



FCC PART 15C TEST REPORT FOR CERTIFICATION

On Behalf of

G. tech Technology Ltd.

2.4GHz Wireless Keyboard

Model Number:KB313W

FCC ID: OO9KB313W

Prepared for : G. tech Technology Ltd.  
No.21, Jinding Industrial Park, West Jinfeng Road,  
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Guangdong

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Report Number : ACS-F15011  
Date of Test : Mar.24~26, 2015  
Date of Report : Apr.20, 2015

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**TEST REPORT CERTIFICATION**

Applicant : G. tech Technology Ltd.  
Manufacturer : G.tech Technology Ltd.  
EUT Description : 2.4GHz Wireless Keyboard  
FCC ID : 009KB313W  
(A) MODEL NO. : KB313W  
(B) SERIAL NO. : N/A  
(C) POWER SUPPLY : DC 1.5V  
(D) TEST VOLTAGE : DC 1.5V

Tested for comply with:  
FCC Rules and Regulations Part 15 Subpart C: 2014

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 : Mar.24~26, 2015 Report of date: Apr.20, 2015

Prepared by : Lisa Liang Reviewed by : Sunny Lu  
Lisa Liang / Assistant Sunny Lu / Assistant Manager



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: David Jin

Approved &amp; Authorized Signer :

David Jin / 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<br>ANSI C63.10-2009                         | N/A     |
| Radiated Emission Test                     | FCC Part 15C: 15.209<br>FCC Part 15C: 15.249<br>ANSI C63.10-2009 | PASS    |
| Band Edge Compliance Test                  | FCC Part 15: 15.249<br>ANSI C63.10-2009                          | PASS    |
| 20dB Bandwidth Test                        | FCC Part 15: 15.215<br>ANSI C63.10-2009                          | PASS    |
| N/A is an abbreviation for Not Applicable. |                                                                  |         |

## 2. GENERAL INFORMATION

### 2.1. Description of Device (EUT)

Product Name : 2.4GHz Wireless Keyboard

Model Number : KB313W

FCC ID : OO9KB313W

Operation frequency : 2402MHz-2479MHz

Antenna : Integrated Onboard antenna, 0dBi gain

Modulation : GFSK

Applicant : G. tech Technology Ltd.  
No.21, Jinding Industrial Park, West Jinfeng Road,  
Tangjiawan Town, Xiangzhou District Zhuhai  
Guangdong

Manufacturer : G. tech Technology Ltd.  
No.21, Jinding Industrial Park, West Jinfeng Road,  
Tangjiawan Town, Xiangzhou District Zhuhai  
Guangdong

Date of Test : Mar.24~26, 2015

Date of Receipt : Mar.22, 2015

Sample Type : Prototype production

### 2.2. EUT Configuration and operation conditions for test.

EUT

**( EUT: 2.4GHz Wireless Keyboard)**

## 2.3. Test Facility

### Site Description

|                           |   |                                                                                                                                                     |
|---------------------------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| Name of Firm              | : | Audix Technology (Shenzhen) Co., Ltd.<br>No. 6, Ke Feng Rd., 52 Block, Shenzhen<br>Science & Industrial Park, Nantou, Shenzhen,<br>Guangdong, China |
| 3m Anechoic Chamber       | : | Certificated by FCC, USA<br>Registration Number: 90454<br>Valid Date: Dec.30, 2017                                                                  |
| 3m & 10m Anechoic Chamber | : | Certificated by FCC, USA<br>Registration Number: 794232<br>Valid Date: Oct.31, 2015                                                                 |
| EMC Lab.                  | : | Certificated by Industry Canada<br>Registration Number: IC 5183A-1<br>Valid Date: May.14, 2017                                                      |
|                           | : | Certificated by DAkkS, Germany<br>Registration No: D-PL-12151-01-00<br>Valid Date: Dec.15, 2016                                                     |
|                           | : | Accredited by NVLAP, USA<br>NVLAP Code: 200372-0<br>Valid Date: Mar.31, 2016                                                                        |

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

| Test Item                                                             | Uncertainty                    |
|-----------------------------------------------------------------------|--------------------------------|
| Uncertainty for Radiation Emission test<br>in 3m chamber              | 3.3 dB(30~200MHz, Polarize: H) |
|                                                                       | 3.3 dB(30~200MHz, Polarize: V) |
|                                                                       | 3.5 dB(200M~1GHz, Polarize: H) |
|                                                                       | 3.4 dB(200M~1GHz, Polarize: V) |
| Uncertainty for Radiation Emission test in<br>3m chamber (1GHz-18GHz) | 5.0 dB (1~6GHz, Distance: 3m)  |
|                                                                       | 5.0 dB (6~18GHz, Distance: 3m) |
| Uncertainty for Radiated Spurious<br>Emission test in RF chamber      | 3.6 dB                         |
| Uncertainty for Conduction Spurious<br>emission test                  | 2.0 dB                         |
| Uncertainty for Output power test                                     | 0.8 dB                         |
| Uncertainty for Bandwidth test                                        | 83 kHz                         |
| Uncertainty for DC power test                                         | 0.1 %                          |
| Uncertainty for test site temperature and<br>humidity                 | 0.6℃                           |
|                                                                       | 3%                             |

### **3. POWER LINE CONDUCTED EMISSION TEST**

According to Paragraph (c) of FCC Part 15 section 15.207, Tests to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.

## 4. RADIATED EMISSION TEST

### 4.1. Test Equipment

Frequency rang: 30~1000MHz

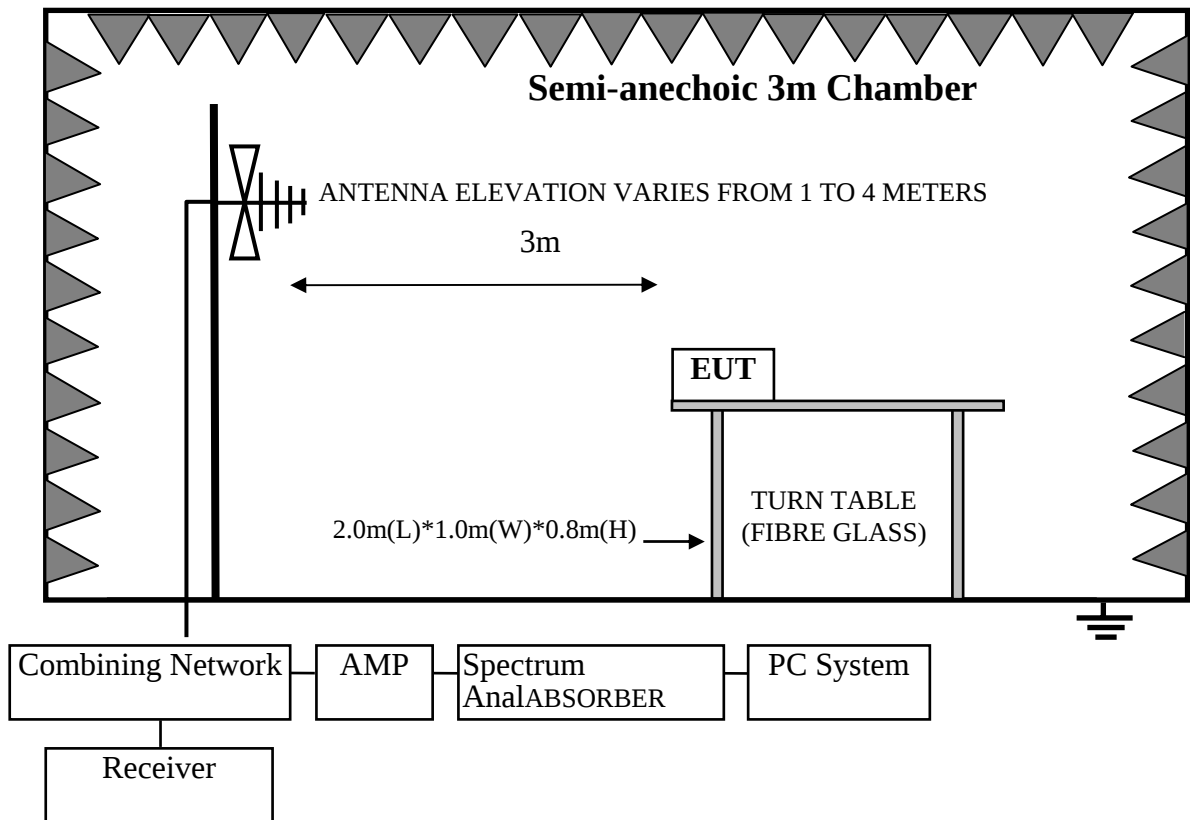
| Item | Equipment      | Manufacturer    | Model No. | Serial No.         | Last Cal. | Cal. Interval |
|------|----------------|-----------------|-----------|--------------------|-----------|---------------|
| 1.   | 3#Chamber      | AUDIX           | N/A       | N/A                | Nov.23,14 | 1 Year        |
| 2.   | EMI Spectrum   | Agilent         | E4407B    | MY41440292         | Apr.28,14 | 1 Year        |
| 3.   | Test Receiver  | Rohde & Schwarz | ESVS10    | 834468/011         | Apr.28,14 | 1 Year        |
| 4.   | Amplifier      | HP              | 8447D     | 2648A04738         | Apr.28,14 | 1 Year        |
| 5.   | Bilog Antenna  | TESEQ           | CBL6112D  | 35375              | Jun.18,14 | 1 Year        |
| 6.   | RF Cable       | MIYAZAKI        | CFD400-NL | 3# Chamber<br>No.1 | Apr.28,14 | 1 Year        |
| 7.   | Coaxial Switch | Anritsu         | MP59B     | 6200313662         | Apr.28,14 | 1 Year        |
| 8.   | Test Software  | AUDIX           | E3        | 6.2009-5-21a(n)    | N/A       | N/A           |

