FCC PART 15C TEST REPORT FOR CERTIFICATION
On Behalf of

KYE SYSTEMS CORP.

2.4GHz Wireless Receiver

Model Number: GM-120020/R

FCC ID: FSUGMZKM

Prepared for : KYE SYSTEMS CORP.
No.492, Sec.5 Chongxin Rd., Sanchong Dist., New Taiper City 2416, Taiwan (R.O.C)

Prepared By : Audix Technology (Shenzhen) Co., Ltd.
No. 6, Ke Feng Rd., 52 Block,
Shenzhen Science & Industrial Park,
Nantou, Shenzhen, Guangdong, China

Tel: (0755) 26639496

Report Number	:	ACS-F12181
Date of Test	:	Dec.25~27, 2012
Date of Report	:	Jan.09, 2013

TABLE OF CONTENTS

TEST REPORT CERTIFICATION

Applicant	:	KYE SYSTEMS CORP.
Manufacturer	:	G. tech Technology Ltd.
EUT Description	:	2.4GHz Wireless Receiver
FCC ID	:	FSUGMZKM

(A) MODEL NO. : GM-120020/R
(B) SERIAL NO. : N/A
(C) POWER SUPPLY : DC 5V
(D) TEST VOLTAGE : DC 5V From PC Input AC 120V/60Hz

Tested for comply with:
FCC Rules and Regulations Part 15 Subpart C: 2011

Test procedure used:
ANSI C63.10:2009

The device described above is tested by AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. to confirm comply with all the FCC Part 15 Subpart C requirements.

The test results are contained in this test report and AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. is assumed full responsibility for the accuracy and completeness of these tests. This report contains data that are not covered by the NVLAP accreditation. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This Report is made under FCC Part 2.1075. No modifications were required during testing to bring this product into compliance.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

Date of Test : Dec.25~ 27, 2012 Report of date: Jan.09, 2013

Prepared by : Selina Liu / Supervisor

Reviewed by : Sunny Lu / Assistant Manager

AUDIX® 信華科技 (深圳) 有限公司
Audix Technology (Shenzhen) Co., Ltd.
EMC 部門報告專用章
Stamp only for EMC Dept. Report
Signature:

Approved & Authorized Signer :

Ken Lu / Manager

1. SUMMARY OF STANDARDS AND RESULTS

1.1.Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below.

EMISSION		
Description of Test Item	**Standard**	**Results**
Power Line Conducted Emission Test	FCC Part 15C: 15.207 ANSI C63.10-2009	PASS
Radiated Emission Test	FCC Part 15C: 15.209 FCC Part 15C: 15.249 ANSI C63.10-2009	PASS
Band Edge Compliance Test	FCC Part 15: 15.249 ANSI C63.10-2009	PASS
20dB Bandwidth Test	FCC Part 15: 15.215 ANSI C63.10-2009	PASS

2. GENERAL INFORMATION

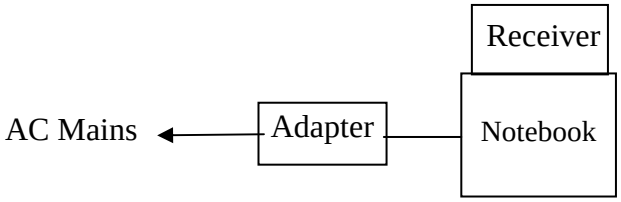
2.1.Description of Device (EUT)

Product Name	:	2.4GHz Wireless Receiver
Model Number	:	GM-120020/R
FCC ID	:	FSUGMZKM
Operation frequency	:	2402MHz-2479MHz
Antenna	:	Integrated PCB antenna, 0dBi gain
Modulation	:	GFSK
Power Supply	:	DC 5V
Applicant	:	KYE SYSTEMS CORP. No.492, Sec.5 Chongxin Rd., Sanchong Dist., New Taiper City 2416, Taiwan (R.O.C)
Manufacturer	:	G. tech Technology Ltd. No.21, Jinding Industrial Park, West Jinfeng Road, Tangjiawan Town, Xiangzhou District Zhuhai Guangdong China
Date of Test	:	Dec.25~28, 2012
Date of Receipt	:	Dec.24, 2012
Sample Type	:	Prototype production

2.2. Tested Supporting System Details

No.	Description	ACS No.	Manufacturer	Model	Serial Number	Approved type
1.	Notebook	N/A	DELL	PP09S	N/A	☑FCC DoC ☑BSMI ID: R41108
		Power Cord: Unshielded, Detachabled, 1.8m Power Adapter: Manufacturer: DELL, M/N: LA65NS1-00 Cable: Unshielded, Detachabled, 4.0m(Bond one ferrite core)				

2.3. EUT Configuration and operation conditions for test.



Notebook run test software to control EUT work in test mode

2.4.Test Facility

Site Description

Name of Firm	:	Audix Technology (Shenzhen) Co., Ltd. No. 6, Ke Feng Rd., 52 Block, Shenzhen Science & Industrial Park,Nantou, Shenzhen, Guangdong, China
3m Anechoic Chamber	:	Certificated by FCC, USA Registration Number: 90454 Valid Date: Feb.22, 2015
3m & 10m Anechoic Chamber	:	Certificated by FCC, USA Registration Number: 794232 Valid Date: Dec.31, 2015
EMC Lab.	:	Certificated by Industry Canada Registration Number: IC 5183A-1 Valid Date: Jun.13, 2014 Certificated by DAkkS, Germany Registration No: D-PL-12151-01-01 Valid Date: Feb.01, 2014 Accredited by NVLAP, USA NVLAP Code: 200372-0 Valid Date: Mar.31, 2013

2.5.Measurement Uncertainty (95% confidence levels, k=2)

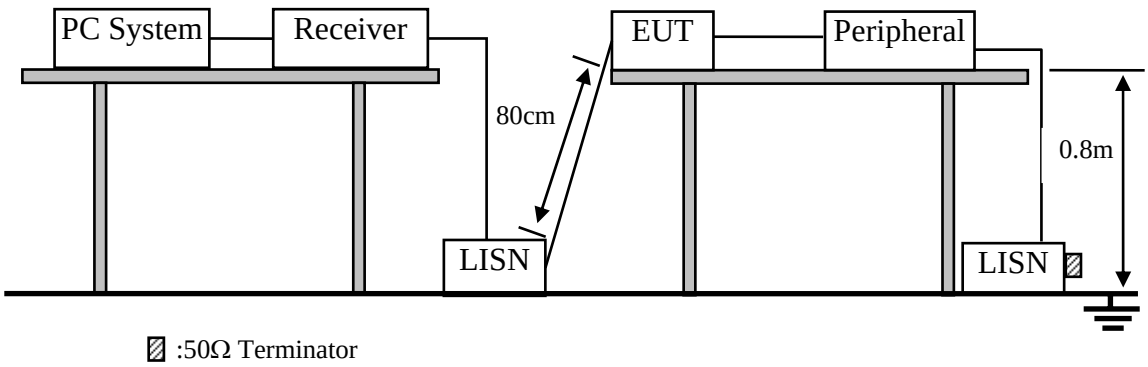
Test Item	Uncertainty
Uncertainty for Radiation Emission test in 3m chamber	3.6 dB(30~200MHz, Polarize: H)
	3.8 dB(30~200MHz, Polarize: V)
	4.2 dB(200M~1GHz, Polarize: H)
	3.8 dB(200M~1GHz, Polarize: V)
Uncertainty for Radiated Spurious Emission test in RF chamber	3.57dB
Uncertainty for Conduction Spurious emission test	2.00 dB
Uncertainty for Output power test	0.73 dB
Uncertainty for Power density test	2.00 dB
Uncertainty for Frequency range test	$7x10^{-8}$
Uncertainty for Bandwidth test	83 kHz
Uncertainty for DC power test	0.038 %
Uncertainty for test site temperature and humidity	0.6℃
	3%

3. POWER LINE CONDUCTED EMISSION TEST

3.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESHS10	838693/001	Oct.31, 12	1 Year
2.	L.I.S.N.#1	Rohde & Schwarz	ESH2-Z5	834066/011	Oct.31, 12	1 Year
3.	L.I.S.N.#3	Kyoritsu	KNW-242C	8-1920-1	May.08, 12	1 Year
4.	Terminator	Hubersuhner	50Ω	No. 1	May.08, 12	1 Year
5.	Terminator	Hubersuhner	50Ω	No. 2	May.08, 12	1 Year
6.	RF Cable	Fujikura	3D-2W	No.1	May.08, 12	1Year
7.	Coaxial Switch	Anritsu	MP59B	M50564	May.08, 12	1 Year
8.	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100341	May.08, 12	1 Year

3.2.Block Diagram of Test Setup



▨ :50Ω Terminator

3.3.Power Line Conducted Emission Test Limits

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. * Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

3.4.Configuration of EUT on Test

The following equipment are installed on Power Line Conducted Emission Test to meet the commission requirement and operating regulations in a manner which tends to maximize its emission characteristics in a normal application.

3.4.1.2.4GHz Wireless Receiver (EUT)

Model Number : GM-120020/R

Serial Number : N/A

3.5. Operating Condition of EUT

3.5.1.Setup the EUT and simulator as shown as Section 3.2.
3.5.2.Turn on the power of all equipment.
3.5.3.Let the EUT work in test mode (TX Mode) and measure it.

3.6.Test Procedure

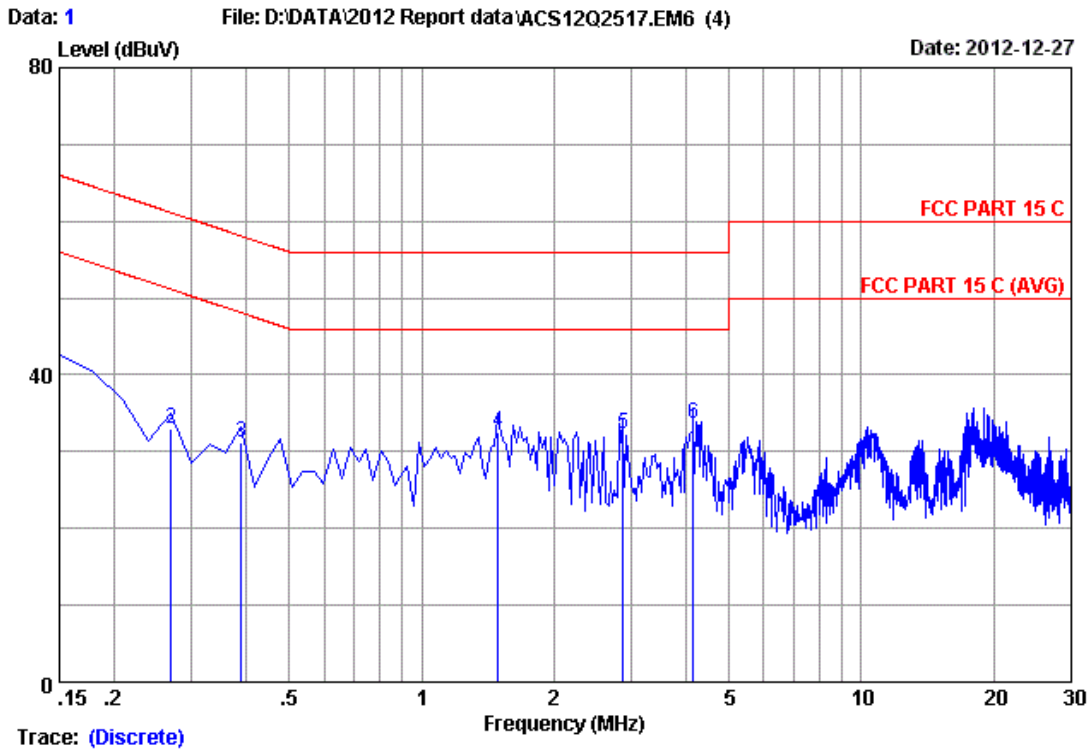
The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT Power connected to the power mains through a line impedance stabilization network (L.I.S.N. #1). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N.#3). this provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). Both sides of power line were checked for maximum conducted interference. 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.

The bandwidth of test receiver (R&S TEST RECEIVER ESHS10) is set at 9kHz.

The frequency range from 150kHz to 30MHz is checked. The test result are reported on Section 3.7.

3.7. Conducted Disturbance at Mains Terminals Test Results

PASS. (All emissions not reported below are too low against the prescribed limits.)

