O911) Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : 23°C/54% Engineer : Jamy\_Yu  
 EUT : Receiver M/N:03-00181  
 Power : DC 5V From PC  
 Test mode : Tx CH High Antenna 1

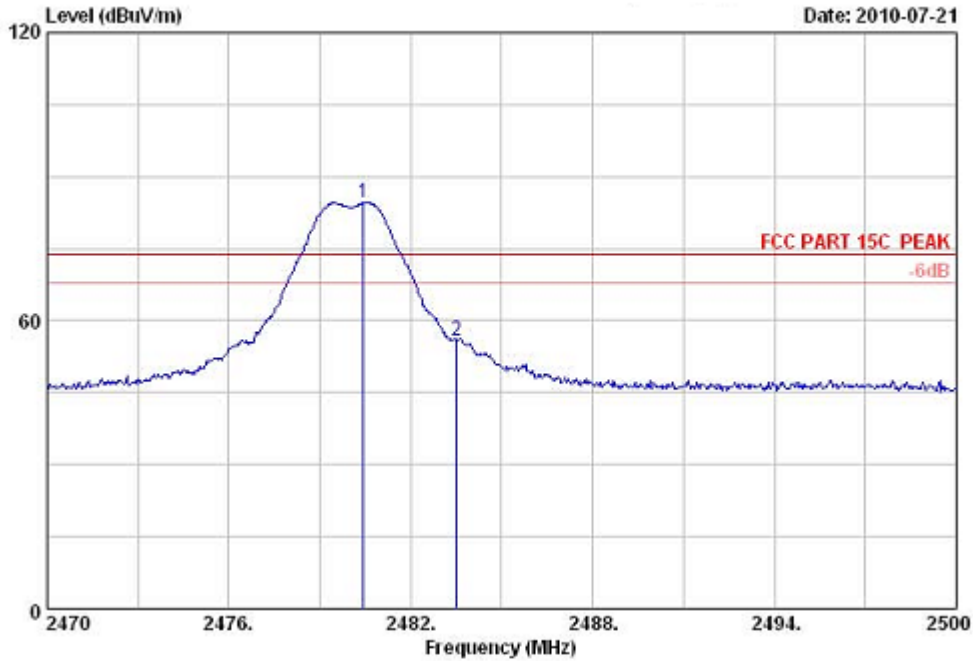
	Ant. Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.560	29.49	7.58	36.60	99.31	99.78			Peak
2	2483.500	29.49	7.58	36.60	69.66	70.13	74.00	3.87	Peak

Remarks:  
 1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

AV value of 2483.5MHz = 70.13-18.237=51.893dBµV/m<54dBµV/m ,so Pass.



7.3.4 Diagram 045



```

Site no.      : 3m Chamber                      Data no.   : 21
Dis. / Ant.  : 3m 3115(0911)                  Ant. pol.  : VERTICAL
Limit        : FCC PART 15C PEAK
Env. / Ins.  : 23°C/54%                       Engineer   : Jamy_Yu
EUT          : Receiver M/N:03-00181
Power        : DC 5V From PC
Test mode    : Tx CH High Antenna 1
  
```

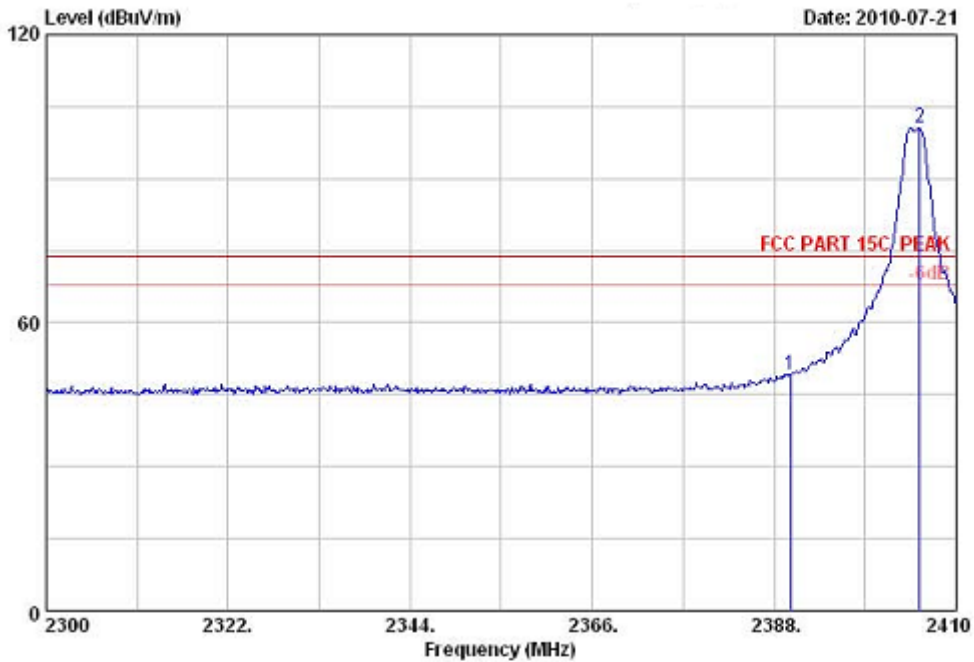
	Ant.	Cable	Amp.	Emission					
Freq.	Factor	loss	Factor	Reading	Level	Limits	Margin	Remark	
(MHz)	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)		
1 2480.440	29.49	7.58	36.60	84.07	84.54			Peak	
2 2483.500	29.49	7.58	36.60	55.47	55.94	74.00	18.06	Peak	

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

AV value of 2483.5MHz = 55.94-18.237=37.703dBµV/m<54dBµV/m ,so Pass.