Frequency rang: above 1000MHz

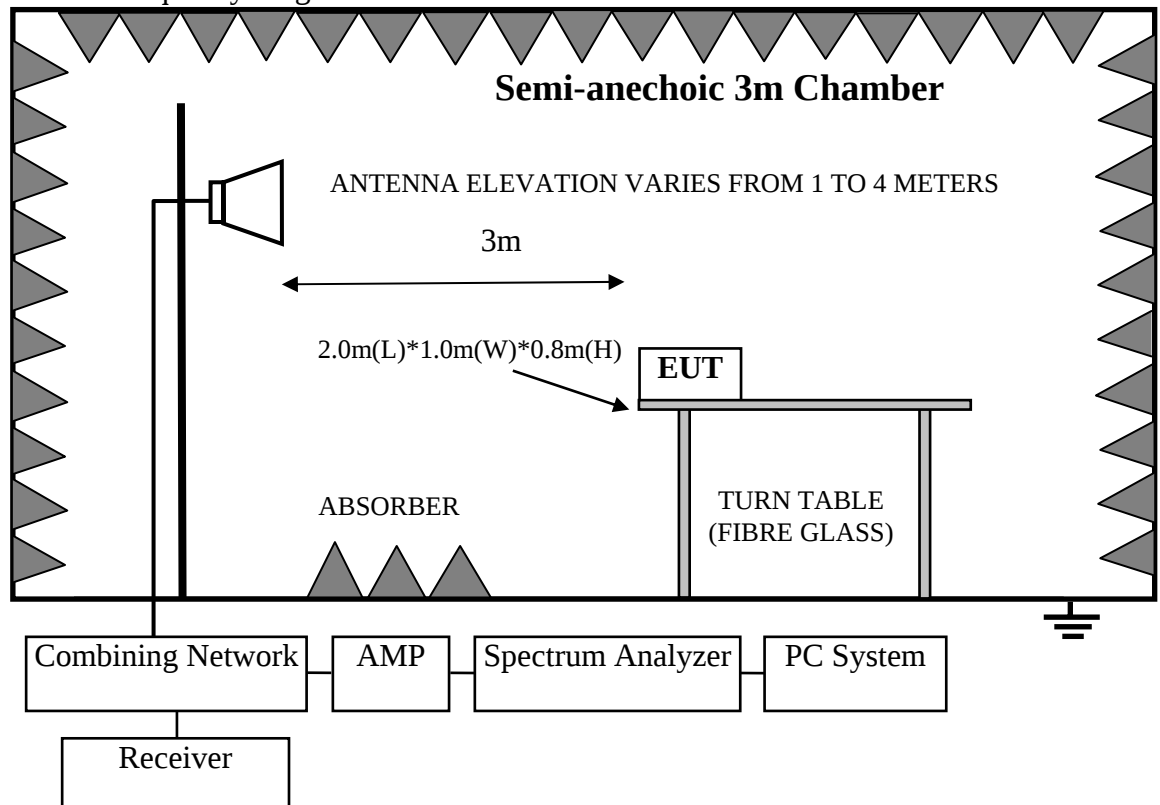
| Item | Equipment         | Manufacturer | Model No.   | Serial No. | Last Cal.  | Cal. Interval |
|------|-------------------|--------------|-------------|------------|------------|---------------|
| 1.   | 3#Chamber         | AUDIX        | N/A         | N/A        | Nov.02, 14 | 1 Year        |
| 2.   | Spectrum Analyzer | Agilent      | E4407B      | MY41440292 | Apr. 28,14 | 1 Year        |
| 3.   | Horn Antenna      | ETS          | 3115        | 9607-4877  | Sep.20, 14 | 1 Year        |
| 4.   | Amplifier         | Agilent      | 8449B       | 3008A00863 | Apr. 28,14 | 1 Year        |
| 5.   | RF Cable          | Hubersuhner  | SUCOFLEX106 | 77977/6    | Apr. 28,14 | 1 Year        |
| 6.   | RF Cable          | Hubersuhner  | SUCOFLEX106 | 28616/2    | Apr. 28,14 | 1 Year        |
| 7.   | Horn Antenna      | ETS          | 3116        | 00060089   | Sep.20, 14 | 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<br>MHz                                                   | DISTANCE<br>Meters | FIELD STRENGTHS LIMIT                                                                              |                                   |
|--------------------------------------------------------------------|--------------------|----------------------------------------------------------------------------------------------------|-----------------------------------|
|                                                                    |                    | $\mu\text{V/m}$                                                                                    | $\text{dB}(\mu\text{V})/\text{m}$ |
| 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 $\text{dB}(\mu\text{V})/\text{m}$ (Peak)<br>54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)  |                                   |
| Field Strength of<br>fundamental emissions for<br>2.4GHz-2.4835GHz | 3                  | 114.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak)<br>94.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average) |                                   |

- Remark :
- (1) Emission level  $\text{dB}\mu\text{V} = 20 \log$  Emission level  $\mu\text{V/m}$
  - (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.

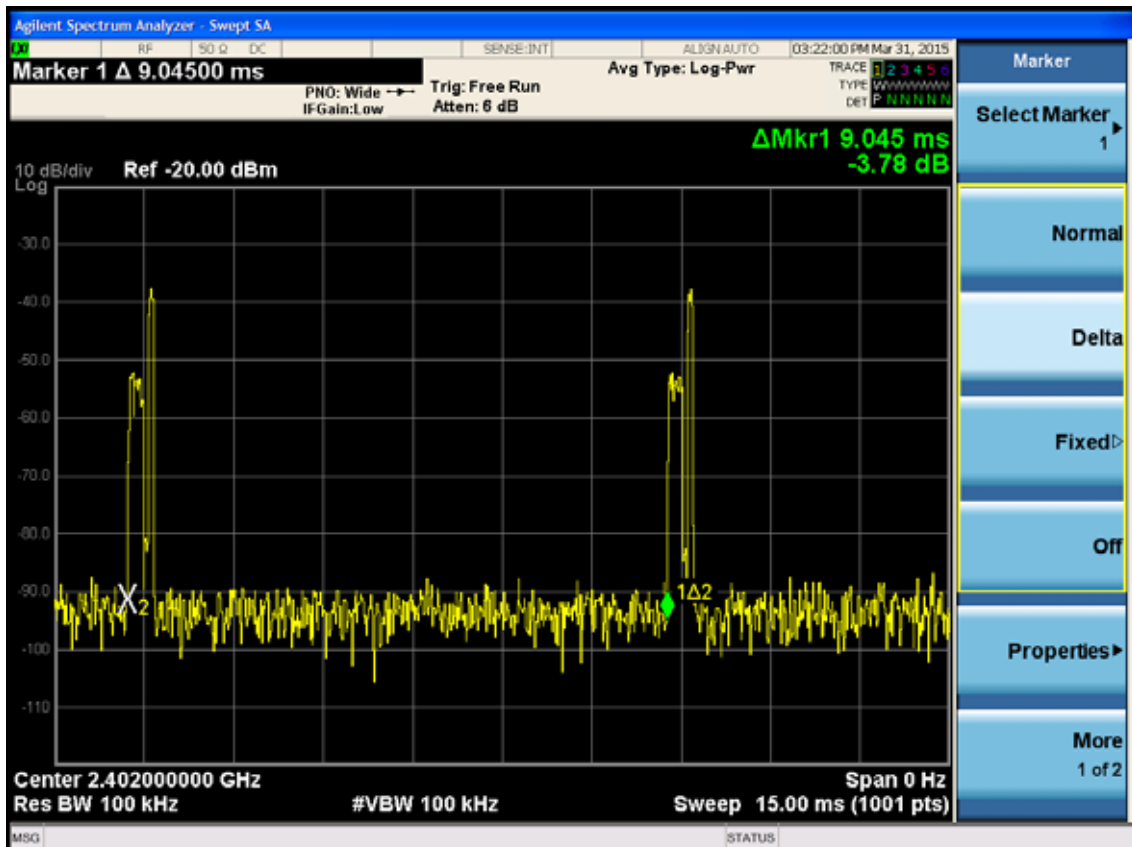
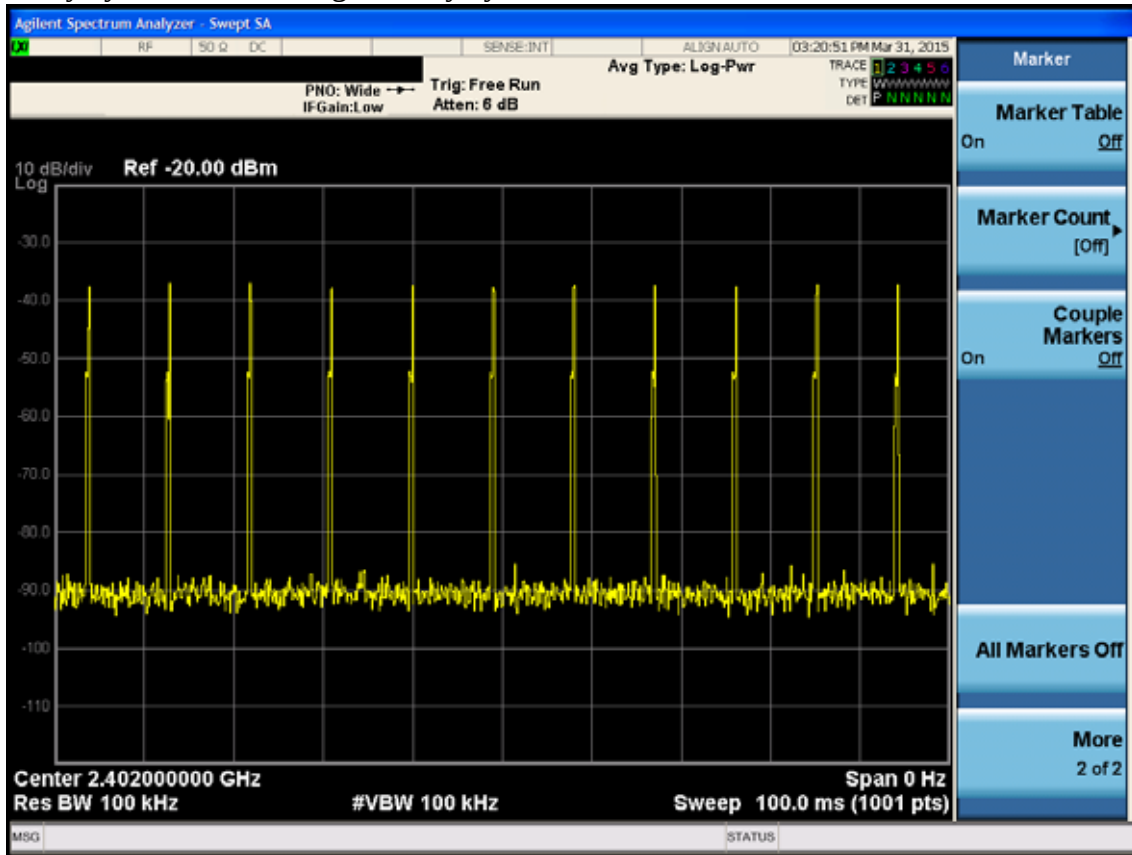
#### 4.7.Radiated Emission Test Results

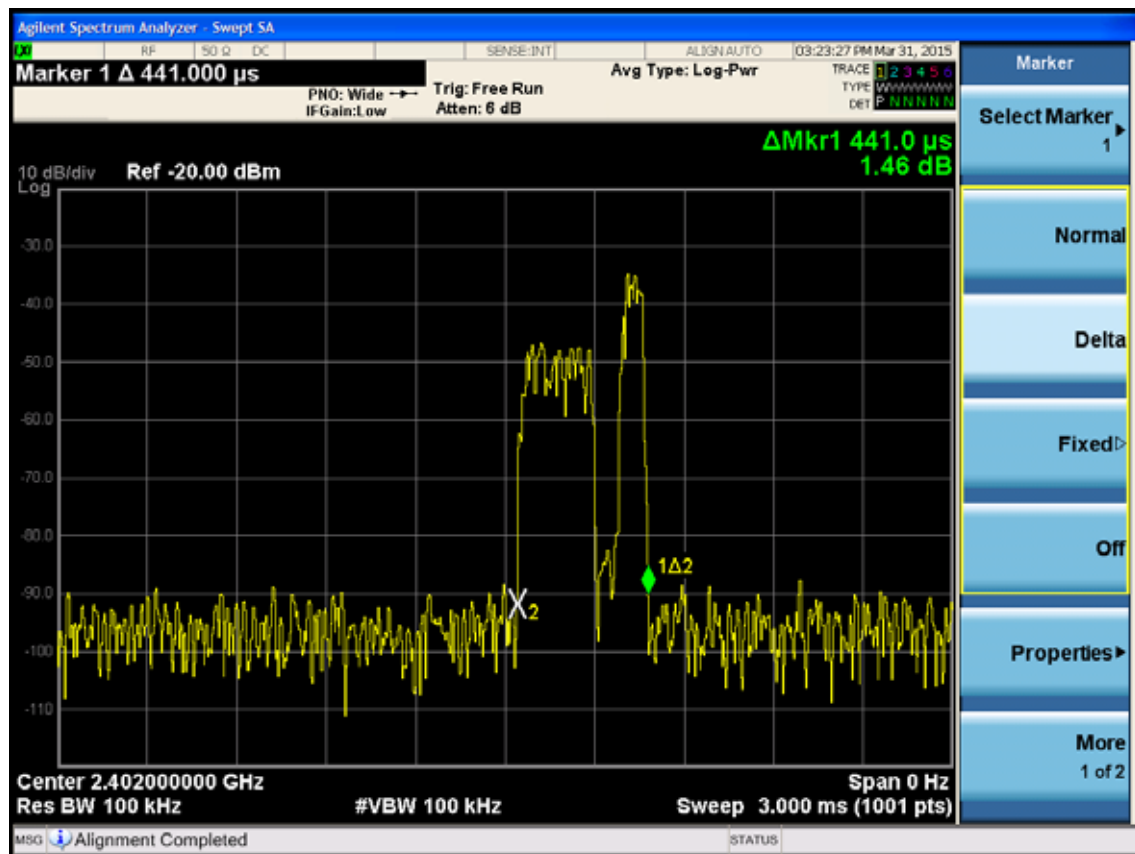
**PASS.**

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

Note: The duty cycle factor for calculate average level is 26.24 dB, and average limit is 20dB below peak limit, so if peak measured level comply with average limit, the average level was deemed to comply with average limit.

