



FCC PART 15C TEST REPORT FOR CERTIFICATION  
On Behalf of

ATEN Technology Inc.

Long Range 2.4GHz Wireless Receiver

Model Number: GKM552R(R)

FCC ID: QLERXGKM552R

Prepared for : ATEN Technology Inc.  
19641 Da Vinci Foothill Ranch, CA 92610 USA

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Date of Report : Aug.08, 2011

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## 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

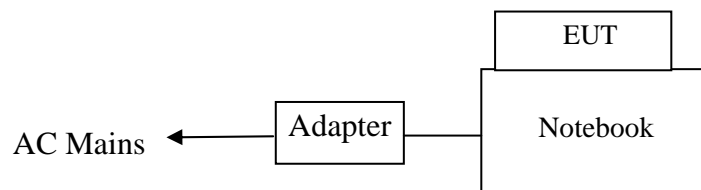
### 2.1. Description of Device (EUT)

Product Name	: Long Range 2.4GHz Wireless Receiver
Model Number	: GKM552R(R)
FCC ID	: QLERXGKM552R
Operation frequency	: 2402MHz-2479MHz
Antenna	: Integrated PCB antenna, 0dBi gain
Modulation	: GFSK
Power Supply	: DC 5V
Applicant	: ATEN Technology Inc. 19641 Da Vinci Foothill Ranch, CA 92610 USA
Manufacturer	: G. tech Technology Ltd. No.21, Jinding Industrial Park, West Jinfeng Road, Tangjiawan Town, Xiangzhou District Zhuhai Guangdong China
Date of Test	: Aug.03~07, 2011
Date of Receipt	: Aug.02, 2010
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	<input checked="" type="checkbox"/> FCC DoC <input checked="" type="checkbox"/> BSMI ID: R41108
Power Cord: Unshielded, Detachable, 1.8m Power Adapter: Manufacturer: DELL, M/N: LA65NS1-00 Cable: Unshielded, Detachable, 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: Mar.31, 2012

3m & 10m Anechoic Chamber : Certificated by FCC, USA  
Registration Number: 794232  
Valid Date: Dec.30, 2012

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, 2012

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

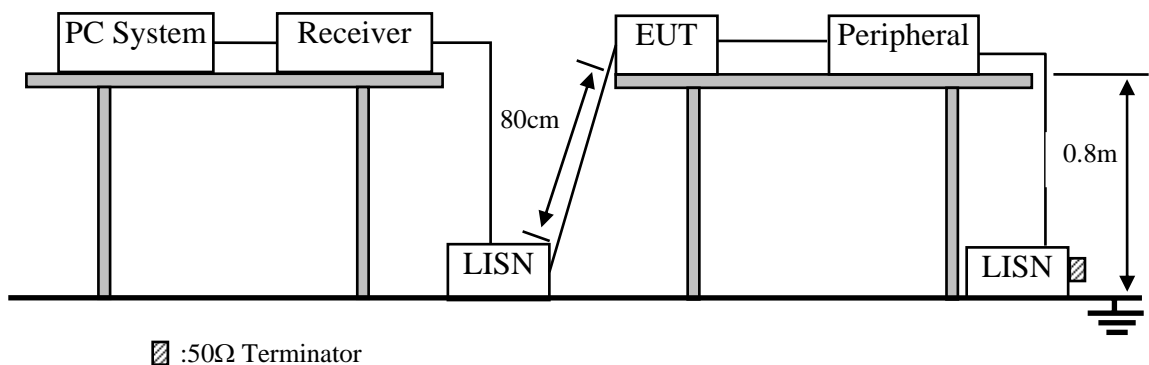
Test Item	Uncertainty
Uncertainty for Conduction emission test in No. 1 Conduction	3.2 dB(150kHz to 30MHz)
Uncertainty for Radiation Emission test in 3m chamber	3.6 dB(30~200MHz, Polarize: H)
	3.7 dB(30~200MHz, Polarize: V)
	4.0 dB(200M~1GHz, Polarize: H)
	3.7 dB(200M~1GHz, Polarize: V)
Uncertainty for 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	$7 \times 10^{-8}$
Uncertainty for Bandwidth test	83 kHz
Uncertainty for DC power test	0.038 %
Uncertainty for test site temperature and humidity	0.6°C
	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	Nov.05, 10	1 Year
2.	L.I.S.N.#1	Rohde & Schwarz	ESH2-Z5	834066/011	Nov.05, 11	1 Year
3.	L.I.S.N.#3	Kyoritsu	KNW-242C	8-1920-1	May.08, 11	1 Year
4.	Terminator	Hubersuhner	50Ω	No. 1	May.08, 11	1 Year
5.	RF Cable	Fujikura	3D-2W	LISN Cable 1#	May.08, 11	1Year
6.	Coaxial Switch	Anritsu	MP59B	M55367	May.08, 11	1 Year
7.	Passive Probe	Rohde & Schwarz	ESH2-Z3	299.7810.52	May.08, 11	1 Year
8.	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100341	May.08, 11	1 Year

#### 3.2. Block Diagram of Test Setup



#### 3.3. Power Line Conducted Emission Test Limits

Frequency range MHz	Limits dB(μV)	
	Quasi-peak Level	Average Level
0,15 to 0,5	79	66
0,5 to 30	73	60

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. Long Range 2.4GHz Wireless Receiver (EUT)

Model Number : GKM552R(R)  
 Serial Number : N/A  
 Manufacturer : ATEN Technology Inc.

### 3.5. Operating Condition of EUT

3.5.1. Setup the EUT and simulator as shown as Section 2.2.

3.5.2. Turn on the power of all equipment.

3.5.3. Let the EUT work in test mode (Notebook LINK) 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.

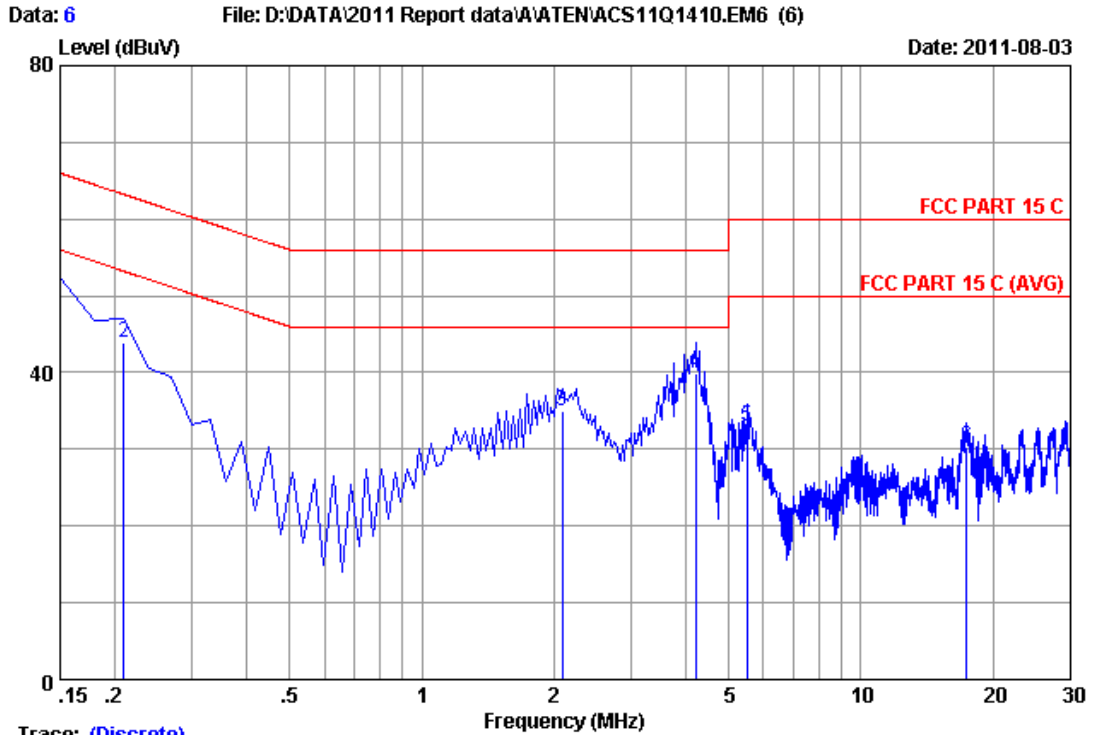
The bandwidth of test receiver (R&S TEST RECEIVER ESHS10) is set at 10kHz.

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.)

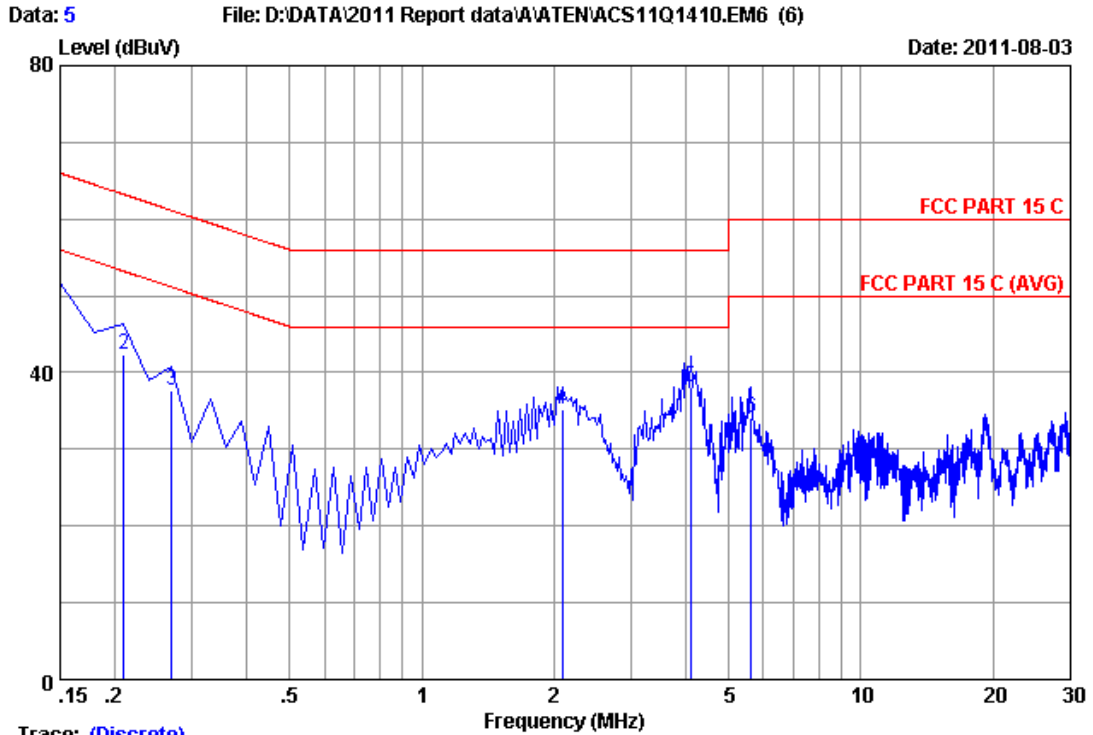




Trace: (Discrete)  
 Site no :1#conduction Data No :6  
 Dis./Ant. :\*\* 2011 ESH2-Z5 LINE  
 Limit :FCC PART 15 C  
 Env./Ins. :29.5°C/55% Engineer :Leo-Li  
 EUT :Long Range 2.4GHz Wireless Receiver  
 Power Rating :DC 5V From PC Input AC 120V/60Hz  
 Test Mode :Tx Mode  
 M/N:GKM552R(R)

No	Freq (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.15000	0.17	9.98	37.21	47.36	66.00	18.64	QP
2	0.20970	0.17	9.98	33.82	43.97	63.22	19.25	QP
3	2.090	0.31	9.96	24.70	34.97	56.00	21.03	QP
4	4.210	0.35	9.94	29.55	39.84	56.00	16.16	QP
5	5.493	0.40	9.93	22.56	32.89	60.00	27.11	QP
6	17.373	0.98	9.97	19.42	30.37	60.00	29.63	QP

Remarks: 1.Emission Level=LISN Factor+Cable Loss(Include 10dB pulse limit)+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.



