

APPLICATION FOR CERTIFICATION

On Behalf of

Harmonix Music Systems, Inc.

Wii Wireless Guitar

Model Number: 19091

FCC ID: VFR19091

Prepared for : Harmonix Music Systems, Inc.  
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Prepared By : Audix Technology (Shenzhen) Co., Ltd.  
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Report Number : ACS-F09125  
Date of Test : Jul.16~23, 2009  
Date of Report : Jul.31, 2009

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## TEST REPORT CERTIFICATION

Applicant : Harmonix Music Systems, Inc.  
Manufacturer : Dong Guan Contel Electronics Co., Ltd.  
EUT Description : Wii Wireless Guitar  
FCC ID : VFR19091  
(A) MODEL NO. : 19091  
(B) SERIAL NO. : N/A  
(C) POWER SUPPLY : DC 4.5V  
(D) TEST VOLTAGE : DC 4.5V

Test Procedure Used:

FCC Rules and Regulations Part 15 Subpart C 2008

The device described above is tested by AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits both radiated and conducted emissions.

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. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

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.

Date of Test : Jul.16~ 23, 2009

Prepared by :

*Edie Huang*  
Edie Huang / Assistant

Reviewer :

*Jamy Yu*  
Jamy Yu / Senior Engineer



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 C63.4-2003	N/A
Radiated Emission Test	FCC Part 15C: 15.209 FCC Part 15C: 15.249 ANSI C63.4-2003	PASS
Band Edge Compliance Test	FCC Part 15: 15.249	PASS
20dB Bandwidth Test	FCC Part 15: 15.215	PASS
N/A is an abbreviation for Not Applicable.		

## 2. GENERAL INFORMATION

### 2.1. Description of Device (EUT)

Product name	: Wii Wireless Guitar
Model Number	: 19091
FCC ID	: VFR19091
Operation frequency	: 2.408GHz-----2.474GHz
Modulation mode	: GFSK
Power Supply	: DC 4.5V (Note: New batteries were used for all test)
Applicant	: Harmonix Music Systems, Inc. 625 Massachusetts Ave, 2nd Floor, Cambridge, MA 02139
Manufacturer	: Dong Guan Contel Electronics Co., Ltd. 2 <sup>nd</sup> Industrial Park, DiChong District, GaoBu Town, Dong Guan City, Guang Dong Province, China
Date of Test	: Jul.16~23, 2009
Date of Receipt	: Jul.15, 2009
Sample Type	: Prototype production

## 2.2. 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	:	Mar.31, 2009 File on Federal Communication Commission Registration Number: 90454
3m & 10m Anechoic Chamber	:	Jan. 31, 2007 File on Federal Communication Commission Registration Number: 794232
EMC Lab.	:	Accredited by DATech, German Registration Number: DAT-P-091/99-01 Feb. 02, 2009  Accredited by NVLAP, USA NVLAP Code: 200372-0 Apr. 01, 2009

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

Test Item	Uncertainty
Uncertainty for Radiation Emission test in 3m chamber	3.78 dB (Polarize: V)
	4.20 dB (Polarize: H)
Uncertainty for Output power test	0.94 dB
Uncertainty for Power density test	2.10 dB
Uncertainty for Temperature and humidity test	2%
	1°C
Uncertainty for Frequency range test	$1 \times 10^{-9}$
Uncertainty for Bandwidth test	$1 \times 10^{-9}$
Uncertainty for DC power test	0.042 %
Uncertainty for test site temperature and humidity	0.6°C
	3%

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

According to Paragraph (f) 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	Dec.05,08	1 Year
2.	EMI Spectrum	Agilent	E4407B	MY41440292	May.08, 09	1 Year
3.	Test Receiver	Rohde & Schwarz	ESVS10	834468/011	May.08, 09	1 Year
4.	Amplifier	HP	8447D	2648A04738	May.08, 09	1 Year
5.	Bilog Antenna	Schaffner	CBL6111C	2598	Nov.10, 08	1 Year
6.	RF Cable	MIYAZAKI	8D-FB	3# Chamber No.1	May.08, 09	1 Year
7.	Coaxial Switch	Anritsu	MP59B	M73989	May.08, 09	1 Year

Frequency rang: above 1000MHz

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	E4446A	US44300459	May.08, 09	1 Year
2.	Horn Antenna	EMCO	3115	9607-4877	May.27, 08	1.5 Year
3.	Amplifier	Agilent	8449B	3008A02495	Nov.24, 08	1 Year
4.	RF Cable	Hubersuhner	SUCOFLEX102	28620/2	May.08, 09	1 Year
5.	RF Cable	Hubersuhner	SUCOFLEX102	271471/4	May.08, 09	1 Year
6.	RF Cable	Hubersuhner	SUCOFLEX102	29086/2	May.08, 09	1 Year

### 4.2. Block Diagram of Test Setup

#### 4.2.1. Block Diagram of connection between EUT and simulators

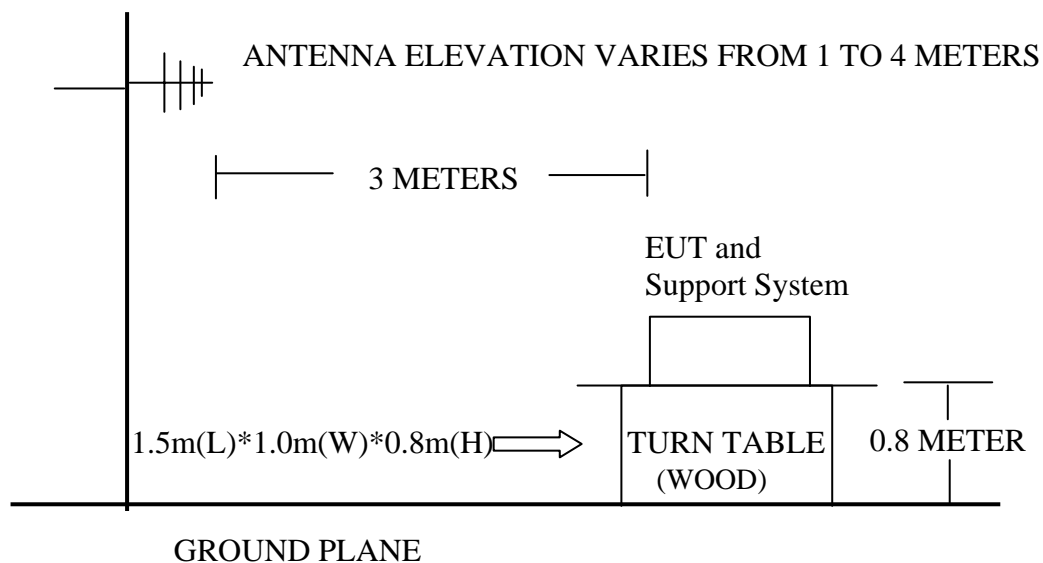


*(EUT: Wii Wireless Guitar)*



## 4.2.2. Anechoic Chamber Setup Diagram

## ANTENNA TOWER



## 4.3. Radiated Emission Limit Standard: FCC 15.209 and 15.249

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		$\mu\text{V}/\text{m}$	$\text{dB}(\mu\text{V})/\text{m}$
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 960MHz	3	74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)	
Field Strength of Fundamental emission for 2.4GHz-2.4835GHz	3	94.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average) 114.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak)	
Field Strength of Harmonics	3	74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)	

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

##### 4.4.1. Wii Wireless Guitar (EUT)

Model Number : 19091  
Serial Number : N/A

#### 4.5. Operating Condition of EUT

4.5.1. Setup the EUT as shown in Section 4.2.

4.5.2. This EUT is battery powered, and a new battery was used for all the test.

4.5.3. Let the EUT work in test mode (TX Mode) and test it.

#### 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 C63.4-2003 on radiated emission Test.

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 VBW is set at 1MHz and RBW is set at 1MHz for peak emissions measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emissions measure above 1GHz

The frequency range from 30MHz to 10th harmonic (25GHz) harmonic 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 and 15.249 Limit.

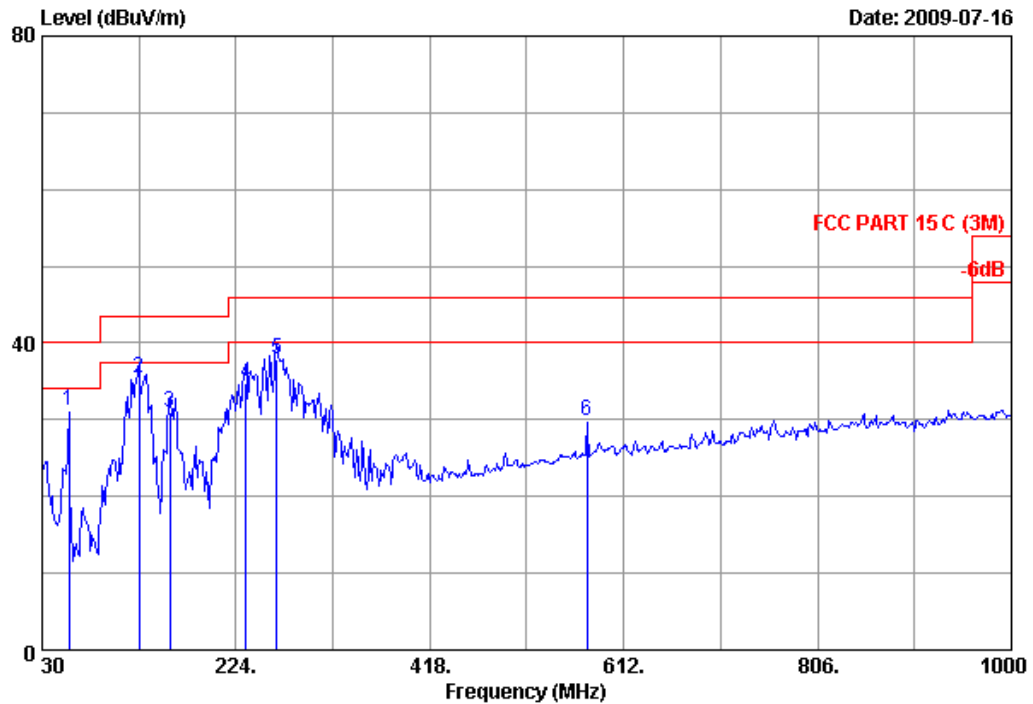
All the fundamental emissions were PK measured and comply with Average limit,so the average levels were deemed to comply with average limit.

Test Frequency: 30MHz-1000MHz



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Data: 2 File: D:\2009 Report Data\B\C\contel\ACS9Q1146.EM6 (2)



Site no. : 3m Chamber Data no. : 2  
Dis. / Ant. : 3m CBL6111C Ant. pol. : HORIZONTAL  
Limit : FCC PART 15 C (3M)  
Env. / Ins. : 24°C/56% Engineer : Cary  
EUT : Wii Wireless Guitar M/N:19091  
Power Rating : DC 4.5V  
Test Mode : Tx

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	57.160	6.53	0.69	23.87	31.09	40.00	8.91	QP
2	127.000	12.02	1.00	22.33	35.35	43.50	8.15	QP
3	158.040	11.07	1.12	18.83	31.02	43.50	12.48	QP
4	233.700	11.14	1.53	22.10	34.77	46.00	11.23	QP
5	264.740	13.71	1.67	22.59	37.97	46.00	8.03	QP
6	575.140	19.37	2.43	8.01	29.81	46.00	16.19	QP

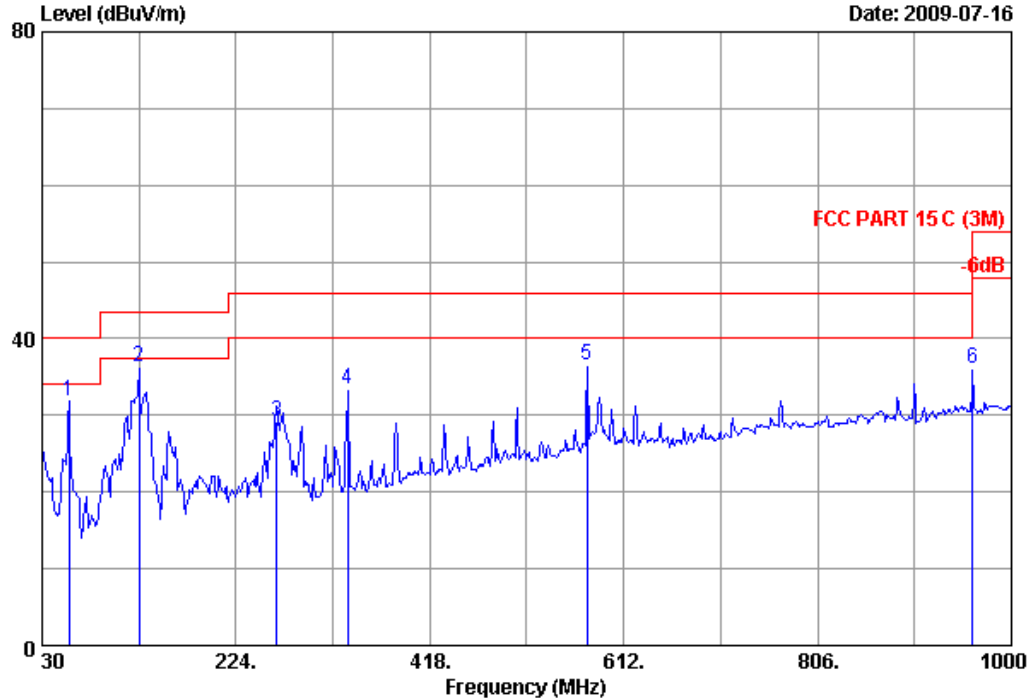
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
2. The emission levels that are 20dB below the official limit are not reported.