Duty cycle factor =  $20\log (1/\text{duty cycle}) = 26.24$



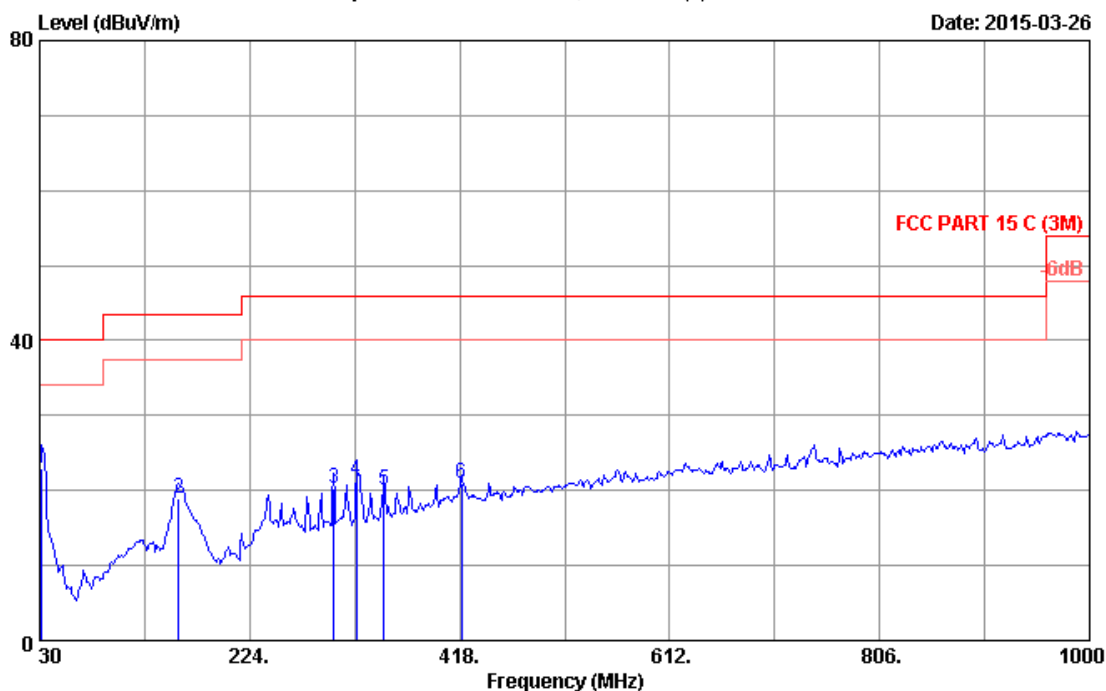


# Frequency: 30MHz~1GHz

Data: 2

File: E:\2015 Report Data\T\TCL\ACS15Q0503.EM6 (2)

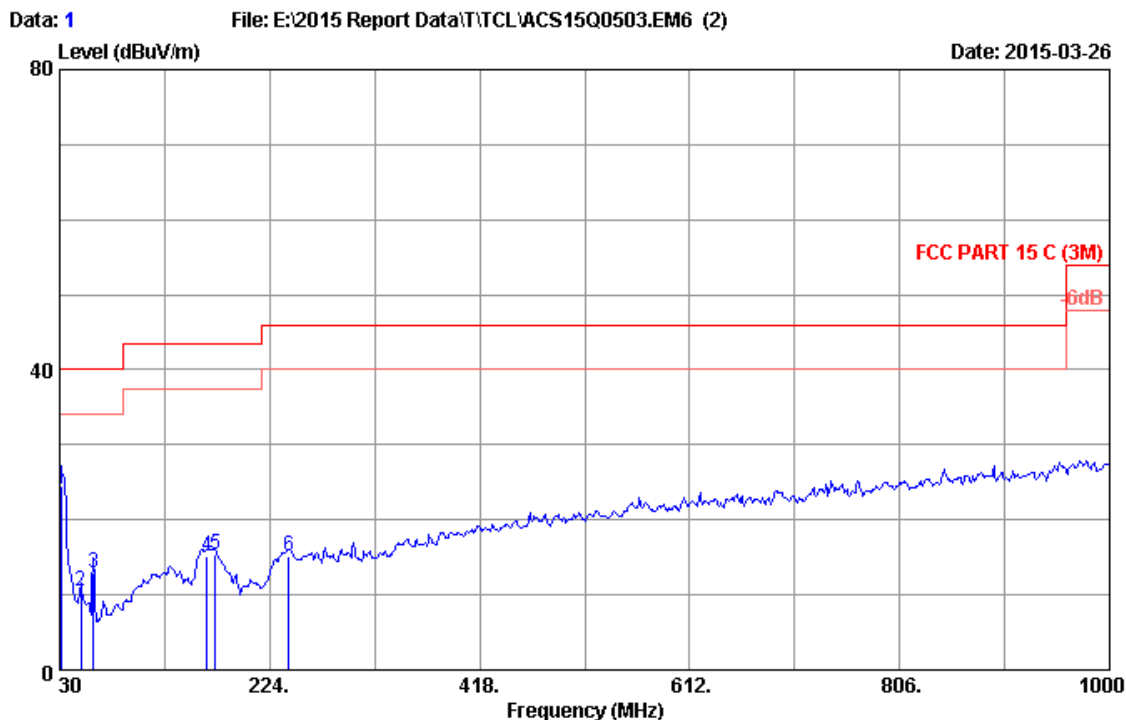
Date: 2015-03-26



Site no. : 3m Chamber Data no. : 2  
Dis. / Ant. : 3m 2014 CBL6112D 35375 Ant. pol. : HORIZONTAL  
Limit : FCC PART 15 C (3M)  
Env. / Ins. : 24°C/56% Engineer : Donjon\_Huang  
EUT : 2.4GHz Wireless Keyboard  
Power rating : DC 1.5V  
Test Mode : Tx Mode  
M/N: KB313W

| No. | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|----------------|--------------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1   | 31.94          | 18.82                    | 0.62                  | 3.58              | 23.02                         | 40.00              | 16.98          | QP     |
| 2   | 158.04         | 11.00                    | 1.59                  | 6.28              | 18.87                         | 43.50              | 24.63          | QP     |
| 3   | 301.60         | 14.03                    | 2.28                  | 4.03              | 20.34                         | 46.00              | 25.66          | QP     |
| 4   | 322.94         | 14.42                    | 2.41                  | 4.63              | 21.46                         | 46.00              | 24.54          | QP     |
| 5   | 348.16         | 15.35                    | 2.55                  | 2.19              | 20.09                         | 46.00              | 25.91          | QP     |
| 6   | 419.94         | 17.30                    | 2.90                  | 0.80              | 21.00                         | 46.00              | 25.00          | 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 2014 CBL6112D 35375 Ant. pol. : VERTICAL  
 Limit : FCC PART 15 C (3M)  
 Env. / Ins. : 24°C/56% Engineer : Donjon\_Huang  
 EUT : 2.4GHz Wireless Keyboard  
 Power rating : DC 1.5V  
 Test Mode : Tx Mode  
 M/N: KB313W

| No. | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|----------------|--------------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1   | 31.94          | 18.82                    | 0.62                  | 5.18              | 24.62                         | 40.00              | 15.38          | QP     |
| 2   | 49.40          | 8.94                     | 0.77                  | 0.87              | 10.58                         | 40.00              | 29.42          | QP     |
| 3   | 61.04          | 6.40                     | 0.87                  | 5.56              | 12.83                         | 40.00              | 27.17          | QP     |
| 4   | 165.80         | 10.41                    | 1.64                  | 3.01              | 15.06                         | 43.50              | 28.44          | QP     |
| 5   | 173.56         | 9.84                     | 1.69                  | 3.83              | 15.36                         | 43.50              | 28.14          | QP     |
| 6   | 241.46         | 12.45                    | 2.04                  | 0.63              | 15.12                         | 46.00              | 30.88          | QP     |

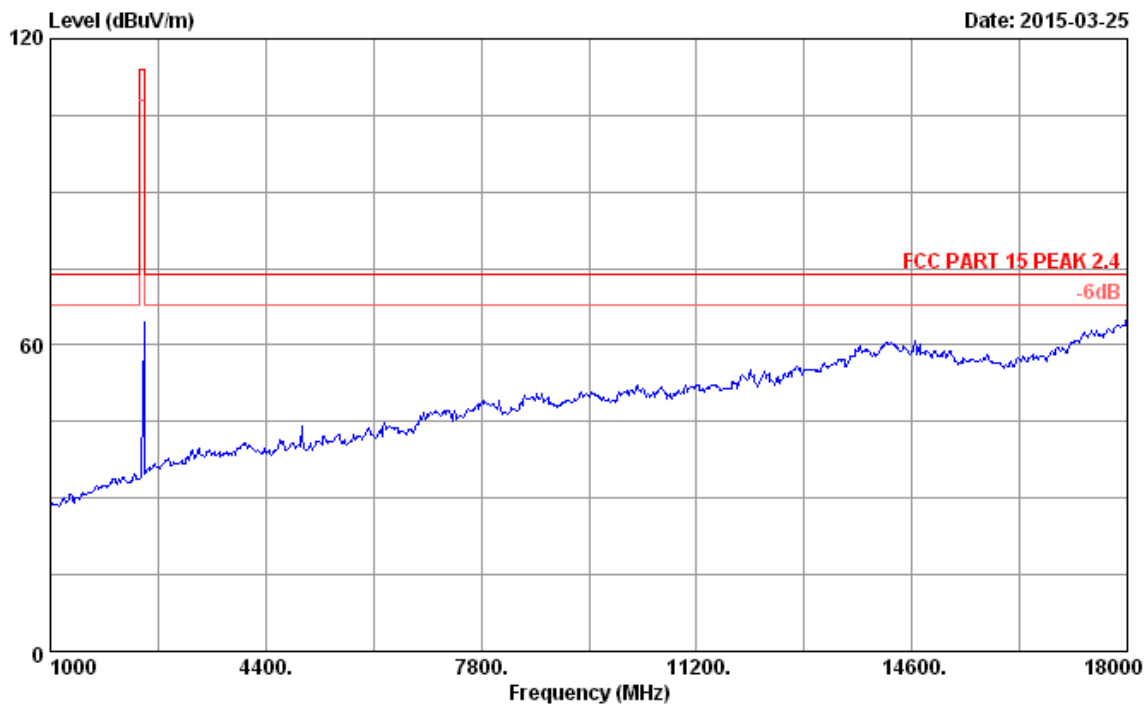
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