Trace: (Discrete)

Site no :1#conduction Data No :5  
 Dis./Ant. \*\*: 2011 ESH2-Z5 NEUTRAL  
 Limit :FCC PART 15 C  
 Env./Ins. :29.5°C/55% Engineer :Leo-Li  
 EUT :Long Range 2.4GHz Wireless Receiver  
 Power Rating :DC 5V From PC Input AC 120V/60Hz  
 Test Mode :Tx Mode  
 M/N:GKM552R(R)

No	Freq (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.15000	0.21	9.98	36.50	46.69	66.00	19.31	QP
2	0.20970	0.21	9.98	32.11	42.30	63.22	20.92	QP
3	0.26940	0.21	9.98	27.51	37.70	61.14	23.44	QP
4	2.090	0.27	9.96	24.98	35.21	56.00	20.79	QP
5	4.090	0.31	9.94	27.87	38.12	56.00	17.88	QP
6	5.613	0.35	9.93	23.85	34.13	60.00	25.87	QP

Remarks: 1.Emission Level=LISN Factor+Cable Loss(Include 10dB pulse limit) +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.

## 4. RADIATED EMISSION TEST

### 4.1. Test Equipment

Frequency rang: 30~1000MHz

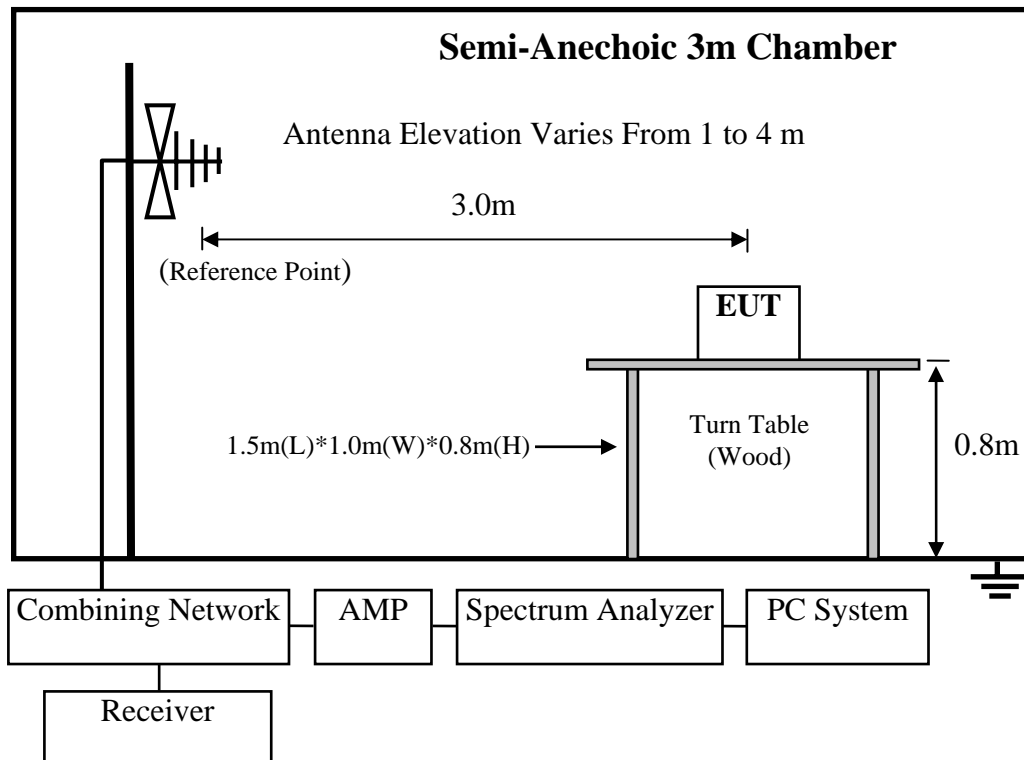
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	3#Chamber	AUDIX	N/A	N/A	Dec.06,10	1 Year
2	EMI Spectrum	Agilent	E4407B	MY41440292	May.08, 11	1 Year
3	Test Receiver	Rohde & Schwarz	ESVS10	834468/011	May.08, 11	1 Year
4	Amplifier	HP	8447D	2648A04738	May.08, 11	1 Year
5	Bilog Antenna	Schaffner	CBL6111C	2598	Oct.26, 10	1 Year
6	RF Cable	MIYAZAKI	8D-FB	3# Chamber No.1	May.08, 11	1 Year
7	Coaxial Switch	Anritsu	MP59B	M73989	May.08, 11	1 Year

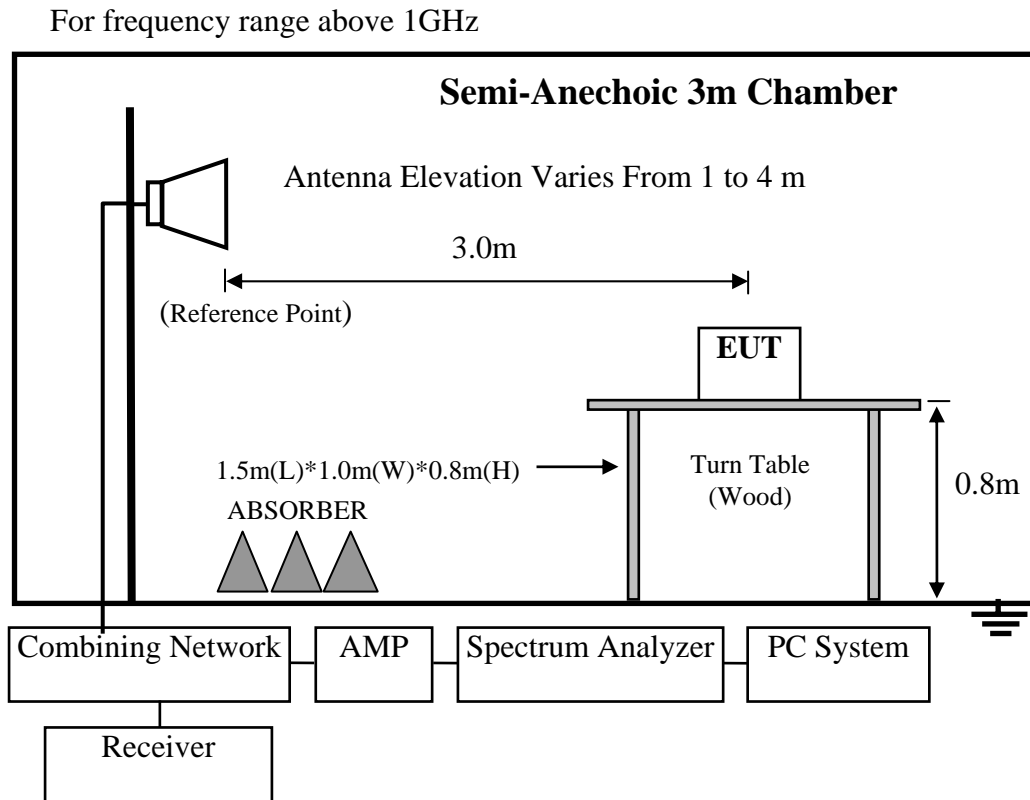
Frequency rang: above 1000MHz

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum Analyzer	Agilent	E4407B	MY41440292	May 08, 11	1 Year
2	Horn Antenna	EMCO	3115	9607-4877	May 08, 11	1.5 Year
3	Amplifier	Agilent	8449B	3008A00863	May 08, 11	1 Year
4	RF Cable	Hubersuhner	SUCOFLEX102	28622/2	May 08, 11	1 Year
5	RF Cable	Hubersuhner	SUCOFLEX102	29091/2	May 08, 11	1 Year

### 4.2. Block Diagram of Test Setup

For frequency range 30MHz-1000MHz





#### 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.

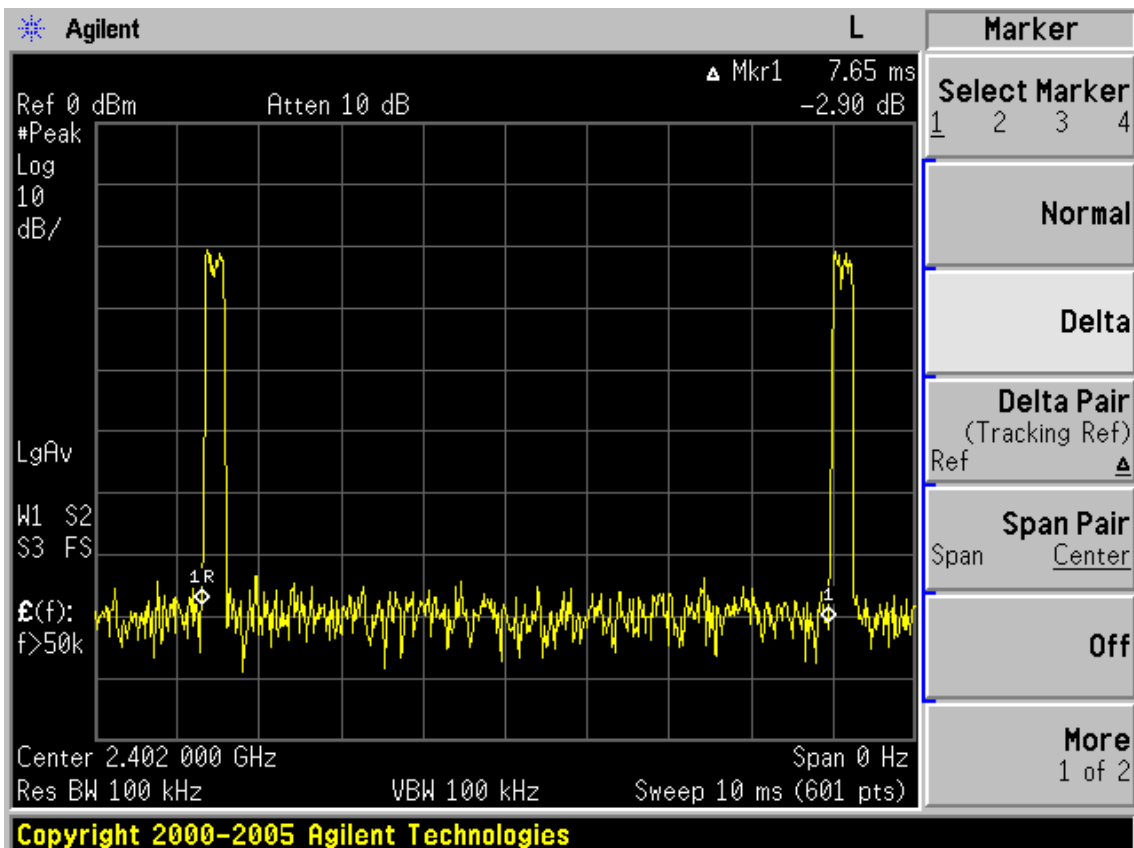
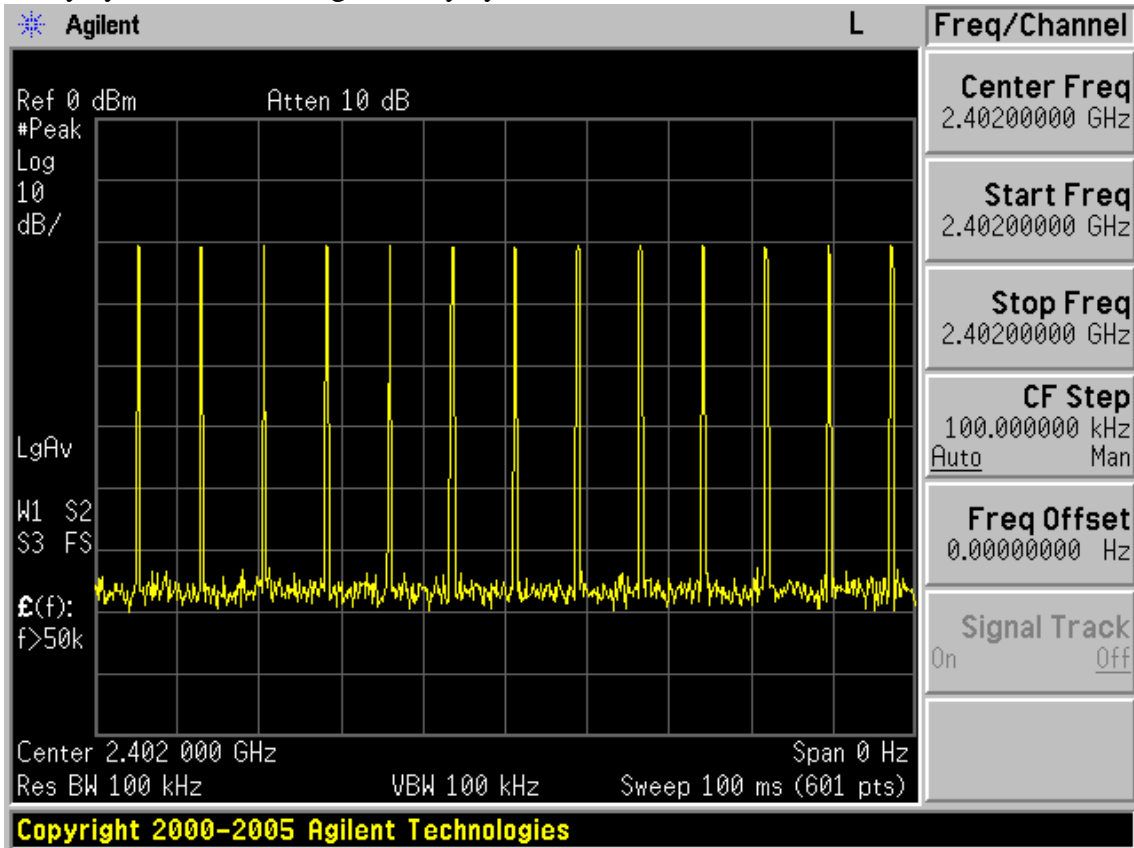
#### 4.7.Radiated Emission Test Results