7.3.5 Diagram 046



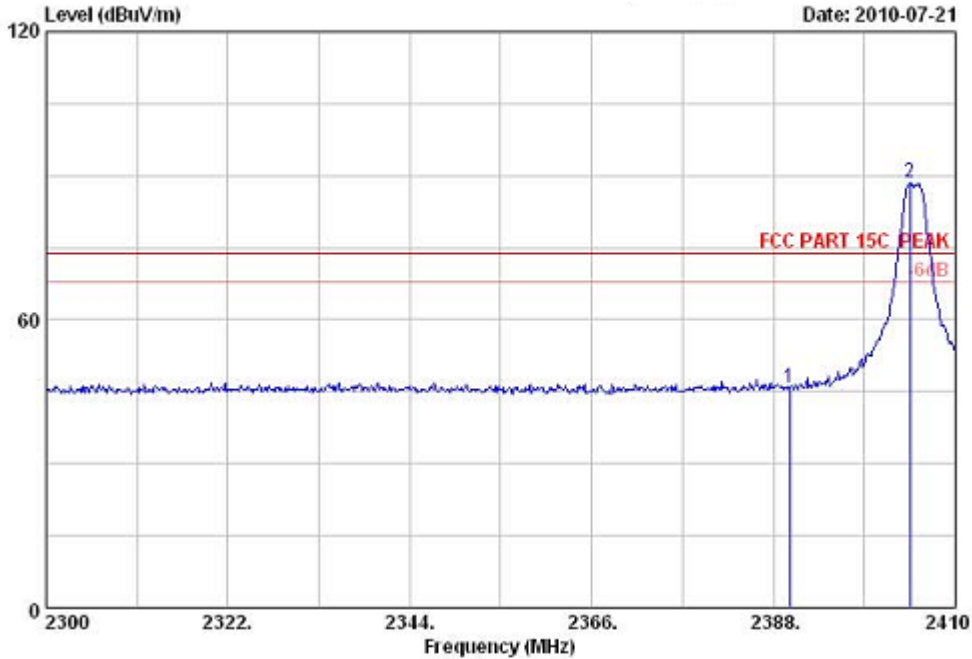
```

Site no.      : 3m Chamber                      Data no.   : 16
Dis. / Ant.   : 3m 3115(O911)                 Ant. pol.  : HORIZONTAL
Limit        : FCC PART 15C PEAK
Env. / Ins.   : 23°C/54%                      Engineer   : Jamy_Yu
EUT          : Receiver M/N:03-00181
Power        : DC 5V From PC
Test mode     : Tx CH Low Antenna 2

  Ant.  Cable  Amp.      Emission
  Freq. Factor loss Factor Reading Level Limits Margin Remark
  (MHz) (dB/m) (dB) (dB) (dBuV) (dBuV/m) (dBuV/m) (dB)
-----
1 2390.000 29.44 7.39 36.62 48.76 48.97 74.00 25.03 Peak
2 2405.600 29.45 7.43 36.62 100.25 100.51          Peak
    
```

Remarks:  
 1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

7.3.6 Diagram 047



Date: 2010-07-21

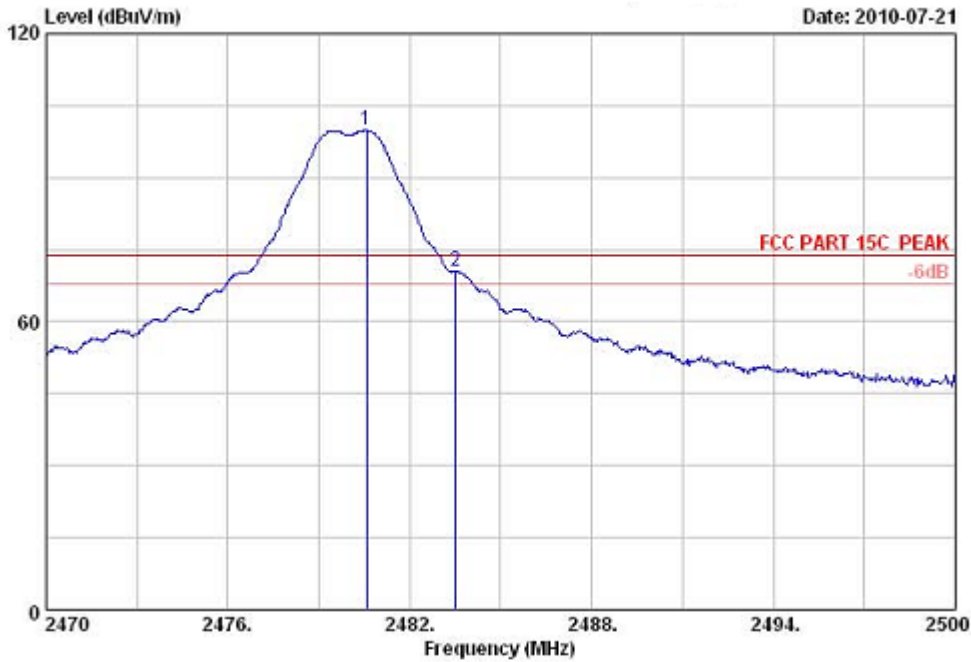
```

Site no.       : 3m Chamber                               Data no.   : 17
Dis. / Ant.    : 3m 3115(0911)                           Ant. pol.  : VERTICAL
Limit         : FCC PART 15C PEAK
Env. / Ins.    : 23°C/54%                                  Engineer   : Jamy_Yu
EUT          : Receiver M/N:03-00181
Power         : DC 5V From PC
Test mode     : Tx CH Low Antenna 2
  
```

	Ant. Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	29.44	7.39	36.62	45.42	45.63	74.00	28.37	Peak
2	2404.500	29.45	7.43	36.62	88.17	88.43			Peak