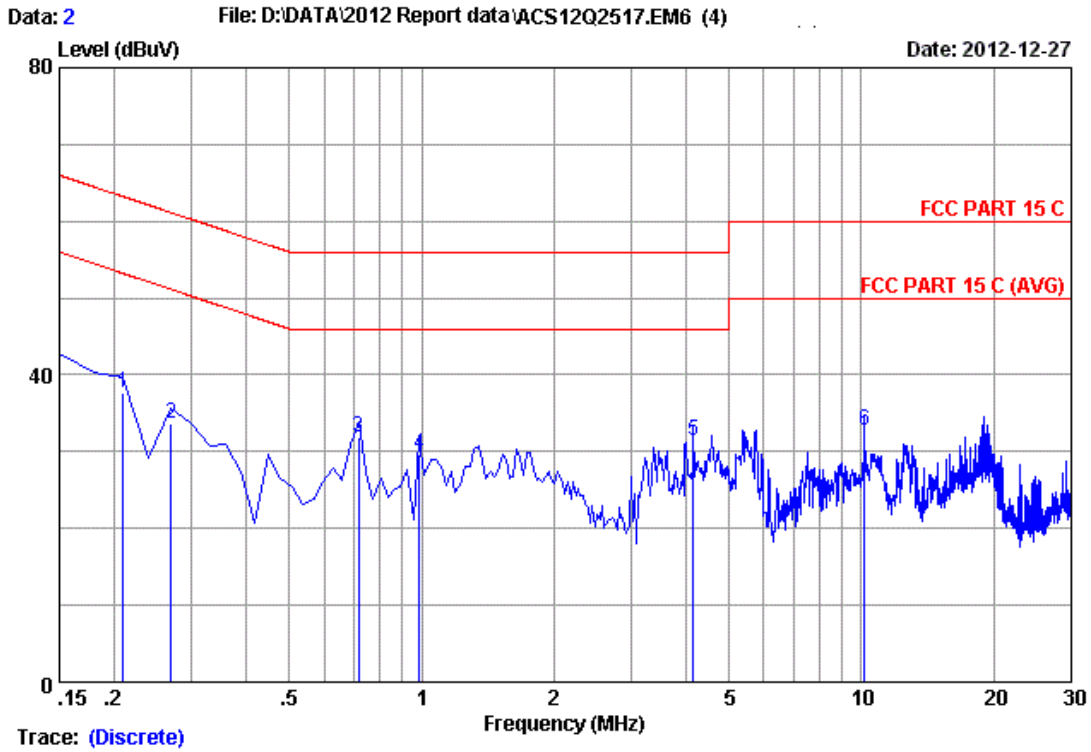


Trace: (Discrete)

Site no :1#conduction Data No :1
Dis./Ant. :** 2012 ESH2-Z5 LINE
Limit :FCC PART 15 C
Env./Ins. :22.4*C/47% Engineer :Leo-Li
EUT :2.4GHz Wireless Receiver
Power Rating :DC 5V From PC Input AC 120V/60Hz
Test Mode :Tx Mode
:M/N:GM-120020/R

No	Freq (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.15000	0.19	9.94	30.42	40.55	66.00	25.45	QP
2	0.26940	0.19	9.95	22.86	33.00	61.14	28.14	QP
3	0.38880	0.19	9.95	20.99	31.13	58.09	26.96	QP
4	1.493	0.22	9.94	22.32	32.48	56.00	23.52	QP
5	2.866	0.26	9.94	22.11	32.31	56.00	23.69	QP
6	4.150	0.29	9.94	23.37	33.60	56.00	22.40	QP

Remarks: 1.Emission Level=LISN Factor+Cable Loss(Include 10dB pulse limit)
+Reading.
2.If the average limit is met when useing a quasi-peak detector.
the EUT shall be deemed to meet both limits and measurement
with average detector is unnecessary.



Trace: (Discrete)

Site no :1#conduction Data No :2
Dis./Ant. :** 2012 ESH2-Z5 NEUTRAL
Limit :FCC PART 15 C
Env./Ins. :22.4*C/47% Engineer :Leo-Li
EUT :2.4GHz Wireless Receiver
Power Rating :DC 5V From PC Input AC 120V/60Hz
Test Mode :Tx Mode
:M/N:GM-120020/R

No	Freq (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.20970	0.21	9.95	27.58	37.74	63.22	25.48	QP
2	0.26940	0.22	9.95	23.40	33.57	61.14	27.57	QP
3	0.71715	0.24	9.95	21.74	31.93	56.00	24.07	QP
4	0.98580	0.24	9.94	19.38	29.56	56.00	26.44	QP
5	4.150	0.33	9.94	21.19	31.46	56.00	24.54	QP
6	10.150	0.44	9.97	22.33	32.74	60.00	27.26	QP

Remarks: 1.Emission Level=LISN Factor+Cable Loss(Include 10dB pulse limit)
+Reading.
2.If the average limit is met when useing a quasi-peak detector.
the EUT shall be deemed to meet both limits and measurement
with average detector is unnecessary.

4. RADIATED EMISSION TEST

4.1.Test Equipment

Frequency rang: 30~1000MHz

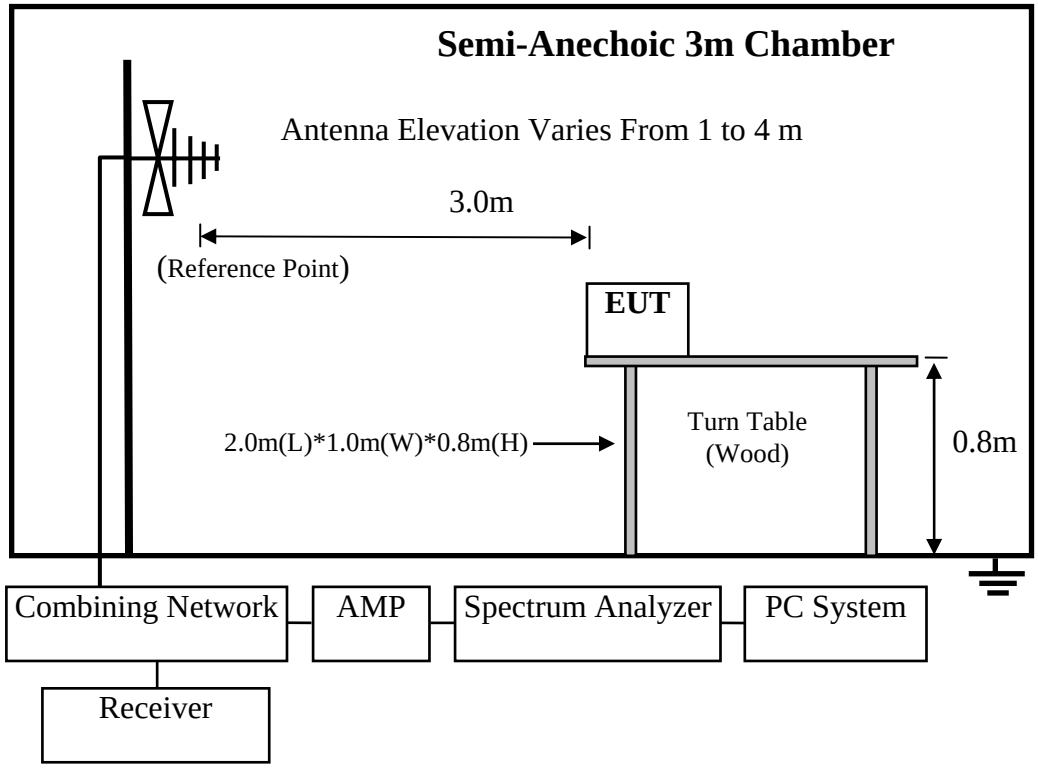
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	3#Chamber	AUDIX	N/A	N/A	Nov.24,12	1 Year
2	EMI Spectrum	Agilent	E4407B	MY41440292	May.08, 12	1 Year
3	Test Receiver	Rohde & Schwarz	ESVS10	834468/011	May.08, 12	1 Year
4	Amplifier	HP	8447D	2648A04738	May.08, 12	1 Year
5	Bilog Antenna	Schaffner	CBL6111C	2598	Dec.26, 10	2.0 Year
6	RF Cable	MIYAZAKI	CFD400-NL	3# Chamber No.1	May.08, 12	1 Year
7	Coaxial Switch	Anritsu	MP59B	M74389	May.08, 12	1 Year

Frequency rang: above 1000MHz

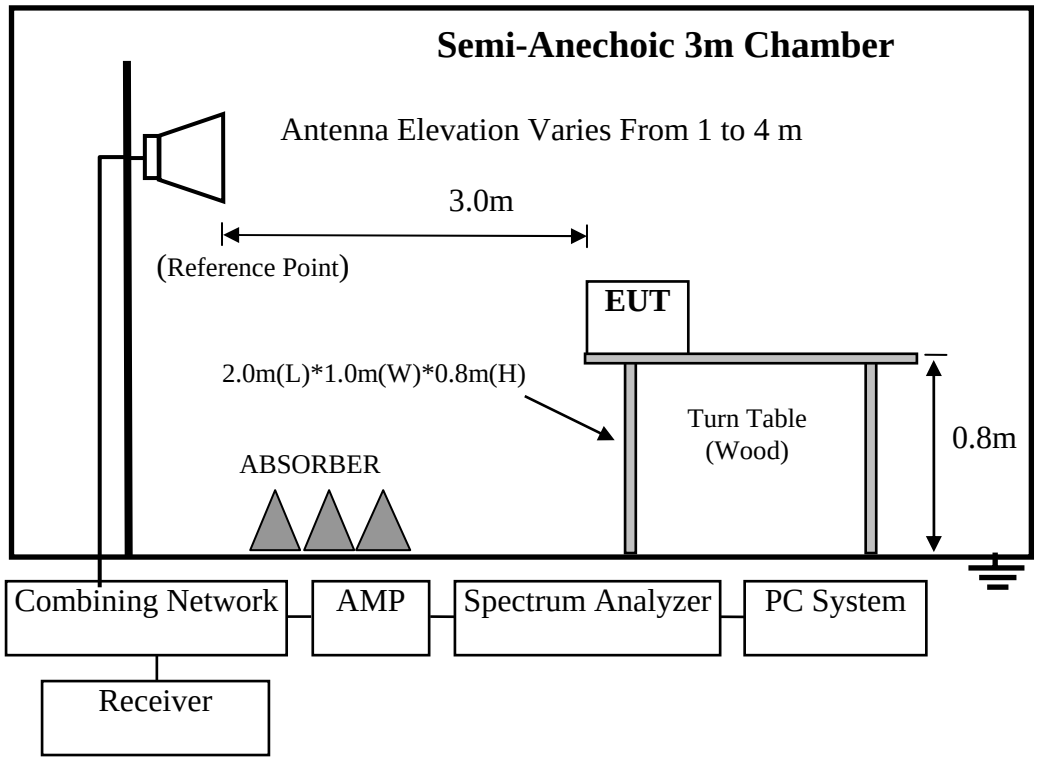
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum Analyzer	Agilent	E4407B	MY41440292	May.08, 12	1 Year
2	Horn Antenna	EMCO	3115	9510-4580	June.05, 12	1 Year
3	Amplifier	Agilent	8449B	3008A00863	May.08, 12	1 Year
4	RF Cable	Hubersuhner	SUCOFLEX106	77980/6	May.08, 12	1 Year
5	RF Cable	Hubersuhner	SUCOFLEX106	77977/6	May.08, 12	1 Year

4.2.Block Diagram of Test Setup

For frequency range 30MHz-1000MHz



For frequency range above 1GHz



4.3. Radiated Emission Limit Standard: FCC 15.209 and 15.249

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000MHz	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	
Field Strength of fundamental emissions for 2.4GHz-2.4835GHz	3	114.0 dB(μV)/m (Peak) 94.0 dB(μV)/m (Average)	

Remark： (1) Emission level dBμV = 20 log Emission level μV/m

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

(4) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

4.4.EUT Configuration on Test

The following equipment are installed on Radiated Emission Test to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

4.5.Operating Condition of EUT

4.5.1.Setup the EUT and simulator as shown as Section 4.2.
4.5.2.Turned on the power of all equipment.
4.5.3.Let EUT work in Tx mode.

4.6.Test Procedure

The EUT and its simulators are placed on a turn table, which is 0.8 meter high above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on Test. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.10-2009 on radiated emission Test.

During the pretest the EUT was rotated through three orthogonal axes to determine the attitude that maximizes the emissions.

After that the EUT was manually handled to find the orientation that has the maximum emission, which is the orientation show in the test setup photos.

The bandwidth of the EMI test receiver (R&S ESVS10) is set at 120kHz for frequency range from 30MHz to 1000 MHz.

The bandwidth of the Spectrum's RBW is set at 1MHz and VBW is set at 3MHz for peak emissions measurement above 1GHz

This device is pulse modulated, a duty cycle factor was used to calculate average level based measured peak level.

The frequency range from 30MHz to 10th harmonic (25GHz) are checked. and no any emissions were found from 18GHz to 25 GHz, So the radiated emissions from 18GHz to 25GHz were not record.