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Data: 1 File: D:\2009 Report Data\B\C\contel\ACS9Q1146.EM6 (2)

Date: 2009-07-16



Site no. : 3m Chamber Data no. : 1  
Dis. / Ant. : 3m CBL6111C Ant. pol. : VERTICAL  
Limit : FCC PART 15 C (3M)  
Env. / Ins. : 24°C/56% Engineer : Cary  
EUT : Wii Wireless Guitar M/N:19091  
Power Rating : DC 4.5V  
Test Mode : Tx

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	57.160	6.53	0.69	24.75	31.97	40.00	8.03	QP
2	127.000	12.02	1.00	23.33	36.35	43.50	7.15	QP
3	264.740	13.71	1.67	13.86	29.24	46.00	16.76	QP
4	335.550	14.53	1.80	17.11	33.44	46.00	12.56	QP
5	575.140	19.37	2.43	14.79	36.59	46.00	9.41	QP
6	961.200	23.69	3.38	8.96	36.03	54.00	17.97	QP

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

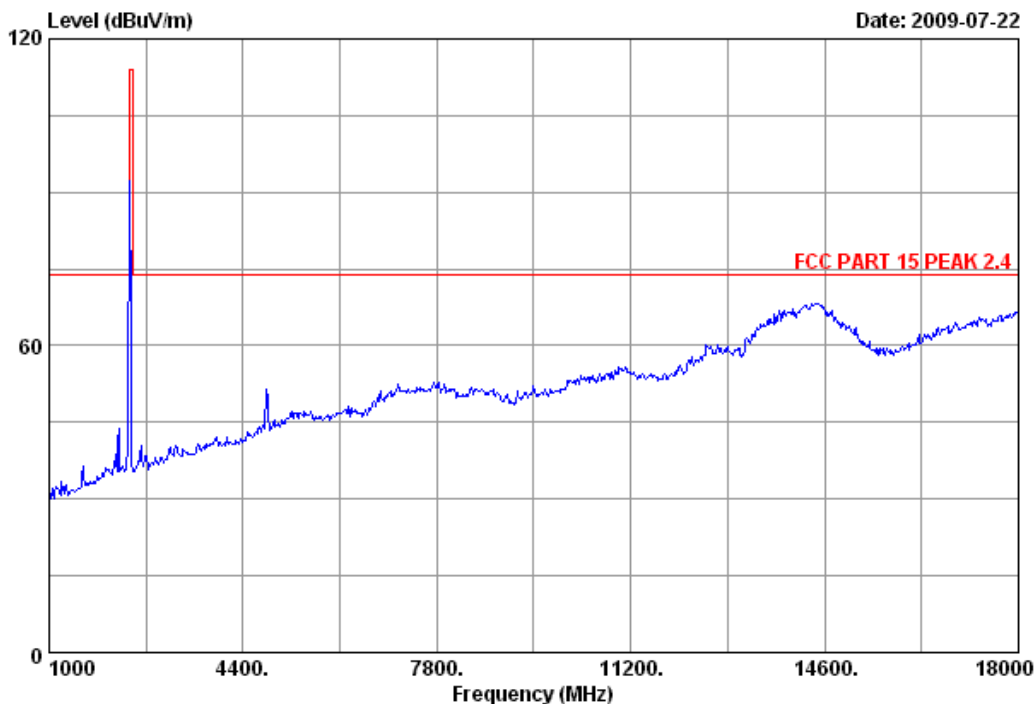
Test Frequency: 1GHz-18GHz



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Date: 2009-07-22

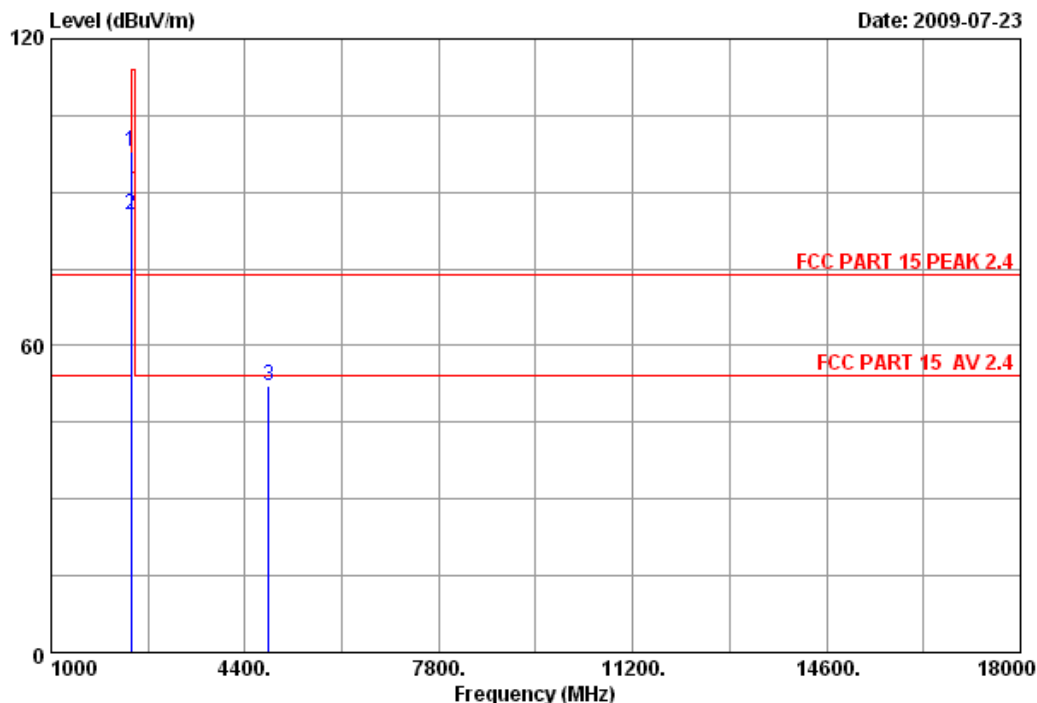


Site no.	: 3m Chamber	Data no.	: 1
Dis. / Ant.	: 3m 3115(0905)	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15 PEAK 2.4		
Env. / Ins.	: 23°C/54%	Engineer	: Power Feng
EUT	: Wii Wireless Guitar		
Power	: DC 4.5V		
Test mode	: Tx 2408MHz		
M/N	: 19091		



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Data: 2 File: E:\2009 report data\C\Contel\ACS9Q1148.EM6 (44)



Site no.	: 3m Chamber	Data no.	: 2
Dis. / Ant.	: 3m 3115(0905)	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15 PEAK 2.4		
Env. / Ins.	: 23°C/54%	Engineer	: Power Feng
EUT	: Wii Wireless Guitar		
Power	: DC 4.5V		
Test mode	: Tx 2408MHz		
M/N	: 19091		

	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	2408.000	28.48	7.66	35.95	97.59	97.78	114.00	16.22	Peak
2	2408.000	28.48	7.66	35.95	85.46	85.65	94.00	8.35	Average
3	4816.000	34.36	10.80	35.37	42.38	52.17	74.00	21.83	Peak

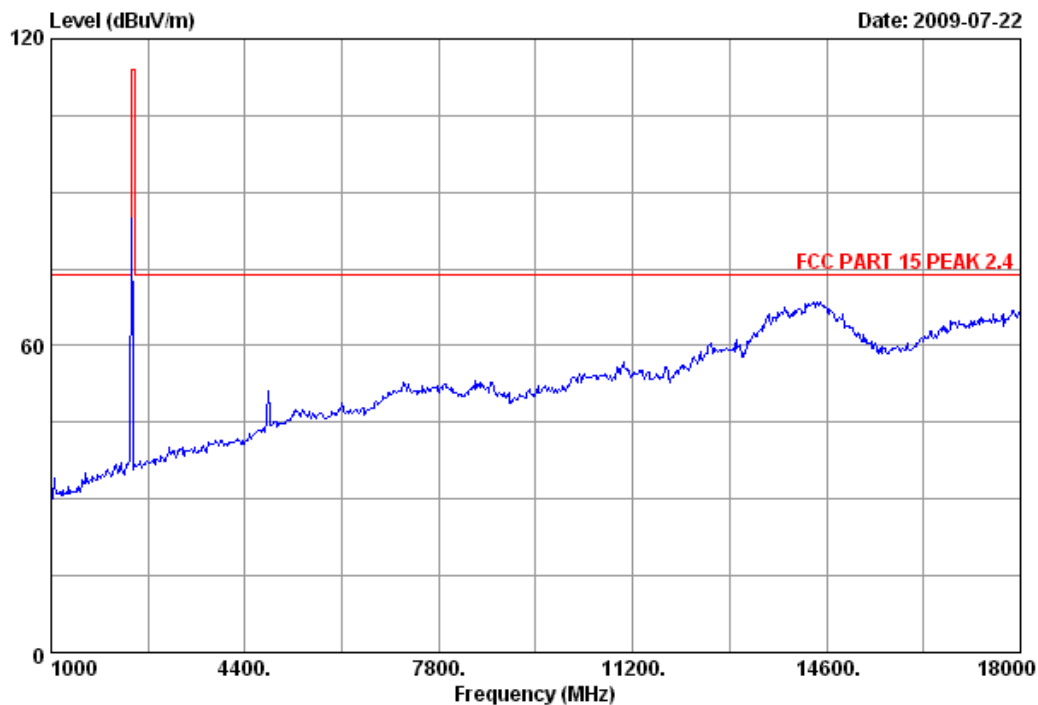
Remarks:

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



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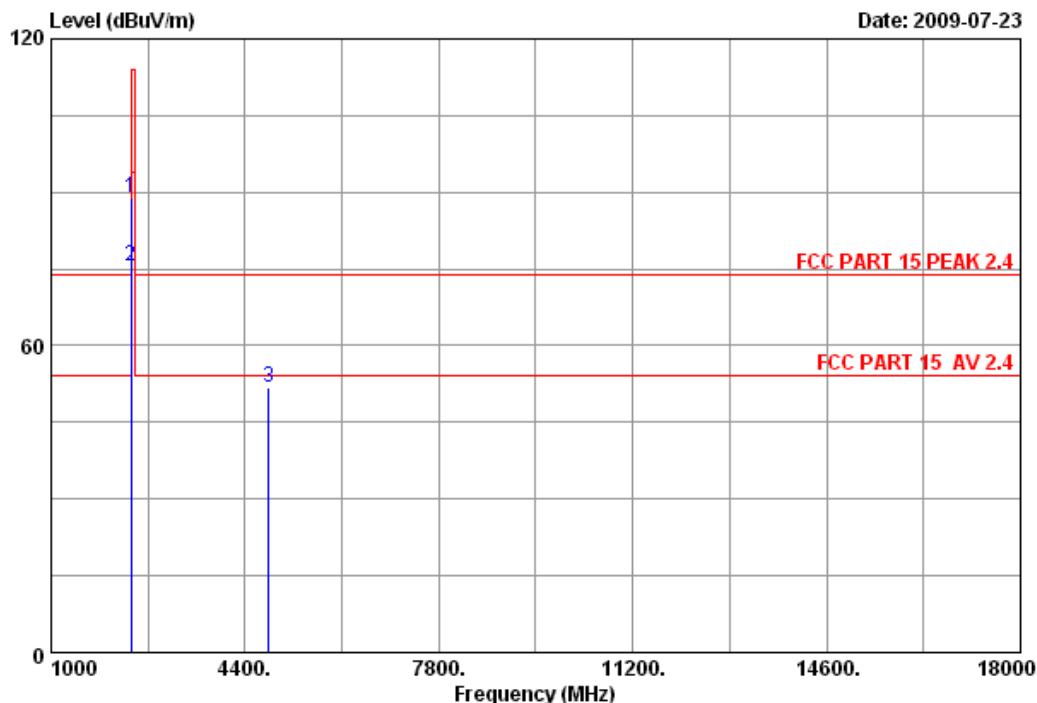


Site no.	: 3m Chamber	Data no.	: 3
Dis. / Ant.	: 3m 3115(0905)	Ant. pol.	: VERTICAL
Limit	: FCC PART 15 PEAK 2.4		
Env. / Ins.	: 23°C/54%	Engineer	: Power Feng
EUT	: Wii Wireless Guitar		
Power	: DC 4.5V		
Test mode	: Tx 2408MHz		
M/N	: 19091		



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Data: 4 File: E:\2009 report data\C\Contel\ACS9Q1148.EM6 (44)



Site no.	: 3m Chamber	Data no.	: 4
Dis. / Ant.	: 3m 3115(0905)	Ant. pol.	: VERTICAL
Limit	: FCC PART 15 PEAK 2.4		
Env. / Ins.	: 23°C/54%	Engineer	: Power Feng
EUT	: Wii Wireless Guitar		
Power	: DC 4.5V		
Test mode	: Tx 2408MHz		
M/N	: 19091		

	Freq.	Ant.	Cable	Amp.	Reading	Emission			
	(MHz)	Factor	loss	Factor	(dbuv)	Level	Limits	Margin	Remark
		(dB/m)	(dB)	(dB)		(dBuV/m)	(dBuV/m)	(dB)	
1	2408.000	28.48	7.66	35.95	88.57	88.76	114.00	25.24	Peak
2	2408.000	28.48	7.66	35.95	75.21	75.40	94.00	18.60	Average
3	4816.000	34.36	10.80	35.37	42.01	51.80	74.00	22.20	Peak

Remarks:

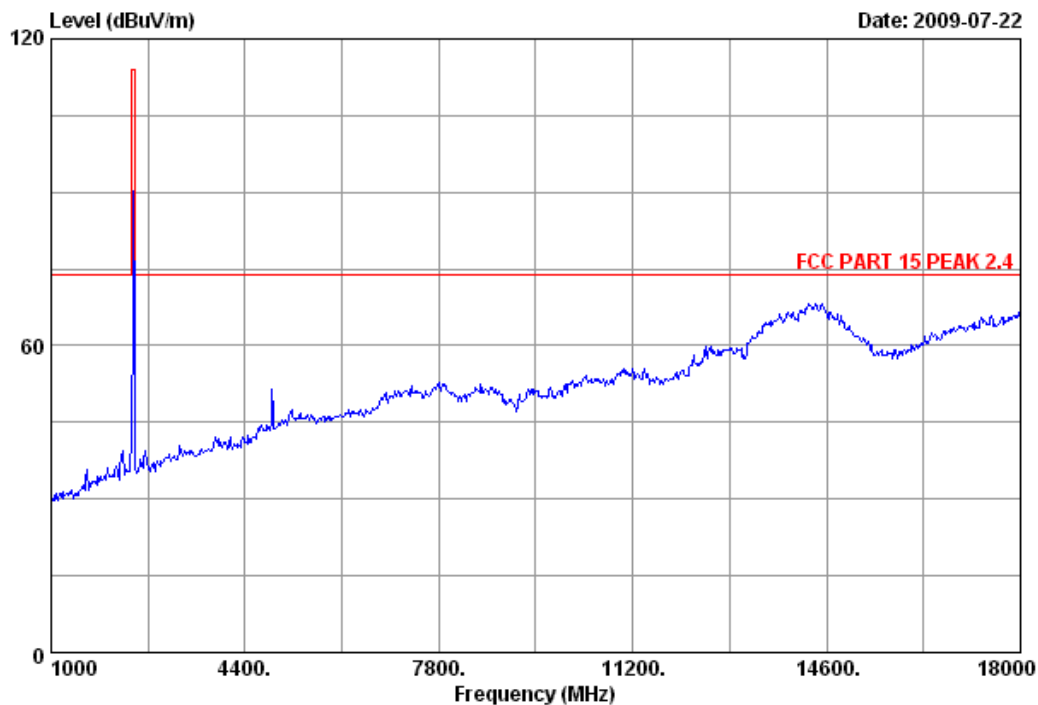
1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.





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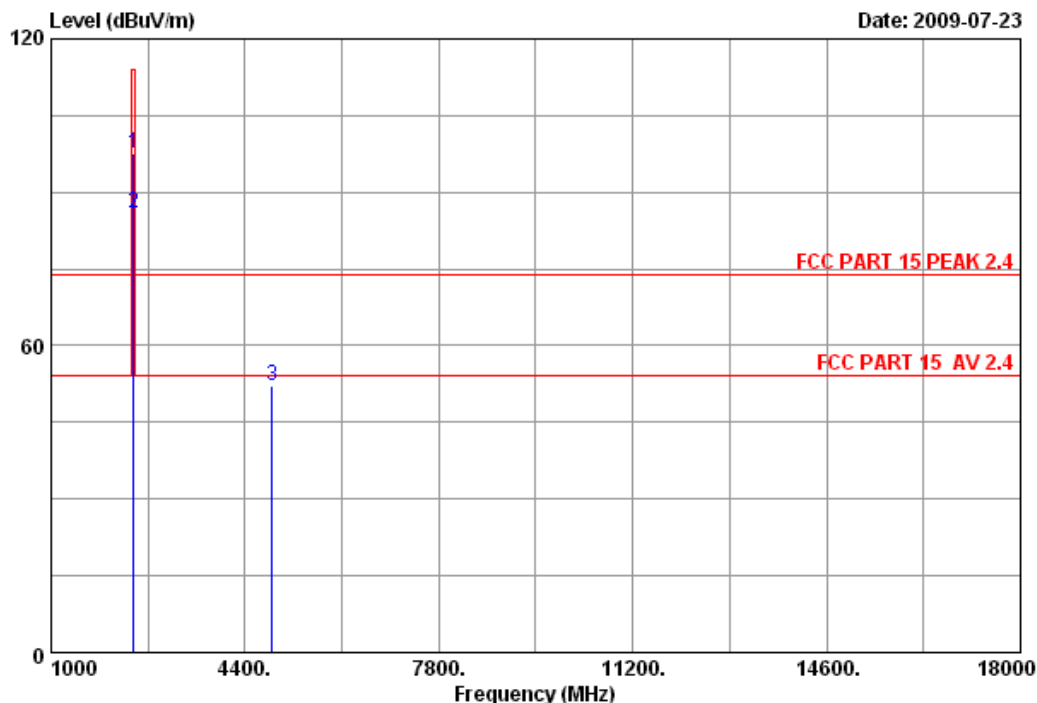


Site no.	: 3m Chamber	Data no.	: 5
Dis. / Ant.	: 3m 3115(0905)	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15 PEAK 2.4		
Env. / Ins.	: 23°C/54%	Engineer	: Power Feng
EUT	: Wii Wireless Guitar		
Power	: DC 4.5V		
Test mode	: Tx 2440MHz		
M/N	: 19091		



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Site no.	: 3m Chamber	Data no.	: 6
Dis. / Ant.	: 3m 3115(0905)	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15 PEAK 2.4		
Env. / Ins.	: 23°C/54%	Engineer	: Power Feng
EUT	: Wii Wireless Guitar		
Power	: DC 4.5V		
Test mode	: Tx 2440MHz		
M/N	: 19091		

	Freq.	Ant.	Cable	Amp.		Emission			
	(MHz)	Factor	loss	Factor	Reading	Level	Limits	Margin	Remark
		(dB/m)	(dB)	(dB)	(dbuv)	(dBuV/m)	(dBuV/m)	(dB)	
1	2440.000	28.53	7.72	36.06	97.30	97.49	114.00	16.51	Peak
2	2440.000	28.53	7.72	36.06	85.68	85.87	94.00	8.13	Average
3	4880.000	34.78	10.95	35.36	41.67	52.04	74.00	21.96	Peak

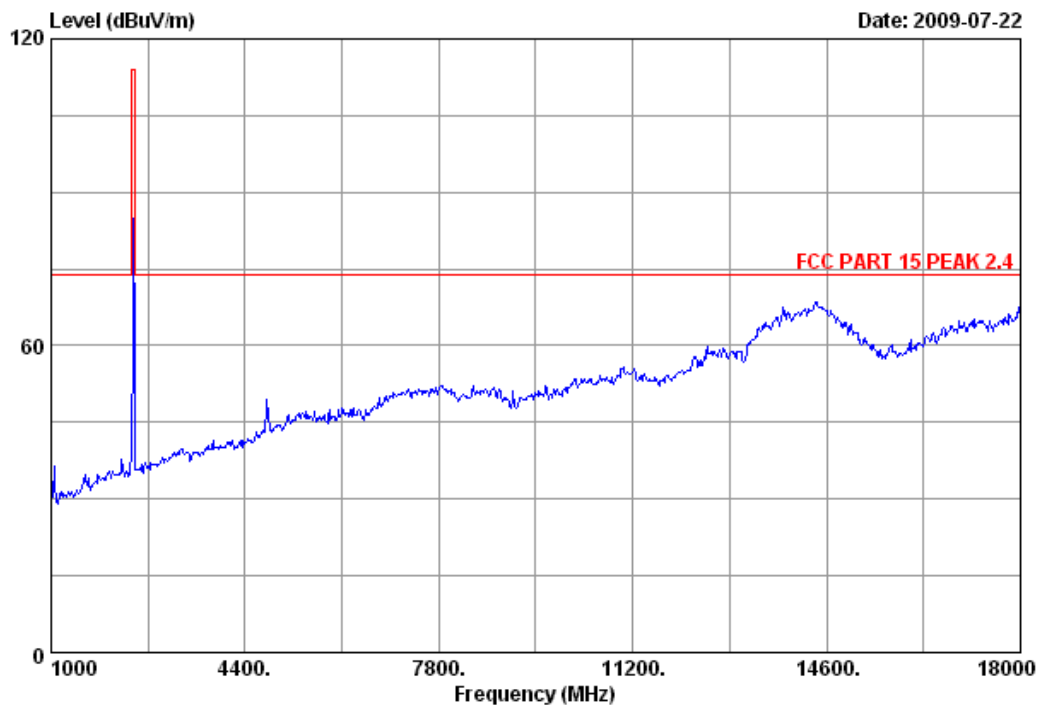
Remarks:

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



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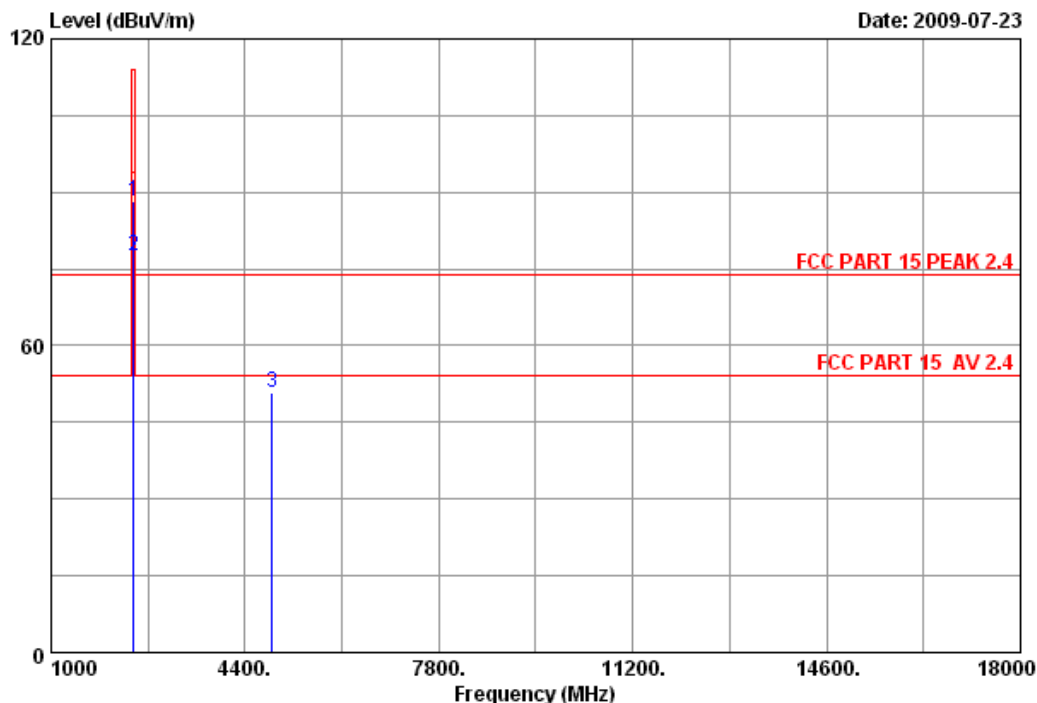


Site no.	: 3m Chamber	Data no.	: 7
Dis. / Ant.	: 3m 3115(0905)	Ant. pol.	: VERTICAL
Limit	: FCC PART 15 PEAK 2.4		
Env. / Ins.	: 23°C/54%	Engineer	: Power Feng
EUT	: Wii Wireless Guitar		
Power	: DC 4.5V		
Test mode	: Tx 2440MHz		
M/N	: 19091		



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Data: 8 File: E:\2009 report data\C\Contel\ACS9Q1148.EM6 (44)



Site no.	: 3m Chamber	Data no.	: 8
Dis. / Ant.	: 3m 3115(0905)	Ant. pol.	: VERTICAL
Limit	: FCC PART 15 PEAK 2.4		
Env. / Ins.	: 23°C/54%	Engineer	: Power Feng
EUT	: Wii Wireless Guitar		
Power	: DC 4.5V		
Test mode	: Tx 2440MHz		
M/N	: 19091		

	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	2440.000	28.53	7.72	36.06	87.95	88.14	114.00	25.86	Peak
2	2440.000	28.53	7.72	36.06	77.25	77.44	94.00	16.56	Average
3	4880.000	34.78	10.95	35.36	40.38	50.75	74.00	23.25	Peak

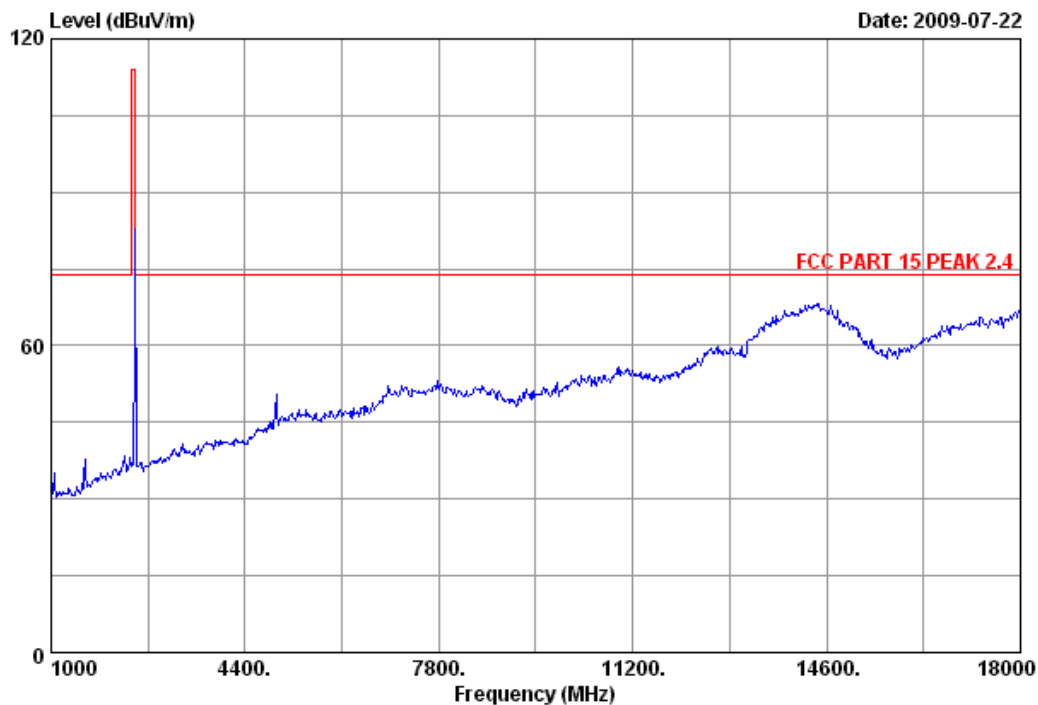
Remarks:

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



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Data: 9 File: E:\2009 report data\C\Contel\ACS9Q1148.EM6 (44)

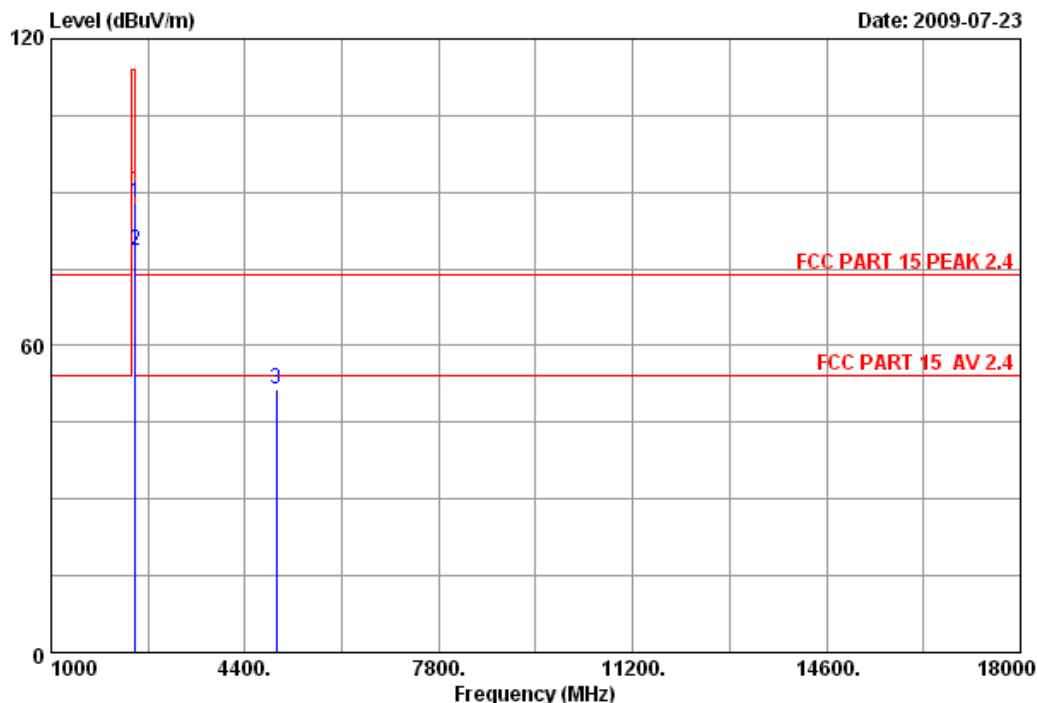


Site no.	: 3m Chamber	Data no.	: 9
Dis. / Ant.	: 3m 3115(0905)	Ant. pol.	: VERTICAL
Limit	: FCC PART 15 PEAK 2.4		
Env. / Ins.	: 23°C/54%	Engineer	: Power Feng
EUT	: Wii Wireless Guitar		
Power	: DC 4.5V		
Test mode	: Tx 2474MHz		
M/N	: 19091		



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Data: 10 File: E:\2009 report data\C\Contel\ACS9Q1148.EM6 (44)



Site no.	: 3m Chamber	Data no.	: 10
Dis. / Ant.	: 3m 3115(0905)	Ant. pol.	: VERTICAL
Limit	: FCC PART 15 PEAK 2.4		
Env. / Ins.	: 23°C/54%	Engineer	: Power Feng
EUT	: Wii Wireless Guitar		
Power	: DC 4.5V		
Test mode	: Tx 2474MHz		
M/N	: 19091		

	Freq.	Ant.	Cable	Amp.		Emission			
	(MHz)	Factor	loss	Factor	Reading	Level	Limits	Margin	Remark
		(dB/m)	(dB)	(dB)	(dbuv)	(dBuV/m)	(dBuV/m)	(dB)	
1	2474.000	28.58	7.72	35.97	87.62	87.95	114.00	26.05	Peak
2	2474.000	28.58	7.72	35.97	78.11	78.44	94.00	15.56	Average
3	4948.000	35.19	11.03	35.40	40.66	51.48	74.00	22.52	Peak

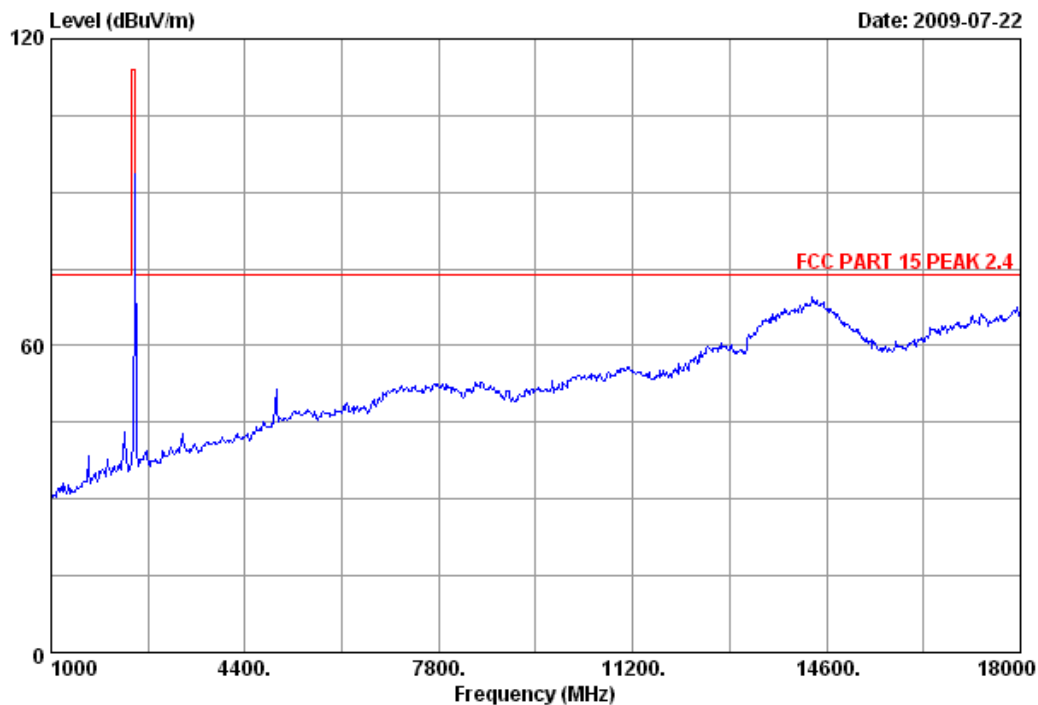
Remarks:

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



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Data: 11 File: E:\2009 report data\C\Contel\ACS9Q1148.EM6 (44)

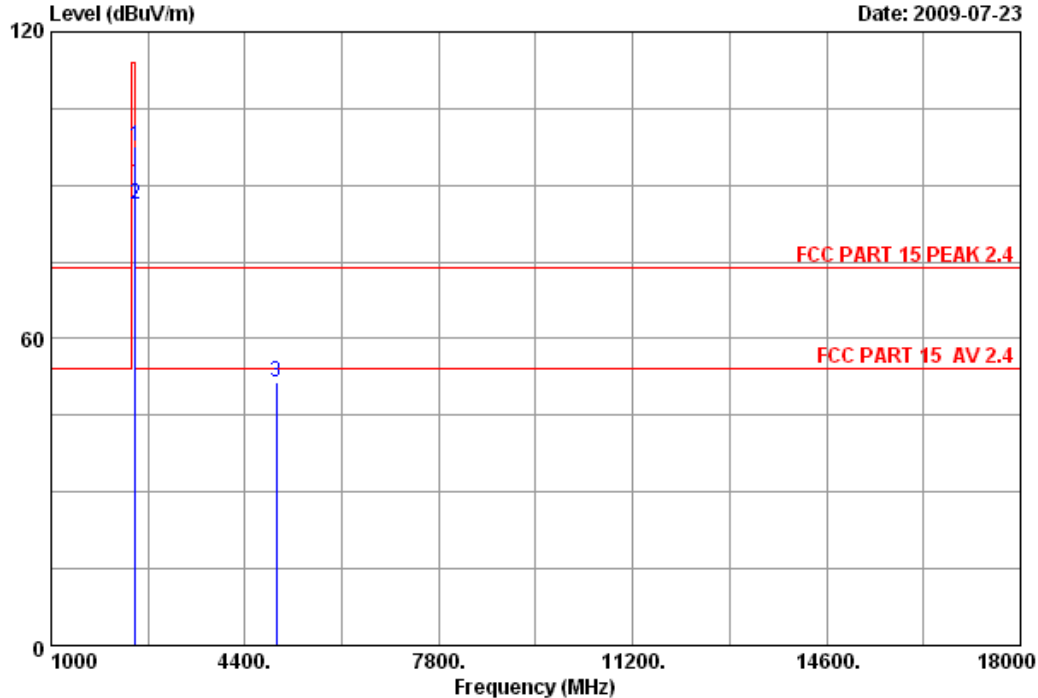


Site no.	: 3m Chamber	Data no.	: 11
Dis. / Ant.	: 3m 3115(0905)	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15 PEAK 2.4		
Env. / Ins.	: 23°C/54%	Engineer	: Power Feng
EUT	: Wii Wireless Guitar		
Power	: DC 4.5V		
Test mode	: Tx 2474MHz		
M/N	: 19091		



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Data: 12 File: E:\2009 report data\C\Contel\ACS9Q1148.EM6 (44)



Site no.	: 3m Chamber	Data no.	: 12
Dis. / Ant.	: 3m 3115(0905)	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15 PEAK 2.4		
Env. / Ins.	: 23°C/54%	Engineer	: Power Feng
EUT	: Wii Wireless Guitar		
Power	: DC 4.5V		
Test mode	: Tx 2474MHz		
M/N	: 19091		

	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	2474.000	28.58	7.72	35.97	97.12	97.45	114.00	16.55	Peak
2	2474.000	28.58	7.72	35.97	85.77	86.10	94.00	7.90	Average
3	4948.000	35.19	11.03	35.40	40.69	51.51	74.00	22.49	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.



## 5. BAND EDGE COMPLIANCE TEST

### 5.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum Analyzer	Agilent	E4446A	US44300459	May.08, 09	1 Year
2	Horn Antenna	EMCO	3115	9607-4877	May.27, 08	1.5 Year
3	Amplifier	Agilent	8449B	3008A02495	May.08, 09	1 Year
4	RF Cable	Hubersuhner	SUCOFLEX 102	28620/2	May.08, 09	1 Year
5	RF Cable	Hubersuhner	SUCOFLEX 102	271471/4	May.08, 09	1 Year
6	RF Cable	Hubersuhner	SUCOFLEX 102	29086/2	May.08, 09	1 Year

### 5.2. Limit

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in section 15.209, which is the lesser attenuation.

### 5.3. 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=VBW=1MHz / Sweep=AUTO
  - (b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO

### 5.4. Test Results

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

All the emissions outside operation frequency band comply with 15.209 limit.

All the PK measured emissions comply with average limit, so the average levels were deemed to comply with average limit.