Remarks:  
 1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

7.3.7 Diagram 048



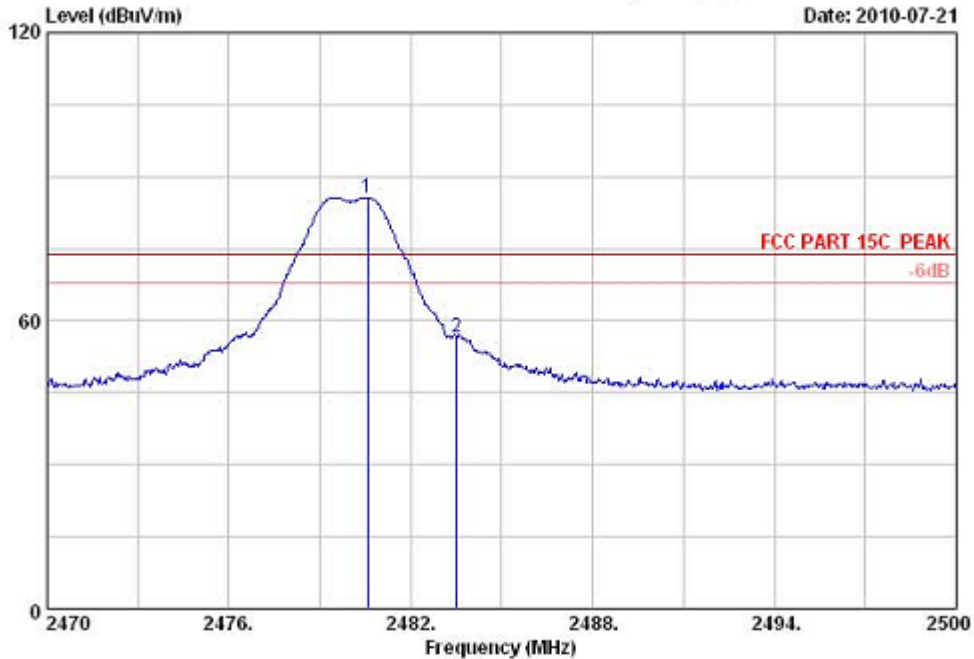
Site no. : 3m Chamber                      Data no. : 15  
 Dis. / Ant. : 3m 3115(0911)              Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : 23°C/54%                      Engineer : Jamy\_Yu  
 EUT : Receiver M/N:03-00181  
 Power : DC 5V From PC  
 Test mode : Tx CH High Antenna 2

	Ant. Freq. (MHz)	Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.560	29.49	7.58	36.60	99.31	99.78			Peak
2	2483.500	29.49	7.58	36.60	69.95	70.42	74.00	3.58	Peak

Remarks:  
 1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

AV value of 2483.5MHz = 70.42-18.237=52.183dBuV/m<54dBuV/m ,so Pass.

7.3.8 Diagram 049



Site no. : 3m Chamber Data no. : 14  
 Dis. / Ant. : 3m 3115(0911) Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : 23°C/54% Engineer : Jamy\_Yu  
 EUT : Receiver M/N:03-00181  
 Power : DC 5V From PC  
 Test mode : Tx CH High Antenna 2

	Ant.	Cable	Amp.	Emission				
Freq.	Factor	loss	Factor	Reading	Level	Limits	Margin	Remark
(MHz)	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1 2480.560	29.49	7.58	36.60	85.19	85.66			Peak
2 2483.500	29.49	7.58	36.60	56.06	56.53	74.00	17.47	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

AV value of 2483.5MHz = 56.53-18.237=38.293dBµV/m<54dBµV/m ,so Pass.

## 8. Power Spectral Density Test

### 8.1 Test Procedure

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.

The transmitter output was connected to a spectrum analyzer. The maximum power density level was measured by spectrum analyzer with 3 kHz RBW and sweep time=span/3kHz, Detector: PK

### 8.2 Measurement Equipment

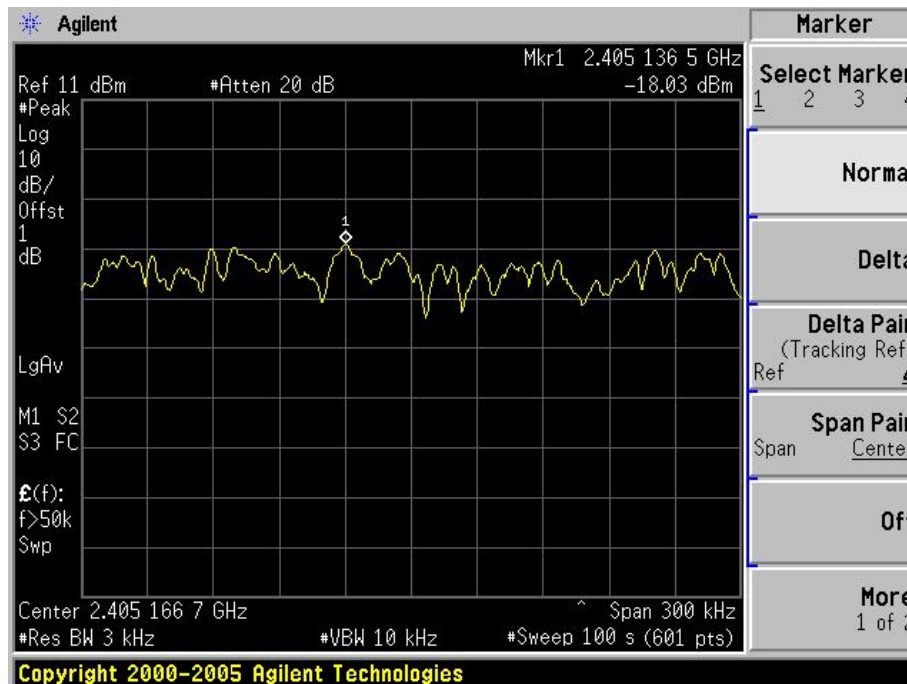
	Equipment	Last Calibration	Type	Serial No.	Manufacturer
<input checked="" type="checkbox"/>	Spectrum	May 15, 10	E4407B	MY41440292	Agilent
<input checked="" type="checkbox"/>	Amp	May 15, 10	8449B	3008A00863	HP
<input checked="" type="checkbox"/>	Antenna	Jan. 23, 10	3115	9607-4877	EMCO
<input checked="" type="checkbox"/>	HF Cable	May 15, 10	Sucoflex104	N/A	Hubersuhne