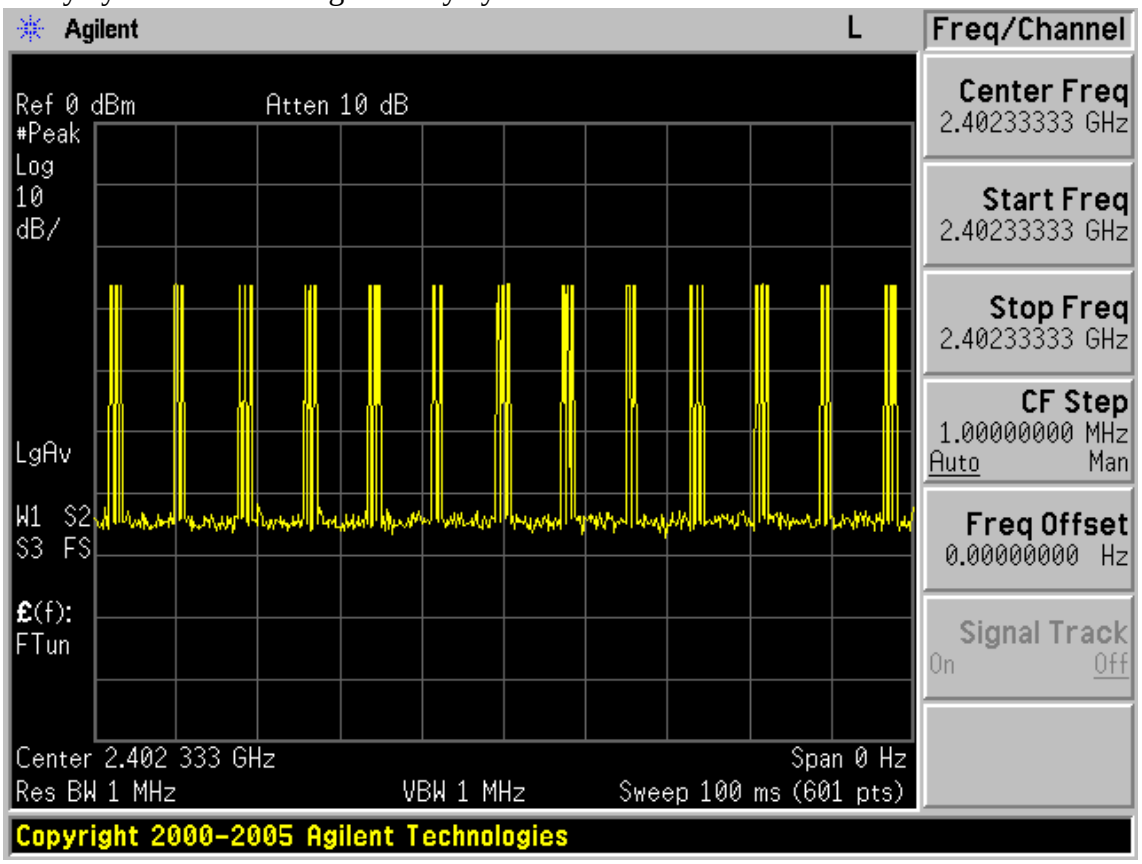
4.7.Radiated Emission Test Results

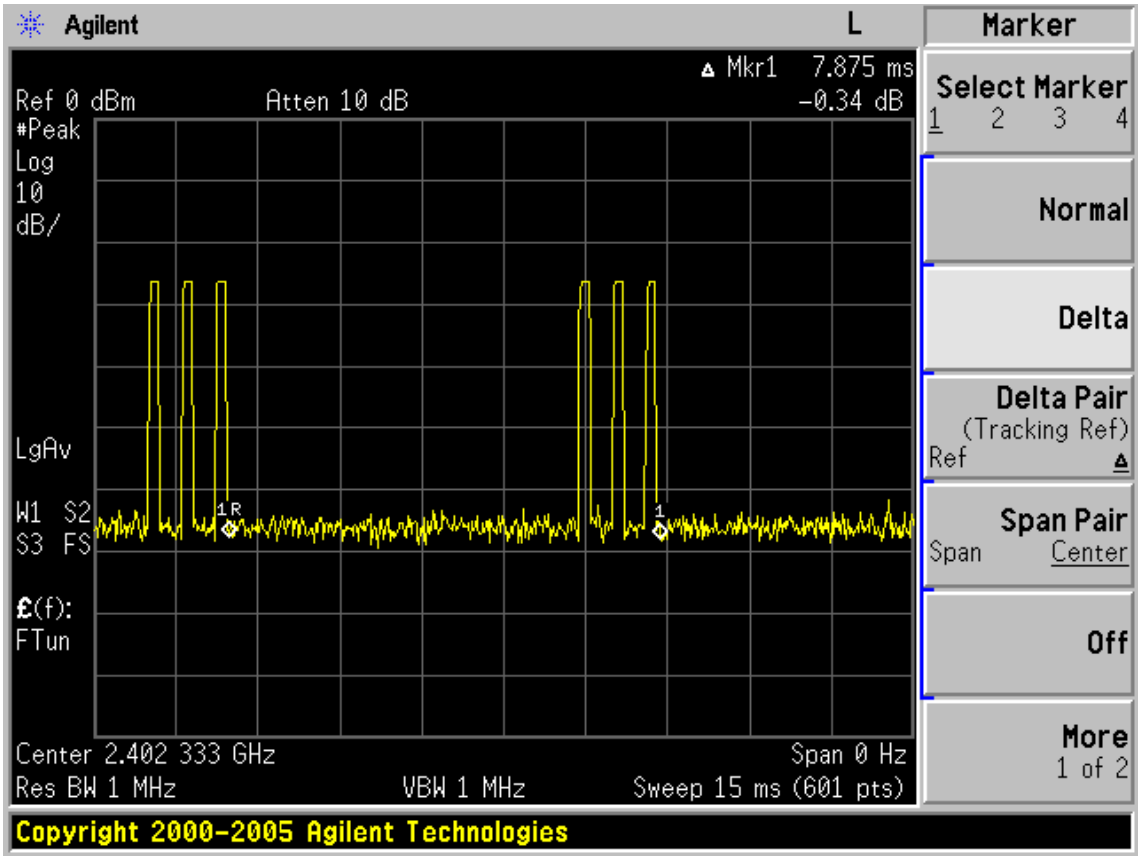
PASS.

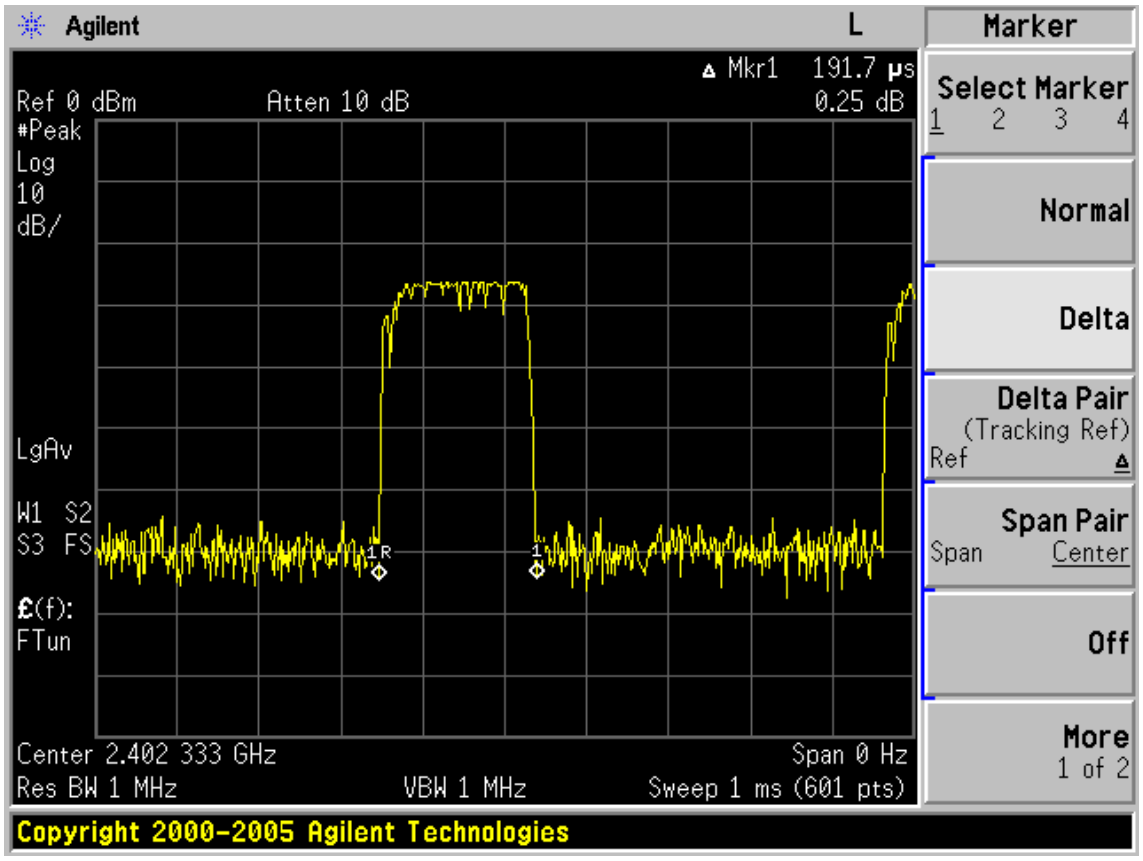
All the emissions from 30MHz to 25GHz were comply with the 15.209 Limit.

Note: The duty cycle factor for calculate average level is22.73dB, and average limit is 20dB below peak limit, so if peak measured level comply with peak limit, the average level was deemed to comply with average limit.

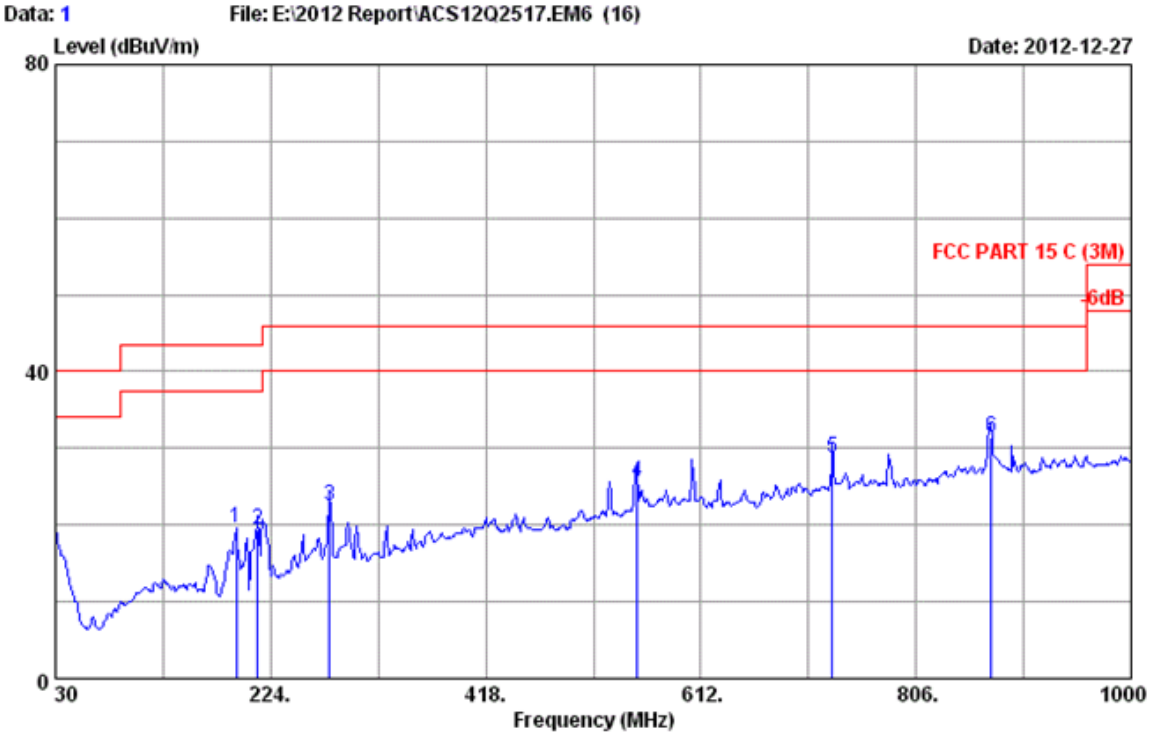
Duty cycle: 0.1917ms*3times /7.875ms *100% = 7.3%
Duty cycle factor = 20log（1/duty cycle）= 22.73dB






Agilent
L
Marker
Mkr1 191.7 µs
0.25 dB
Ref 0 dBm
Atten 10 dB
#Peak
Log
10
dB/
LgAv
W1 S2
S3 FS
£(f):
FTun
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref
Span Pair
Span Center
Off
More
1 of 2
Center 2.402 333 GHz
Span 0 Hz
Res BW 1 MHz
VBW 1 MHz
Sweep 1 ms (601 pts)
Copyright 2000-2005 Agilent Technologies