# Frequency: 1GHz~18GHz

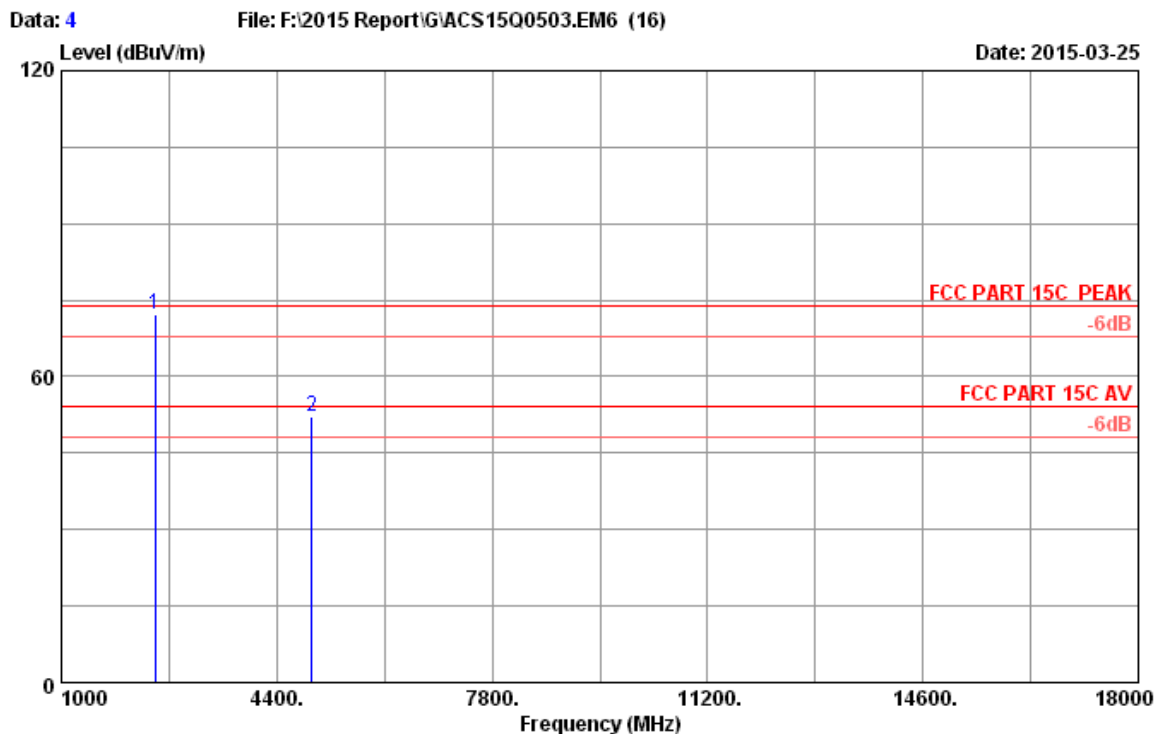
Data: 3

File: F:\2015 Report\G\ACS1500503.EM6 (16)

Date: 2015-03-25



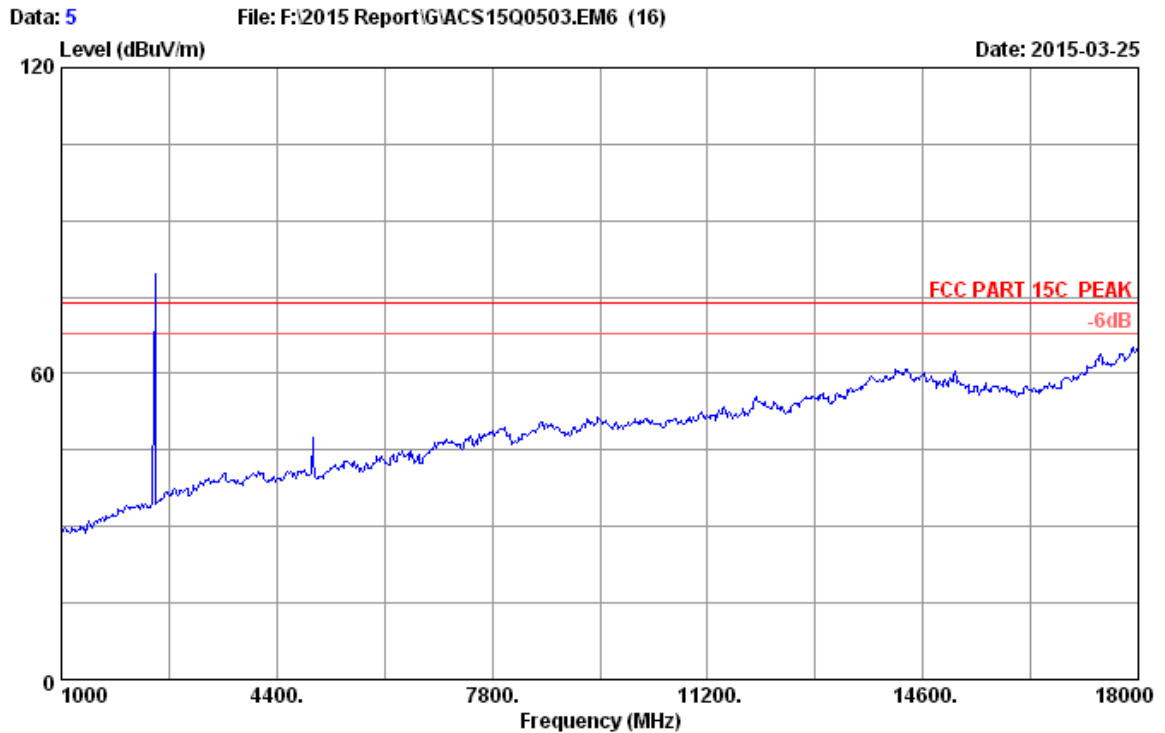
Site no. : 3m Chamber  
Dis. / Ant. : 3m 2014 3115 (4580)  
Limit : FCC PART 15 PEAK 2.4  
Env. / Ins. : 23°C/54%  
Engineer : Black-Yan  
EUT : 2.4GHz Wireless Keyboard  
Power rating : DC 1.5V  
Test Mode : 2479MHz Tx Mode  
M/N : KB313W



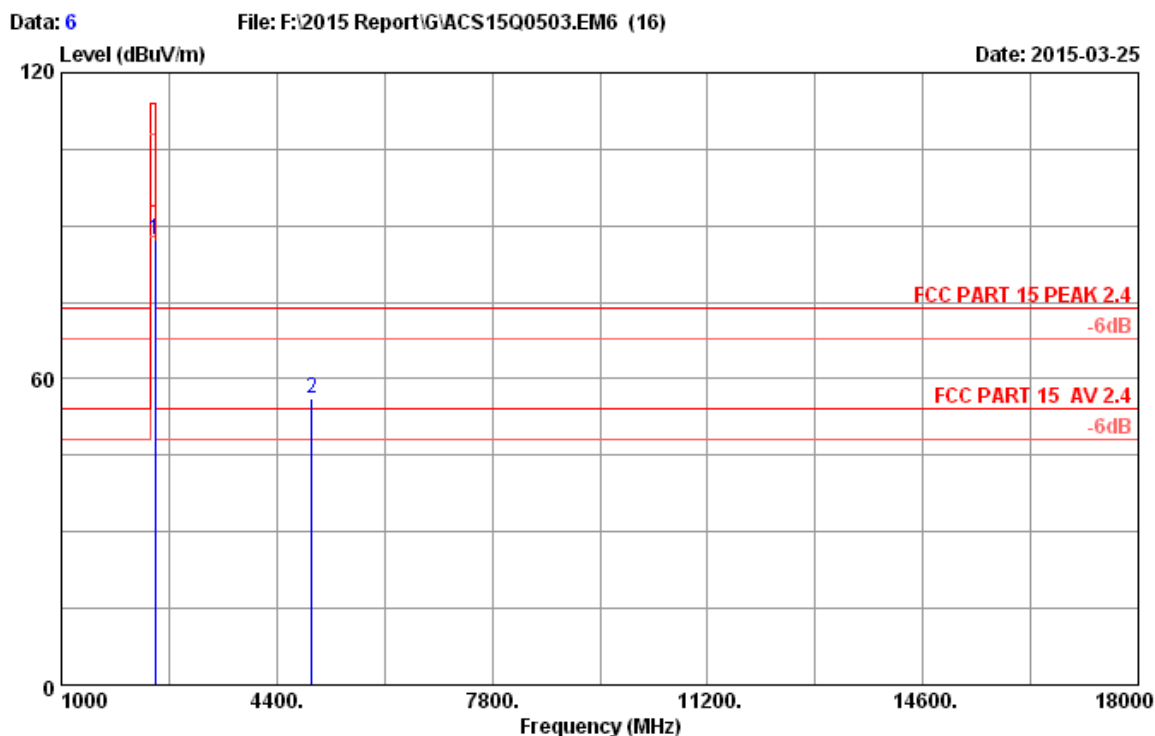
Site no. : 3m Chamber Data no. : 4  
 Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : 23°C/54%  
 Engineer : Black-Yan  
 EUT : 2.4GHz Wireless Keyboard  
 Power rating : DC 1.5V  
 Test Mode : 2479MHz Tx Mode  
 M/N : KB313W

| No. | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | AMP<br>factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1   | 2479.000       | 28.35                    | 5.91                  | 35.70                 | 73.55             | 72.11                         | 74.00              | 1.89           | Peak   |
| 2   | 4958.000       | 33.12                    | 8.72                  | 35.70                 | 46.09             | 52.23                         | 74.00              | 21.77          | Peak   |

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



Site no. : 3m Chamber Data no. : 5  
Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : HORIZONTAL  
Limit : FCC PART 15C PEAK  
Env. / Ins. : 23°C/54%  
Engineer : Black-Yan  
EUT : 2.4GHz Wireless Keyboard  
Power rating : DC 1.5V  
Test Mode : 2479MHz Tx Mode  
M/N : KB313W