### 8.3 Test Result

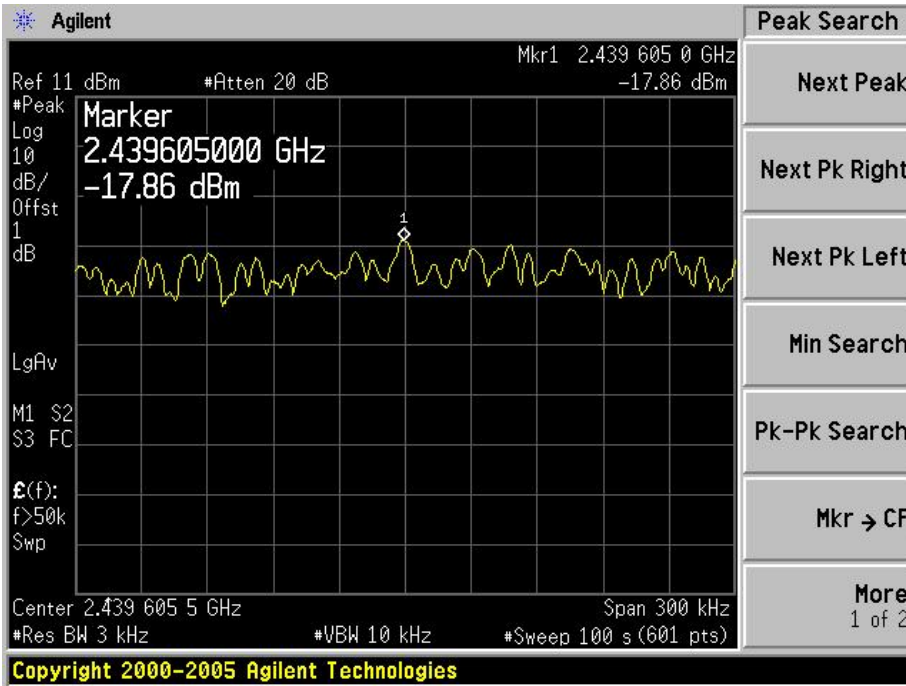
#### TM1:

Channel	Diagram	Read (dBm)	Limit(dBm)	Result
1	050	-18.03	8	Pass
2	051	-17.86	8	Pass
3	052	-19.54	8	Pass
Remark	TM1 is the worse case by pre-scan.Cable loss is 1dB and have been added into the offset.			

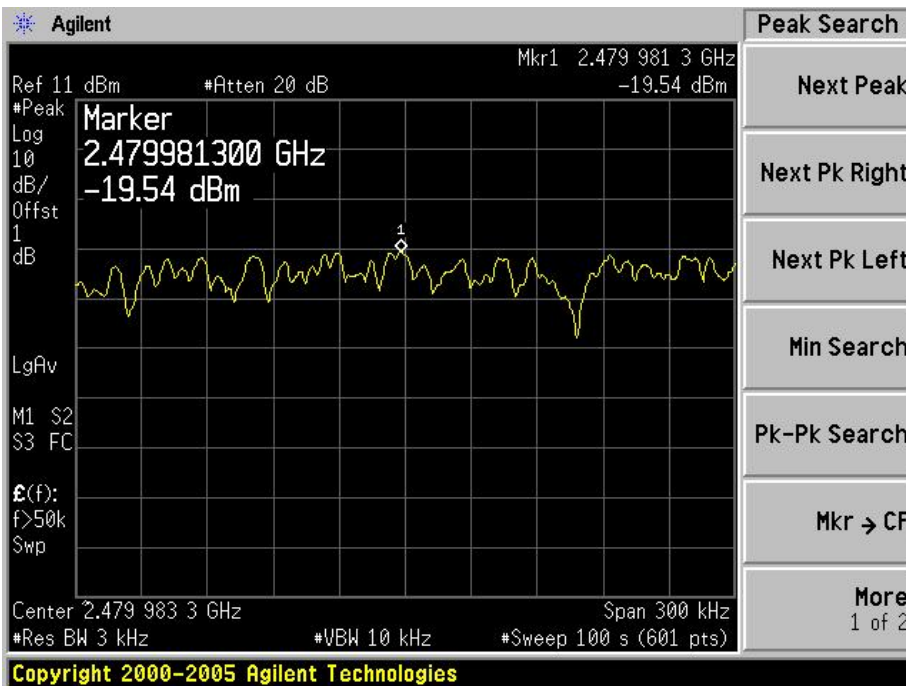
#### 8.3.1 Diagram 050



### 8.3.2 Diagram 051



### 8.3.3 Diagram 052







## 9. Output Power Test

### 9.1 Test Procedure

For systems using digital modulation in the 2400—2483.5MHz, The Peak out put power shall not exceed 1W(30dBm)

Cable loss: 1 dB(added in offset); Antenna Gain: 3.3dBi

Test channel for Antenna 1 and Antenna 2

CH1:2405MHz CH2:2440MHz CH3:2480MHz

Conducted measurement .