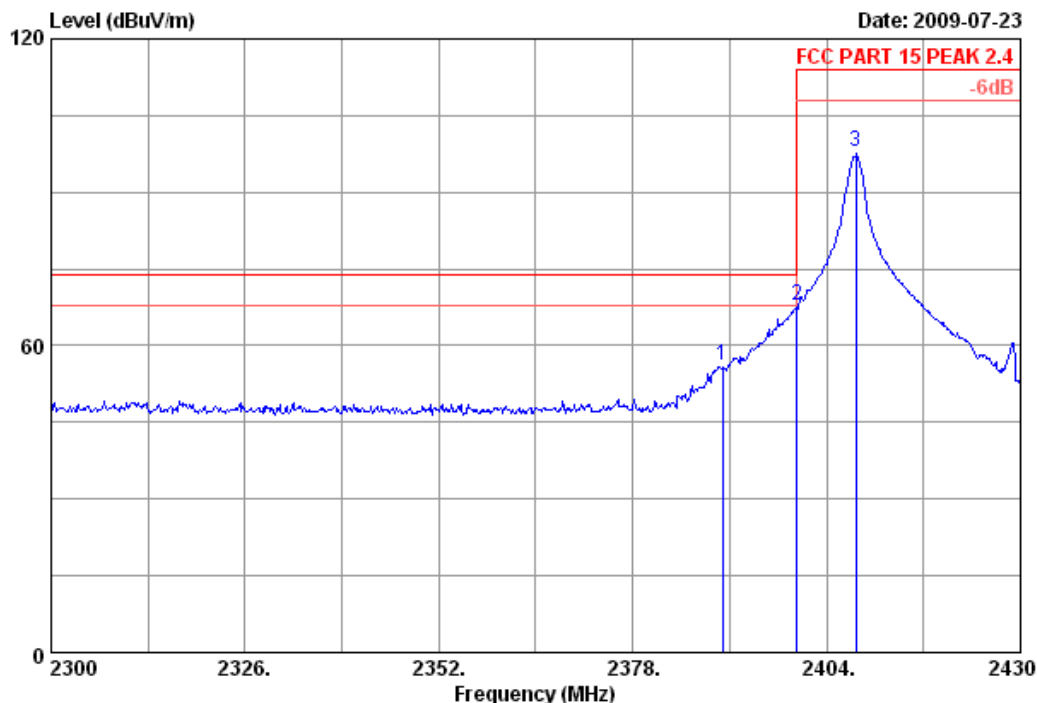


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Postcode:518057

Data: 29

File: E:\2009 report data\C\Contel\ACS9Q1148.EM6 (36)

Date: 2009-07-23



Site no.	: 3m Chamber	Data no.	: 29
Dis. / Ant.	: 3m 3115(0905)	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15 PEAK 2.4		
Env. / Ins.	: 23°C/54%	Engineer	: Power Feng
EUT	: Wii Wireless Guitar	M/N:	: 19091
Power	: DC 4.5V		
Test mode	: Tx 2408MHz		

	Freq.	Ant.	Cable	Amp.		Emission			
	(MHz)	Factor	loss	Factor	Reading	Level	Limits	Margin	Remark
		(dB/m)	(dB)	(dB)	(dbuv)	(dBUV/m)	(dBUV/m)	(dB)	
1	2390.000	28.46	7.66	36.09	55.96	55.99	74.00	18.01	Peak
2	2400.000	28.46	7.66	36.09	67.73	67.76	74.00	6.24	Peak
3	2407.900	28.48	7.66	35.95	97.64	97.83	114.00	16.17	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.

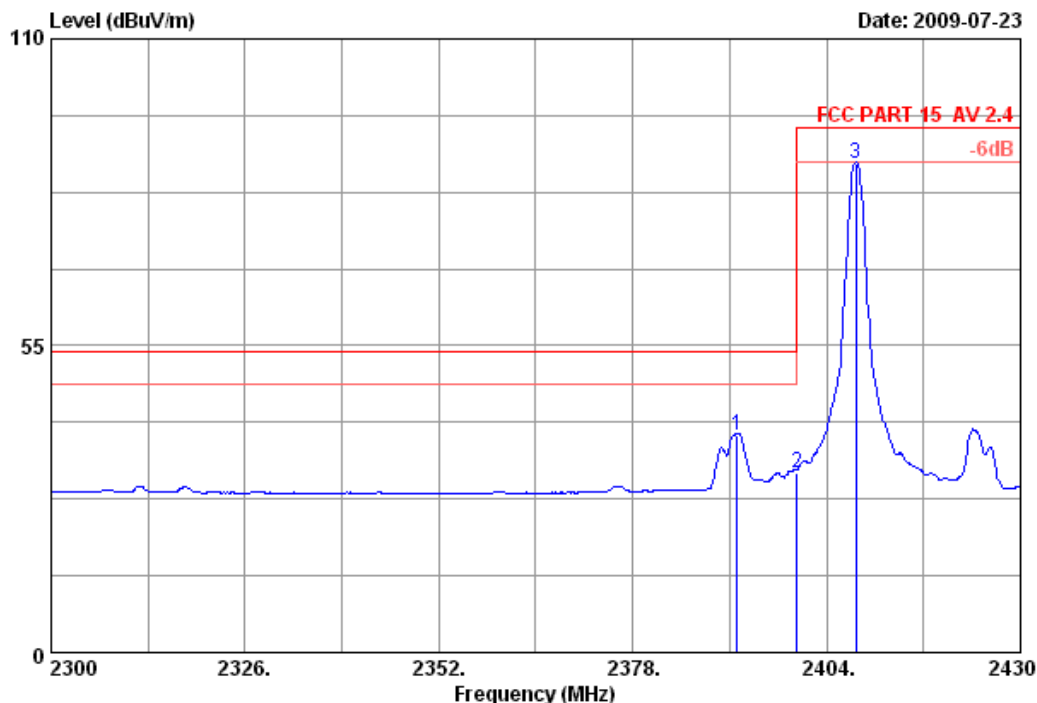


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Data: 30

File: E:\2009 report data\C\Contel\ACS9Q1148.EM6 (36)

Date: 2009-07-23



Site no.	: 3m Chamber	Data no.	: 30
Dis. / Ant.	: 3m 3115(0905)	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15 AV 2.4		
Env. / Ins.	: 23°C/54%	Engineer	: Power Feng
EUT	: Wii Wireless Guitar	M/N:	: 19091
Power	: DC 4.5V		
Test mode	: Tx 2408MHz		

	Freq.	Ant.	Cable	Amp.		Emission			
	(MHz)	Factor	loss	Factor	Reading	Level	Limits	Margin	Remark
		(dB/m)	(dB)	(dB)	(dbuv)	(dBUV/m)	(dBUV/m)	(dB)	
1	2392.040	28.46	7.66	36.09	38.76	38.79	54.00	15.21	Average
2	2400.000	28.46	7.66	36.09	32.26	32.29	54.00	21.71	Average
3	2407.900	28.48	7.66	35.95	87.36	87.55	94.00	6.45	Average

## 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.

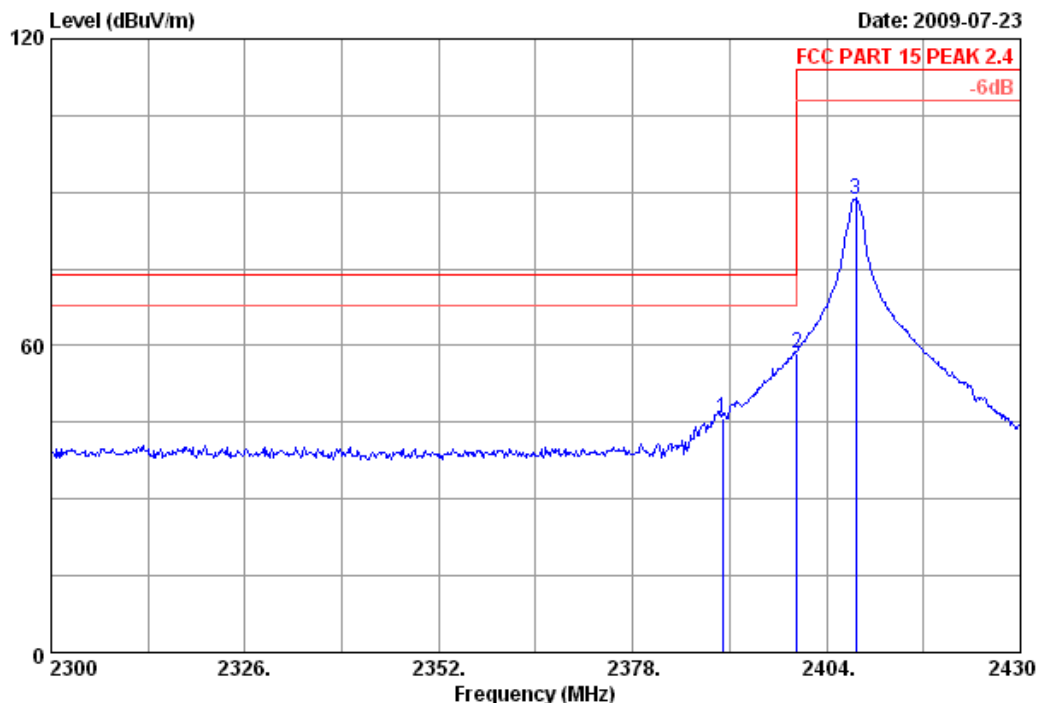


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Data: 31

File: E:\2009 report data\C\Contel\ACS9Q1148.EM6 (36)

Date: 2009-07-23



Site no.	: 3m Chamber	Data no.	: 31
Dis. / Ant.	: 3m 3115(0905)	Ant. pol.	: VERTICAL
Limit	: FCC PART 15 PEAK 2.4		
Env. / Ins.	: 23°C/54%	Engineer	: Power Feng
EUT	: Wii Wireless Guitar	M/N:	: 19091
Power	: DC 4.5V		
Test mode	: Tx 2408MHz		

	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	28.46	7.66	36.09	45.85	45.88	74.00	28.12	Peak
2	2400.000	28.46	7.66	36.09	58.35	58.38	74.00	15.62	Peak
3	2407.900	28.48	7.66	35.95	88.32	88.51	114.00	25.49	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.

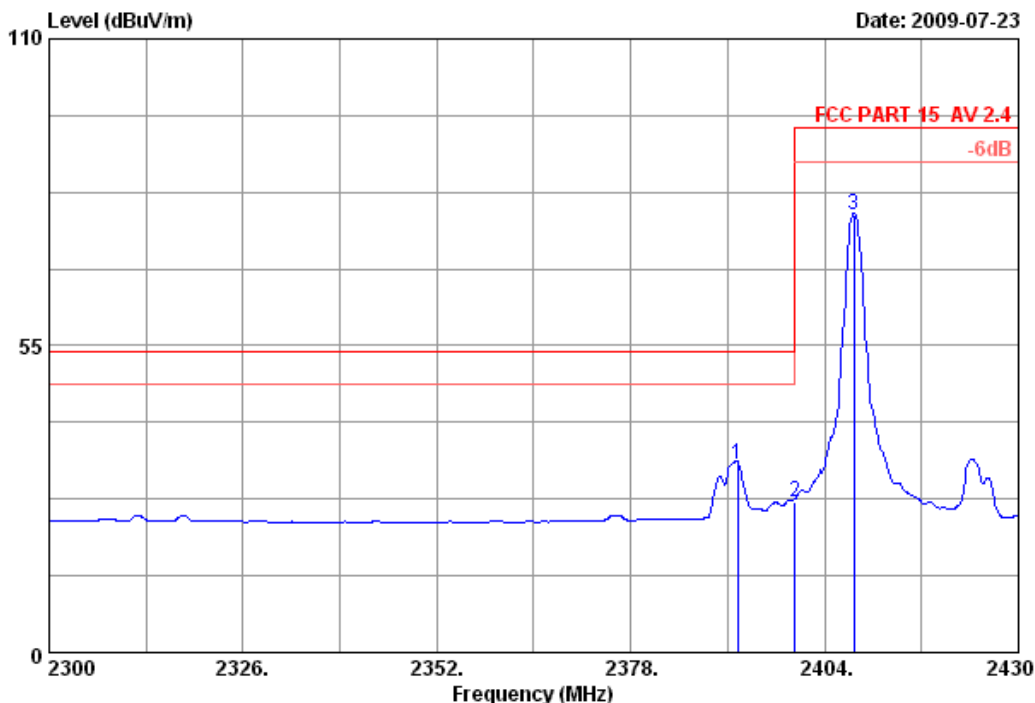


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Data: 32

File: E:\2009 report data\C\Contel\ACS9Q1148.EM6 (36)

Date: 2009-07-23



Site no. : 3m Chamber  
Dis. / Ant. : 3m 3115(0905)  
Limit : FCC PART 15 AV 2.4  
Env. / Ins. : 23°C/54%  
EUT : Wii Wireless Guitar  
Power : DC 4.5V  
Test mode : Tx 2408MHz

Data no. : 32  
Ant. pol. : VERTICAL  
Engineer : Power Feng  
M/N:19091

	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	2392.300	28.46	7.66	36.09	33.69	33.72	54.00	20.28	Average
2	2400.000	28.46	7.66	36.09	27.02	27.05	54.00	26.95	Average
3	2407.900	28.48	7.66	35.95	78.26	78.45	94.00	15.55	Average

## 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.

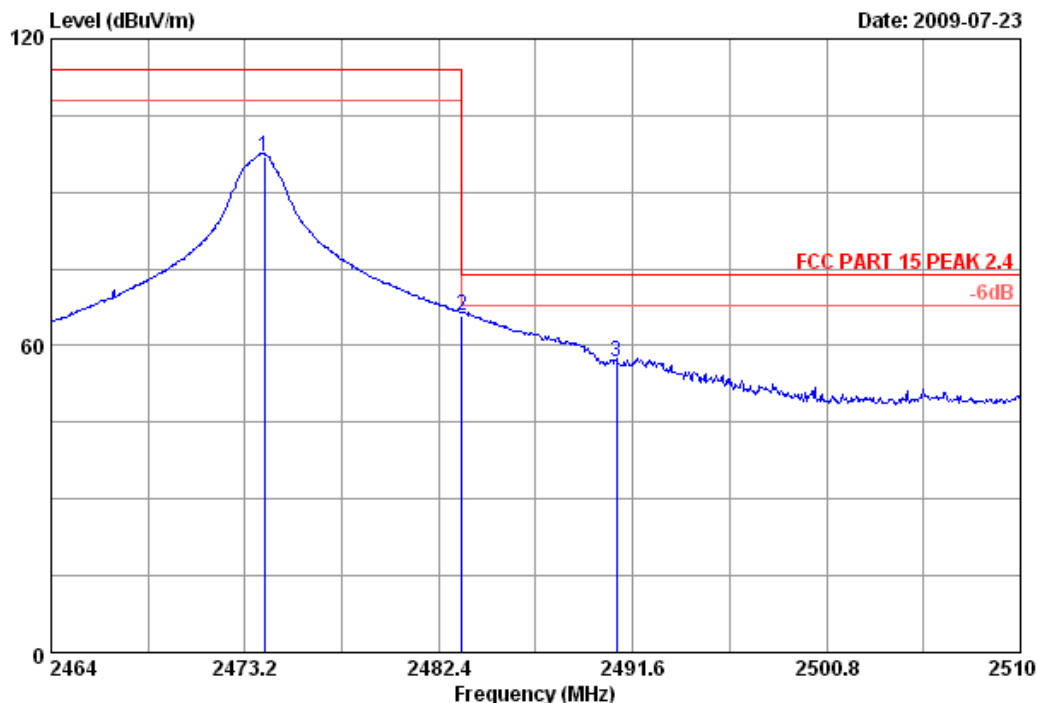


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Postcode:518057

Data: 33

File: E:\2009 report data\C\Contel\ACS9Q1148.EM6 (36)