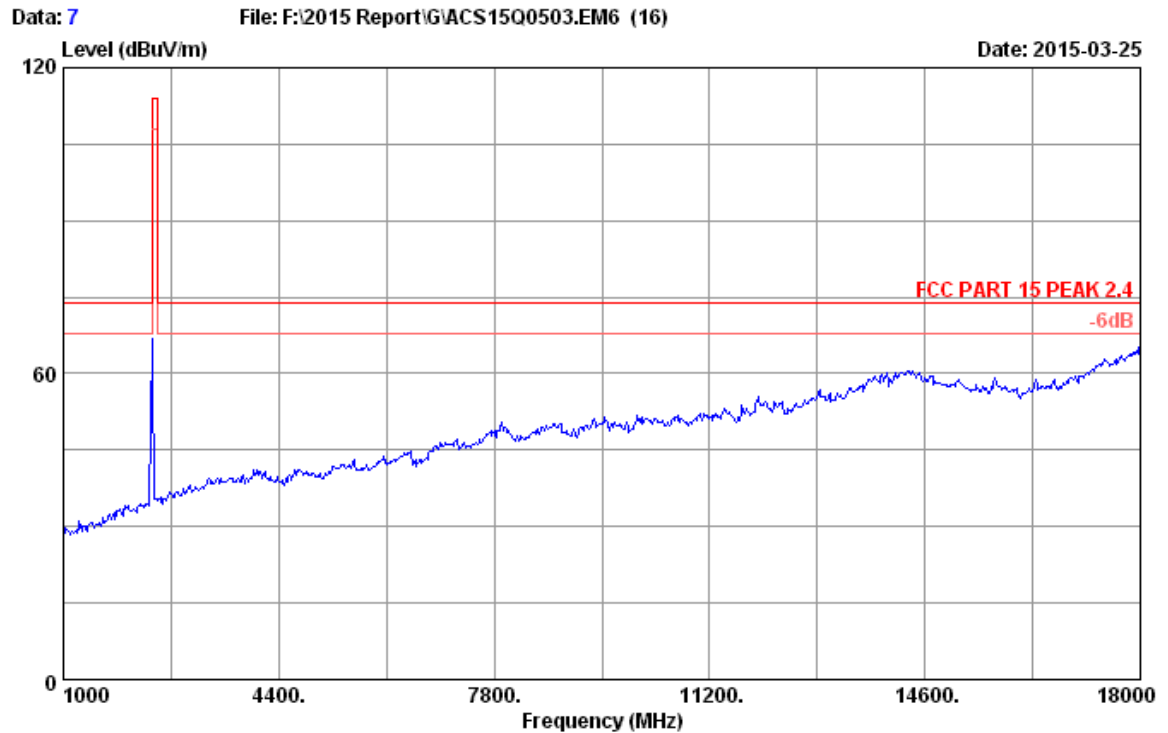


Site no. : 3m Chamber Data no. : 6  
Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : HORIZONTAL  
Limit : FCC PART 15 PEAK 2.4  
Env. / Ins. : 23°C/54%  
Engineer : Black-Yan  
EUT : 2.4GHz Wireless Keyboard  
Power rating : DC 1.5V  
Test Mode : 2479MHz Tx Mode  
M/N : KB313W

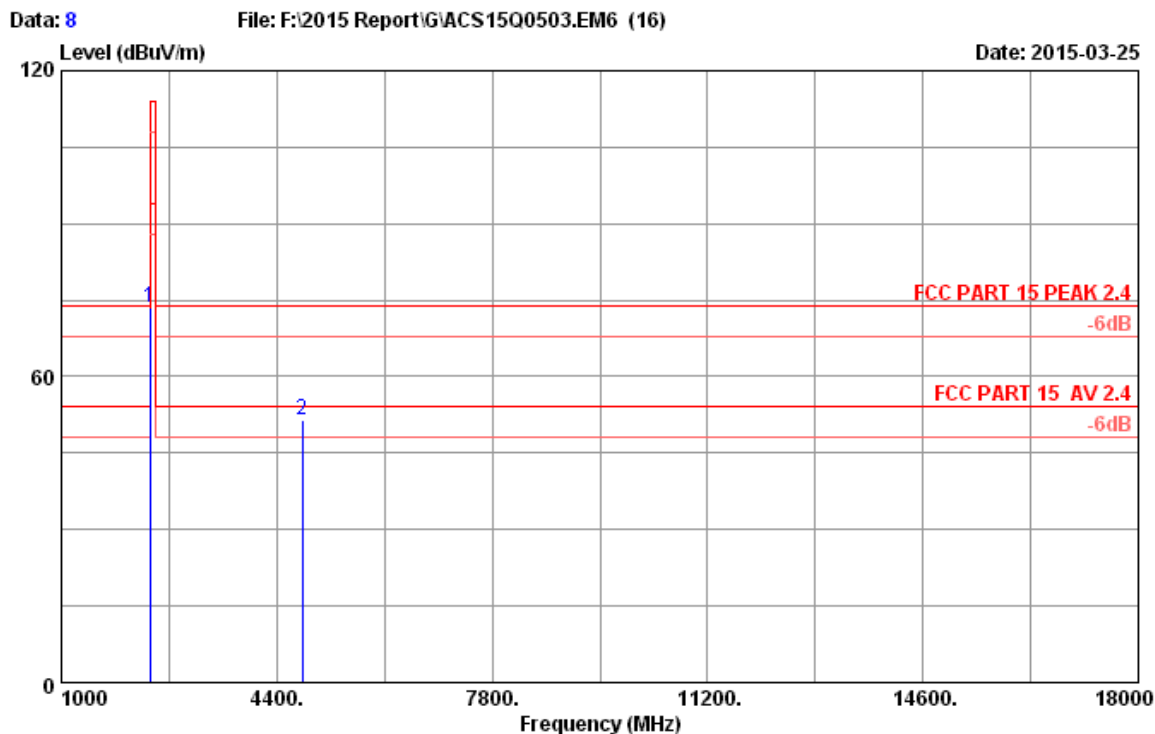
| No. | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | AMP<br>factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1   | 2479.000       | 28.35                    | 5.91                  | 35.70                 | 88.70             | 87.26                         | 114.00             | 26.74          | Peak   |
| 2   | 4958.000       | 33.12                    | 8.72                  | 35.70                 | 49.97             | 56.11                         | 74.00              | 17.89          | Peak   |

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

| Frequency<br>(MHz) | Peak level<br>(dBuV/m) | Duty cycle factor<br>(dB) | AV level<br>(dBuV/m) | Limit(dBuV/m) | Conclusion |
|--------------------|------------------------|---------------------------|----------------------|---------------|------------|
| 4958.000           | 56.11                  | 26.24                     | 29.87                | 54            | Pass       |



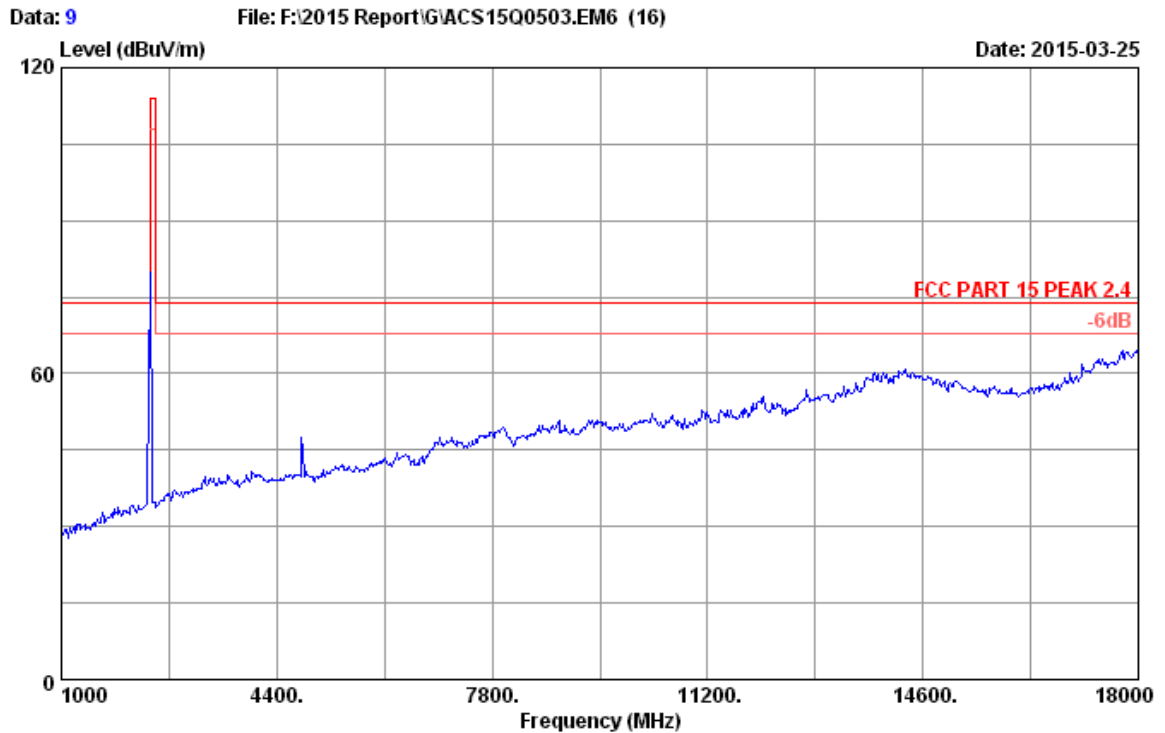
|              |                            |           |            |
|--------------|----------------------------|-----------|------------|
| Site no.     | : 3m Chamber               | Data no.  | : 7        |
| Dis. / Ant.  | : 3m 2014 3115 (4580)      | Ant. pol. | : VERTICAL |
| Limit        | : FCC PART 15 PEAK 2.4     |           |            |
| Env. / Ins.  | : 23°C/54%                 |           |            |
| Engineer     | : Black-Yan                |           |            |
| EUT          | : 2.4GHz Wireless Keyboard |           |            |
| Power rating | : DC 1.5V                  |           |            |
| Test Mode    | : 2402MHz Tx Mode          |           |            |
| M/N          | : KB313W                   |           |            |



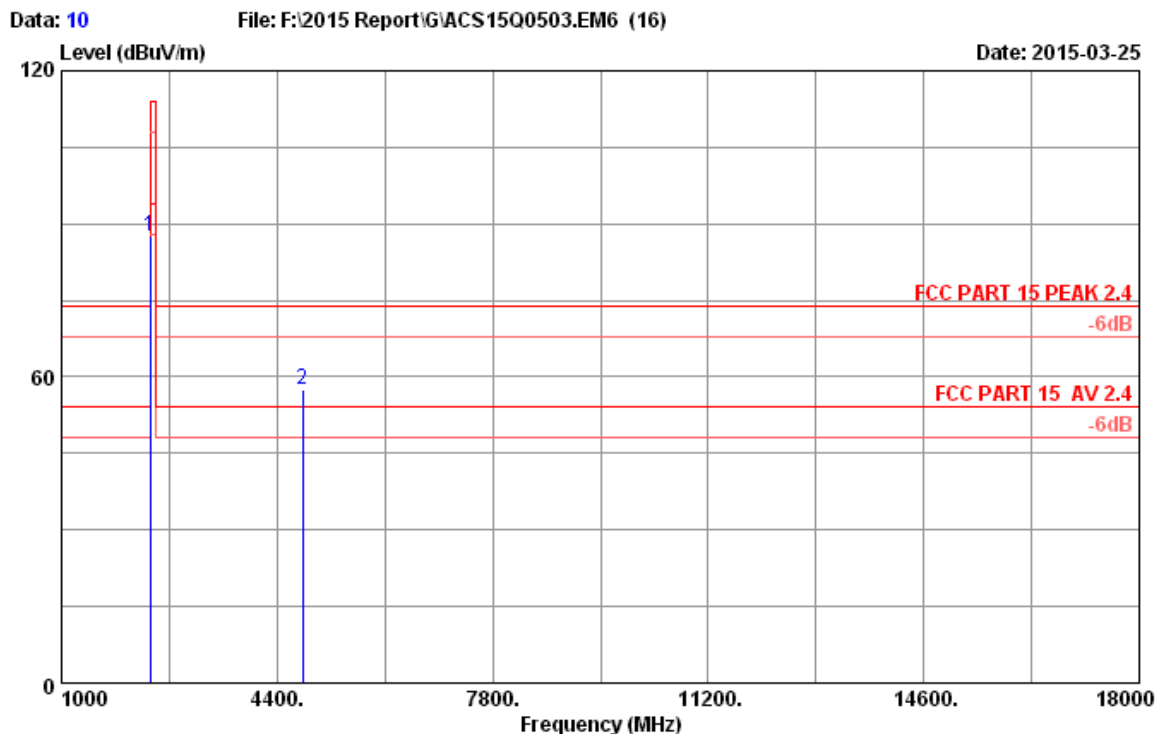
Site no. : 3m Chamber Data no. : 8  
 Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : VERTICAL  
 Limit : FCC PART 15 PEAK 2.4  
 Env. / Ins. : 23°C/54%  
 Engineer : Black-Yan  
 EUT : 2.4GHz Wireless Keyboard  
 Power rating : DC 1.5V  
 Test Mode : 2402MHz Tx Mode  
 M/N : KB313W

| No. | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | AMP<br>factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1   | 2402.000       | 28.18                    | 5.80                  | 35.70                 | 75.38             | 73.66                         | 114.00             | 40.34          | Peak   |
| 2   | 4804.000       | 32.85                    | 8.56                  | 35.70                 | 45.92             | 51.63                         | 74.00              | 22.37          | Peak   |