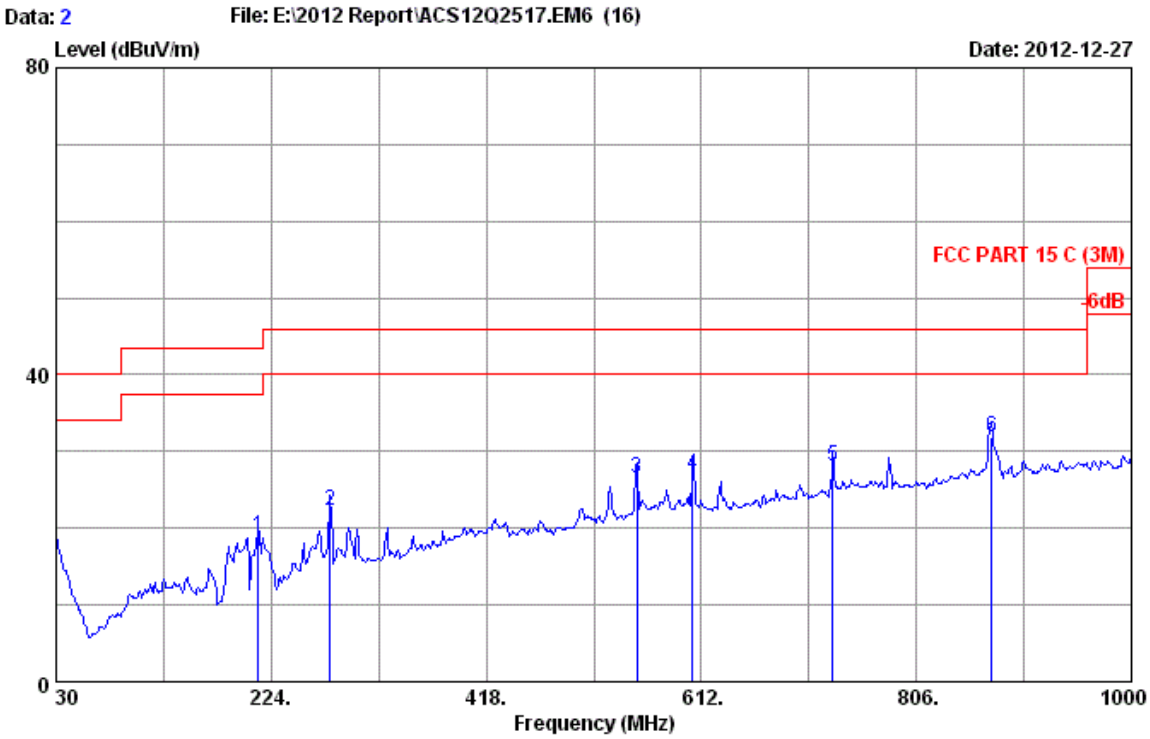
Frequency: 30MHz~1GHz




```
Site no.      : 3m Chamber                    Data no.   : 1
Dis. / Ant.   : 3m   2012 CBL6111C 2598       Ant. pol.  : HORIZONTAL
Limit         : FCC PART 15 C (3M)
Env. / Ins.   : 24*C/56%                      Engineer   : Leo_Li
EUT           : 2.4GHz Wireless Receiver
Power rating  : DC 5V From PC Input AC 120V/60Hz
Test Mode     : Tx Mode
                M/N:GM-120020/R
```

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	192.960	8.90	1.04	9.68	19.62	43.50	23.88	QP
2	212.360	9.77	1.09	8.42	19.28	43.50	24.22	QP
3	277.350	13.21	1.23	8.18	22.62	46.00	23.38	QP
4	554.770	19.38	1.99	4.35	25.72	46.00	20.28	QP
5	730.340	21.80	2.50	4.48	28.78	46.00	17.22	QP
6	873.900	23.41	2.78	5.16	31.35	46.00	14.65	QP

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

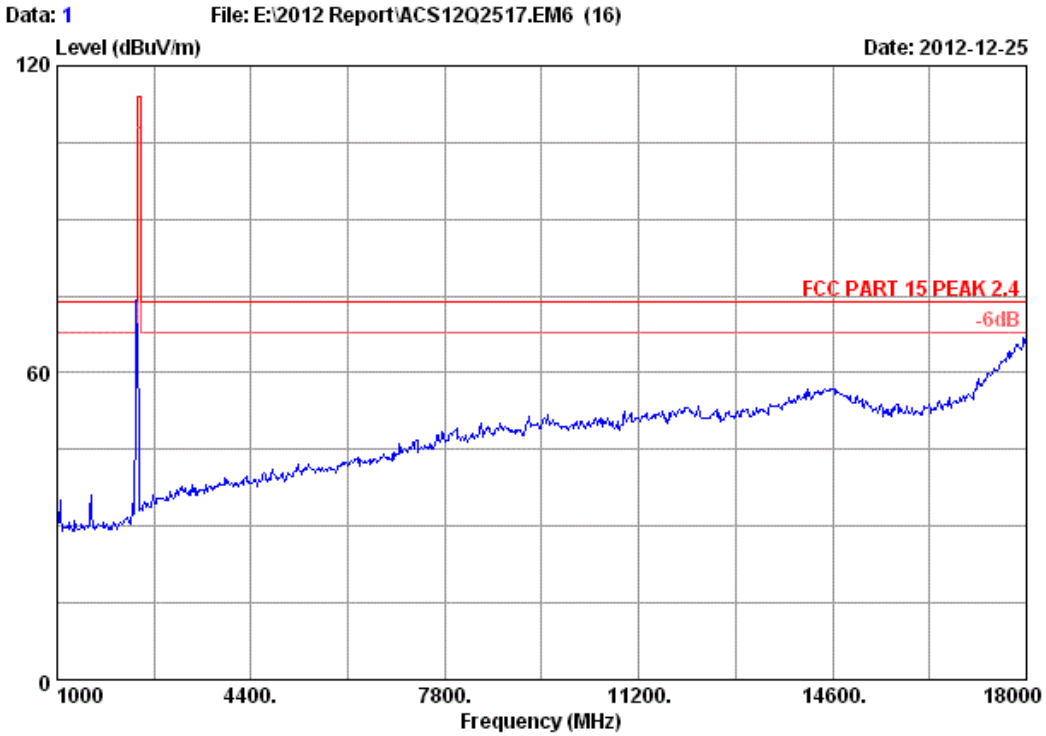


Site no. : 3m Chamber Data no. : 2
Dis. / Ant. : 3m 2012 CBL6111C 2598 Ant. pol. : VERTICAL
Limit : FCC PART 15 C (3M)
Env. / Ins. : 24*C/56% Engineer : Leo_Li
EUT : 2.4GHz Wireless Receiver
Power rating : DC 5V From PC Input AC 120V/60Hz
Test Mode : Tx Mode
M/N:GM-120020/R

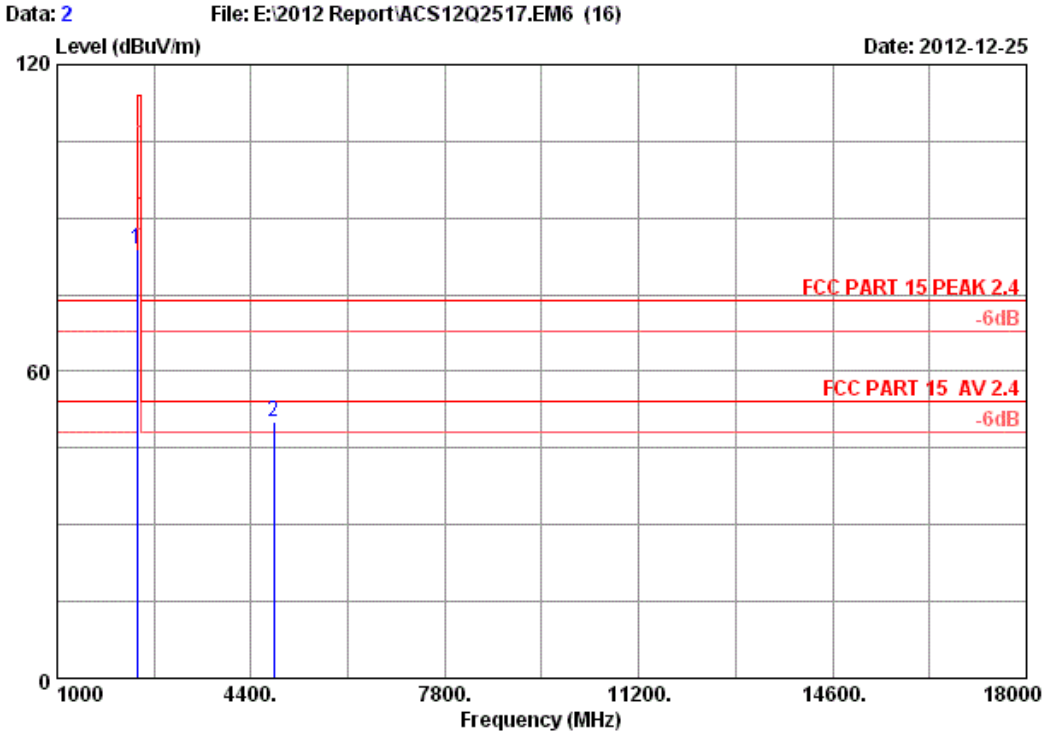
No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	212.360	9.77	1.09	7.98	18.84	43.50	24.66	QP
2	277.350	13.21	1.23	7.91	22.35	46.00	23.65	QP
3	553.800	19.35	1.99	5.25	26.59	46.00	19.41	QP
4	604.240	20.27	2.13	4.64	27.04	46.00	18.96	QP
5	730.340	21.80	2.50	3.83	28.13	46.00	17.87	QP
6	873.900	23.41	2.78	5.75	31.94	46.00	14.06	QP

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

Frequency: 1GHz~18GHz



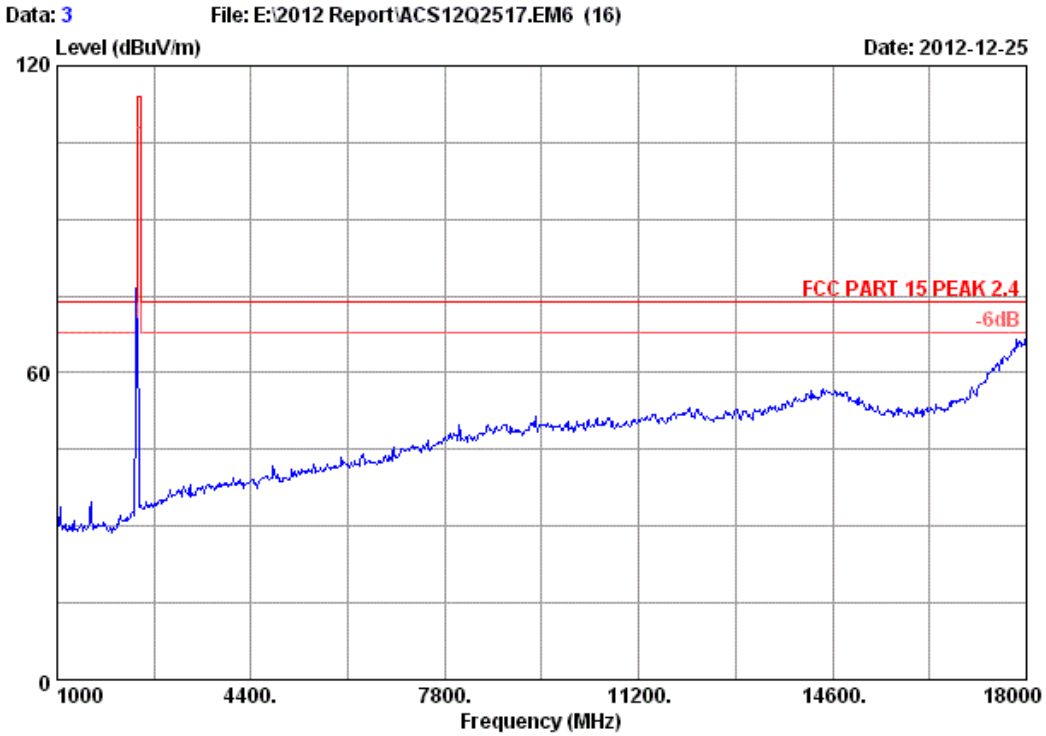
Site no.	: 3m Chamber	Data no.	: 1
Dis. / Ant.	: 3m 2012 3115 (4580)	Ant. pol.	: VERTICAL
Limit	: FCC PART 15 PEAK 2.4		
Env. / Ins.	: 23*C/54%	Engineer	: Leo-Li
EUT	: 2.4GHz Wireless Receiver		
Power supply	: DC 5V From PC Input AC 120V/60Hz		
Test mode	: GFSK 2402MHz Tx Mode		
M/N	: GM-120020/R		
	:		



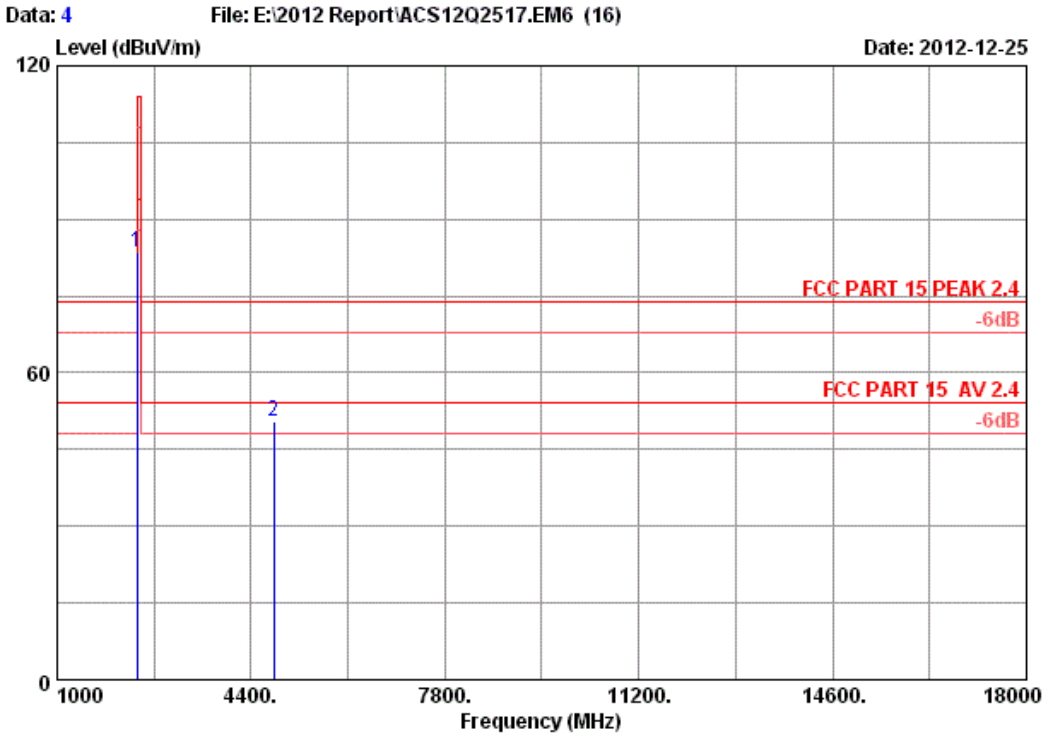
Site no. : 3m Chamber Data no. : 2
Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : VERTICAL
Limit : FCC PART 15 PEAK 2.4
Env. / Ins. : 23*C/54% Engineer : Leo-Li
EUT : 2.4GHz Wireless Receiver
Power supply : DC 5V From PC Input AC 120V/60Hz
Test mode : GFSK 2402MHz Tx Mode
M/N : GM-120020/R
:

	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	2402.000	26.77	6.02	35.92	86.91	83.78	114.00	30.22	Peak
2	4804.000	32.47	8.67	35.72	44.75	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.