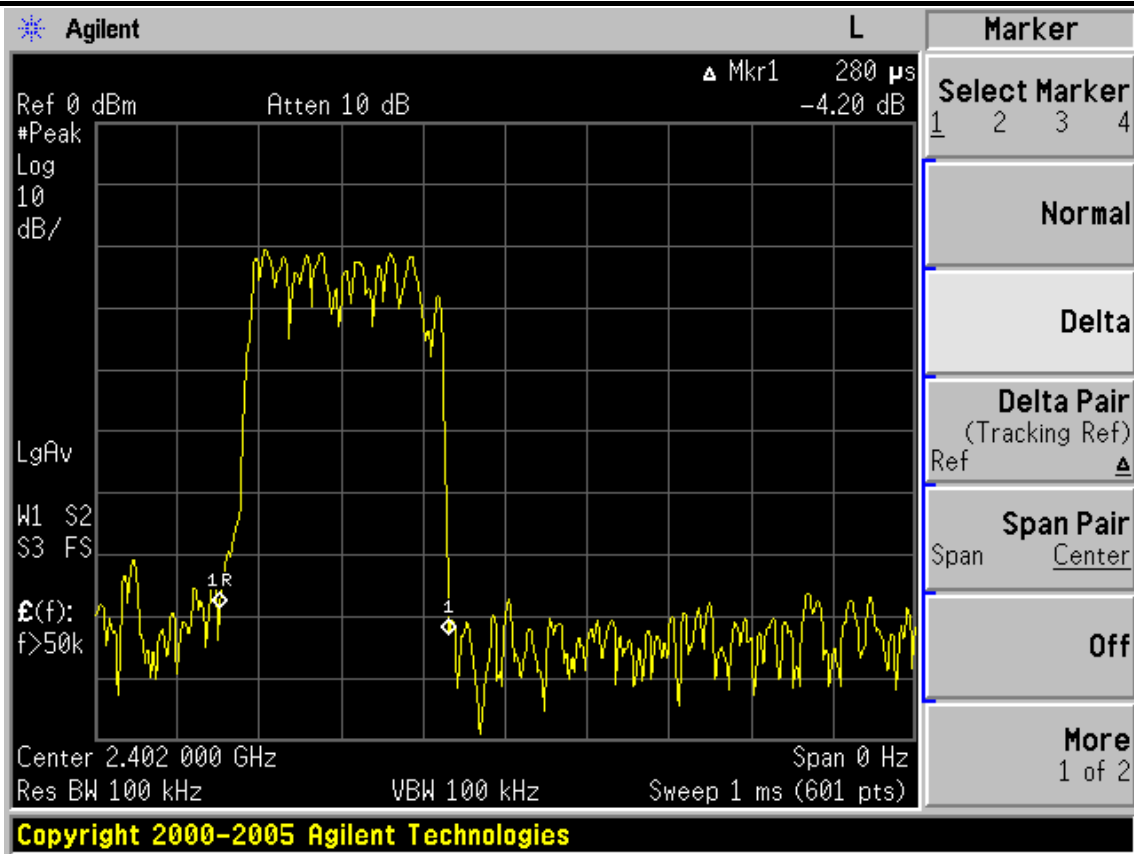
##### **PASS.**

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

Note: The duty cycle factor for calculate average level is 28.73dB, 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:  $280\mu s * 7.65\text{ms} * 100\% = 3.66\%$   
 Duty cycle factor =  $20\log (1/\text{duty cycle}) = 28.73\text{dB}$



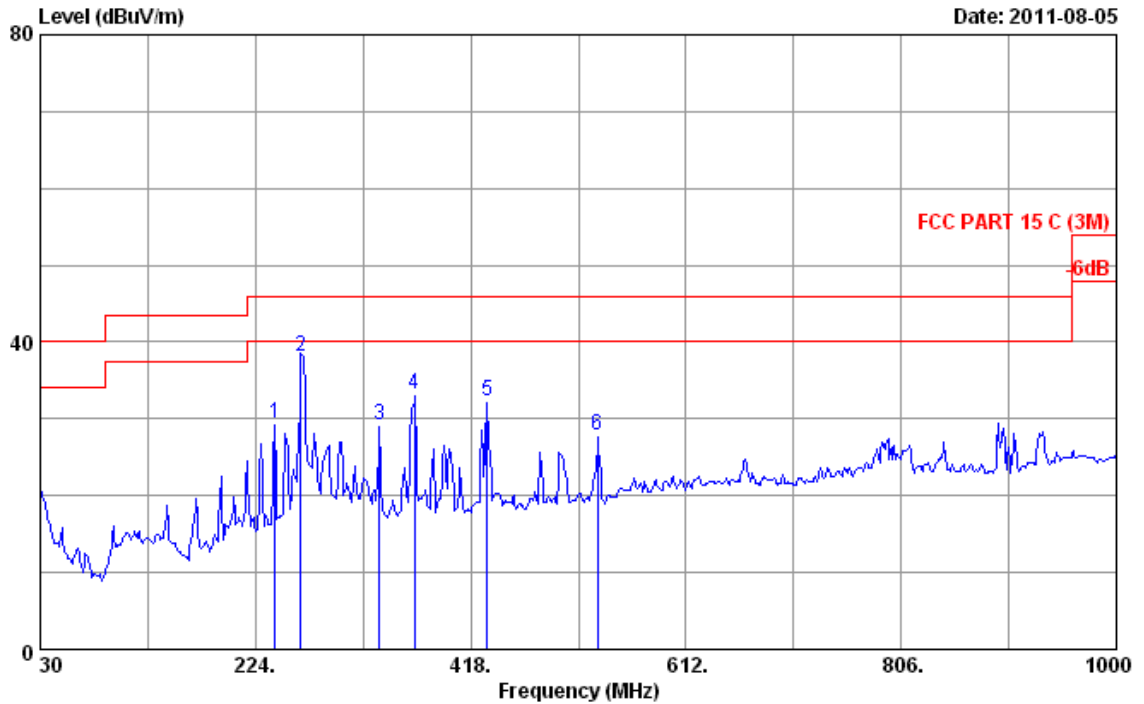


**Frequency: 30MHz~1GHz**

Data: 2

File: E:\2011 Report data\A\ATEN\ACS11Q1410.EM6 (12)

Date: 2011-08-05

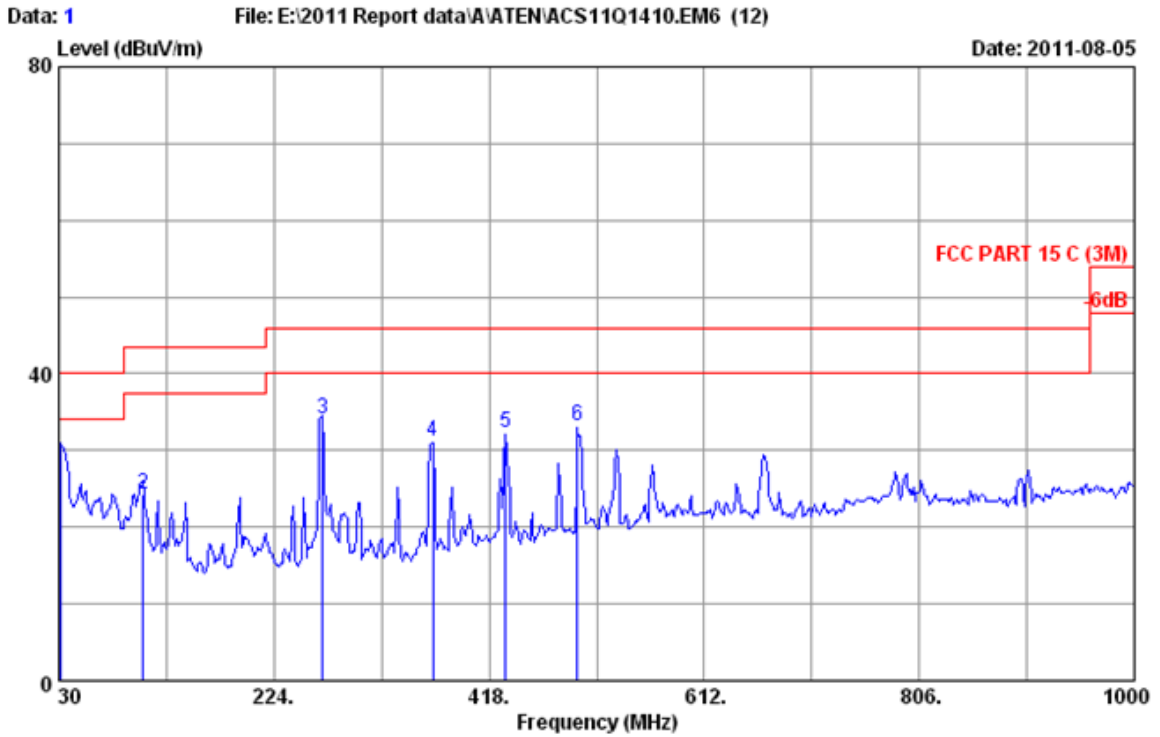


Site no. : 3m Chamber Data no. : 2  
 Dis. / Ant. : 3m 2010 CBL6111C 2598 Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15 C (3M)  
 Env. / Ins. : 24°C/56% Engineer : Leo-Li  
 EUT : Long Range 2.4GHz Wireless Receiver  
 Power rating : DC 5V From PC Input AC 120V/60Hz  
 Test Mode : Tx Mode  
 M/N:GFK552R(R)

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	241.460	11.93	2.31	15.19	29.43	46.00	16.57	QP
2	264.740	13.80	2.59	21.73	38.12	46.00	7.88	QP
3	335.550	14.62	3.12	11.46	29.20	46.00	16.80	QP
4	367.560	15.53	3.22	14.46	33.21	46.00	12.79	QP
5	432.550	17.42	3.55	11.35	32.32	46.00	13.68	QP
6	532.460	18.27	4.16	5.51	27.94	46.00	18.06	QP

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



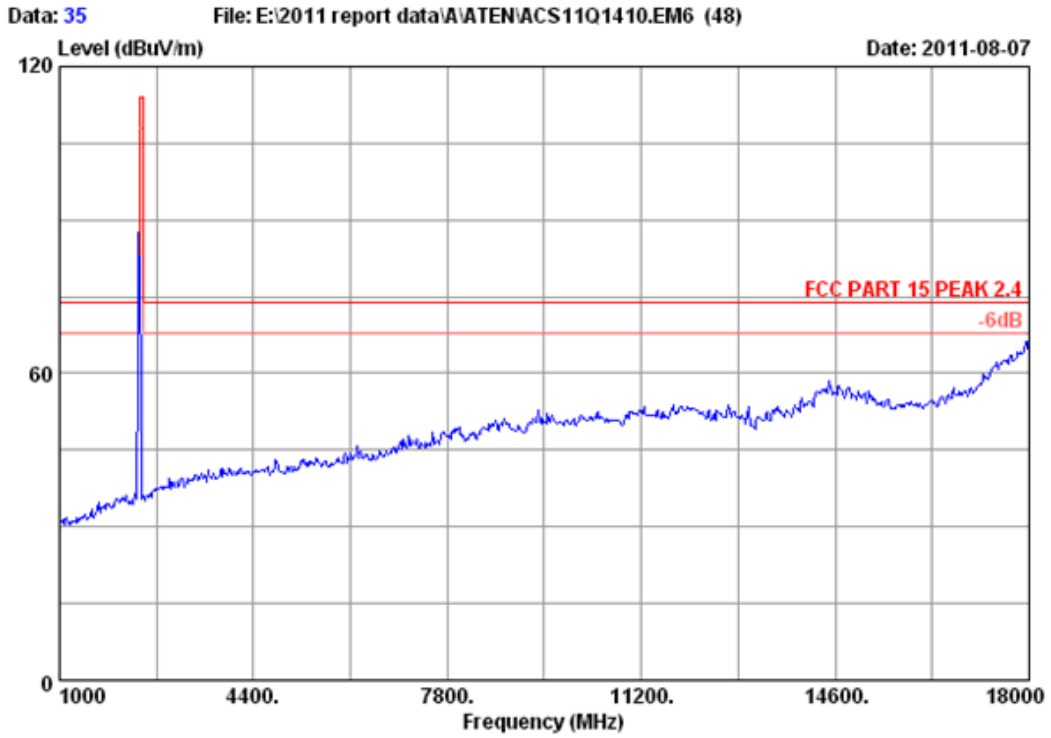


Site no. : 3m Chamber Data no. : 1  
 Dis. / Ant. : 3m 2010 CBL6111C 2598 Ant. pol. : VERTICAL  
 Limit : FCC PART 15 C (3M)  
 Env. / Ins. : 24°C/56% Engineer : Leo-Li  
 EUT : Long Range 2.4GHz Wireless Receiver  
 Power rating : DC 5V From PC Input AC 120V/60Hz  
 Test Mode : Tx Mode  
 M/N:GFK552R(R)