RBW=2MHz, VBW=2MHz, PK detector

### 9.2 Measurement Equipment

	Equipment	Last Calibration	Type	Serial No.	Manufacturer
<input checked="" type="checkbox"/>	Spectrum	May 15, 10	E4407B	MY41440292	Agilent
<input checked="" type="checkbox"/>	HF Cable	May 15, 10	Sucoflex104	N/A	Hubersuhne

### 9.3 Test Result

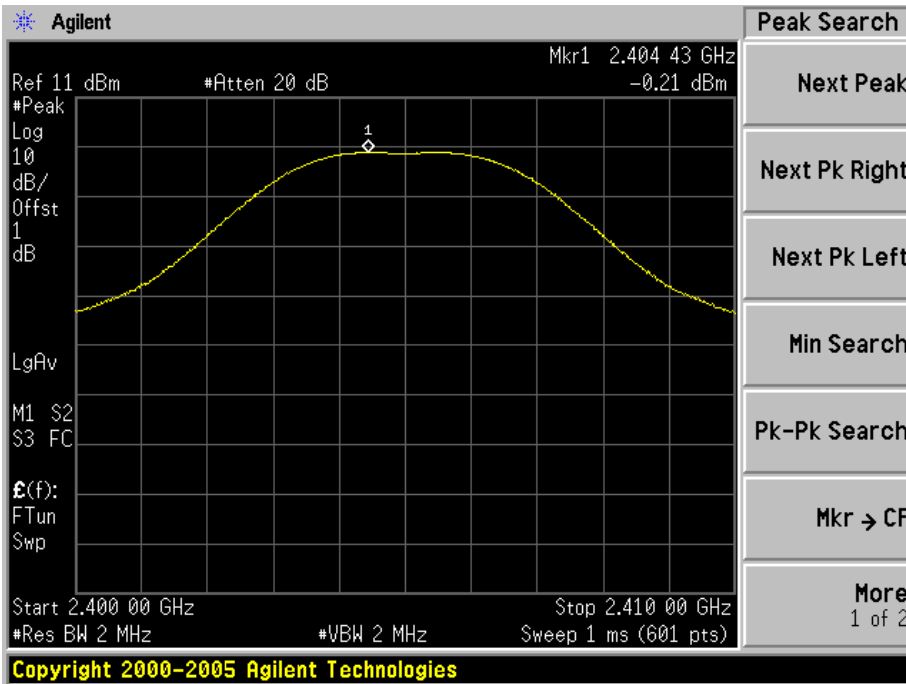
TM1:

Channel	Diagram	Output power (dBm)	Limit dBm	Result	/
1	053	-0.21	30	Pass	/
2	054	-0.43	30	Pass	/
3	055	-1.13	30	Pass	/
Channel	Output power (dBm)	Antenna gain(dBi)	EIRP (dBm)	Limit dBm	Result
1	-0.21	3.3	3.09	36	Pass
2	-0.43	3.3	2.87	36	Pass
3	-1.13	3.3	2.17	36	Pass

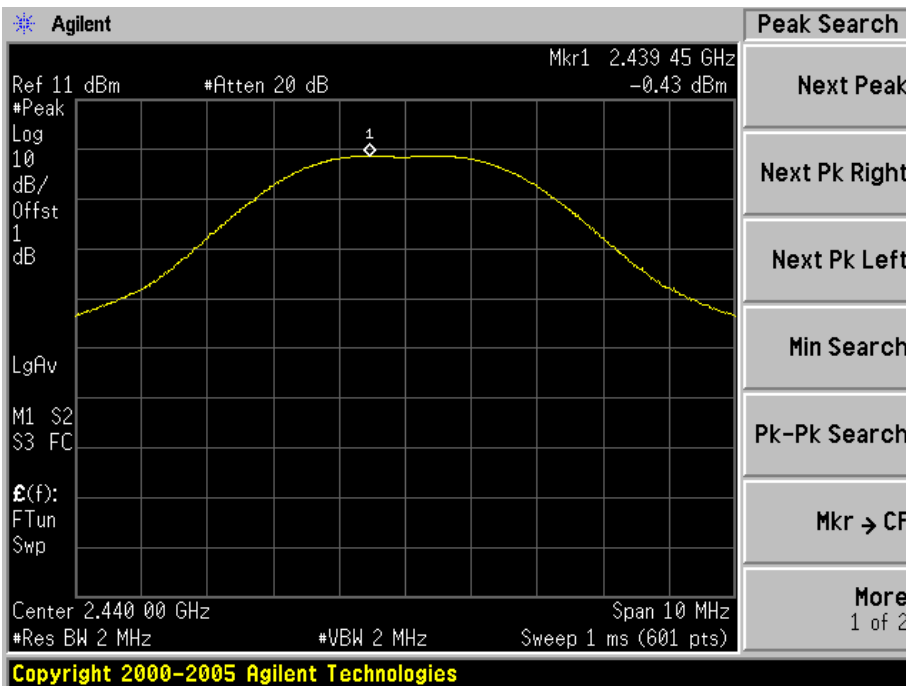
Remark : TM1 is the worse case by pre-scan.