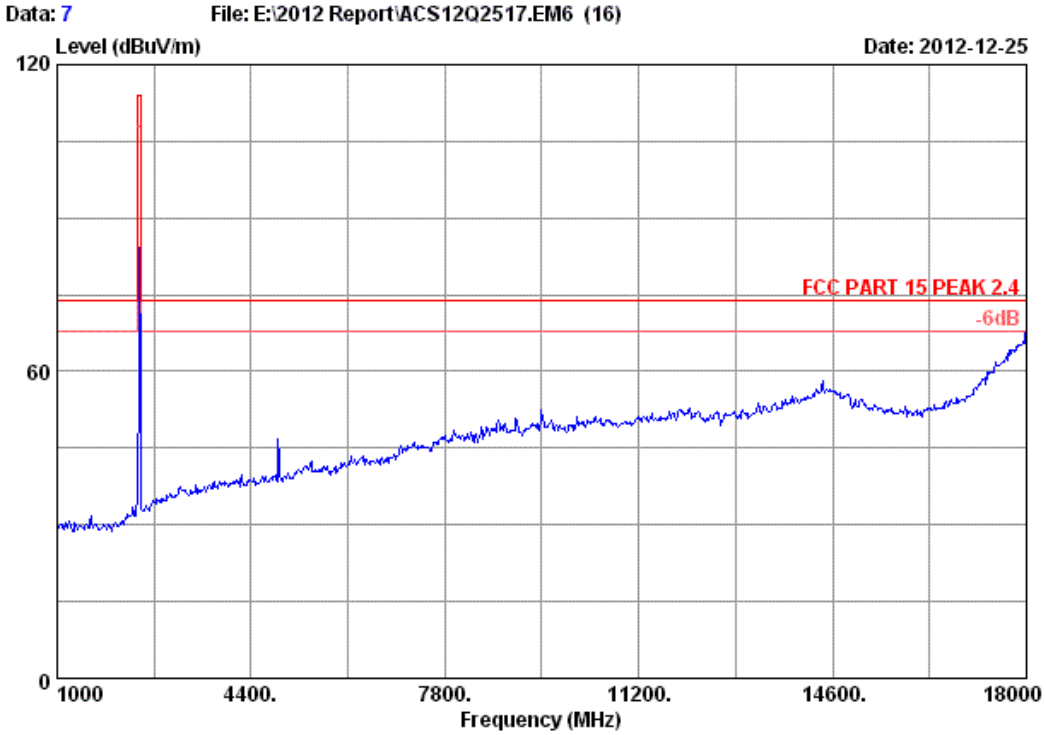
Site no.	: 3m Chamber	Data no.	: 3
Dis. / Ant.	: 3m 2012 3115 (4580)	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15 PEAK 2.4		
Env. / Ins.	: 23*C/54%	Engineer	: Leo-Li
EUT	: 2.4GHz Wireless Receiver		
Power supply	: DC 5V From PC Input AC 120V/60Hz		
Test mode	: GFSK 2402MHz Tx Mode		
M/N	: GM-120020/R		
	:		



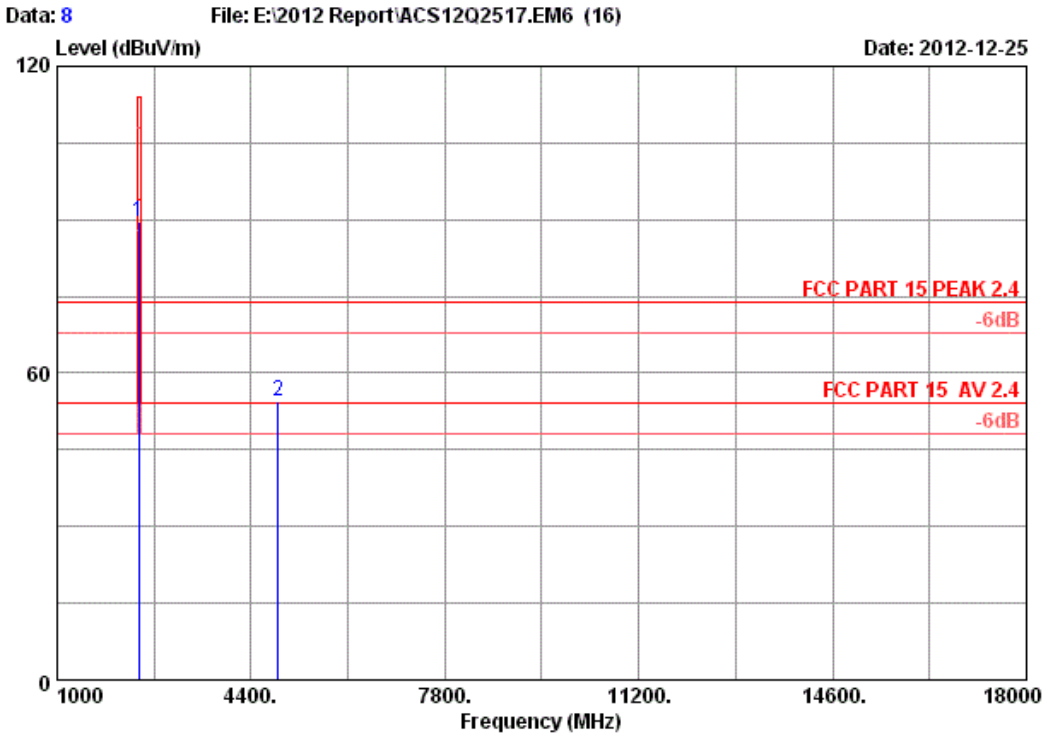
Site no. : 3m Chamber Data no. : 4
Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : HORIZONTAL
Limit : FCC PART 15 PEAK 2.4
Env. / Ins. : 23*C/54% Engineer : Leo-Li
EUT : 2.4GHz Wireless Receiver
Power supply : DC 5V From PC Input AC 120V/60Hz
Test mode : GFSK 2402MHz Tx Mode
M/N : GM-120020/R
:

	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	2402.000	26.77	6.02	35.92	86.80	83.67	114.00	30.33	Peak
2	4804.000	32.47	8.67	35.72	44.99	50.41	74.00	23.59	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.




```
Site no.      : 3m Chamber                Data no.   : 7
Dis. / Ant.   : 3m   2012 3115 (4580)     Ant. pol.  : HORIZONTAL
Limit         : FCC PART 15 PEAK 2.4
Env. / Ins.   : 23*C/54%                  Engineer   : Leo-Li
EUT           : 2.4GHz Wireless Receiver
Power supply  : DC 5V From PC Input AC 120V/60Hz
Test mode     : GFSK 2439MHz Tx Mode
M/N           : GM-120020/R
              :
```

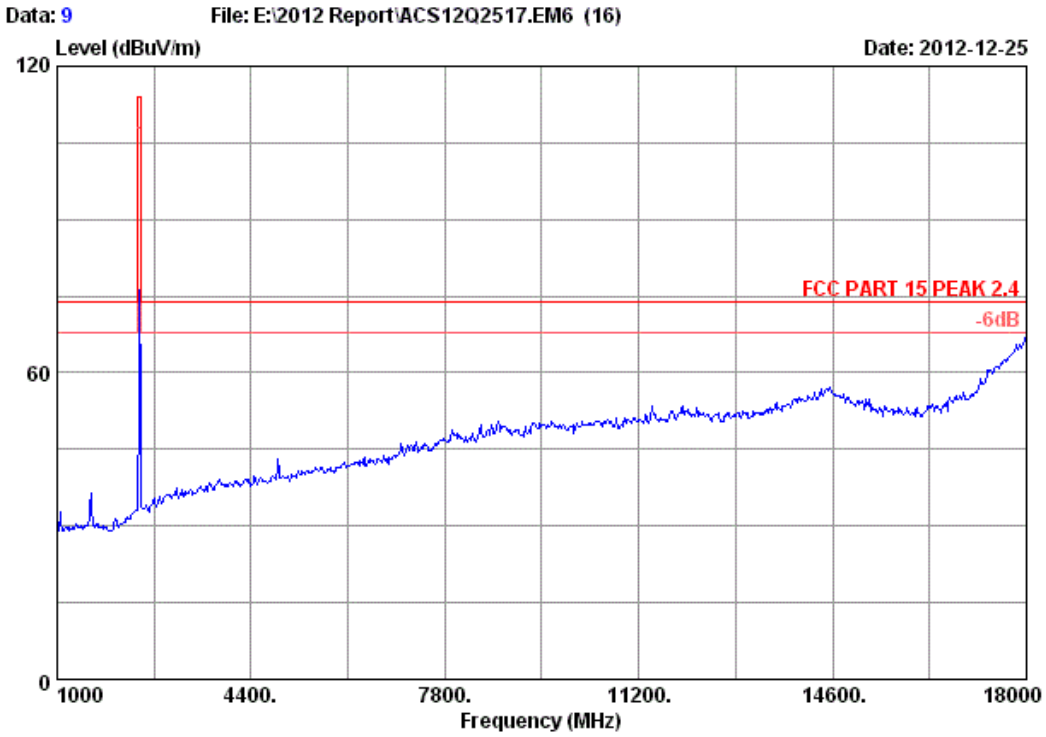



```
Site no.      : 3m Chamber                Data no.   : 8
Dis. / Ant.   : 3m   2012 3115 (4580)     Ant. pol.  : HORIZONTAL
Limit         : FCC PART 15 PEAK 2.4
Env. / Ins.   : 23*C/54%                  Engineer   : Leo-Li
EUT           : 2.4GHz Wireless Receiver
Power supply  : DC 5V From PC Input AC 120V/60Hz
Test mode     : GFSK 2439MHz Tx Mode
M/N           : GM-120020/R
              :
```

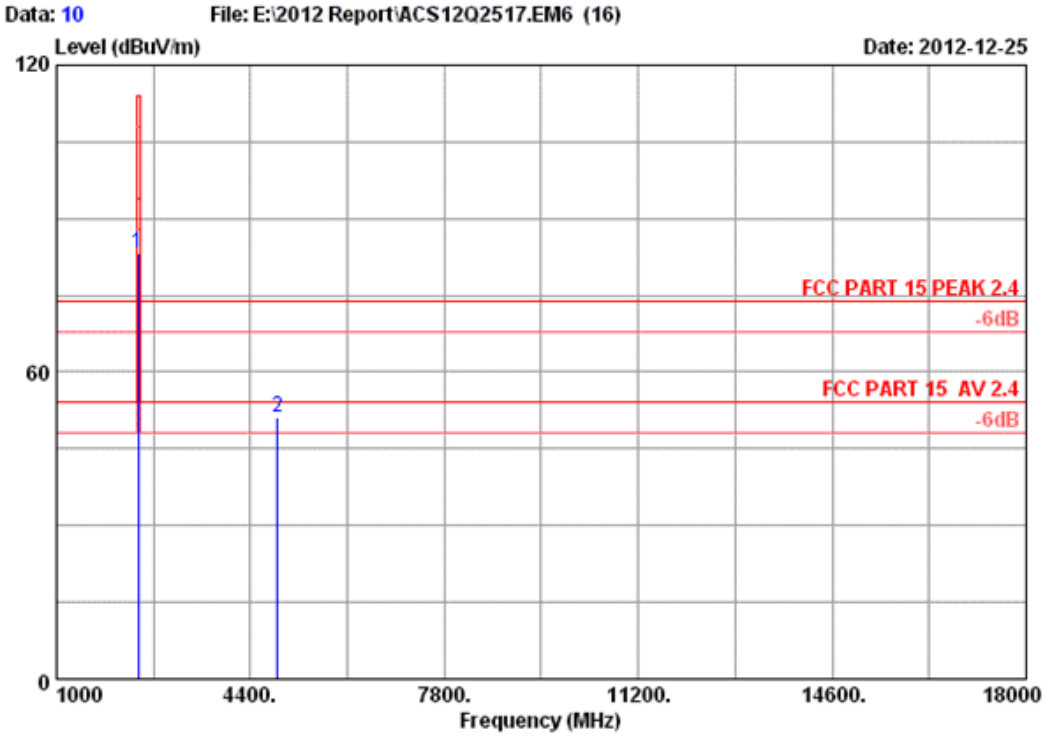
	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2439.000	27.01	6.08	35.92	92.37	89.54	114.00	24.46	Peak
2	4878.000	32.63	8.73	35.69	48.84	54.51	74.00	19.49	Peak

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.