Date: 2009-07-23



Site no.	: 3m Chamber	Data no.	: 33
Dis. / Ant.	: 3m 3115 (0905)	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15 PEAK 2.4		
Env. / Ins.	: 23°C/54%	Engineer	: Power Feng
EUT	: Wii Wireless Guitar	M/N:	: 19091
Power	: DC 4.5V		
Test mode	: Tx 2474MHz		

	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	2474.120	28.58	7.72	35.97	96.71	97.04	114.00	16.96	Peak
2	2483.500	28.58	7.77	35.97	65.48	65.86	74.00	8.14	Peak
3	2490.818	28.60	7.77	36.00	56.56	56.93	74.00	17.07	Peak

## Remarks:

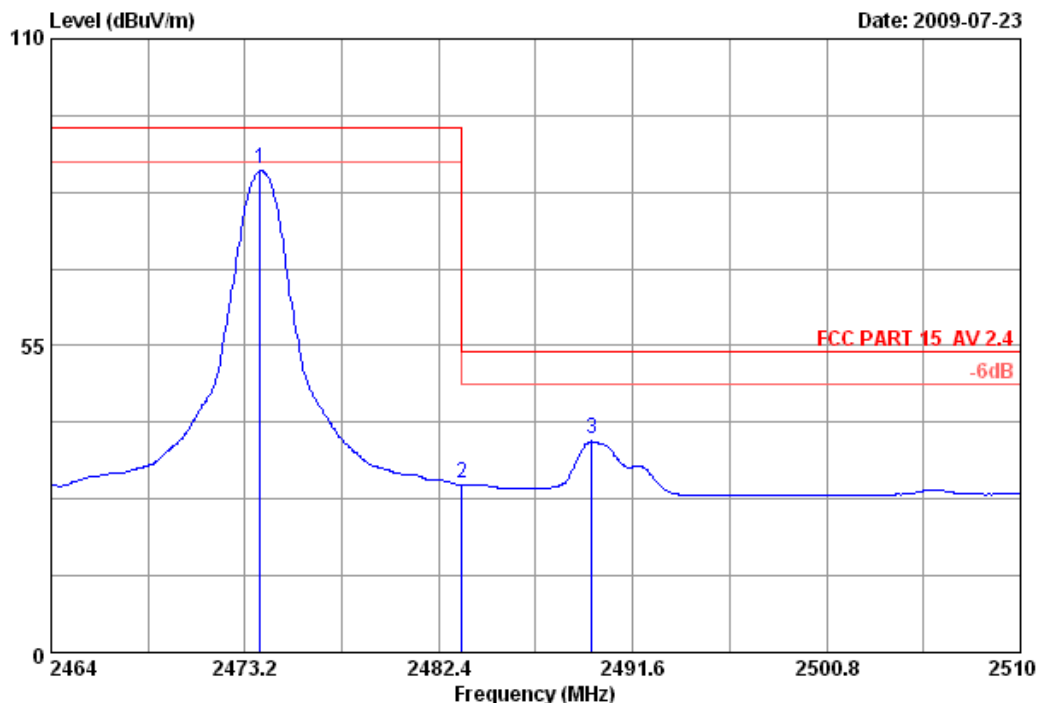
1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



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Data: 34 File: E:\2009 report data\C\Contel\ACS9Q1148.EM6 (36)

Date: 2009-07-23



Site no.	: 3m Chamber	Data no.	: 34
Dis. / Ant.	: 3m 3115(0905)	Ant. pol.	: HORIZONTAL
Limit	: FCC PART 15 AV 2.4		
Env. / Ins.	: 23°C/54%	Engineer	: Power Feng
EUT	: Wii Wireless Guitar	M/N:	: 19091
Power	: DC 4.5V		
Test mode	: Tx 2474MHz		

	Freq.	Ant.	Cable	Amp.		Emission			
	(MHz)	Factor	loss	Factor	Reading	Level	Limits	Margin	Remark
		(dB/m)	(dB)	(dB)	(dbuv)	(dBuV/m)	(dBuV/m)	(dB)	
1	2473.936	28.58	7.72	35.97	86.38	86.71	94.00	7.29	Average
2	2483.500	28.58	7.77	35.97	30.00	30.38	54.00	23.62	Average
3	2489.668	28.60	7.77	36.00	37.83	38.20	54.00	15.80	Average

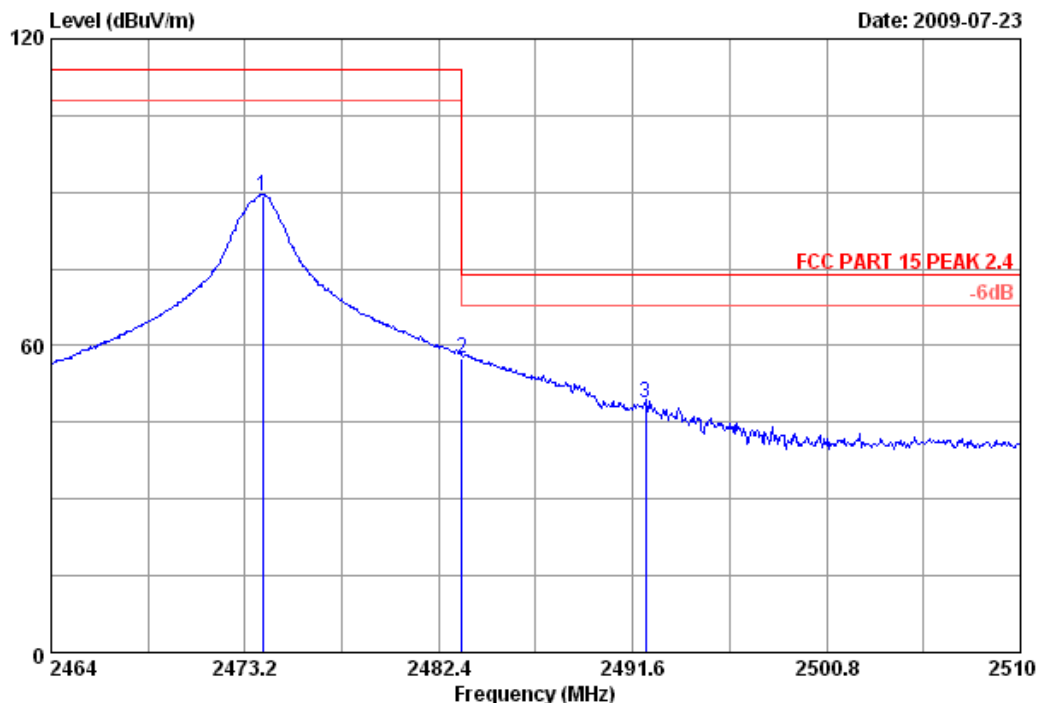
Remarks:

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



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Data: 35 File: E:\2009 report data\C\Contel\ACS9Q1148.EM6 (36)



Site no.	: 3m Chamber	Data no.	: 35
Dis. / Ant.	: 3m 3115(0905)	Ant. pol.	: VERTICAL
Limit	: FCC PART 15 PEAK 2.4		
Env. / Ins.	: 23°C/54%	Engineer	: Power Feng
EUT	: Wii Wireless Guitar	M/N:	: 19091
Power	: DC 4.5V		
Test mode	: Tx 2474MHz		

	Freq.	Ant.	Cable	Amp.		Emission			
	(MHz)	Factor	loss	Factor	Reading	Level	Limits	Margin	Remark
		(dB/m)	(dB)	(dB)	(dbuv)	(dBuV/m)	(dBuV/m)	(dB)	
1	2474.028	28.58	7.72	35.97	88.77	89.10	114.00	24.90	Peak
2	2483.500	28.58	7.77	35.97	57.23	57.61	74.00	16.39	Peak
3	2492.198	28.60	7.77	36.00	48.42	48.79	74.00	25.21	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.



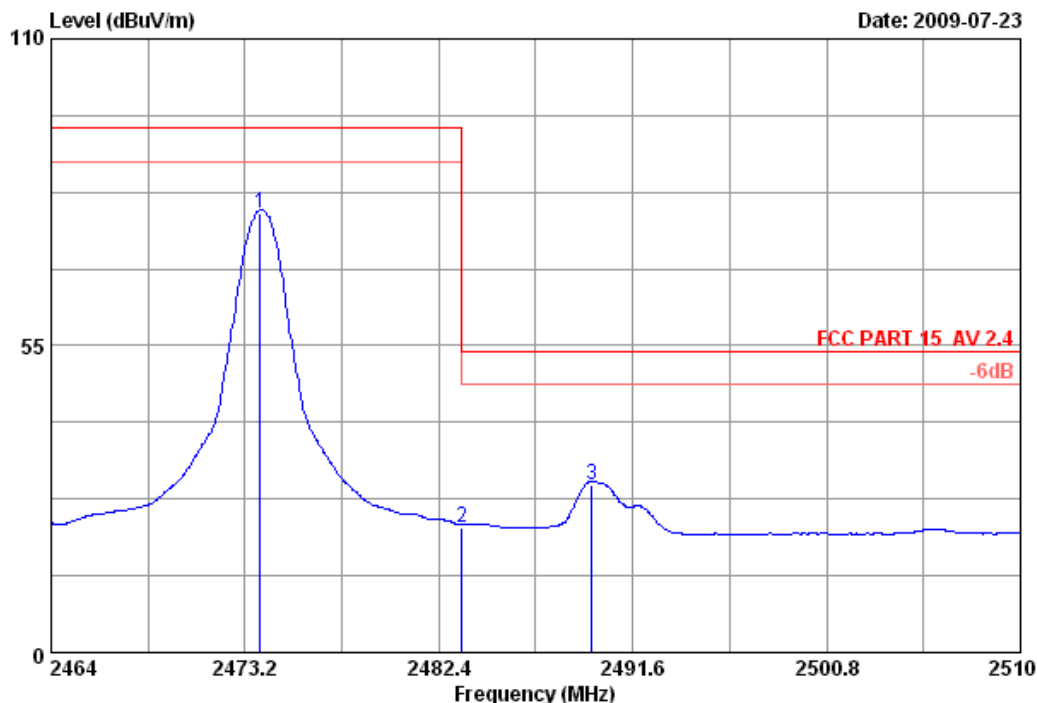


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Data: 36

File: E:\2009 report data\C\Contel\ACS9Q1148.EM6 (36)

Date: 2009-07-23



Site no. : 3m Chamber  
Dis. / Ant. : 3m 3115(0905)  
Limit : FCC PART 15 AV 2.4  
Env. / Ins. : 23°C/54%  
EUT : Wii Wireless Guitar  
Power : DC 4.5V  
Test mode : Tx 2474MHz

Data no. : 36  
Ant. pol. : VERTICAL  
Engineer : Power Feng  
M/N:19091

	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	2473.936	28.58	7.72	35.97	78.38	78.71	94.00	15.29	Average
2	2483.500	28.58	7.77	35.97	22.01	22.39	54.00	31.61	Average
3	2489.668	28.60	7.77	36.00	29.70	30.07	54.00	23.93	Average