## 9.4 Diagram

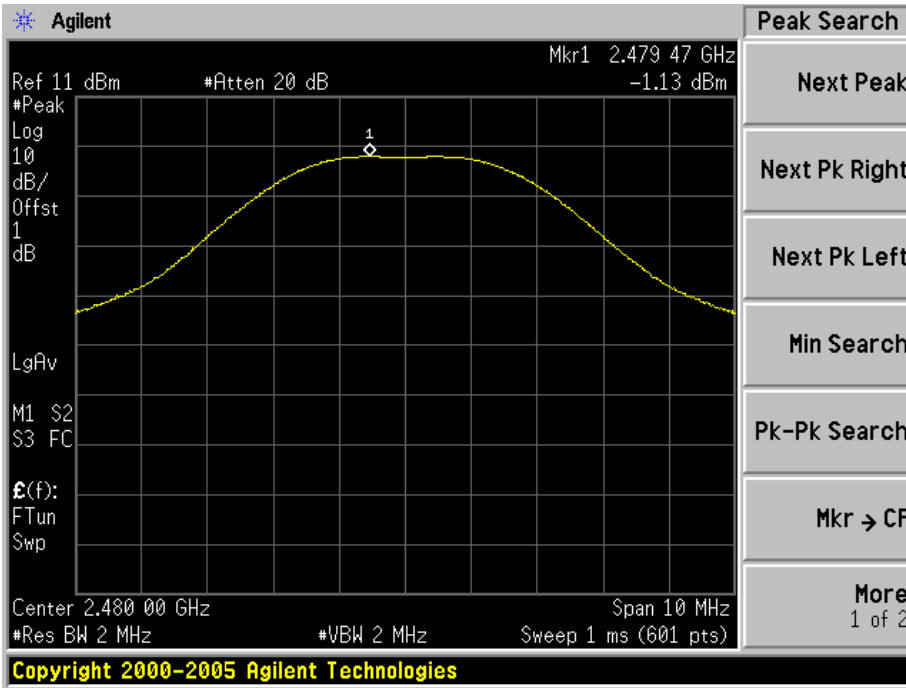
### 9.4.1 Diagram 053



### 9.4.2 Diagram 054



### 9.4.3 Diagram 055



## 10 POWER LINE CONDUCTED EMISSION TEST

### 10.1 Test Procedure

An intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50  $\mu$ H/50  $\Omega$  line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of emission (MHz)	Conducted limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50

\*-Decreases with the logarithm of the frequency.

### 10.2 Measurement Equipment

	Equipment	Last Calibration	Type	Serial No.	Manufacturer
<input checked="" type="checkbox"/>	EMI Test Receiver	10.05.2009	ESHS10	844077/020	R&S
<input checked="" type="checkbox"/>	LISN	10.05.2009	ESH2-Z5	834066/011	R&S
<input checked="" type="checkbox"/>	LISN	10.05.2009	3825/2	9006-1660	EMCO
<input checked="" type="checkbox"/>	Terminator	10.05.2009	50 $\Omega$	No.1	Hubersuhner
<input checked="" type="checkbox"/>	RF cable	09.07.2009	3D-2W	LISN Cable1#	Fujikura
<input checked="" type="checkbox"/>	Coaxial switch	09.07.2009	MP59B	M55367	Anritsu
<input checked="" type="checkbox"/>	Pulse Limiter	09.07.2009	ESH3-Z2	100340	R&S

### 10.3 Test Result

The EUT was placed on a non-metallic table, 80cm above the ground plane. The other peripheral devices power cord connected to the power mains through another line impedance stabilization network. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.4-2009 on conducted Emission test.

#### Preview measurements:

0.15 MHz to 30 MHz

Receiver settings: PK&AV detector

RBW:9 kHz

#### Final measurement:

0.15 MHz to 30 MHz

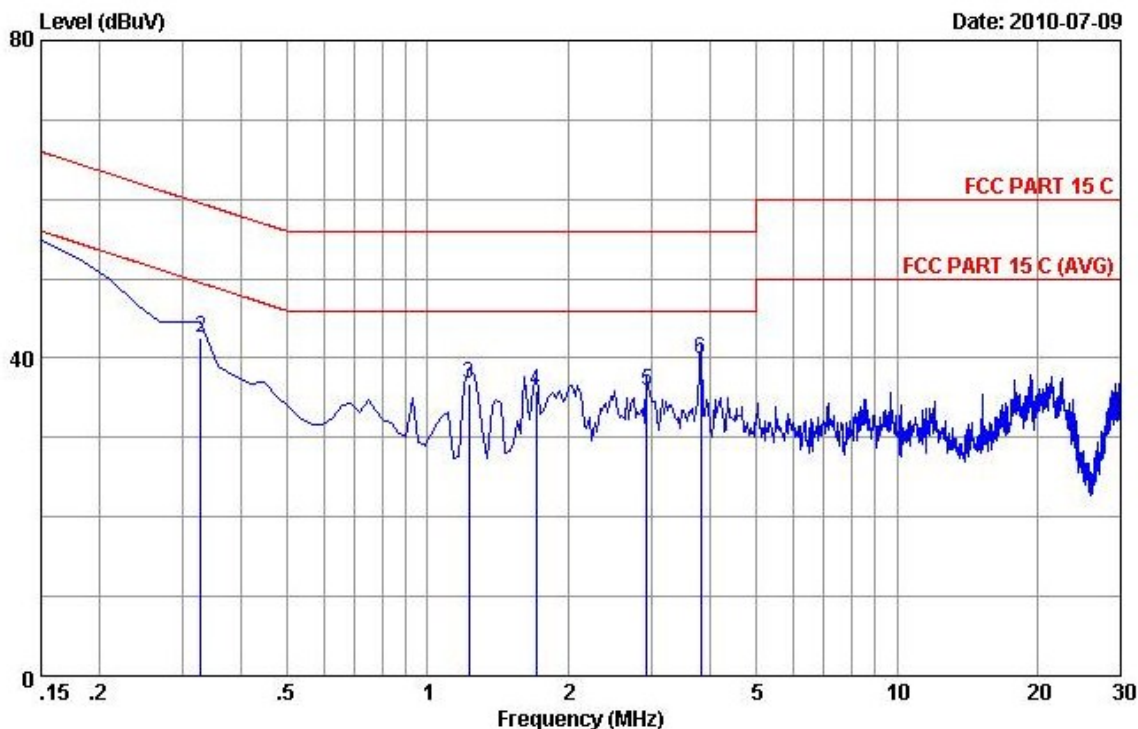
Receiver settings:QP&AV detector

Test mode	Power Line	Test Data	Test Result
TX MODE	Line	Diagram 056	Pass
	Neutral	Diagram 057	Pass

#### NOTES:

- Measurements using CISPR quasi-peak mode & average mode.
- All modes of operation were investigated and the worst -case emission are reported. See attached Plots.
- If PK value is lower than AV limit then no reading value listed in report .If QP value is Lower than AV limit ,then AV value don't listed in report.