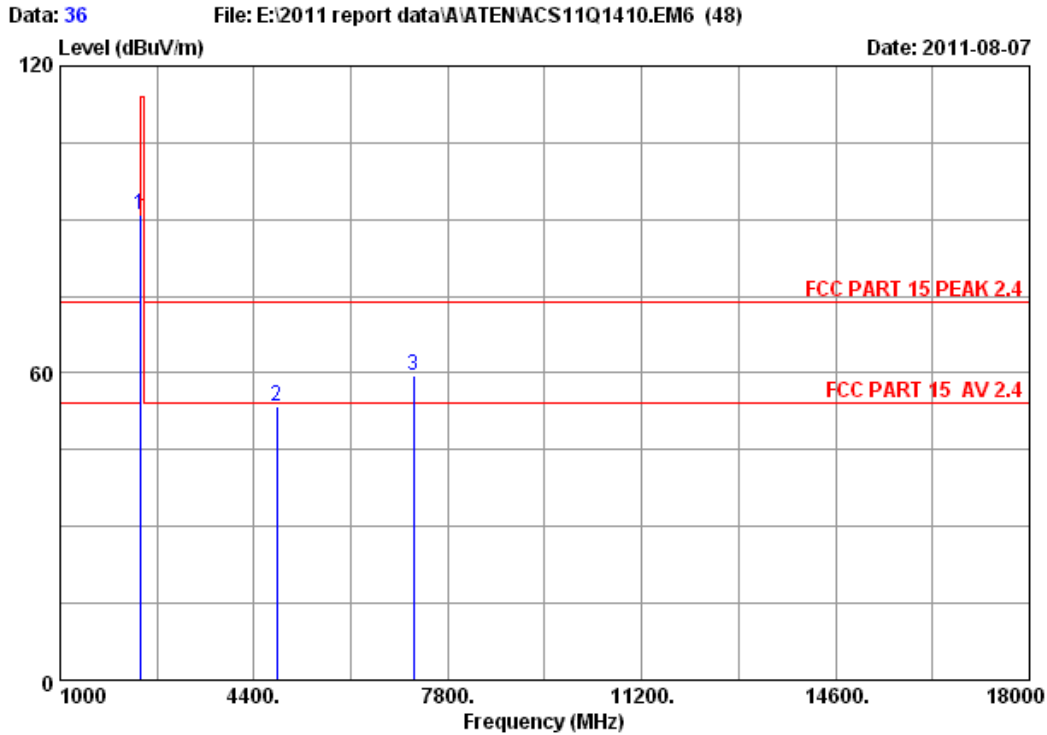
No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission		Margin (dB)	Remark
					Level (dBuV/m)	Limits (dBuV/m)		
1	31.940	18.88	0.61	8.79	28.28	40.00	11.72	QP
2	105.660	11.00	1.21	12.08	24.29	43.50	19.21	QP
3	267.650	13.50	2.63	18.00	34.13	46.00	11.87	QP
4	367.560	15.53	3.22	12.44	31.19	46.00	14.81	QP
5	432.550	17.42	3.55	11.39	32.36	46.00	13.64	QP
6	497.540	18.27	3.99	10.83	33.09	46.00	12.91	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. :	35
Dis. / Ant.	: 3m 2011 3115 4580	Ant. pol. :	HORIZONTAL
Limit	: FCC PART 15 PEAK 2.4		
Env. / Ins.	: 23*C/54%	Engineer :	Paul Tian
EUT	: Long Range 2.4GHz Wireless Receiver		
Power	: DC 5V From PC Input AC 120V/60Hz		
Test mode	: Tx 2402MHz		
M/N	: GKM552R(R)		

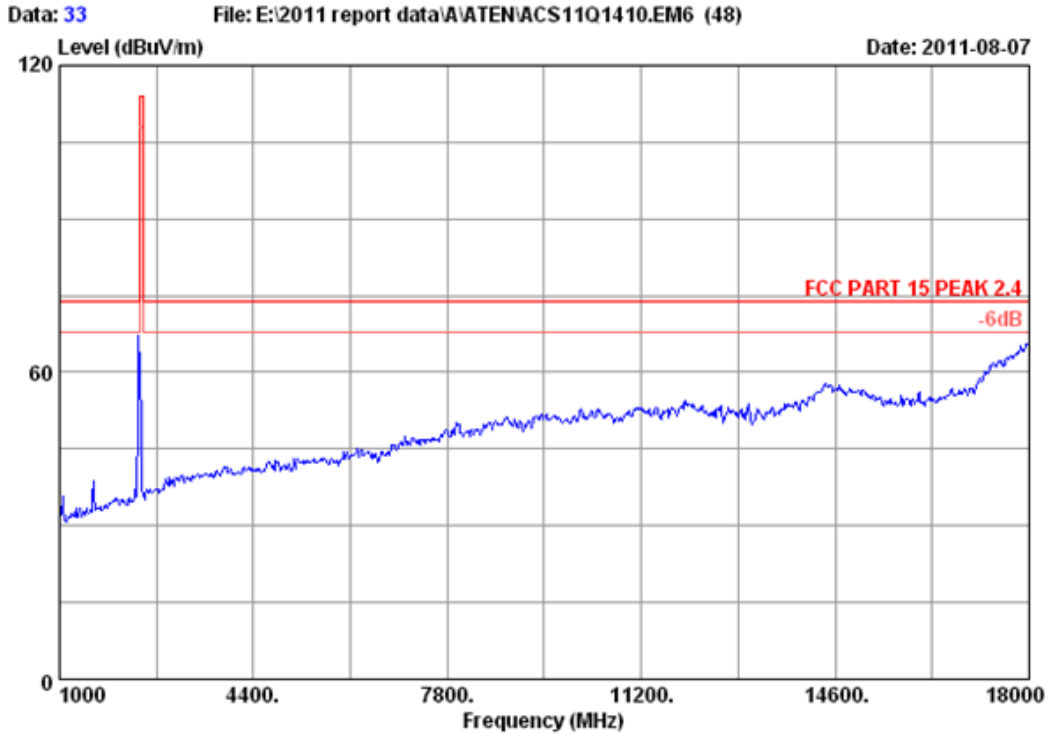


Site no. : 3m Chamber Data no. : 36  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15 PEAK 2.4  
 Env. / Ins. : 23°C/54% Engineer : Paul Tian  
 EUT : Long Range 2.4GHz Wireless Receiver  
 Power : DC 5V From PC Input AC 120V/60Hz  
 Test mode : Tx 2402MHz  
 M/N : GKM552R(R)

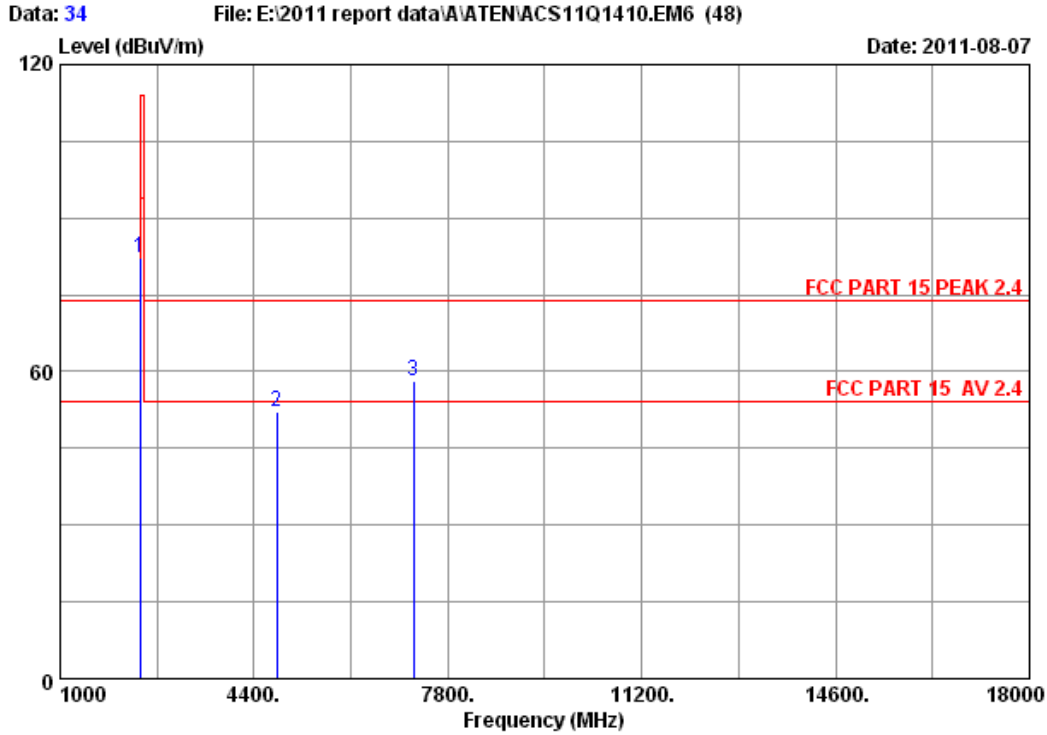
	Ant. Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Emission Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2402.000	27.96	6.75	34.44	90.78	91.05	114.00	22.95	Peak
2	4804.000	32.86	9.55	34.60	45.68	53.49	74.00	20.51	Peak
3	7206.000	35.74	11.82	34.72	46.50	59.34	74.00	14.66	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
2402	91.05	28.73	62.32	94	Pass
4804	53.49	28.73	24.76	54	Pass
7206	59.34	28.73	30.61	54	Pass



Site no. : 3m Chamber Data no. : 33  
Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : VERTICAL  
Limit : FCC PART 15 PEAK 2.4  
Env. / Ins. : 23°C/54% Engineer : Paul Tian  
EUT : Long Range 2.4GHz Wireless Receiver  
Power : DC 5V From PC Input AC 120V/60Hz  
Test mode : Tx 2402MHz  
M/N : GKM552R(R)



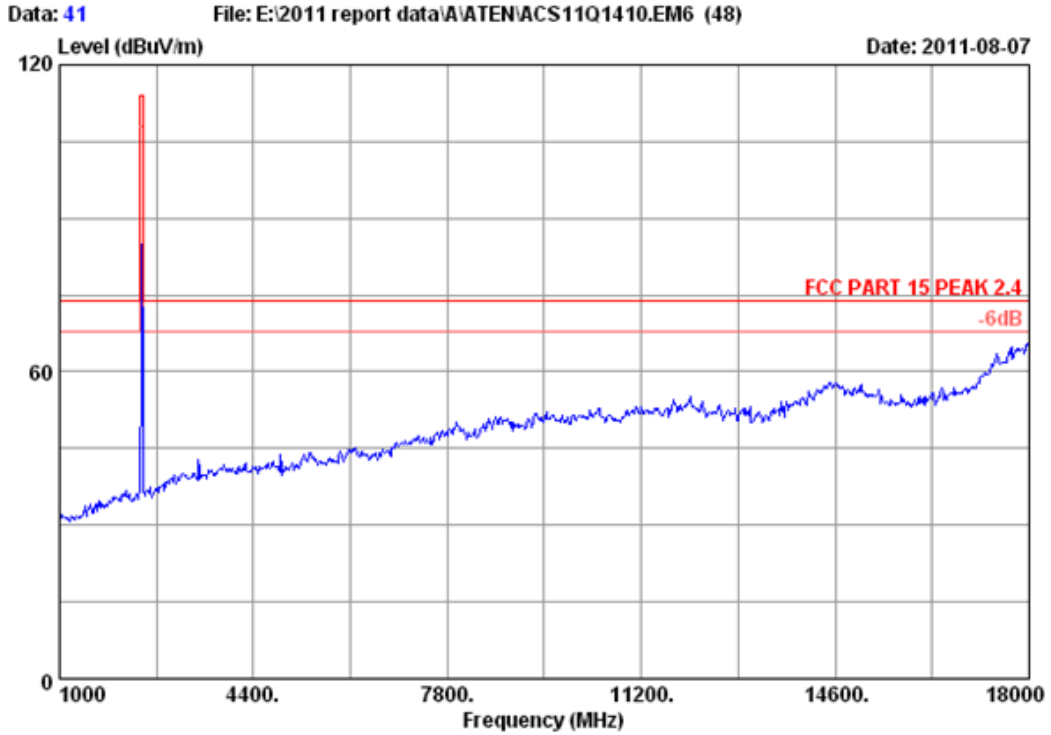
Site no. : 3m Chamber Data no. : 34  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : VERTICAL  
 Limit : FCC PART 15 PEAK 2.4  
 Env. / Ins. : 23°C/54% Engineer : Paul Tian  
 EUT : Long Range 2.4GHz Wireless Receiver  
 Power : DC 5V From PC Input AC 120V/60Hz  
 Test mode : Tx 2402MHz  
 M/N : GKM552R(R)