Frequency（MHz）	Peak level（dBuv/m）	Duty cycle factor (dB)	AV level (dBuv/m)	Limit(dBuv/m)	Conclusion
4878	54.51	22.73	31.78	54	Pass



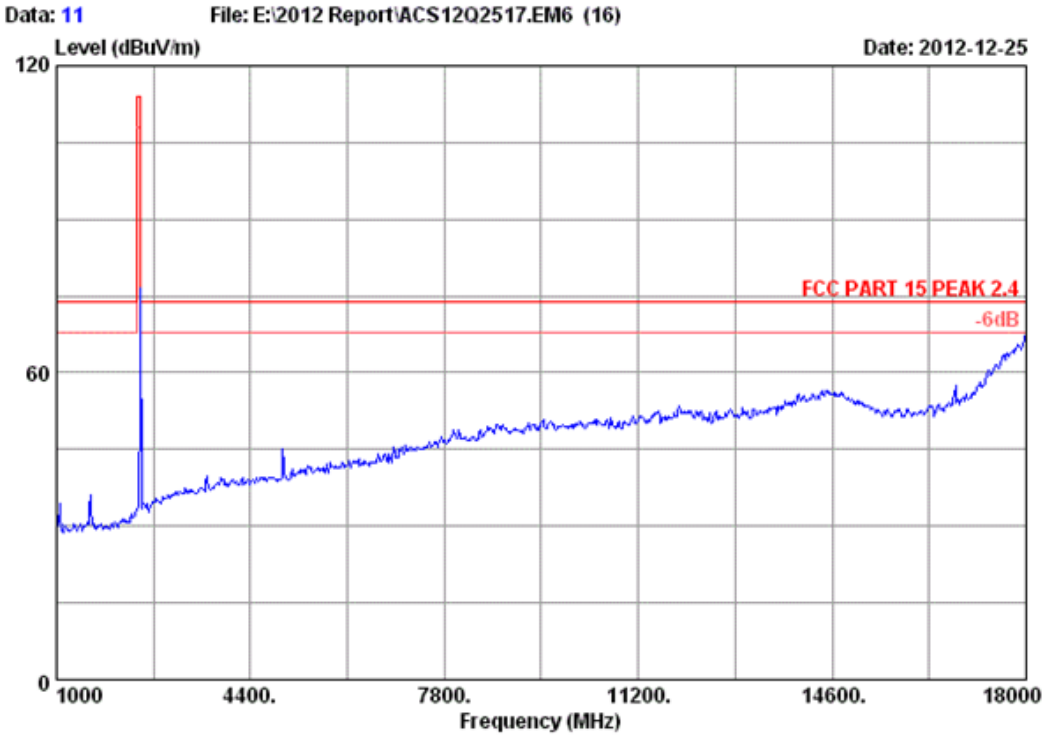

```
Site no.      : 3m Chamber                Data no.   : 9
Dis. / Ant.   : 3m   2012 3115 (4580)     Ant. pol.  : VERTICAL
Limit         : FCC PART 15 PEAK 2.4
Env. / Ins.   : 23*C/54%                  Engineer   : Leo-Li
EUT           : 2.4GHz Wireless Receiver
Power supply  : DC 5V From PC Input AC 120V/60Hz
Test mode     : GFSK 2439MHz Tx Mode
M/N           : GM-120020/R
              :
```



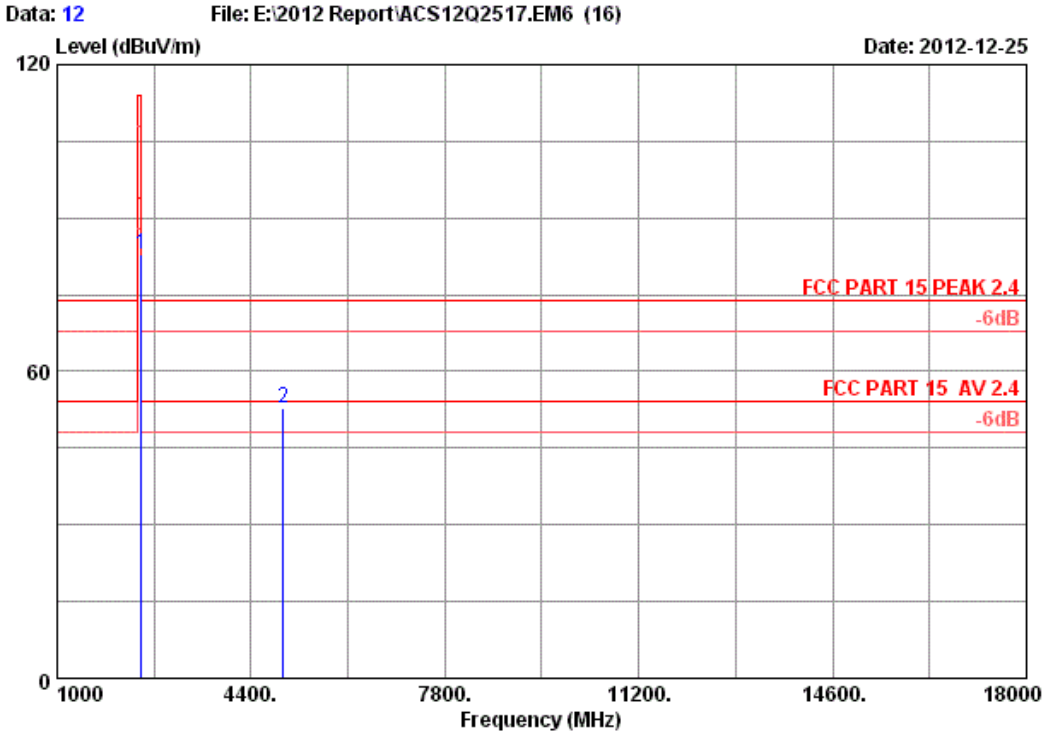
Site no. : 3m Chamber Data no. : 10
Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : VERTICAL
Limit : FCC PART 15 PEAK 2.4
Env. / Ins. : 23*C/54% Engineer : Leo-Li
EUT : 2.4GHz Wireless Receiver
Power supply : DC 5V From PC Input AC 120V/60Hz
Test mode : GFSK 2439MHz Tx Mode
M/N : GM-120020/R
:

	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	2439.000	27.01	6.08	35.92	86.15	83.32	114.00	30.68	Peak
2	4878.000	32.63	8.73	35.69	45.53	51.20	74.00	22.80	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.



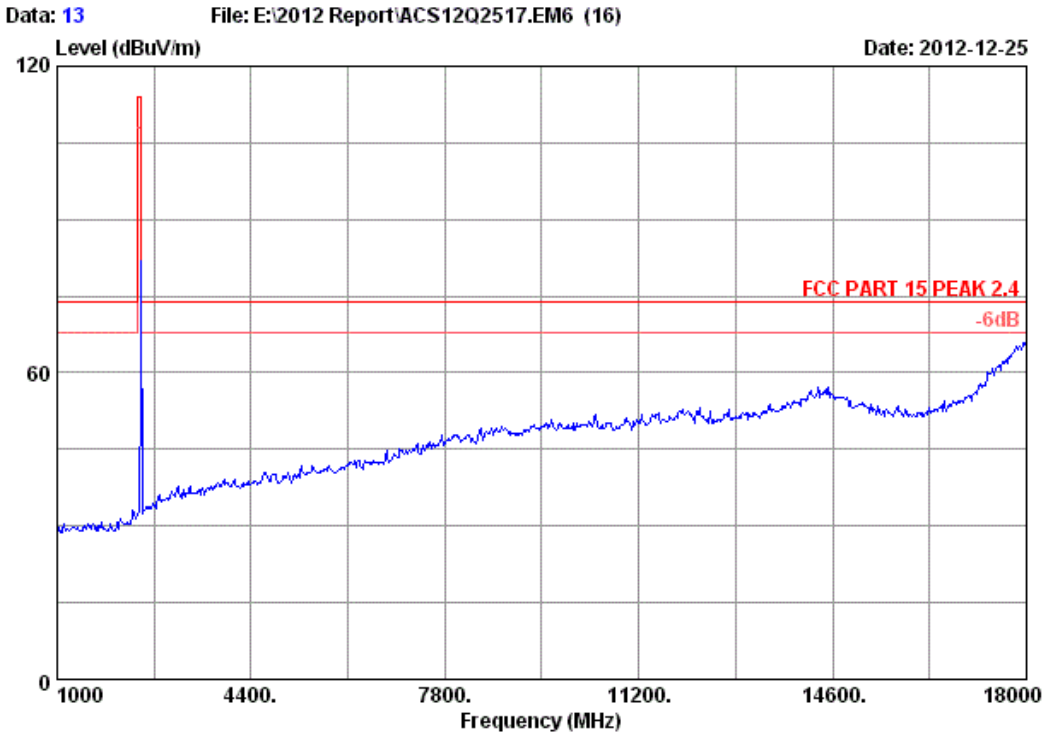

```
Site no.      : 3m Chamber                Data no.   : 11
Dis. / Ant.   : 3m   2012 3115 (4580)     Ant. pol.  : VERTICAL
Limit         : FCC PART 15 PEAK 2.4
Env. / Ins.   : 23*C/54%                  Engineer   : Leo-Li
EUT           : 2.4GHz Wireless Receiver
Power supply  : DC 5V From PC Input AC 120V/60Hz
Test mode     : GFSK 2479MHz Tx Mode
M/N           : GM-120020/R
              :
```



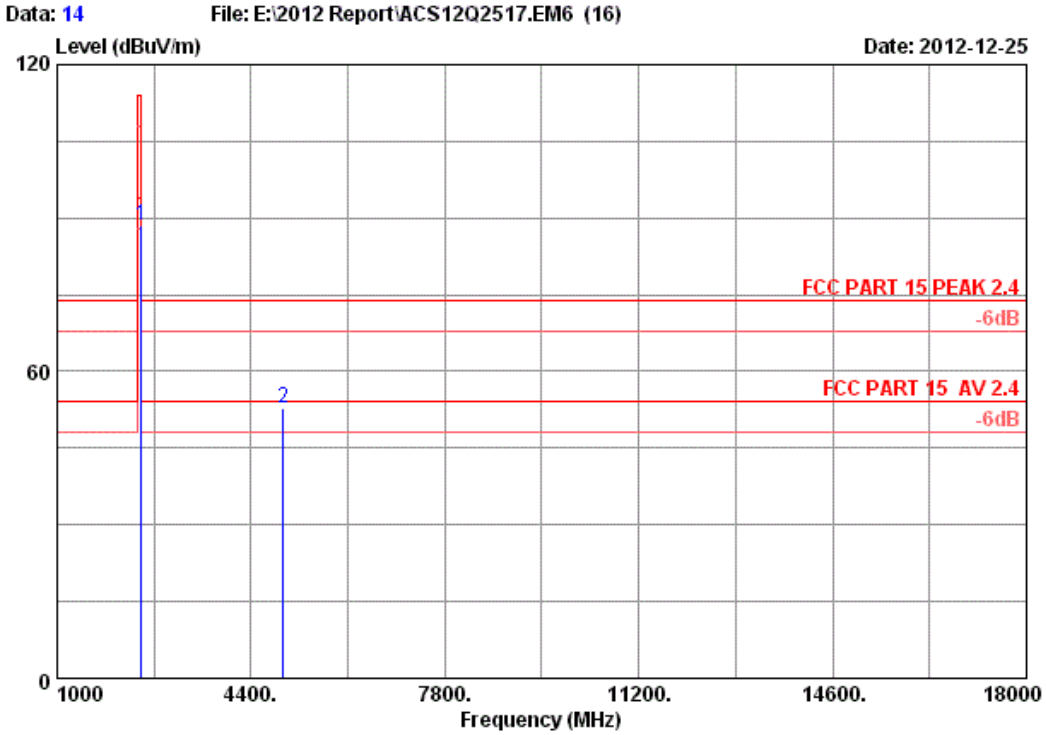
Site no. : 3m Chamber Data no. : 12
Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : VERTICAL
Limit : FCC PART 15 PEAK 2.4
Env. / Ins. : 23*C/54% Engineer : Leo-Li
EUT : 2.4GHz Wireless Receiver
Power supply : DC 5V From PC Input AC 120V/60Hz
Test mode : GFSK 2479MHz Tx Mode
M/N : GM-120020/R
:

	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	2479.000	27.27	6.15	35.92	85.24	82.74	114.00	31.26	Peak
2	4958.000	32.81	8.81	35.66	46.71	52.67	74.00	21.33	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.




```
Site no.      : 3m Chamber                Data no.   : 13
Dis. / Ant.   : 3m   2012 3115 (4580)     Ant. pol.  : HORIZONTAL
Limit         : FCC PART 15 PEAK 2.4
Env. / Ins.   : 23*C/54%                  Engineer   : Leo-Li
EUT           : 2.4GHz Wireless Receiver
Power supply  : DC 5V From PC Input AC 120V/60Hz
Test mode     : GFSK 2479MHz Tx Mode
M/N           : GM-120020/R
              :
```