10.3.1 Diagram 056

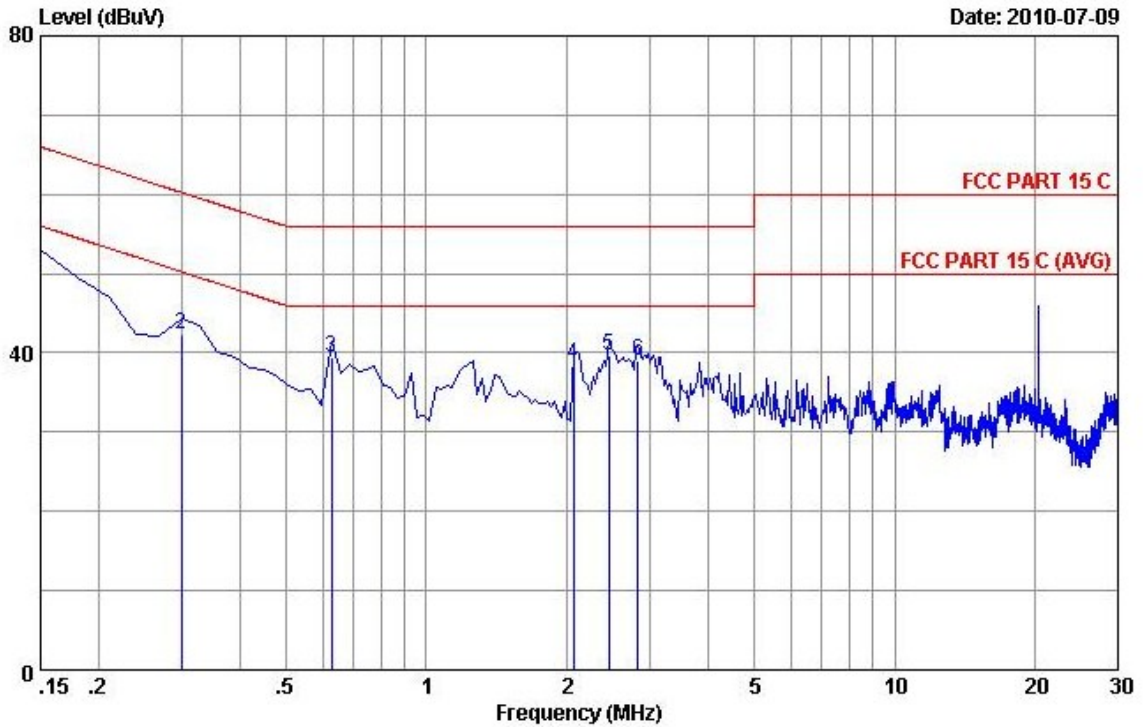


Site no :Audix No.1 Conduction Data no :2  
 Dis./Ant. :\*\* 2010 ESH2-25 LINE  
 Limit :FCC PART 15 C  
 Env./Ins. :Temp:23'C Humi:54% Engineer :Leo-Li  
 EUT :Receiver M/N:03-00181  
 Power Rating :DC 5V From PC Input AC 120V/60Hz  
 Test Mode :Tx Mode

No	Freq (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.15000	0.23	9.88	40.65	50.76	66.00	15.24	QP
2	0.32910	0.23	9.88	32.47	42.58	59.47	16.89	QP
3	1.225	0.23	9.89	26.73	36.85	56.00	19.15	QP
4	1.702	0.25	9.90	25.64	35.79	56.00	20.21	QP
5	2.926	0.26	9.93	25.65	35.84	56.00	20.16	QP
6	3.822	0.27	9.94	29.73	39.94	56.00	16.06	QP

Remarks: 1.Emission Level=LISN Factor+Cable Loss(Cable loss+pulse limiter)+Reading  
 2.If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

10.3.2 Diagram 057



Site no :Audix No.1 Conduction Data no :1  
 Dis./Ant. :\*\* 2010 ESH2-Z5 NEUTRAL  
 Limit :FCC PART 15 C  
 Env./Ins. :Temp:23'C Humi:54% Engineer :Leo-Li  
 EUT :Receiver M/N:03-00181  
 Power Rating :DC 5V From PC Input AC 120V/60Hz  
 Test Mode :Tx Mode

No	Freq (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBUV)	Emission Level (dBUV)	Limits (dBUV)	Margin (dB)	Remark
1	0.15000	0.21	9.88	40.85	50.94	66.00	15.06	QP
2	0.29925	0.21	9.88	32.24	42.33	60.26	17.93	QP
3	0.62760	0.23	9.88	29.25	39.36	56.00	16.64	QP
4	2.060	0.26	9.91	28.38	38.55	56.00	17.45	QP
5	2.448	0.26	9.92	29.54	39.72	56.00	16.28	QP
6	2.837	0.27	9.93	28.77	38.97	56.00	17.03	QP

Remarks: 1.Emission Level=LISN Factor+Cable Loss(Cable loss+pulse limiter)+Reading  
 2.If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.



FCC ID: QCISRP04

IC ID: 4302A-SRP04

Reference No.: 150934

## **11. Antenna requirement**

### **11.1 Requirement**

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.

### **10.2 Result**

The antenna used for this product is Internal Patch antenna 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 3.3dBi.