	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	2402.000	27.96	6.75	34.44	82.11	82.38	114.00	31.62	Peak
2	4804.000	32.86	9.55	34.60	44.37	52.18	74.00	21.82	Peak
3	7206.000	35.74	11.82	34.72	45.25	58.09	74.00	15.91	Peak

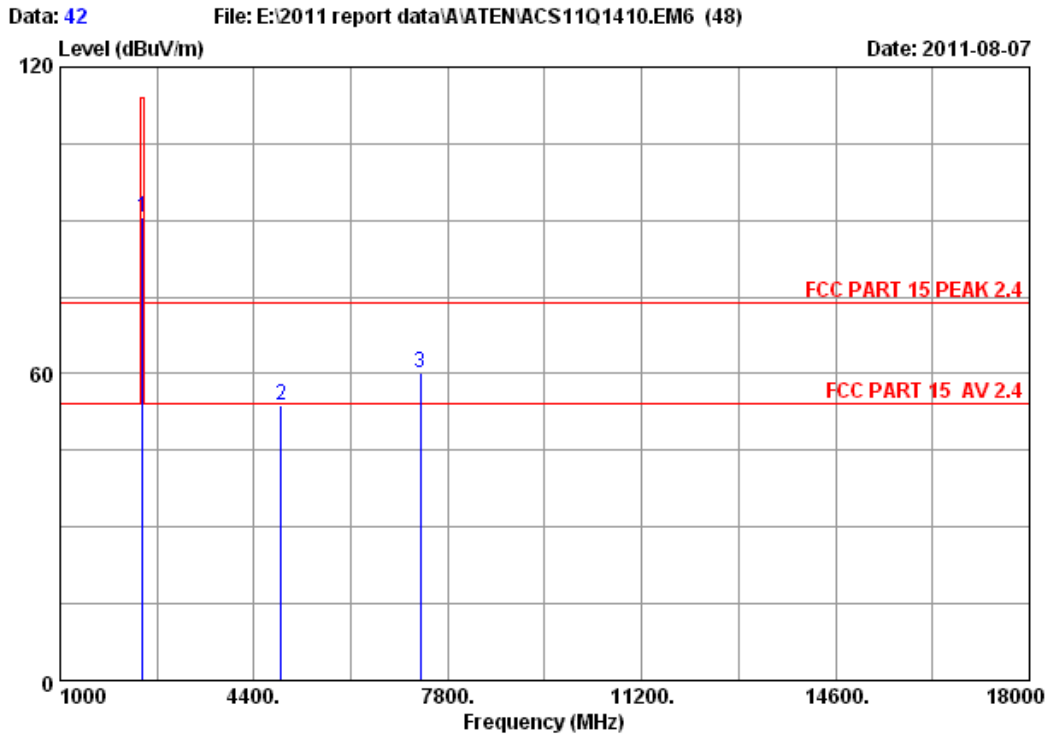
Remarks:

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
2402	82.39	28.73	53.66	94	Pass
4804	52.18	28.73	23.45	54	Pass
7206	58.09	28.73	29.36	54	Pass



Site no. : 3m Chamber Data no. : 41  
Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : HORIZONTAL  
Limit : FCC PART 15 PEAK 2.4  
Env. / Ins. : 23°C/54% Engineer : Paul Tian  
EUT : Long Range 2.4GHz Wireless Receiver  
Power : DC 5V From PC Input AC 120V/60Hz  
Test mode : Tx 2440MHz  
M/N : GKM552R(R)



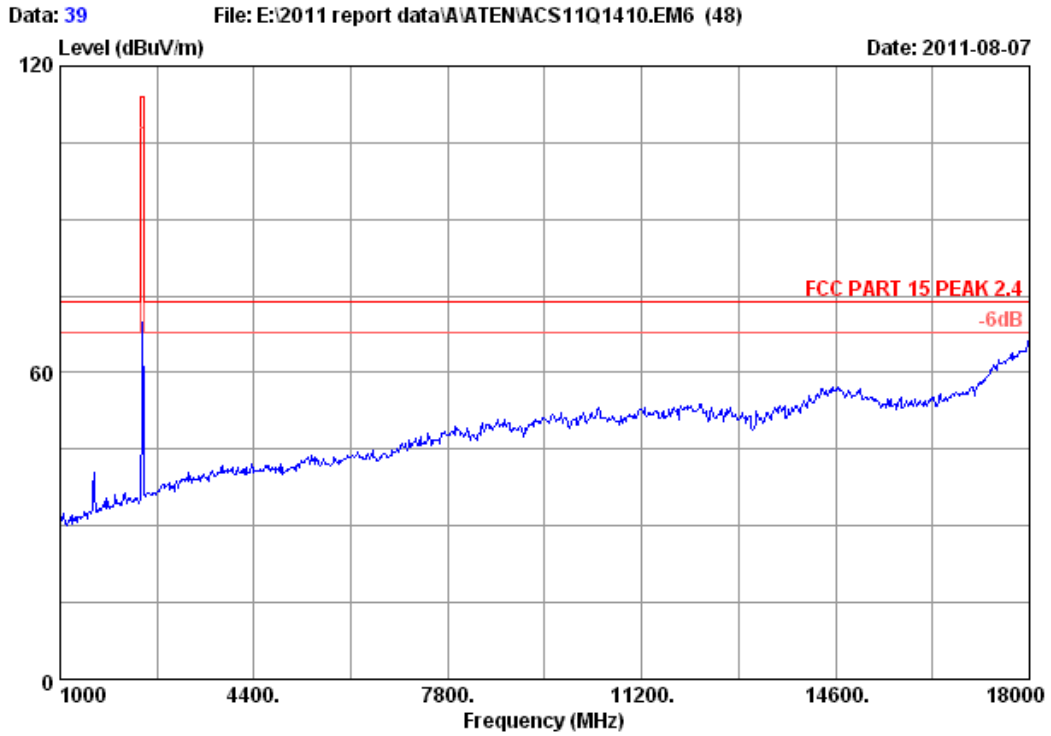
Site no. : 3m Chamber Data no. : 42  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15 PEAK 2.4  
 Env. / Ins. : 23°C/54% Engineer : Paul Tian  
 EUT : Long Range 2.4GHz Wireless Receiver  
 Power : DC 5V From PC Input AC 120V/60Hz  
 Test mode : Tx 2440MHz  
 M/N : GKM552R(R)

	Ant. Freq.	Factor	Cable loss	Amp. Factor	Emission Reading	Level	Limits	Margin	Remark
	(MHz)	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	2440.000	28.03	6.81	34.44	90.06	90.46	114.00	23.54	Peak
2	4880.000	32.98	9.62	34.60	45.73	53.73	74.00	20.27	Peak
3	7320.000	36.05	11.89	34.73	46.92	60.13	74.00	13.87	Peak

Remarks:

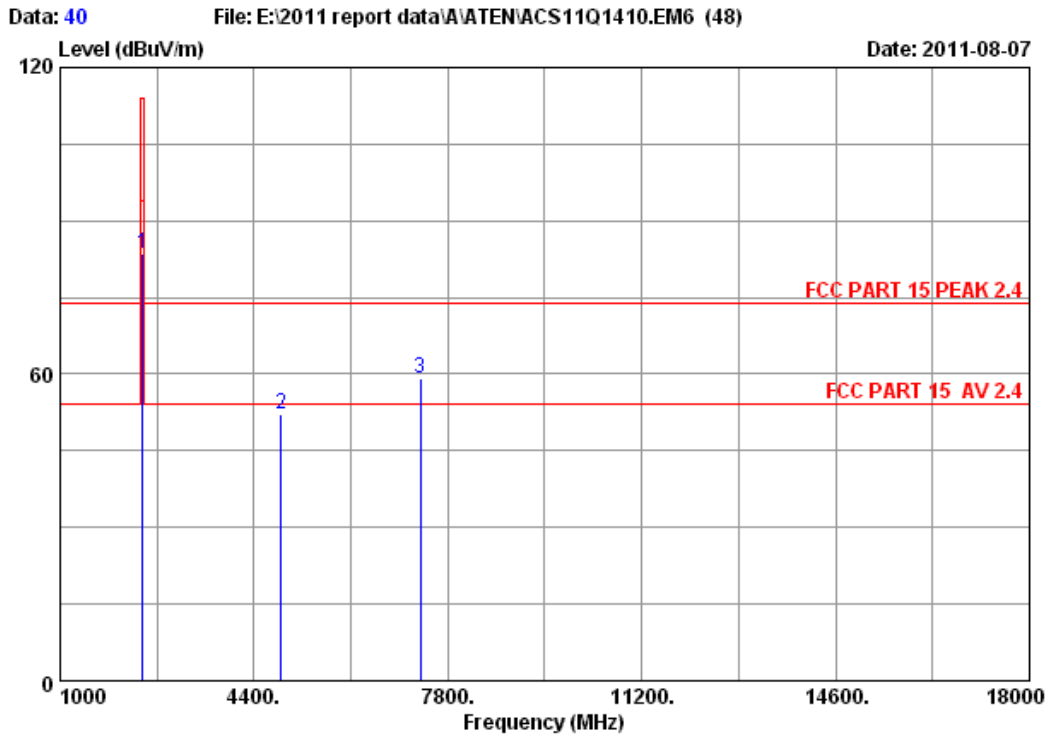
1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Frequency (MHz)	Peak level (dBuV/m)	Duty cycle factor (dB)	AV level (dBuV/m)	Limit(dBuV/m)	Conclusion
2440	90.46	28.73	61.73	94	Pass
4880	53.73	28.73	25	54	Pass
7320	60.13	28.73	31.4	54	Pass



Site no. : 3m Chamber Data no. : 39  
Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : VERTICAL  
Limit : FCC PART 15 PEAK 2.4  
Env. / Ins. : 23°C/54% Engineer : Paul Tian  
EUT : Long Range 2.4GHz Wireless Receiver  
Power : DC 5V From PC Input AC 120V/60Hz  
Test mode : Tx 2440MHz  
M/N : GKM552R(R)