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



|              |                            |           |              |
|--------------|----------------------------|-----------|--------------|
| Site no.     | : 3m Chamber               | Data no.  | : 9          |
| Dis. / Ant.  | : 3m 2014 3115 (4580)      | Ant. pol. | : HORIZONTAL |
| Limit        | : FCC PART 15 PEAK 2.4     |           |              |
| Env. / Ins.  | : 23°C/54%                 |           |              |
| Engineer     | : Black-Yan                |           |              |
| EUT          | : 2.4GHz Wireless Keyboard |           |              |
| Power rating | : DC 1.5V                  |           |              |
| Test Mode    | : 2402MHz Tx Mode          |           |              |
| M/N          | : KB313W                   |           |              |

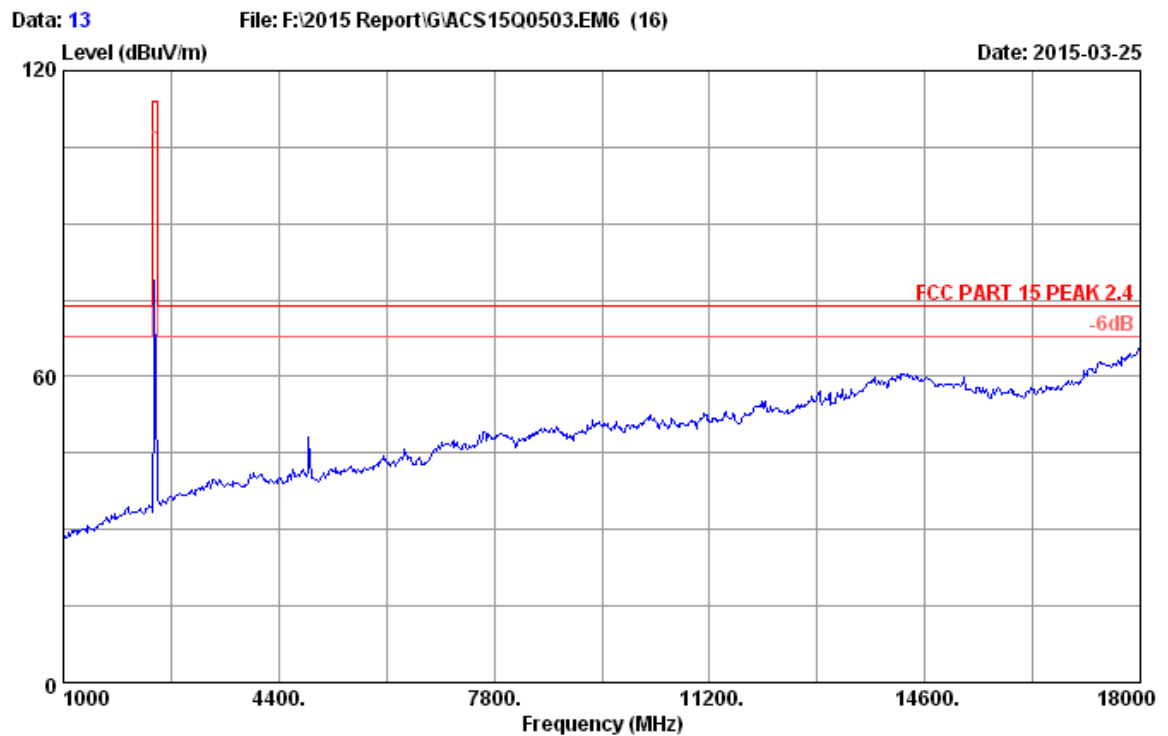


Site no. : 3m Chamber Data no. : 10  
 Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15 PEAK 2.4  
 Env. / Ins. : 23°C/54%  
 Engineer : Black-Yan  
 EUT : 2.4GHz Wireless Keyboard  
 Power rating : DC 1.5V  
 Test Mode : 2402MHz Tx Mode  
 M/N : KB313W

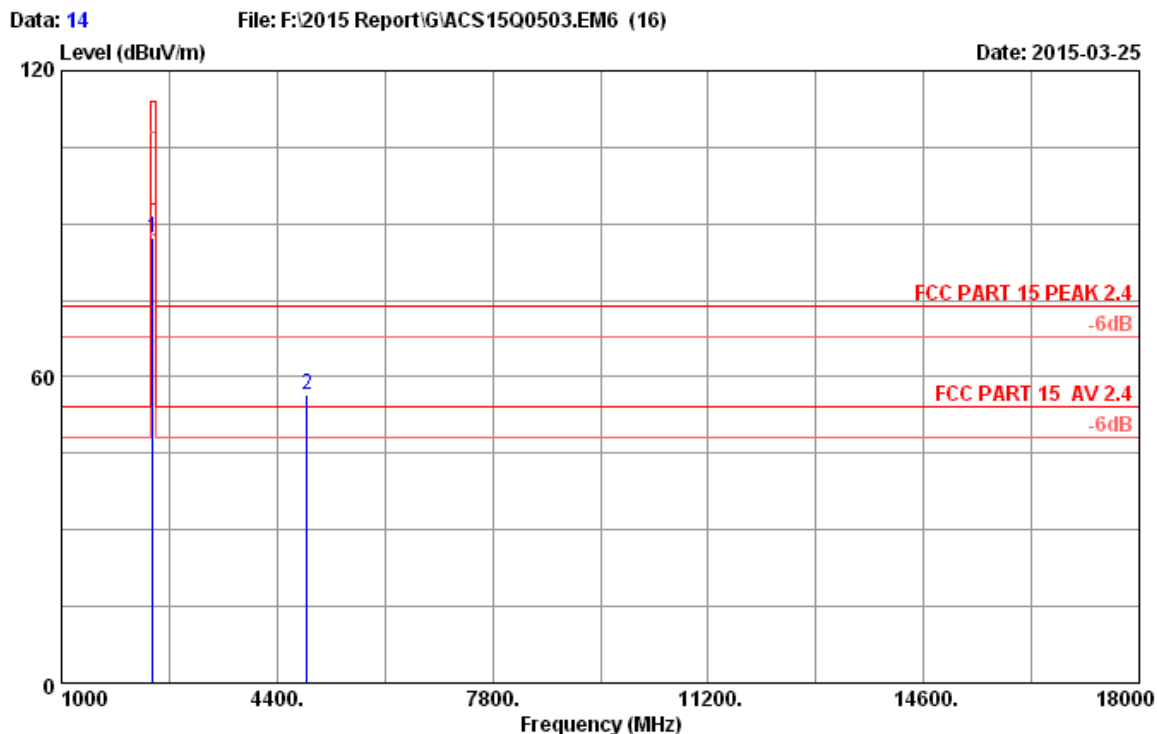
| No. | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | AMP<br>factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1   | 2402.000       | 28.18                    | 5.80                  | 35.70                 | 89.16             | 87.44                         | 114.00             | 26.56          | Peak   |
| 2   | 4804.000       | 32.85                    | 8.56                  | 35.70                 | 51.83             | 57.54                         | 74.00              | 16.46          | Peak   |

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

| Frequency<br>(MHz) | Peak level<br>(dBuV/m) | Duty cycle factor<br>(dB) | AV level<br>(dBuV/m) | Limit(dBuV/m) | Conclusion |
|--------------------|------------------------|---------------------------|----------------------|---------------|------------|
| 4804.000           | 57.54                  | 26.24                     | 31.30                | 54            | Pass       |



Site no. : 3m Chamber Data no. : 13  
Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : HORIZONTAL  
Limit : FCC PART 15 PEAK 2.4  
Env. / Ins. : 23°C/54%  
Engineer : Black-Yan  
EUT : 2.4GHz Wireless Keyboard  
Power rating : DC 1.5V  
Test Mode : 2439MHz Tx Mode  
M/N : KB313W

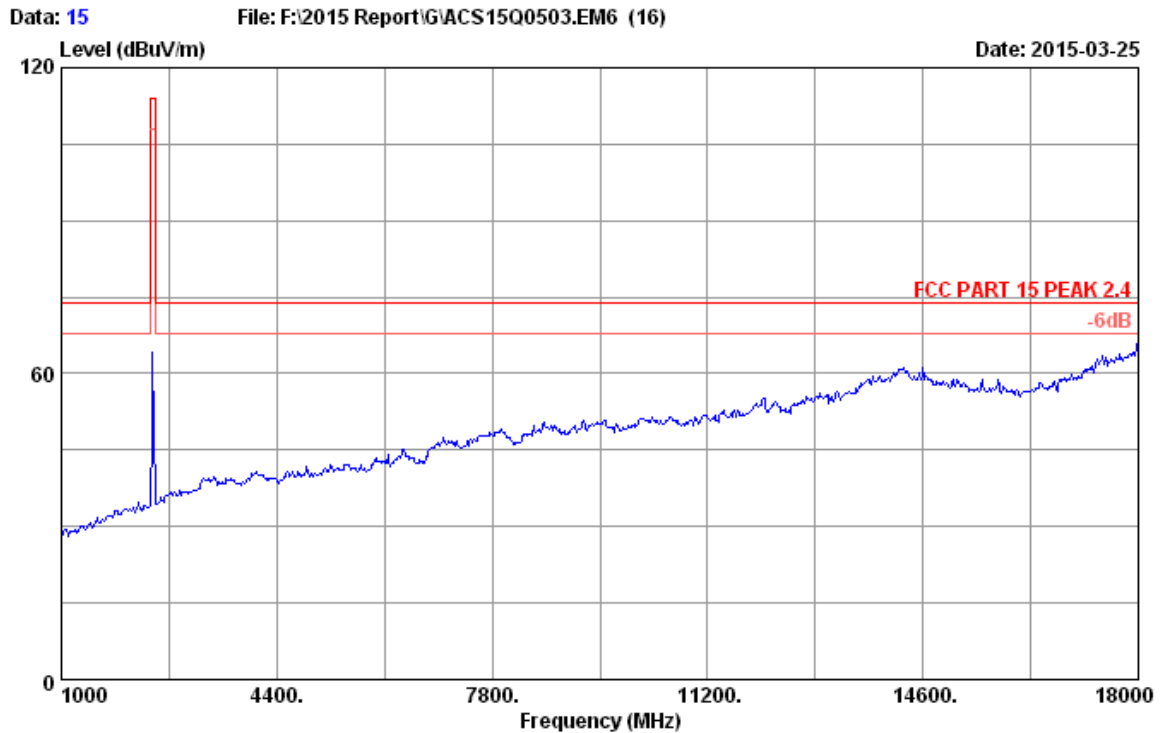


Site no. : 3m Chamber Data no. : 14  
 Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15 PEAK 2.4  
 Env. / Ins. : 23°C/54%  
 Engineer : Black-Yan  
 EUT : 2.4GHz Wireless Keyboard  
 Power rating : DC 1.5V  
 Test Mode : 2439MHz Tx Mode  
 M/N : KB313W