Site no. : 3m Chamber Data no. : 14
Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : HORIZONTAL
Limit : FCC PART 15 PEAK 2.4
Env. / Ins. : 23*C/54% Engineer : Leo-Li
EUT : 2.4GHz Wireless Receiver
Power supply : DC 5V From PC Input AC 120V/60Hz
Test mode : GFSK 2479MHz Tx Mode
M/N : GM-120020/R
:

	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	2479.000	27.27	6.15	35.92	90.99	88.49	114.00	25.51	Peak
2	4958.000	32.81	8.81	35.66	46.77	52.73	74.00	21.27	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. 20 DB BANDWIDTH TEST

5.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	E4446A	US44300459	May.08, 12	1 Year

5.2. Limit

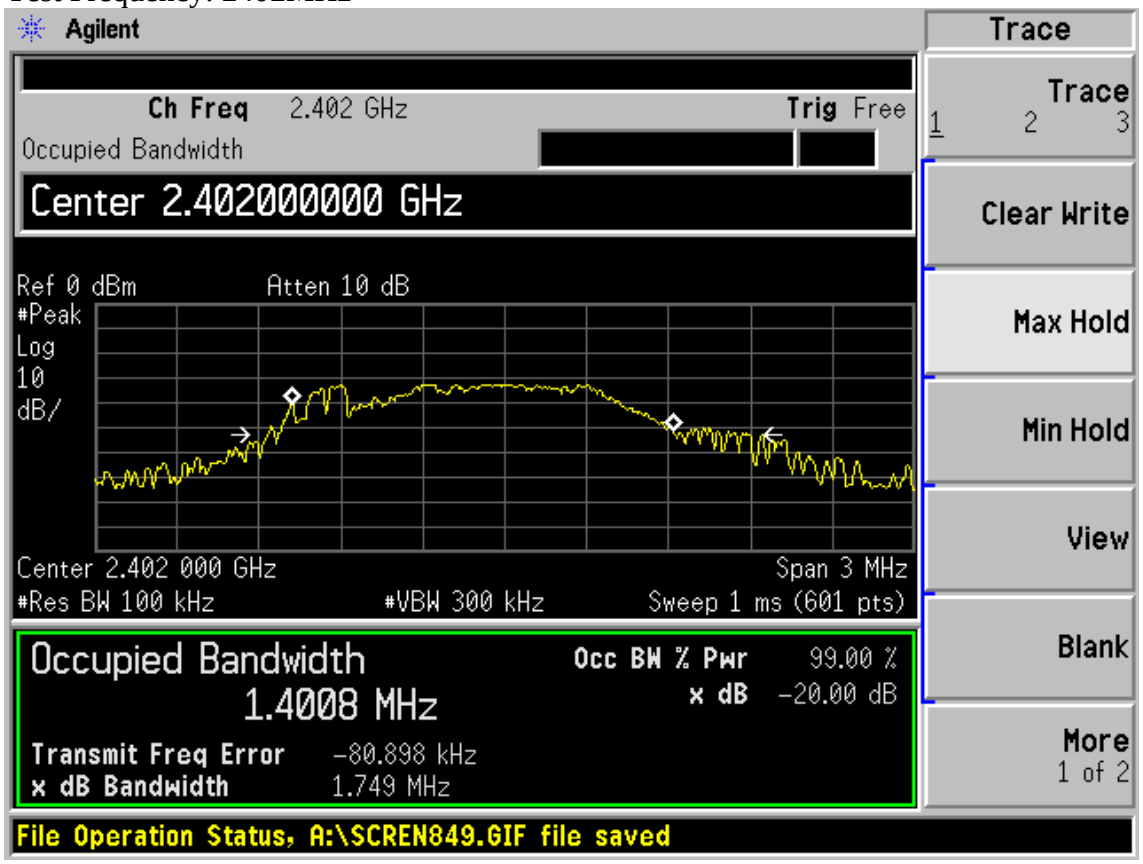
Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

5.3. Test Results

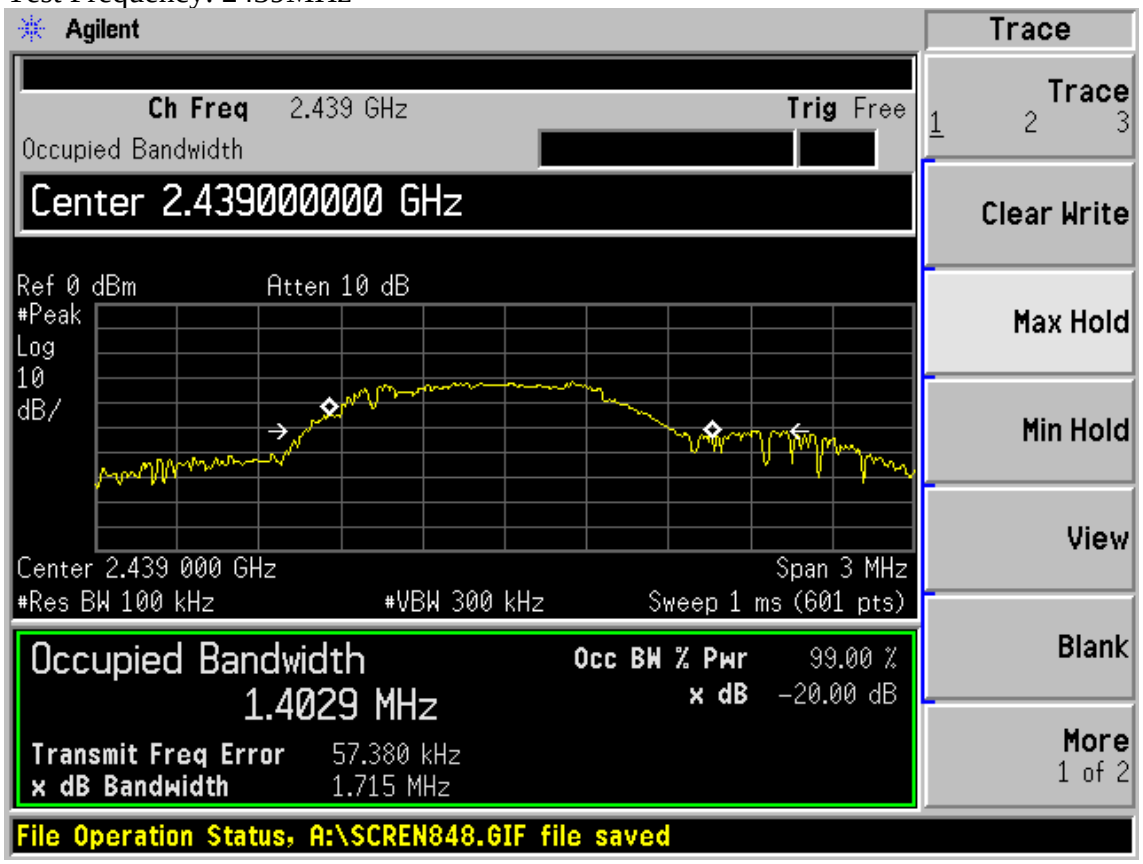
EUT: 2.4GHz Wireless Receiver		
M/N:GM-120020/R		
Test date:2012-12-27	Test date:2012-12-27	Test date:2012-12-27
Tested by: Leo-Li	Tested by: Leo-Li	Tested by: Leo-Li

Frequency	20dB bandwidth （MHz）	Limit (MHz)
2402MHz	1.749	N/A
2439MHz	1.715	N/A
2479MHz	1.373	N/A
Conclusion：PASS		

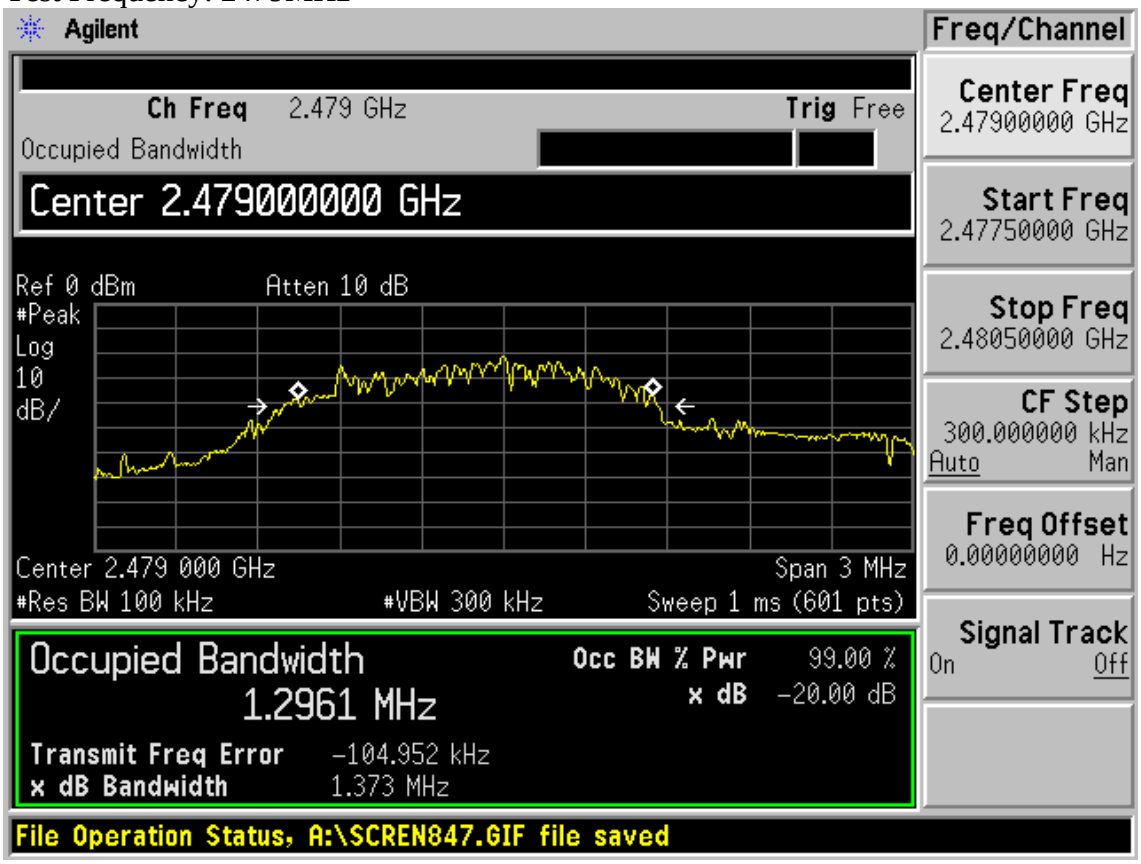
Test Frequency: 2402MHz



Test Frequency: 2439MHz



Test Frequency: 2479MHz



6. BAND EDGE COMPLIANCE TEST

6.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	E4446A	US44300459	May.08, 12	1 Year
2.	Amp	HP	8449B	3008A08495	May.08, 12	1 Year
3.	Antenna	EMCO	3115	9510-4580	June.05, 12	1Year
4.	HF Cable	Hubersuhne	Sucoflex104	-	May.08, 12	1 Year

6.2. Limit

All the lower and upper band-edges emissions appearing within 2310MHz to 2390MHz and 2483.5MHz to 2500MHz restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation frequency band 2400MHz to 2483.5MHz shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

6.3. Test Produce

1. The EUT is placed on a turntable, which is 0.8m above the ground plane and worked at highest radiated power.
2. The turntable was rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upperband-edges of the emission:

(a) PEAK: RBW=1MHz ;VBW=3MHz, PK detector, Sweep=AUTO

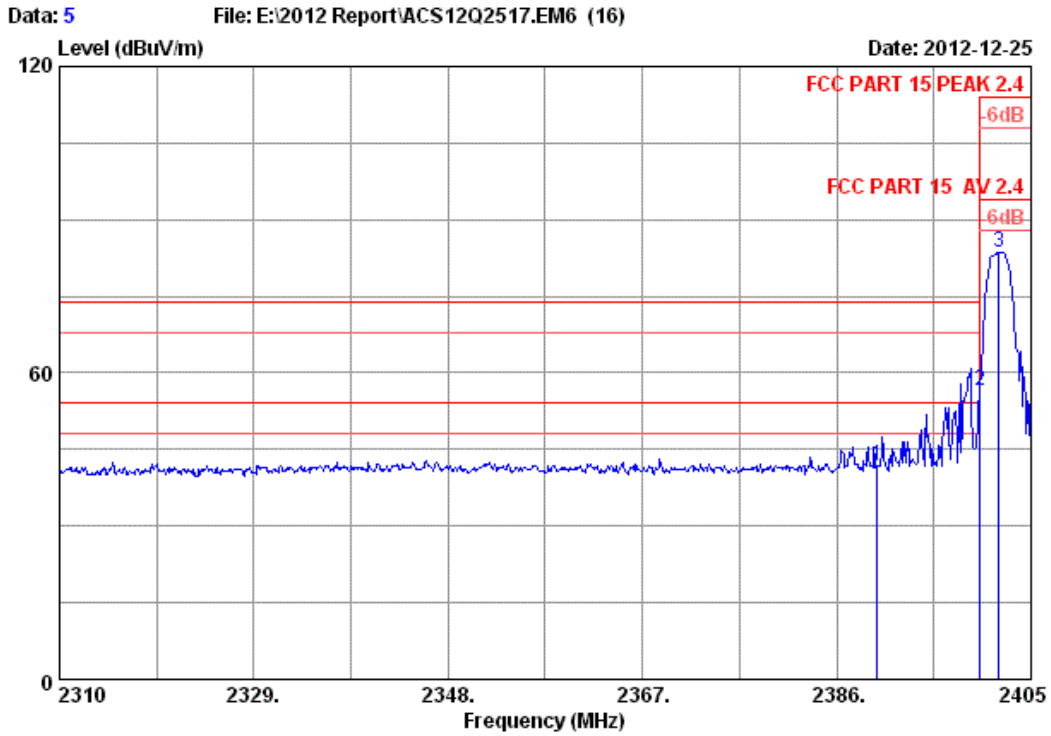
(b)This device is pulse modulated, a duty cycle factor was used to calculate average level based measured peak level

6.4. Test Results

Pass (The testing data was attached in the next pages.)