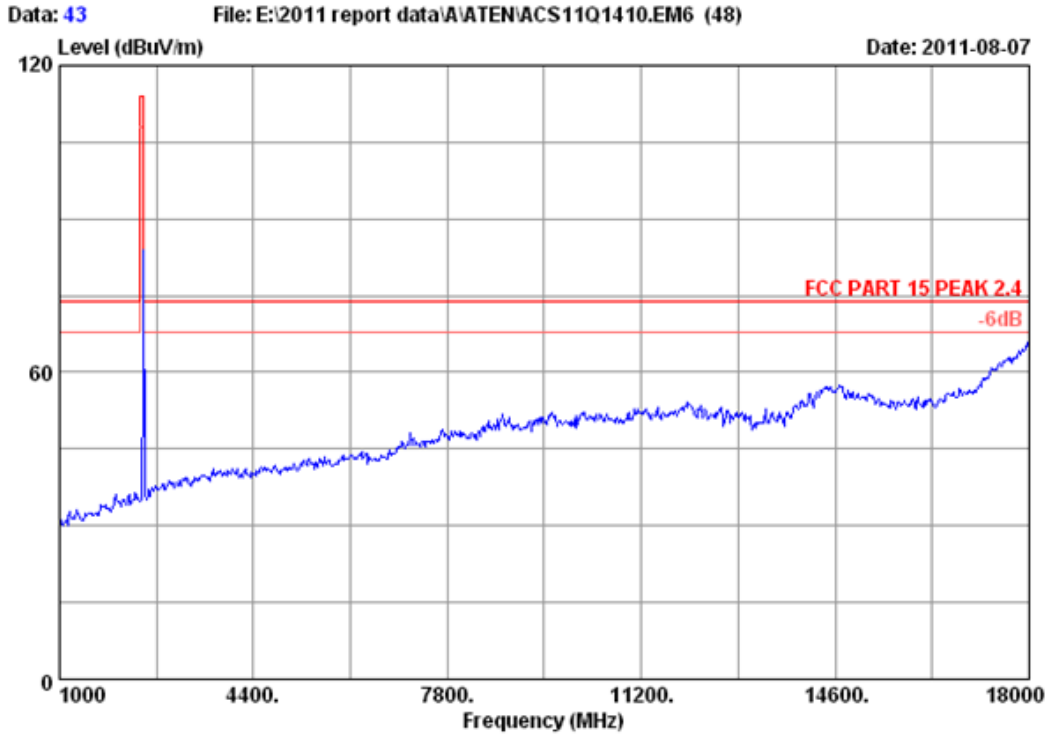
Site no. : 3m Chamber                      Data no. : 40  
 Dis. / Ant. : 3m 2011 3115 4580            Ant. pol. : VERTICAL  
 Limit : FCC PART 15 PEAK 2.4  
 Env. / Ins. : 23°C/54%                      Engineer : Paul Tian  
 EUT : Long Range 2.4GHz Wireless Receiver  
 Power : DC 5V From PC Input AC 120V/60Hz  
 Test mode : Tx 2440MHz  
 M/N : GKM552R(R)

	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	2440.000	28.03	6.81	34.44	83.02	83.42	114.00	30.58	Peak
2	4880.000	32.98	9.62	34.60	44.13	52.13	74.00	21.87	Peak
3	7320.000	36.05	11.89	34.73	45.79	59.00	74.00	15.00	Peak

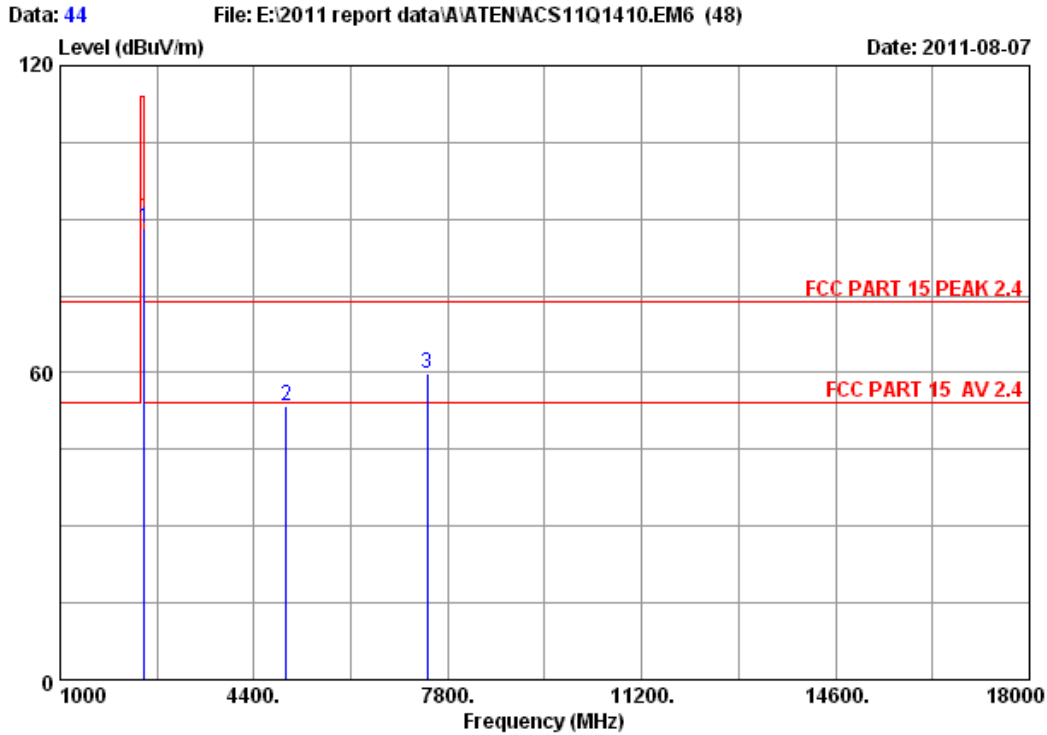
Remarks:

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
2440	83.42	28.73	54.69	94	Pass
4880	52.13	28.73	23.4	54	Pass
7320	59.00	28.73	30.27	54	Pass



Site no. : 3m Chamber Data no. : 43  
Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : HORIZONTAL  
Limit : FCC PART 15 PEAK 2.4  
Env. / Ins. : 23°C/54% Engineer : Paul Tian  
EUT : Long Range 2.4GHz Wireless Receiver  
Power : DC 5V From PC Input AC 120V/60Hz  
Test mode : Tx 2479MHz  
M/N : GKM552R(R)



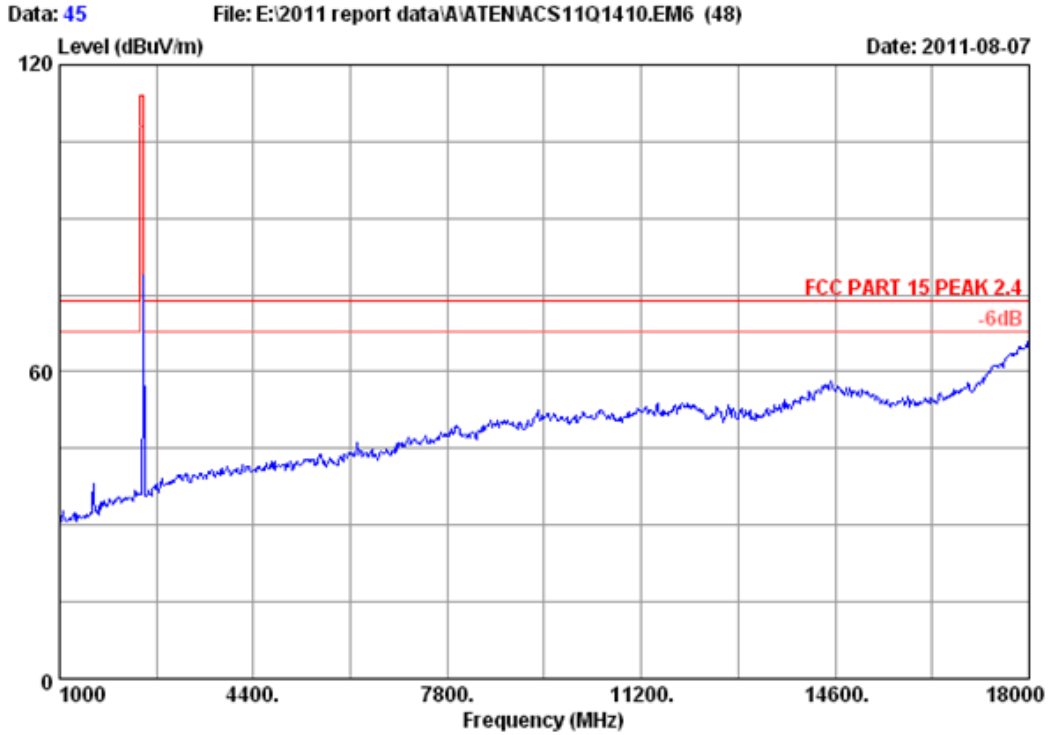
Site no. : 3m Chamber Data no. : 44  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15 PEAK 2.4  
 Env. / Ins. : 23\*C/54% Engineer : Paul Tian  
 EUT : Long Range 2.4GHz Wireless Receiver  
 Power : DC 5V From PC Input AC 120V/60Hz  
 Test mode : Tx 2479MHz  
 M/N : GKM552R(R)

	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	2479.000	28.08	6.87	34.45	87.77	88.27	114.00	25.73	Peak
2	4958.000	33.14	9.69	34.60	45.22	53.45	74.00	20.55	Peak
3	7437.000	36.37	11.95	34.74	46.18	59.76	74.00	14.24	Peak

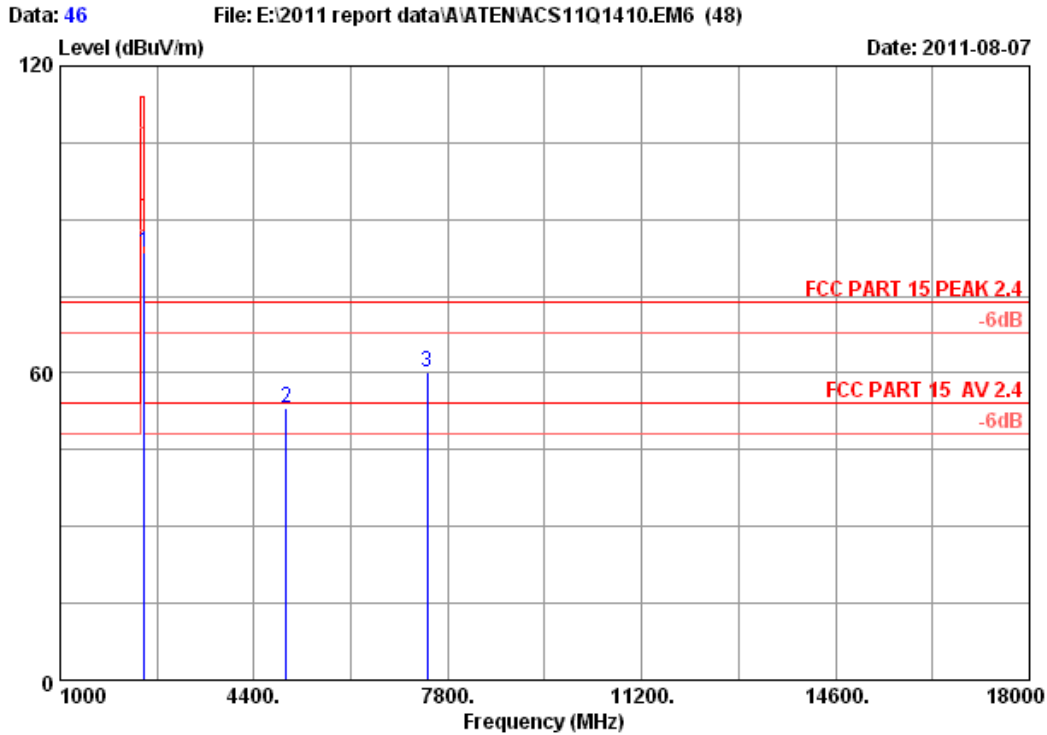
Remarks:

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
2479	88.27	28.73	59.54	94	Pass
4958	53.45	28.73	24.72	54	Pass
7437	59.76	28.73	31.03	54	Pass



Site no. : 3m Chamber Data no. : 45  
Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : VERTICAL  
Limit : FCC PART 15 PEAK 2.4  
Env. / Ins. : 23°C/54% Engineer : Paul Tian  
EUT : Long Range 2.4GHz Wireless Receiver  
Power : DC 5V From PC Input AC 120V/60Hz  
Test mode : Tx 2479MHz  
M/N : GKM552R(R)



Site no. : 3m Chamber Data no. : 46  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : VERTICAL  
 Limit : FCC PART 15 PEAK 2.4  
 Env. / Ins. : 23°C/54% Engineer : Paul Tian  
 EUT : Long Range 2.4GHz Wireless Receiver  
 Power : DC 5V From PC Input AC 120V/60Hz  
 Test mode : Tx 2479MHz  
 M/N : GKM552R(R)

	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	2479.000	28.08	6.87	34.45	83.19	83.69	114.00	30.31	Peak
2	4958.000	33.14	9.69	34.60	45.02	53.25	74.00	20.75	Peak
3	7437.000	36.37	11.95	34.74	46.44	60.02	74.00	13.98	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.