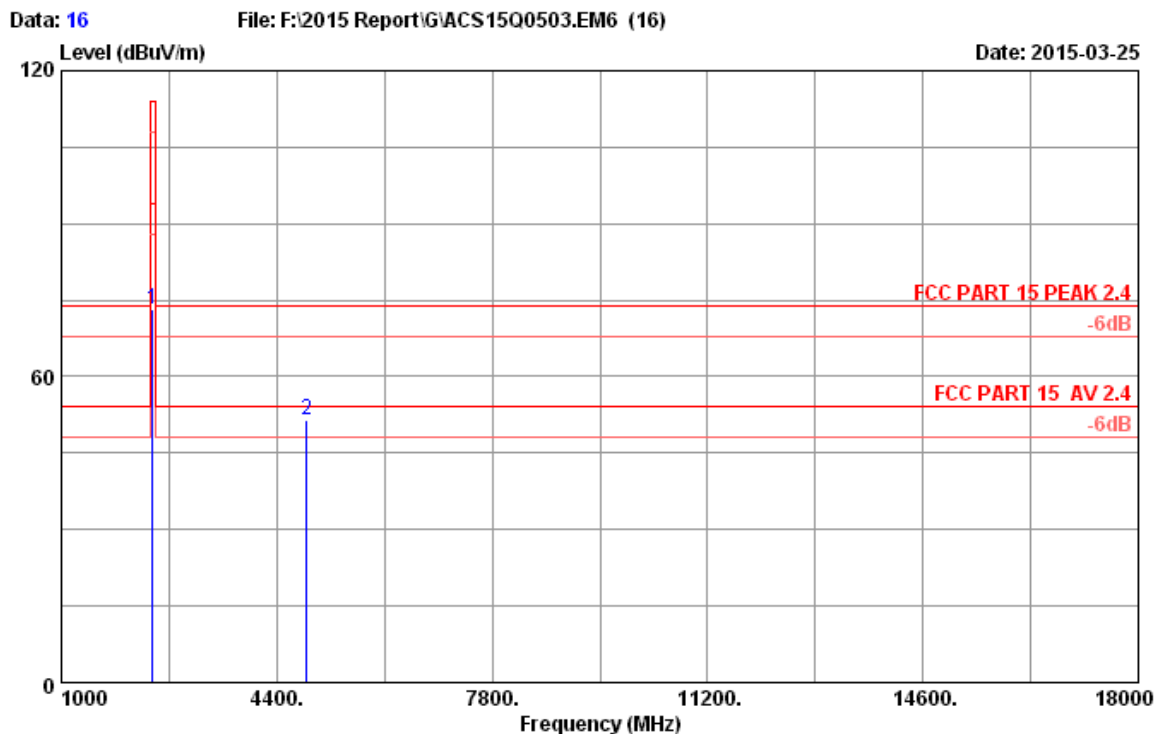
| No. | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | AMP<br>factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1   | 2439.000       | 28.27                    | 5.85                  | 35.70                 | 88.96             | 87.38                         | 114.00             | 26.62          | Peak   |
| 2   | 4878.000       | 32.98                    | 8.64                  | 35.70                 | 50.69             | 56.61                         | 74.00              | 17.39          | Peak   |

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

| Frequency<br>(MHz) | Peak level<br>(dBuV/m) | Duty cycle factor<br>(dB) | AV level<br>(dBuV/m) | Limit(dBuV/m) | Conclusion |
|--------------------|------------------------|---------------------------|----------------------|---------------|------------|
| 4878.000           | 56.61                  | 26.24                     | 30.37                | 54            | Pass       |



|              |                            |           |            |
|--------------|----------------------------|-----------|------------|
| Site no.     | : 3m Chamber               | Data no.  | : 15       |
| Dis. / Ant.  | : 3m 2014 3115 (4580)      | Ant. pol. | : VERTICAL |
| Limit        | : FCC PART 15 PEAK 2.4     |           |            |
| Env. / Ins.  | : 23°C/54%                 |           |            |
| Engineer     | : Black-Yan                |           |            |
| EUT          | : 2.4GHz Wireless Keyboard |           |            |
| Power rating | : DC 1.5V                  |           |            |
| Test Mode    | : 2439MHz Tx Mode          |           |            |
| M/N          | : KB313W                   |           |            |



Site no. : 3m Chamber Data no. : 16  
 Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : VERTICAL  
 Limit : FCC PART 15 PEAK 2.4  
 Env. / Ins. : 23°C/54%  
 Engineer : Black-Yan  
 EUT : 2.4GHz Wireless Keyboard  
 Power rating : DC 1.5V  
 Test Mode : 2439MHz Tx Mode  
 M/N : KB313W

| No. | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | AMP<br>factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1   | 2439.000       | 28.27                    | 5.85                  | 35.70                 | 74.86             | 73.28                         | 114.00             | 40.72          | Peak   |
| 2   | 4878.000       | 32.98                    | 8.64                  | 35.70                 | 45.71             | 51.63                         | 74.00              | 22.37          | Peak   |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading  
 -Amp Factor  
 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      | N9030A      | MY51380221 | Oct.29, 14 | 1Year         |
| 2.   | Attenuator (20dB) | Agilent      | 8491B       | MY39262165 | Apr. 28,14 | 1 Year        |
| 3.   | RF Cable          | Hubersuhner  | SUCOFLEX102 | 28620/2    | Apr. 28,14 | 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 keyboard |                       |                         |
| M/N: KB313W                   |                       |                         |
| Test date:2015-03-25          | Pressure:101.6±1.0kpa | Humidity: 51.5±3.0 %    |
| Tested by:Black_Yan           | Test site: RF site    | Temperature:22.3±0.6 °C |

| Test Mode         | Frequency ( MHz ) | -20dB bandwidth ( KHz ) | Limit (KHz) |
|-------------------|-------------------|-------------------------|-------------|
| Tx                | 2402              | 2134                    | N/A         |
|                   | 2439              | 2123                    | N/A         |
|                   | 2479              | 1717                    | 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 | Apr.28,14 | 1 Year        |
| 2.   | Amp          | HP           | 8449B       | 3008A02495 | Apr.28,14 | 1 Year        |
| 3.   | Horn Antenna | ETS          | 3115        | 9510-4580  | Jun.06,14 | 1 Year        |
| 4.   | HF Cable     | Hubersuhner  | Sucoflex104 | 274094/4   | Apr.28,14 | 1 Year        |
| 5.   | RF Cable     | Hubersuhner  | Sucoflex102 | 28610/2    | Apr.28,14 | 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

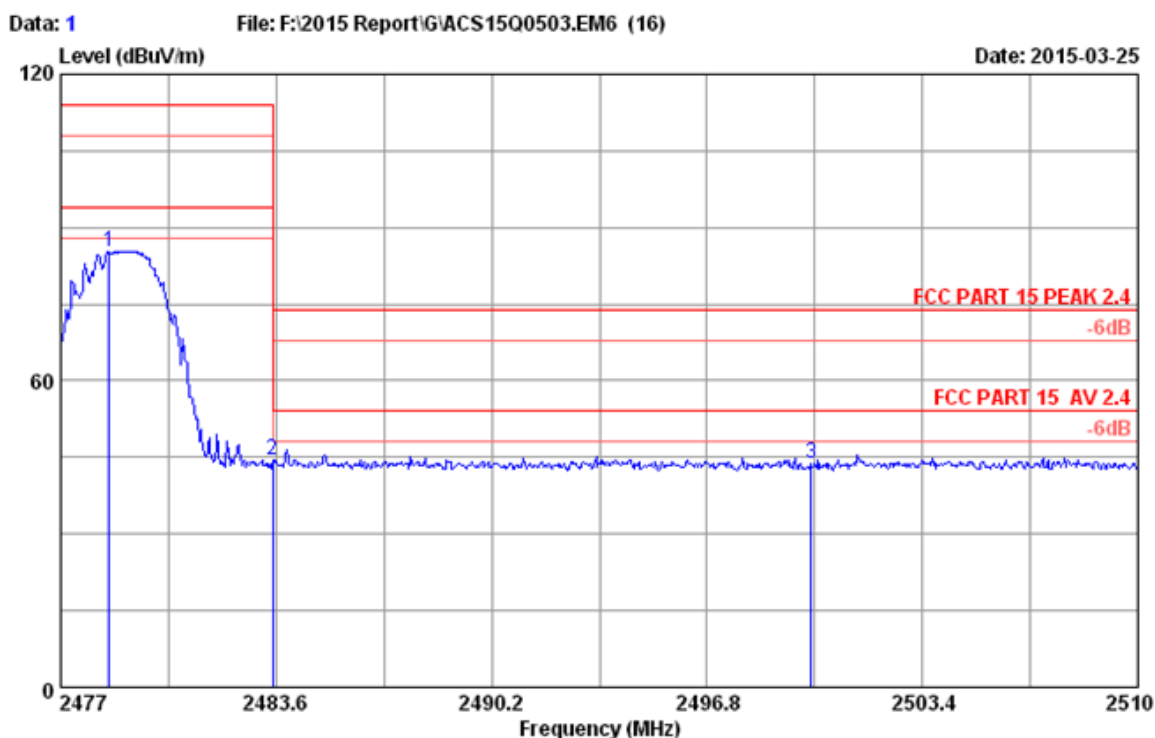
1. The EUT is placed on a turntable, which is 0.8m above the ground plane and worked at highest radiated power.
2. The turntable was rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out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

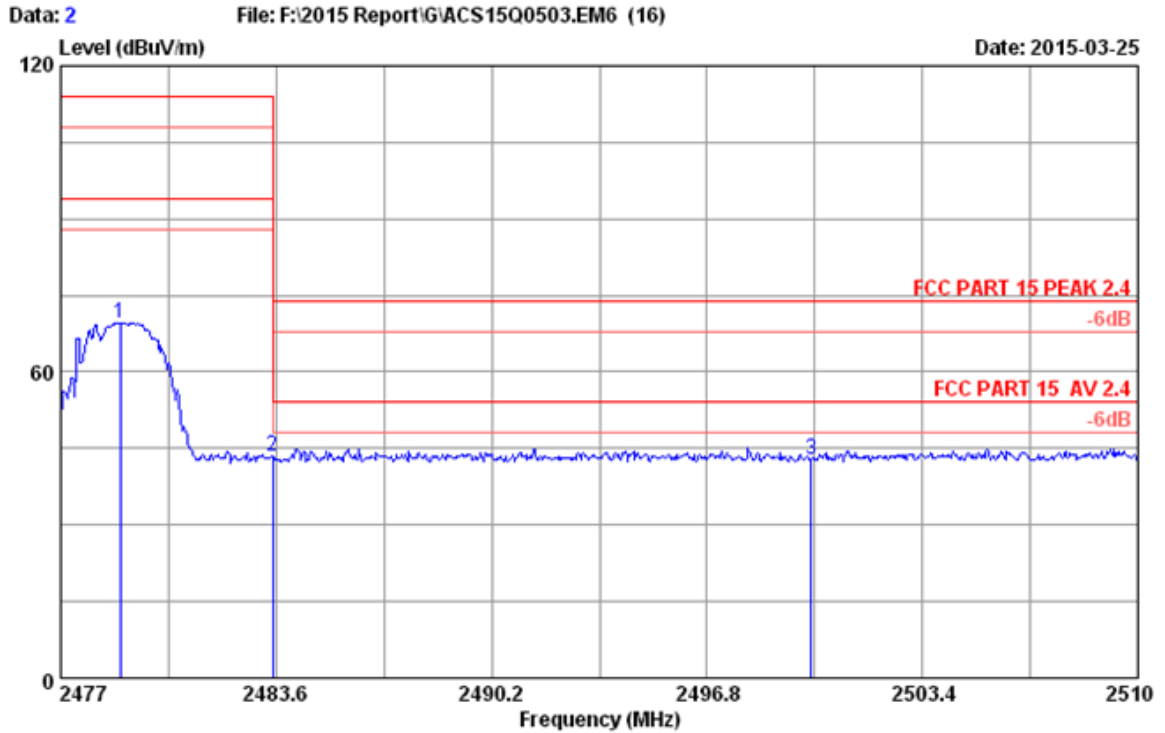
Note: The duty cycle factor for calculate average level is 26.24 dB, and average limit is 20dB below peak limit, so if peak measured level comply with average limit, the average level was deemed to comply with average limit.