## 12.MPE

### Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

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

where: S = power density

P = power input to the antenna

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

R = distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal: ( -0.21 ) dBm

Maximum peak output power at antenna input terminal: (0.9528) mW

Antenna gain(typical): 3.3 (dBi)

Maximum antenna gain: ( 2.138 ) numeric

Time Averaging: 100 (%)

Prediction distance: 20 (cm)

Prediction frequency: ( 2405 ) MHz

MPE limit for uncontrolled exposure at prediction frequency: 1 (mW/cm<sup>2</sup>)

Power density at prediction frequency: ( 0.00040547 ) mW/cm<sup>2</sup>

Margin of compliance: ( 33.92 ) dB



FCC ID: QCISRP04  
IC ID: 4302A-SRP04  
Reference No.: 150934

## Appendix A Sample Label

### Labelling Requirements

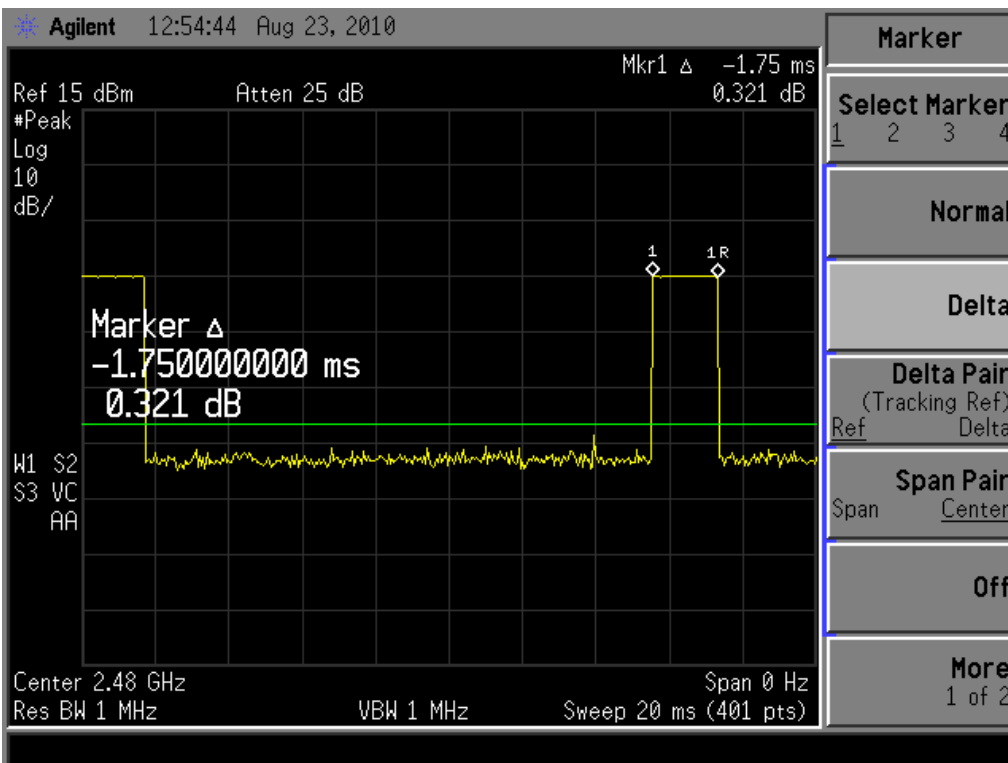
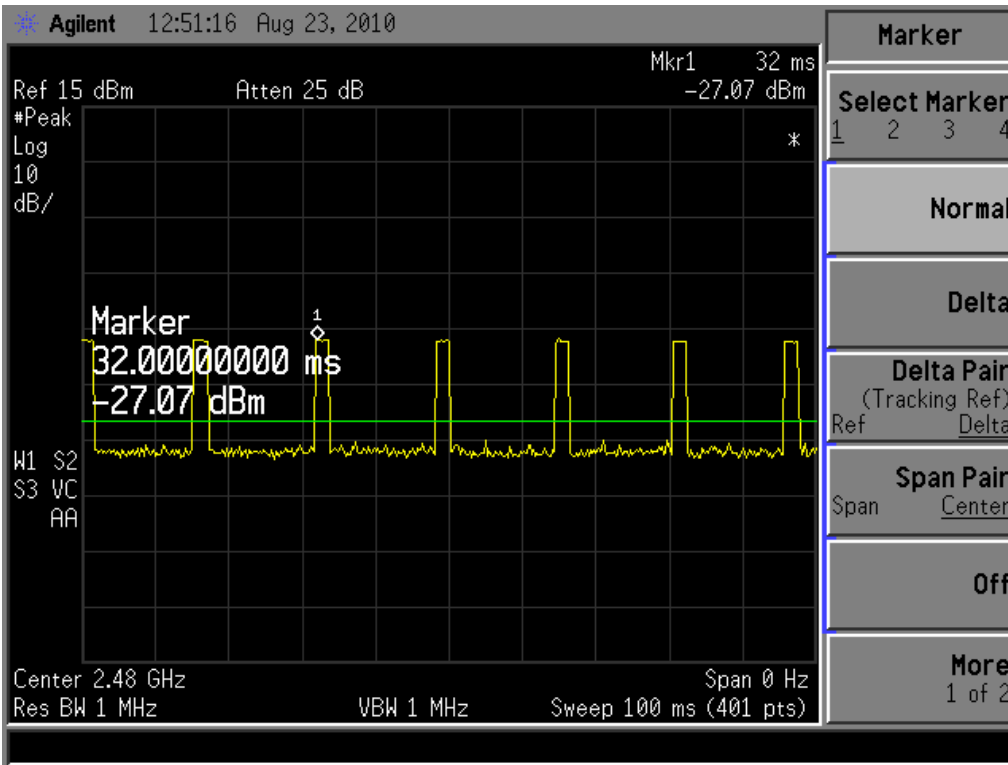
The sample label shown shall be permanently affixed at a conspicuous location on the device and be readily visible to the user at the time of purchase.

\*\*\* The following paragraph specified in the user manual.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.



### Appendix B Duty cycle



So duty cycle =  $1.75 \times 7 / 100 = 12.25\%$

END OF REPORT