Frequency (MHz)	Peak level (dBuV/m)	Duty cycle factor (dB)	AV level (dBuV/m)	Limit(dBuV/m)	Conclusion
2479	83.69	28.73	54.96	94	Pass
4958	53.25	28.73	24.52	54	Pass
7437	60.02	28.73	31.29	54	Pass

## 5. 20 DB BANDWIDTH TEST

### 5.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	E4446A	US44300459	May.08,11	1 Year

### 5.2. Limit

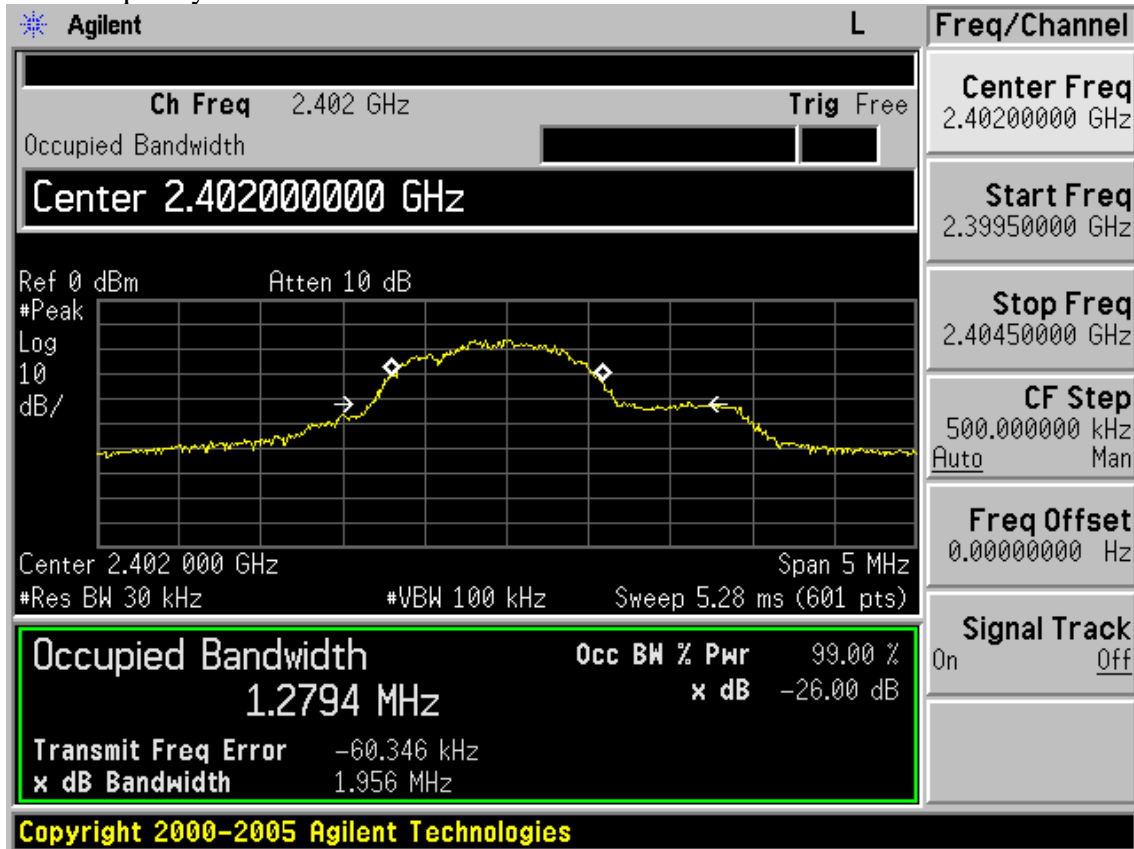
Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific 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

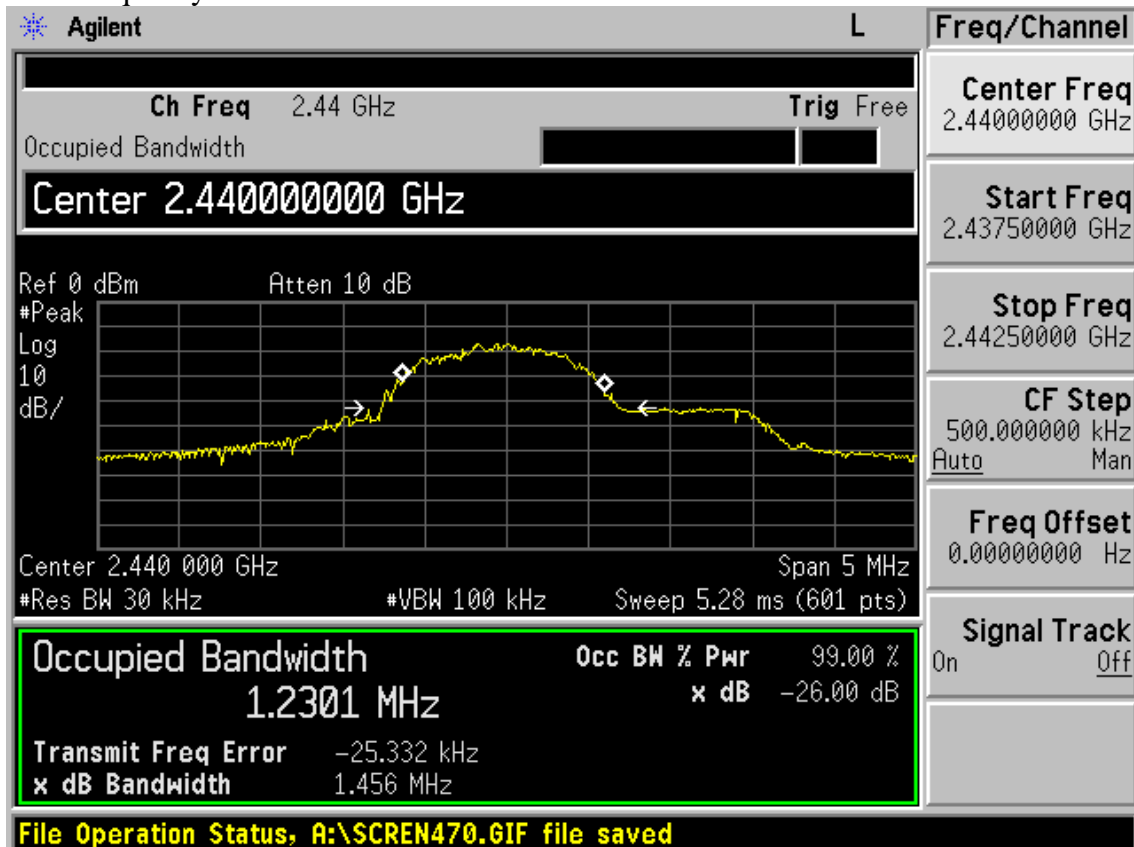
EUT: Long Range 2.4GHz Wireless Receiver		
M/N: GKM552R(R)		
Test date:2011-08-05	Pressure: 101.7 kpa	Humidity: 52 %
Tested by: Leo-Li	Test site: RF site	Temperature : 25.6 °C

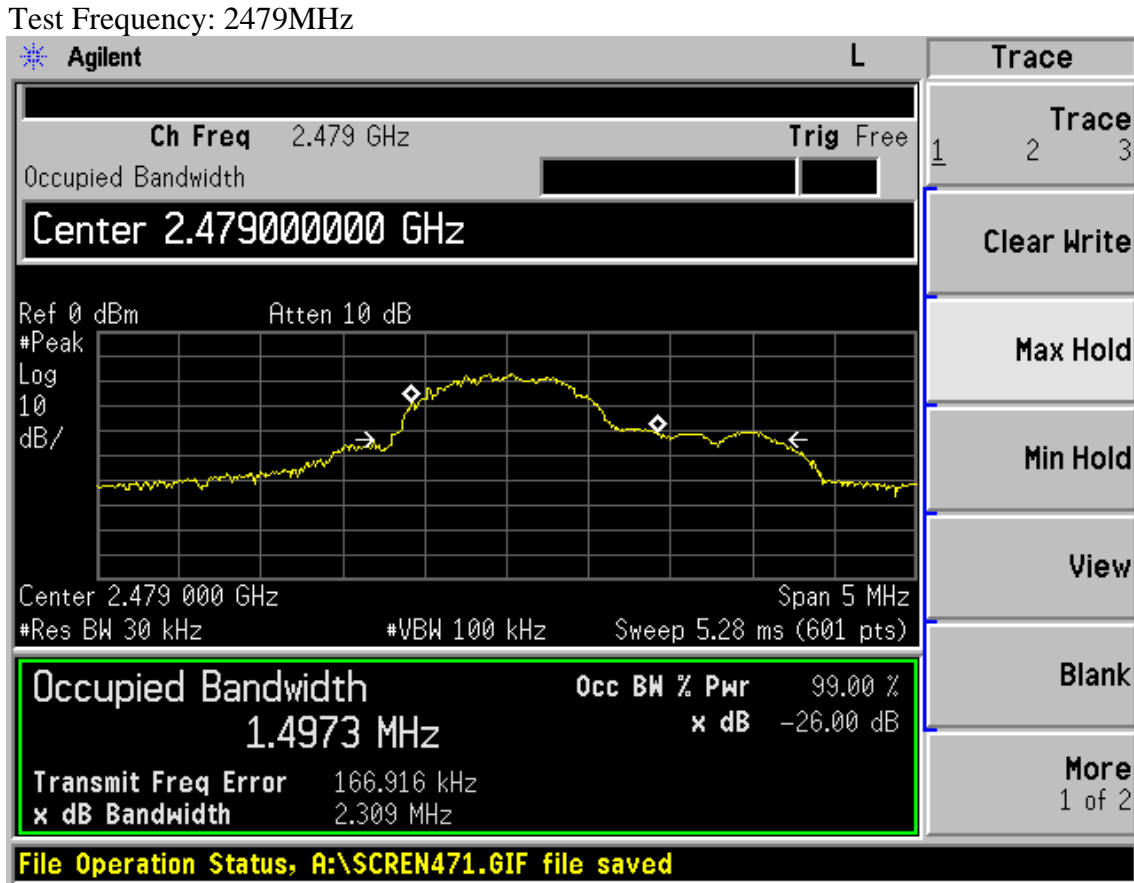
Frequency	20dB bandwidth ( KHz )	Limit (KHz)
2402MHz	1956	N/A
2440MHz	1456	N/A
2479MHz	2309	N/A
Conclusion : PASS		

Test Frequency: 2402MHz



Test Frequency: 2440MHz







## 6. BAND EDGE COMPLIANCE TEST

### 6.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	E4446A	US44300459	May.08,11	1 Year
2.	Horn Antenna	EMCO	3115	9607-4877	May.25, 11	1.5 Year
3.	Amplifier	Agilent	8449B	3008A02495	May.08, 11	1 Year
4.	RF Cable	Hubersuhner	SUCOFLEX102	28620/2	May.08,11	1 Year
5.	RF Cable	Hubersuhner	SUCOFLEX102	28618/2	May.08,11	1 Year
6.	RF Cable	Hubersuhner	SUCOFLEX102	28610/2	May.08,11	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

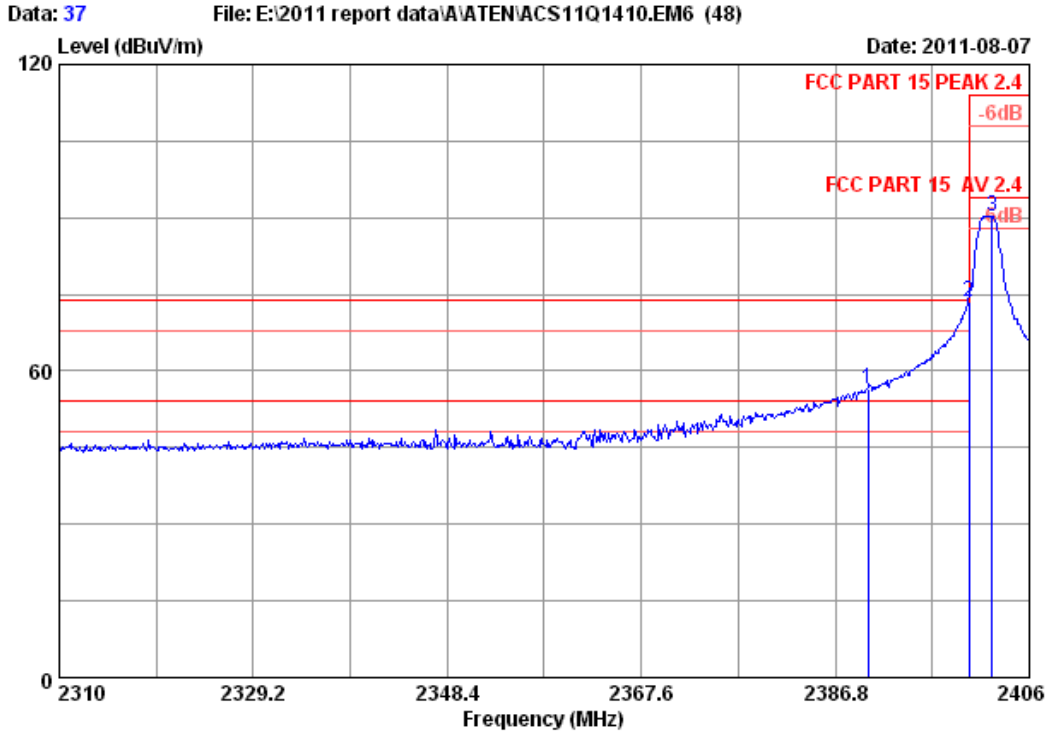
1. The EUT is placed on a turntable, which is 0.8m above the ground plane and worked at highest radiated power.
2. The turntable was rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out 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 28.73dB, 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.