Site no. : 3m Chamber Data no. : 1  
 Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15 PEAK 2.4  
 Env. / Ins. : 23°C/54%  
 Engineer : Black-Yan  
 EUT : 2.4GHz Wireless Keyboard  
 Power rating : DC 1.5V  
 Test Mode : 2479MHz Tx Mode  
 M/N : KB313W

| No. | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | AMP<br>factor<br>(dB) | Reading<br>(dBUV) | Emission<br>Level<br>(dBUV/m) | Limits<br>(dBUV/m) | Margin<br>(dB) | Remark |
|-----|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1   | 2478.485       | 28.35                    | 5.91                  | 35.70                 | 86.71             | 85.27                         | 114.00             | 28.73          | Peak   |
| 2   | 2483.500       | 28.36                    | 5.92                  | 35.70                 | 45.76             | 44.34                         | 74.00              | 29.66          | Peak   |
| 3   | 2500.000       | 28.40                    | 5.94                  | 35.70                 | 45.31             | 43.95                         | 74.00              | 30.05          | Peak   |

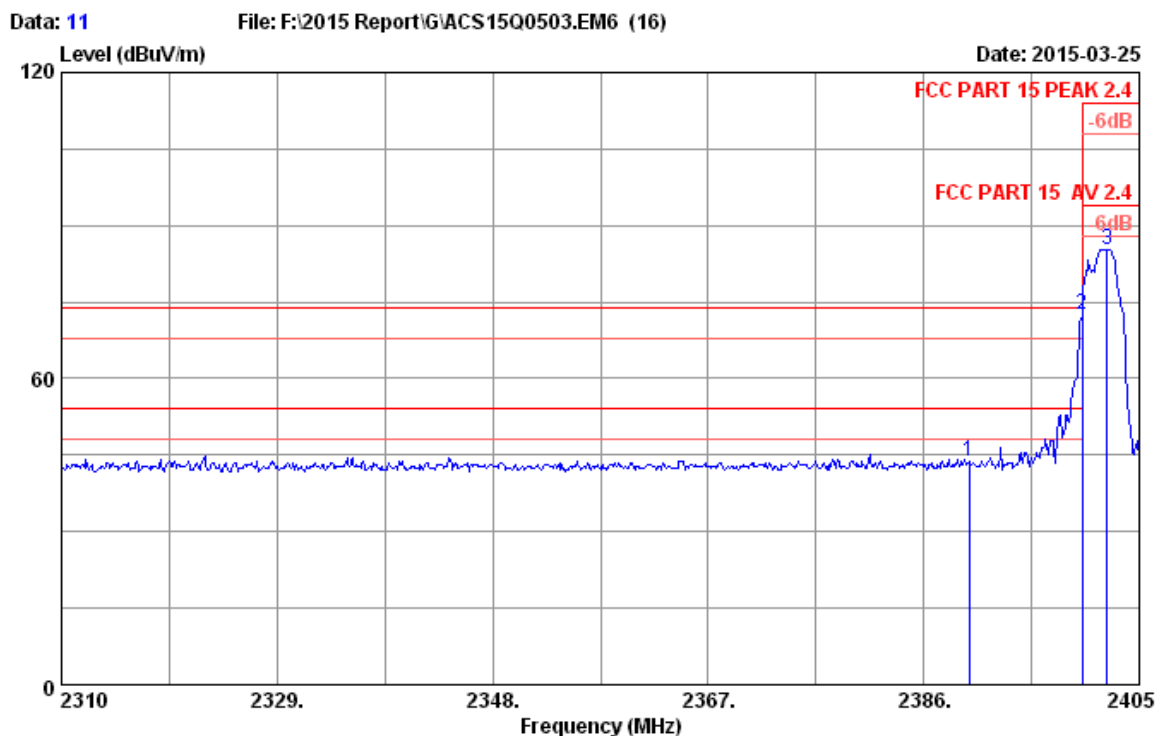
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading  
 -Amp Factor  
 2. The emission levels that are 20dB below the official  
 limit are not reported.



Site no. : 3m Chamber Data no. : 2  
 Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : VERTICAL  
 Limit : FCC PART 15 PEAK 2.4  
 Env. / Ins. : 23°C/54%  
 Engineer : Black-Yan  
 EUT : 2.4GHz Wireless Keyboard  
 Power rating : DC 1.5V  
 Test Mode : 2479MHz Tx Mode  
 M/N : KB313W

| No. | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | AMP<br>factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1   | 2478.815       | 28.35                    | 5.91                  | 35.70                 | 71.02             | 69.58                         | 114.00             | 44.42          | Peak   |
| 2   | 2483.500       | 28.36                    | 5.92                  | 35.70                 | 44.84             | 43.42                         | 74.00              | 30.58          | Peak   |
| 3   | 2500.000       | 28.40                    | 5.94                  | 35.70                 | 44.24             | 42.88                         | 74.00              | 31.12          | Peak   |

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

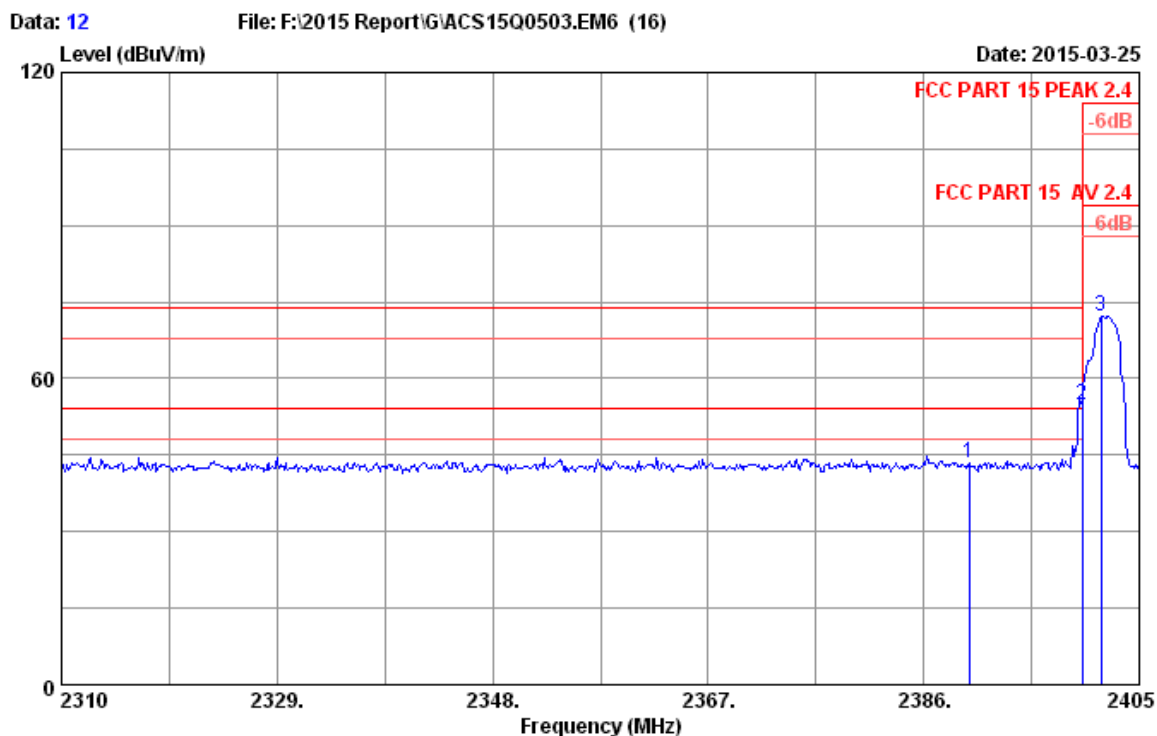


Site no. : 3m Chamber Data no. : 11  
 Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15 PEAK 2.4  
 Env. / Ins. : 23°C/54%  
 Engineer : Black-Yan  
 EUT : 2.4GHz Wireless Keyboard  
 Power rating : DC 1.5V  
 Test Mode : 2402MHz Tx Mode  
 M/N : KB313W

| No. | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | AMP<br>factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1   | 2390.000       | 28.16                    | 5.78                  | 35.70                 | 45.52             | 43.76                         | 74.00              | 30.24          | Peak   |
| 2   | 2400.000       | 28.18                    | 5.80                  | 35.70                 | 74.28             | 72.56                         | 74.00              | 1.44           | Peak   |
| 3   | 2402.150       | 28.18                    | 5.80                  | 35.70                 | 87.11             | 85.39                         | 114.00             | 28.61          | Peak   |

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

| Frequency<br>(MHz) | Peak level<br>(dBuV/m) | Duty cycle factor<br>(dB) | AV level<br>(dBuV/m) | Limit(dBuV/m) | Conclusion |
|--------------------|------------------------|---------------------------|----------------------|---------------|------------|
| 2400.000           | 72.56                  | 26.24                     | 46.32                | 54            | Pass       |



Site no. : 3m Chamber Data no. : 12  
Dis. / Ant. : 3m 2014 3115 (4580) Ant. pol. : VERTICAL  
Limit : FCC PART 15 PEAK 2.4  
Env. / Ins. : 23°C/54%  
Engineer : Black-Yan  
EUT : 2.4GHz Wireless Keyboard  
Power rating : DC 1.5V  
Test Mode : 2402MHz Tx Mode  
M/N : KB313W

| No. | Freq.<br>(MHz) | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | AMP<br>factor<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limits<br>(dBuV/m) | Margin<br>(dB) | Remark |
|-----|----------------|--------------------------|-----------------------|-----------------------|-------------------|-------------------------------|--------------------|----------------|--------|
| 1   | 2390.000       | 28.16                    | 5.78                  | 35.70                 | 45.13             | 43.37                         | 74.00              | 30.63          | Peak   |
| 2   | 2400.000       | 28.18                    | 5.80                  | 35.70                 | 56.46             | 54.74                         | 74.00              | 19.26          | Peak   |
| 3   | 2401.675       | 28.18                    | 5.80                  | 35.70                 | 73.84             | 72.12                         | 114.00             | 41.88          | Peak   |

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

| Frequency<br>(MHz) | Peak level<br>(dBuV/m) | Duty cycle factor<br>(dB) | AV level<br>(dBuV/m) | Limit(dBuV/m) | Conclusion |
|--------------------|------------------------|---------------------------|----------------------|---------------|------------|
| 2400.000           | 54.74                  | 26.24                     | 28.50                | 54            | Pass       |

## 7. ANTENNA REQUIREMENT

**RESULT** : **PASS**

Test Date : Mar.24~26, 2015

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 D01 V05

Since maximum peak output power of the transmitter is  $<10\text{mW}$ , i.e.  $0.009346\text{mW} < 10\text{mW}$ , hence the EUT is excluded from SAR evaluation according to FCC KDB Publication 447498 D01:General RF Exposure Guidance V05.

## 9. DEVIATION TO TEST SPECIFICATIONS

[NONE]