## 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.

## 6. 20DB BANDWIDTH TEST

### 6.1. Test Equipment

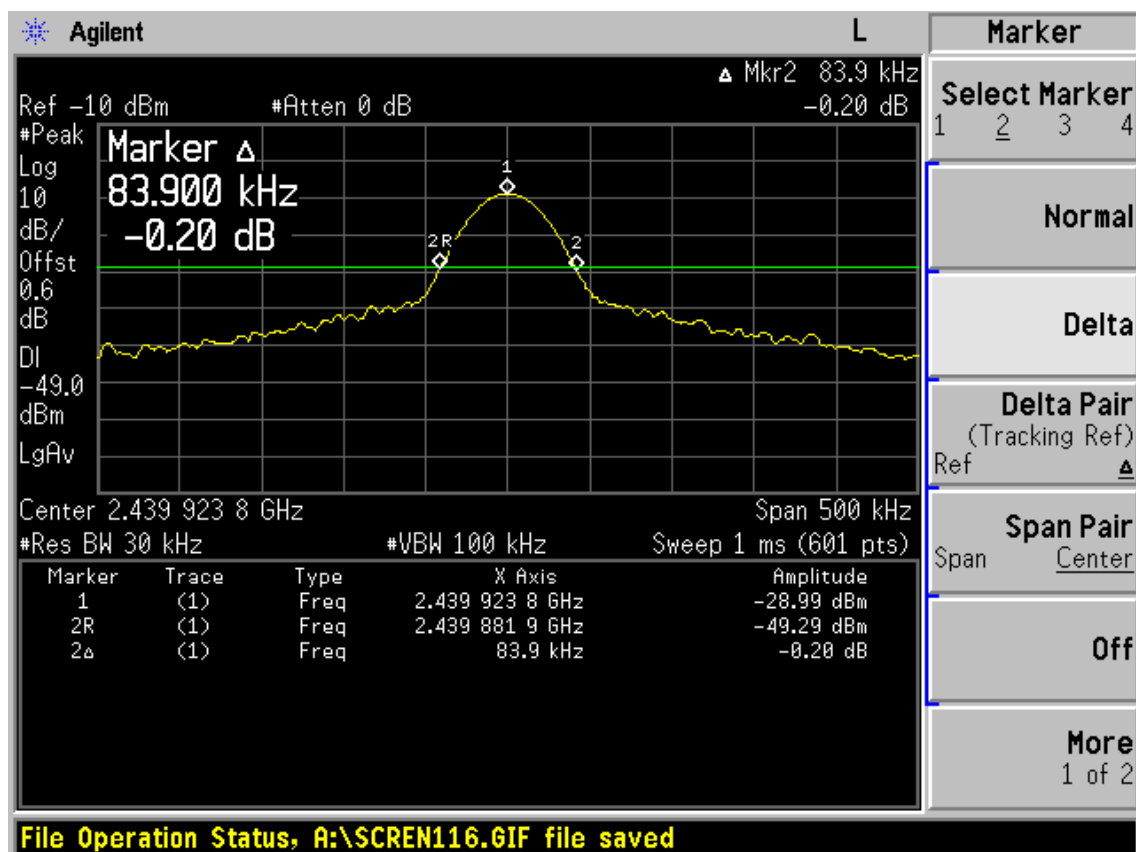
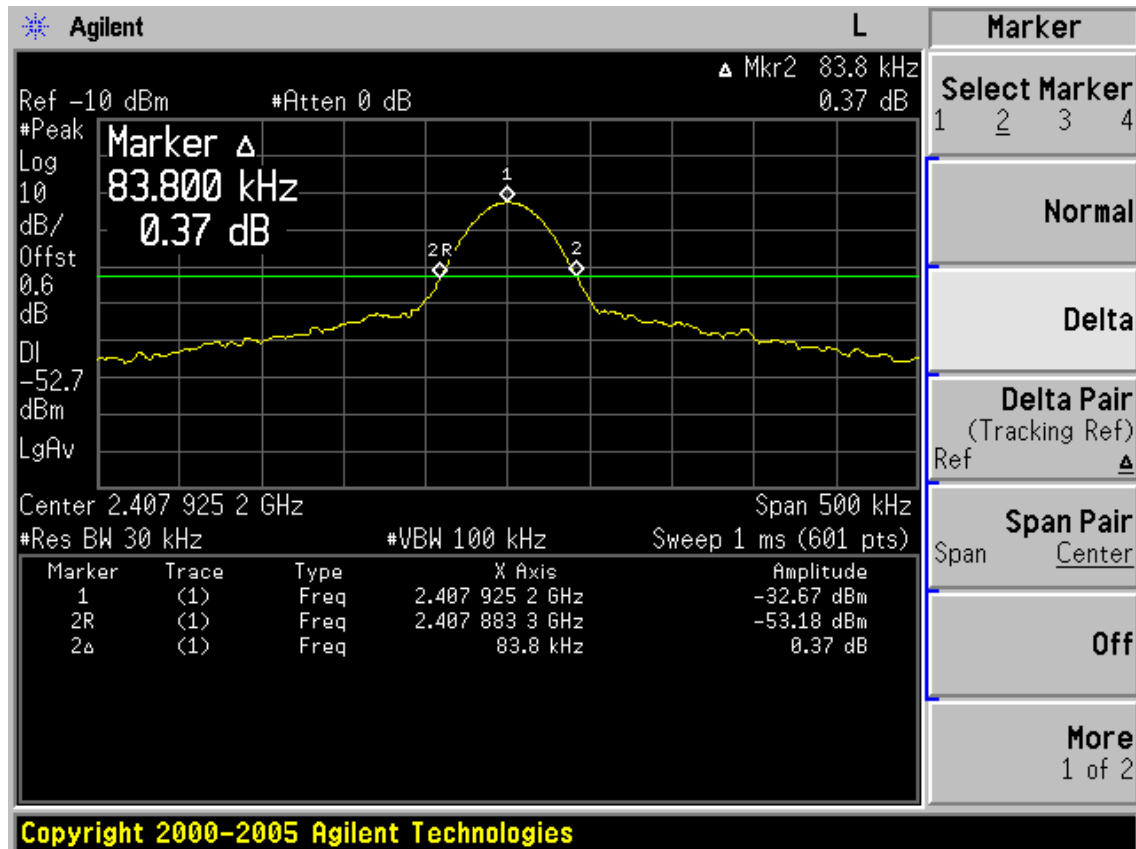
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum Analyzer	Agilent	E4446A	US44300459	May,08, 09	1 Year
2	Attenuator	Agilent	8491B	MY39262165	May,08, 09	1 Year
3	RF Cable	Hubersuhner	SUCOFLEX 102	28618/2	May,08, 09	1 Year

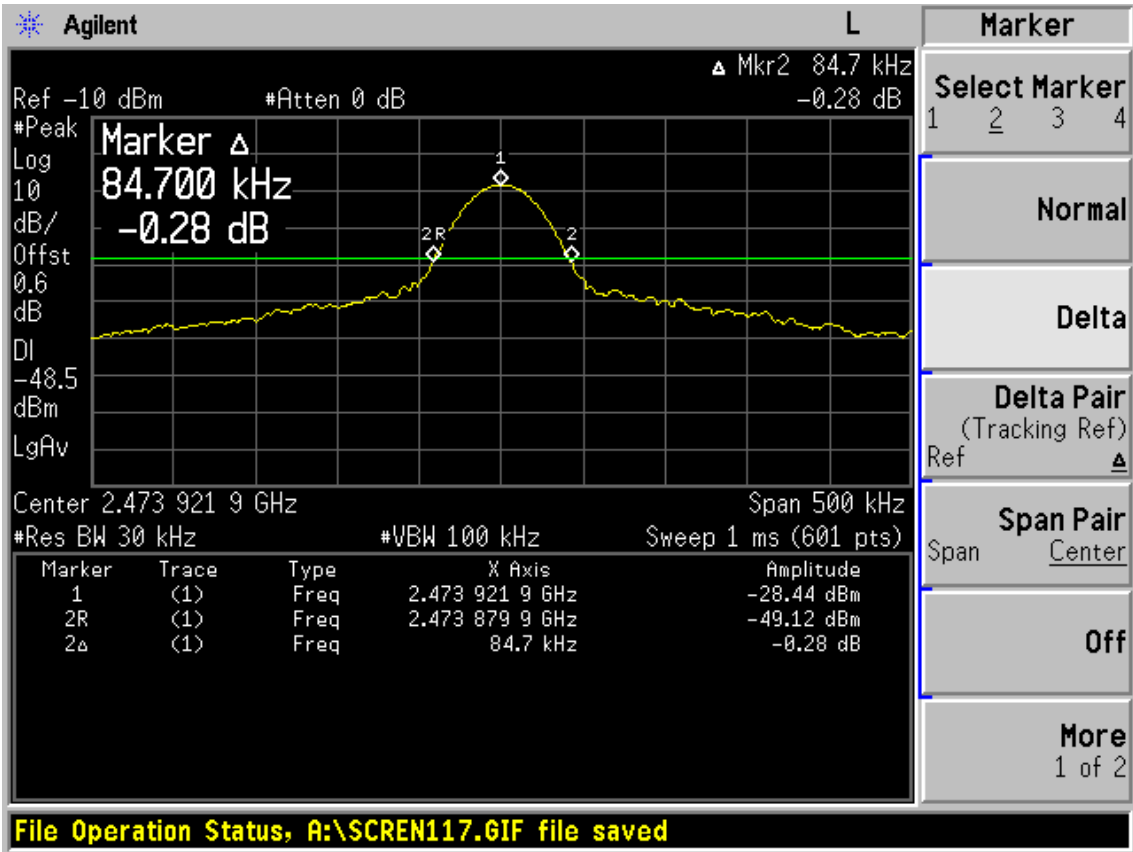
### 6.2. Limit

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.

### 6.3. Test Results

CH	20dB Bandwidth (kHz)	Limit (MHz)	Conclusion
(Low)	83.8	---	PASS
(Mid)	83.9	---	PASS
(High)	84.7	---	PASS





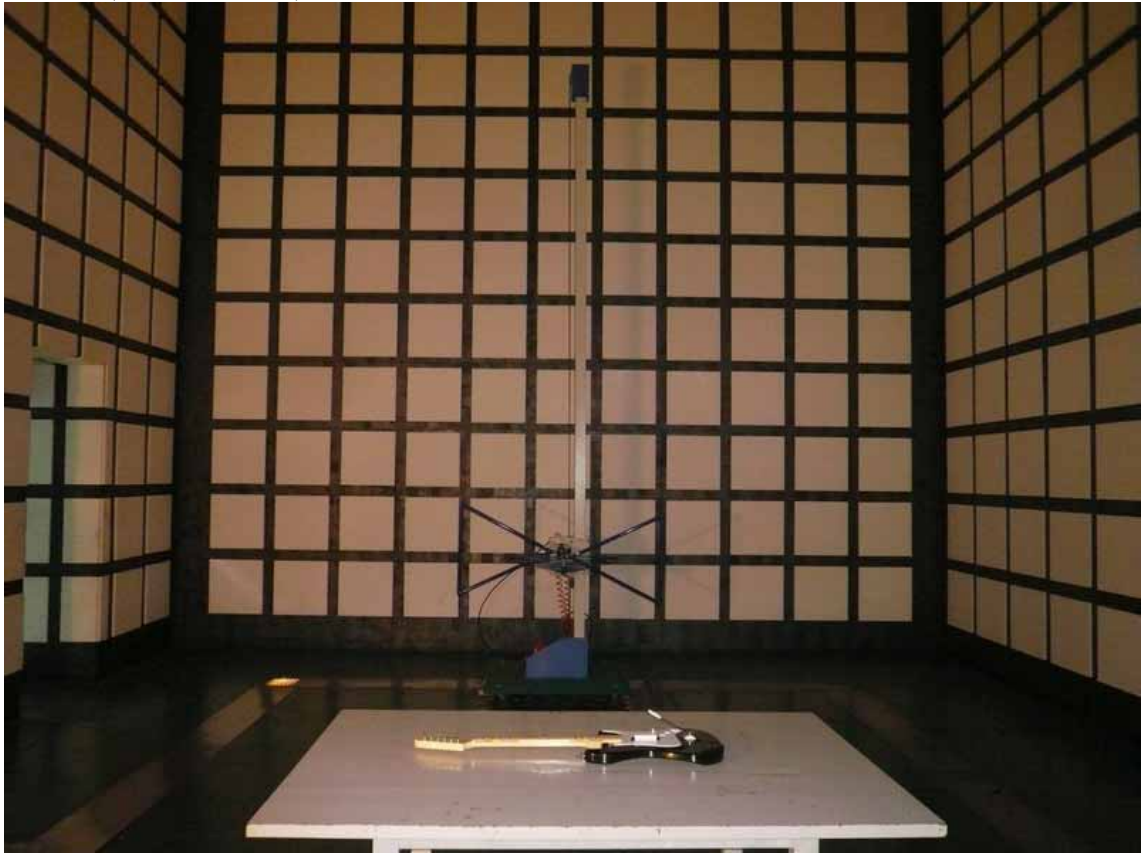
## **7. DEVIATION TO TEST SPECIFICATIONS**

[ NONE]