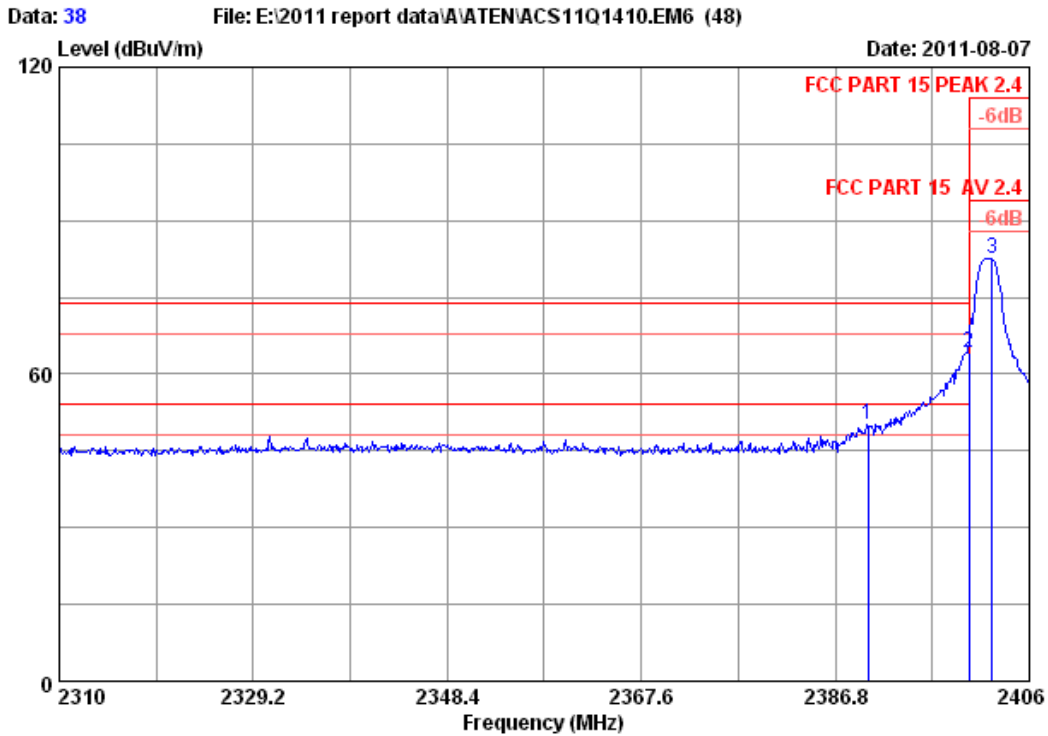
Site no. : 3m Chamber                      Data no. : 37  
 Dis. / Ant. : 3m 2011 3115 4580            Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15 PEAK 2.4  
 Env. / Ins. : 23°C/54%                      Engineer : Paul Tian  
 EUT : Long Range 2.4GHz Wireless Receiver  
 Power : DC 5V From PC Input AC 120V/60Hz  
 Test mode : Tx 2402MHz  
 M/N : GKM552R(R)

	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	2390.000	27.96	6.72	34.44	56.33	56.57	74.00	17.43	Peak
2	2400.000	27.96	6.75	34.44	73.20	73.47	74.00	0.53	Peak
3	2402.352	27.96	6.75	34.44	89.90	90.17	114.00	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.

Frequency (MHz)	Peak level (dBUV/m)	Duty cycle factor (dB)	AV level (dBUV/m)	Limit(dBUV/m)	Conclusion
2390.000	56.57	28.73	27.84	94	Pass
2400.000	73.47	28.73	44.74	54	Pass
2402.352	90.17	28.73	61.44	54	Pass



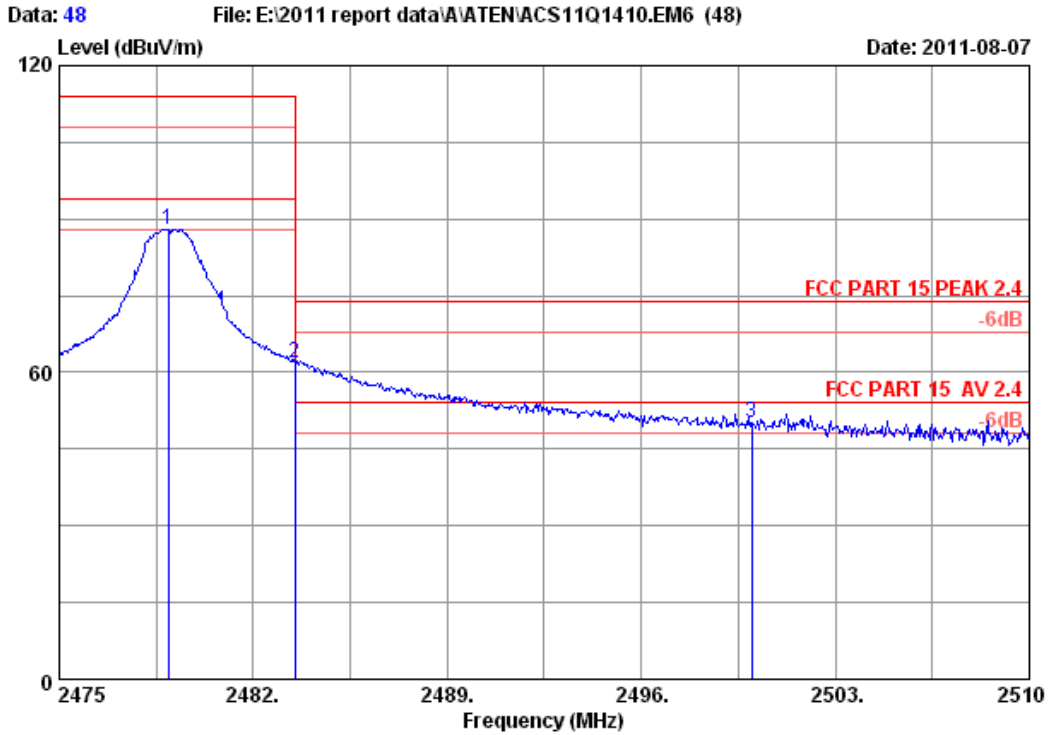
Site no. : 3m Chamber Data no. : 38  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : VERTICAL  
 Limit : FCC PART 15 PEAK 2.4  
 Env. / Ins. : 23°C/54% Engineer : Paul Tian  
 EUT : Long Range 2.4GHz Wireless Receiver  
 Power : DC 5V From PC Input AC 120V/60Hz  
 Test mode : Tx 2402MHz  
 M/N : GKM552R(R)

	Ant. Freq. (MHz)	Cable Factor (dB/m)	Amp. Factor (dB)	Emission Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	27.96	6.72	34.44	49.74	74.00	24.02	Peak
2	2400.000	27.96	6.75	34.44	63.96	74.00	9.77	Peak
3	2402.352	27.96	6.75	34.44	82.30	114.00	31.43	Peak

Remarks:

- Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
- 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
2390.000	49.98	28.73	21.25	94	Pass
2400.000	64.23	28.73	35.5	54	Pass
2402.350	82.57	28.73	53.84	54	Pass



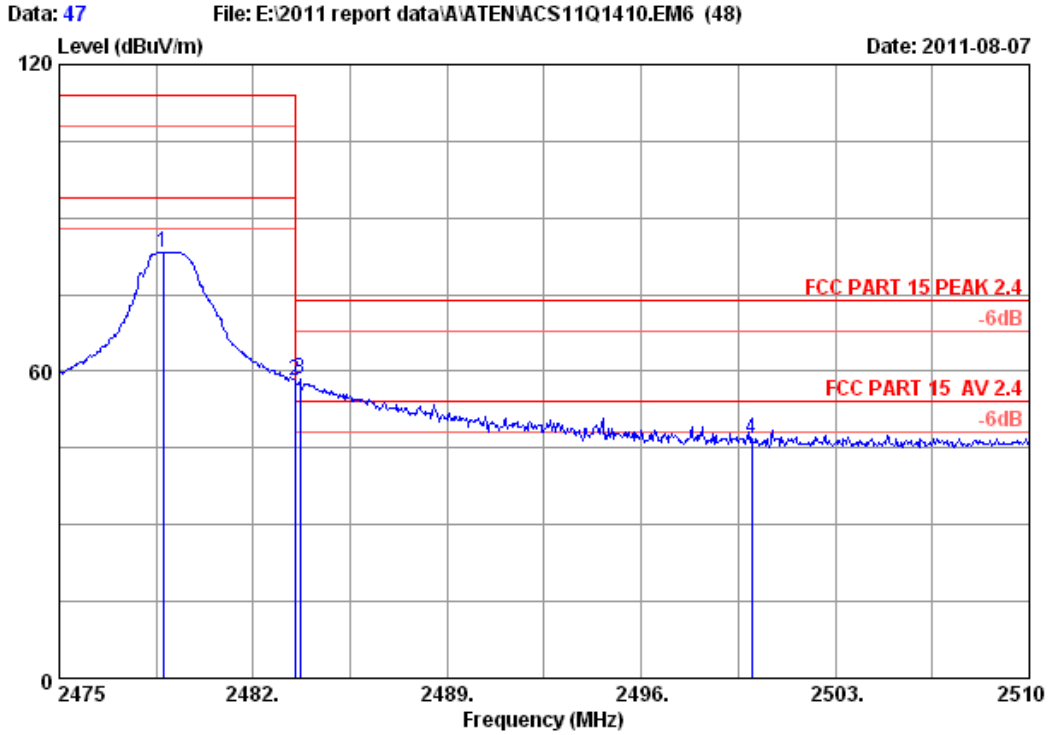
Site no. : 3m Chamber Data no. : 48  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15 PEAK 2.4  
 Env. / Ins. : 23\*C/54% Engineer : Paul Tian  
 EUT : Long Range 2.4GHz Wireless Receiver  
 Power : DC 5V From PC Input AC 120V/60Hz  
 Test mode : Tx 2479MHz  
 M/N : GKM552R(R)

	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	2478.920	28.08	6.87	34.45	87.36	87.86	114.00	26.14	Peak
2	2483.500	28.08	6.90	34.45	61.42	61.95	74.00	12.05	Peak
3	2500.000	28.10	6.90	34.45	49.44	49.99	74.00	24.01	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.

Frequency (MHz)	Peak level (dBuV/m)	Duty cycle factor (dB)	AV level (dBuV/m)	Limit(dBuV/m)	Conclusion
2478.920	87.86	28.73	59.13	94	Pass
2483.500	61.95	28.73	33.22	54	Pass
2500	49.99	28.73	21.26	54	Pass



Site no. : 3m Chamber Data no. : 47  
 Dis. / Ant. : 3m 2011 3115 4580 Ant. pol. : VERTICAL  
 Limit : FCC PART 15 PEAK 2.4  
 Env. / Ins. : 23°C/54% Engineer : Paul Tian  
 EUT : Long Range 2.4GHz Wireless Receiver  
 Power : DC 5V From PC Input AC 120V/60Hz  
 Test mode : Tx 2479MHz  
 M/N : GKM552R(R)

	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	2478.745	28.08	6.87	34.45	82.71	83.21	114.00	30.79	Peak
2	2483.500	28.08	6.90	34.45	57.59	58.12	74.00	15.88	Peak
3	2483.680	28.08	6.90	34.45	57.93	58.46	74.00	15.54	Peak
4	2500.000	28.10	6.90	34.45	46.15	46.70	74.00	27.30	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
2478.745	83.21	28.73	54.48	94	Pass
2483.500	58.12	28.73	29.39	54	Pass
2483.680	58.46	28.73	29.73	54	Pass
2500.000	46.70	28.73	17.97	54	Pass

## 7. ANTENNA REQUIREMENT

**RESULT** : **PASS**

Test Date : Aug.07, 2011

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  $< 60/f(\text{GHz})\text{mW}$ ,  
i.e.  $0.009346\text{mW} < 25(=60/2.4)\text{mW}$ , hence the EUT is excluded from SAR evaluation according  
to FCC KDB Publication 447498 D01:Mobile Portable RF Exposure



## 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]