Note: If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.

Note: The duty cycle factor for calculate average level is 22.73dB, and average limit is 20dB below peak limit, so if peak measured level comply with peak limit, the average level was deemed to comply with average limit.

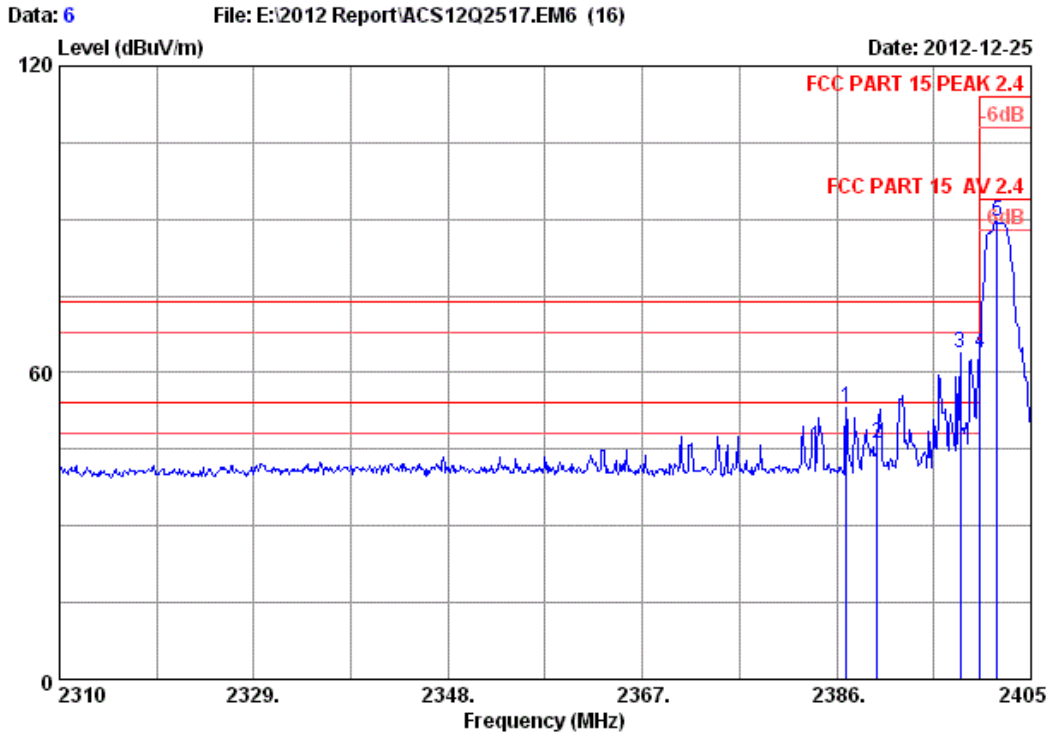



```
Site no.      : 3m Chamber                Data no.   : 5
Dis. / Ant.   : 3m   2012 3115 (4580)     Ant. pol.  : HORIZONTAL
Limit         : FCC PART 15 PEAK 2.4
Env. / Ins.   : 23*C/54%                  Engineer   : Leo-Li
EUT           : 2.4GHz Wireless Receiver
Power supply  : DC 5V From PC Input AC 120V/60Hz
Test mode     : GFSK 2402MHz Tx Mode
M/N           : GM-120020/R
              :
```

	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	26.70	6.00	35.92	44.94	41.72	74.00	32.28	Peak
2	2400.000	26.76	6.02	35.92	59.53	56.39	74.00	17.61	Peak
3	2401.865	26.77	6.02	35.92	86.70	83.57	114.00	30.43	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.

Frequency（MHz）	Peak level（dBuv/m）	Duty cycle factor (dB)	AV level (dBuv/m)	Limit(dBuv/m)	Conclusion
2400.000	56.39	22.73	33.66	54	Pass

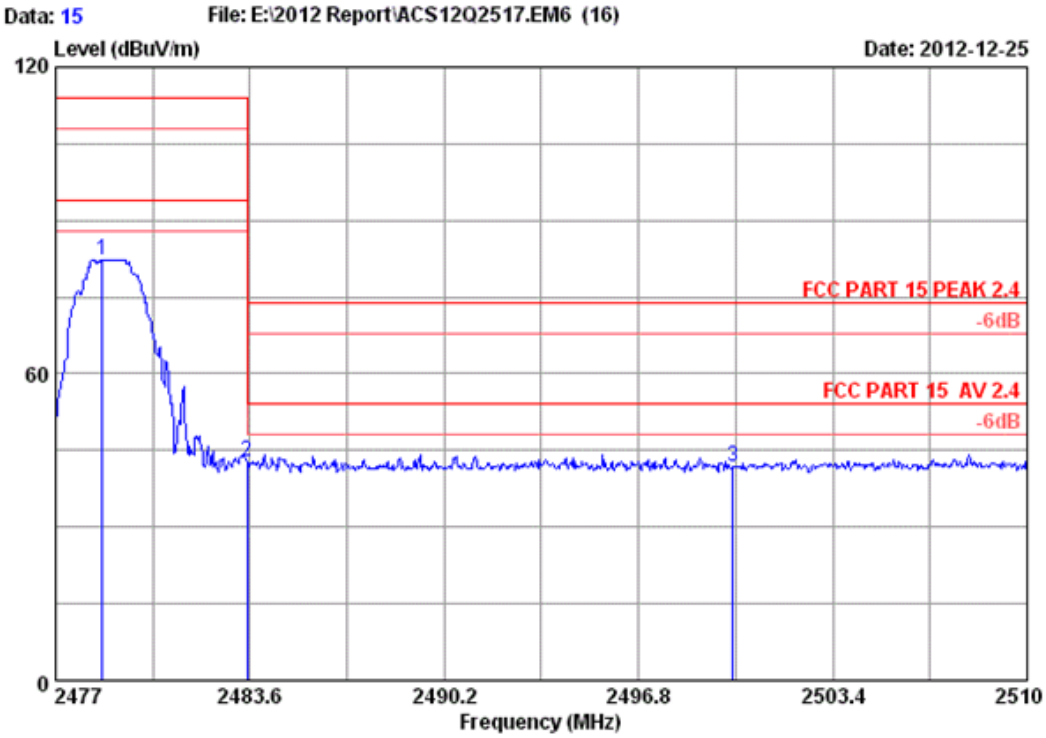


Site no. : 3m Chamber Data no. : 6
Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : VERTICAL
Limit : FCC PART 15 PEAK 2.4
Env. / Ins. : 23*C/54% Engineer : Leo-Li
EUT : 2.4GHz Wireless Receiver
Power supply : DC 5V From PC Input AC 120V/60Hz
Test mode : GFSK 2402MHz Tx Mode
M/N : GM-120020/R
:

	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	2386.950	26.68	5.99	35.92	56.26	53.01	74.00	20.99	Peak
2	2390.000	26.70	6.00	35.92	49.22	46.00	74.00	28.00	Peak
3	2398.065	26.75	6.01	35.92	66.84	63.68	74.00	10.32	Peak
4	2400.000	26.76	6.02	35.92	67.00	63.86	74.00	10.14	Peak
5	2401.675	26.77	6.02	35.92	92.57	89.44	114.00	24.56	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.

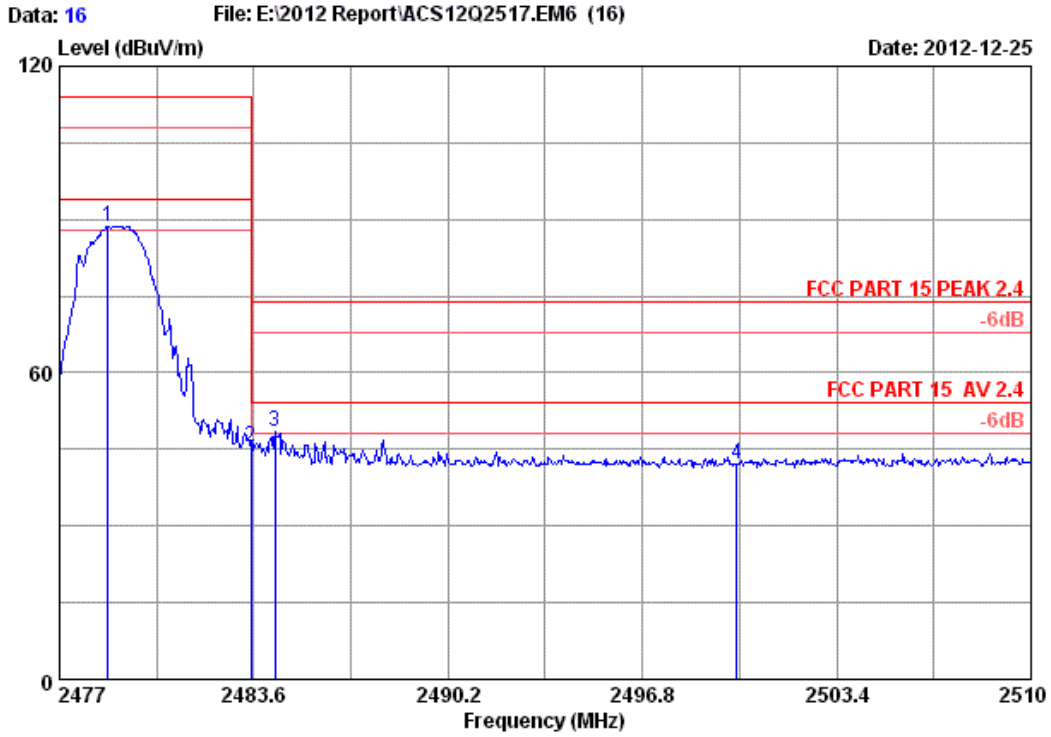
Frequency （MHz）	Peak level （dBuv/m）	Duty cycle factor (dB)	AV level (dBuv/m)	Limit(dBuv/m)	Conclusion
2398.065	63.68	22.73	40.95	54	Pass
2400.000	63.86	22.73	41.13	54	Pass



Site no. : 3m Chamber Data no. : 15
Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : VERTICAL
Limit : FCC PART 15 PEAK 2.4
Env. / Ins. : 23*C/54% Engineer : Leo-Li
EUT : 2.4GHz Wireless Receiver
Power supply : DC 5V From PC Input AC 120V/60Hz
Test mode : GFSK 2479MHz Tx Mode
M/N : GM-120020/R
:

	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	2478.584	27.26	6.15	35.92	84.88	82.37	114.00	31.63	Peak
2	2483.500	27.29	6.16	35.92	45.28	42.81	74.00	31.19	Peak
3	2500.000	27.40	6.19	35.93	44.01	41.67	74.00	32.33	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.



Site no. : 3m Chamber Data no. : 16
Dis. / Ant. : 3m 2012 3115 (4580) Ant. pol. : HORIZONTAL
Limit : FCC PART 15 PEAK 2.4
Env. / Ins. : 23*C/54% Engineer : Leo-Li
EUT : 2.4GHz Wireless Receiver
Power supply : DC 5V From PC Input AC 120V/60Hz
Test mode : GFSK 2479MHz Tx Mode
M/N : GM-120020/R
:

	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	2478.650	27.26	6.15	35.92	91.19	88.68	114.00	25.32	Peak
2	2483.500	27.29	6.16	35.92	47.84	45.37	74.00	28.63	Peak
3	2484.326	27.30	6.16	35.92	50.90	48.44	74.00	25.56	Peak
4	2500.000	27.40	6.19	35.93	44.38	42.04	74.00	31.96	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. ANTENNA REQUIREMENT

RESULT : PASS

Test Date : Dec.28, 2012

Test standard : FCC Part 15.203

Limit : the use of antennas with directional gains that do not exceed 6 dBi

According to the manufacturer declared, the EUT has an internal antenna, the directional gain of antenna is 0dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Therefore the EUT is considered sufficient to comply the provision.

8. RADIO FRREQUENCY EXPOSURE COMPLIANCE

RESULT : PASS

Test standard : FCC KDB Publication 447498

Since maximum peak output power of the transmitter is<10mW=10dBm, i.e.0.009346mW<10mW, hence the EUT is exclueded from SAR evaluation according to FCC KDB Publication 447498 D01:General RF Exposure Guide.

9. TEST SOFTWARE

Manufacturer **:** G. tech Technology Ltd.

Version **:** Fuhlen Bind V1.1

The test software is used to control EUT work in TX mode and to change the test channel.

10. DEVIATION TO TEST SPECIFICATIONS

[NONE]