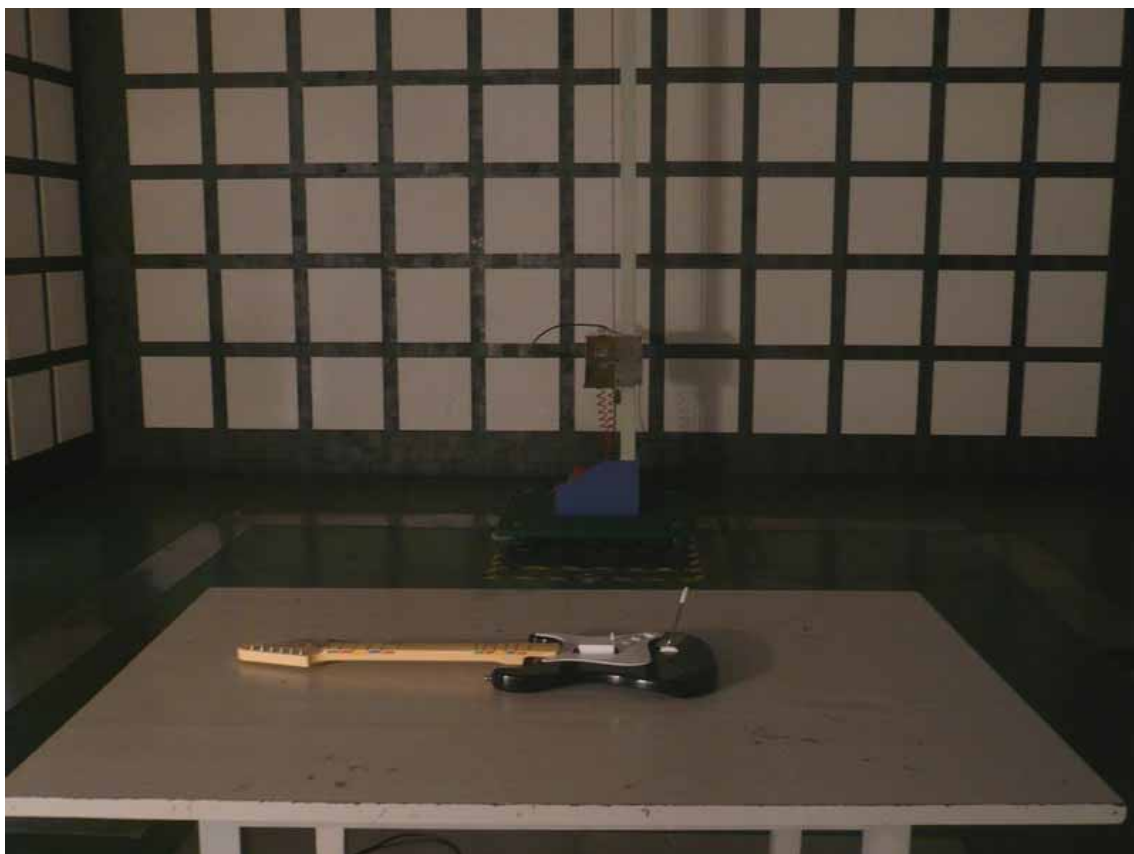
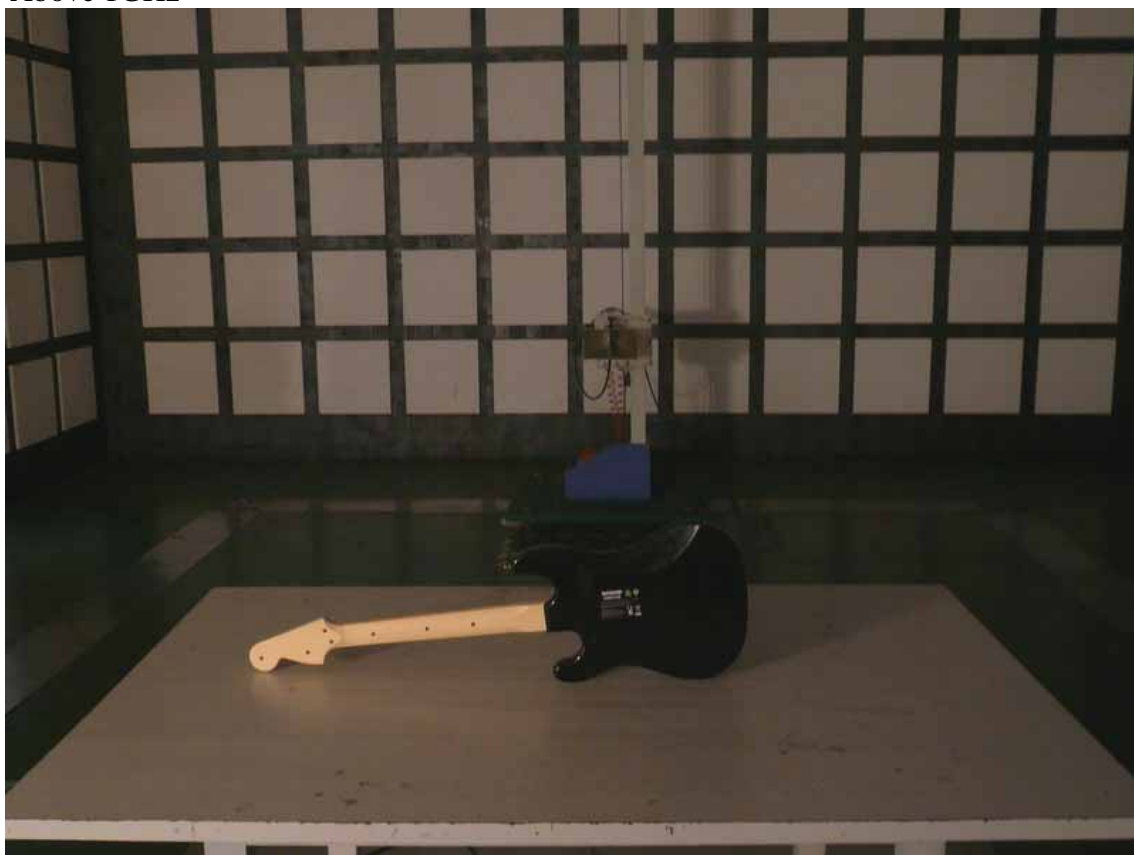
## 8. PHOTOGRAPH OF TEST

### 8.1. Photos of Radiated Emission Test (In Anechoic Chamber)

(30~1000MHz)



Above 1GHz



## 9. PHOTOGRAPH OF EUT

**Figure 1**  
General Appearance of the EUT



**Figure 2**  
General Appearance of the EUT





**Figure 3**  
General Appearance of the EUT



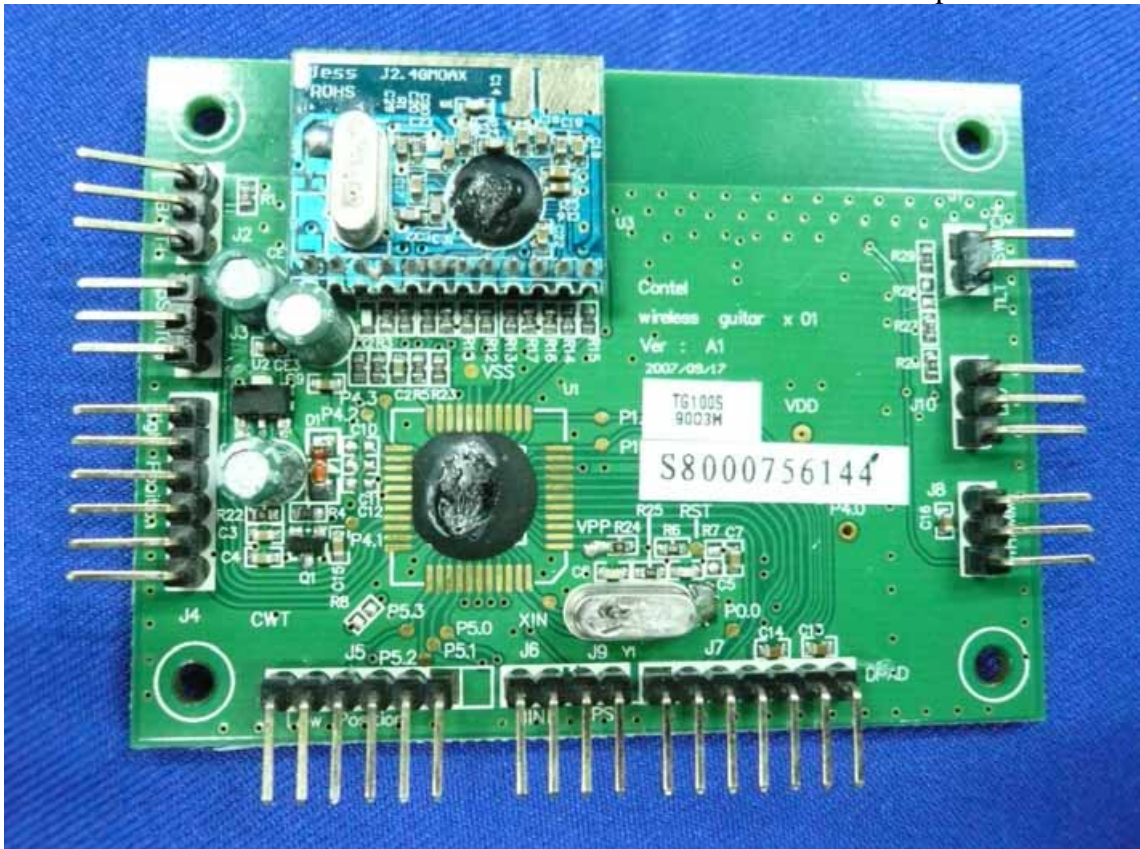
**Figure 4**  
Inside of the EUT



**Figure 5**  
Inside of the EUT

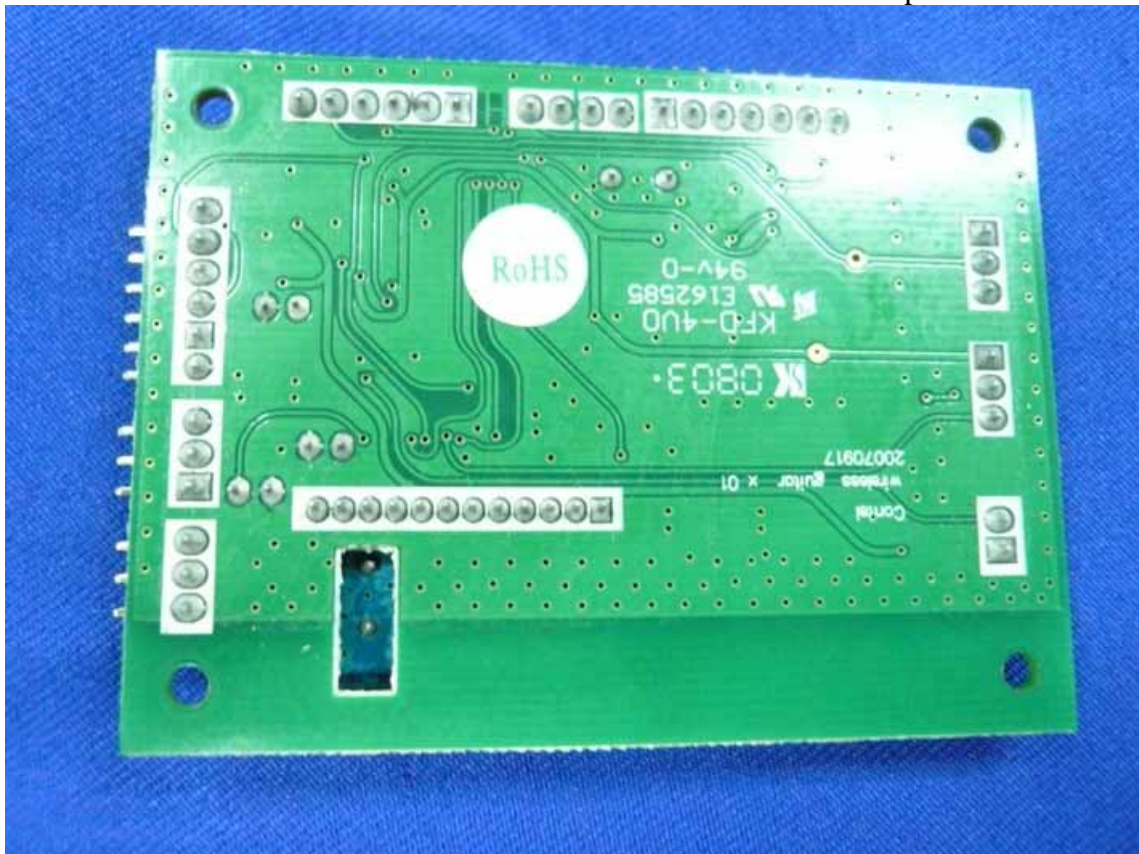


**Figure 6**  
Component Side of the PCB

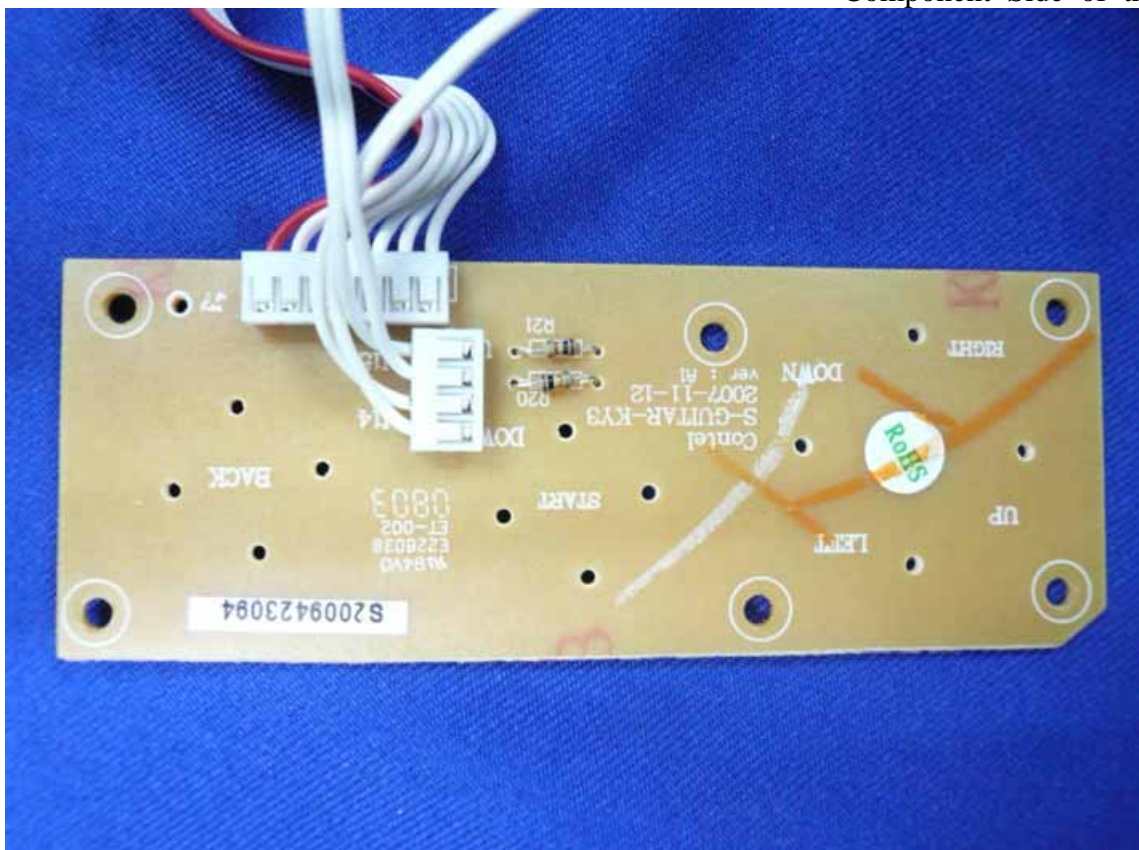




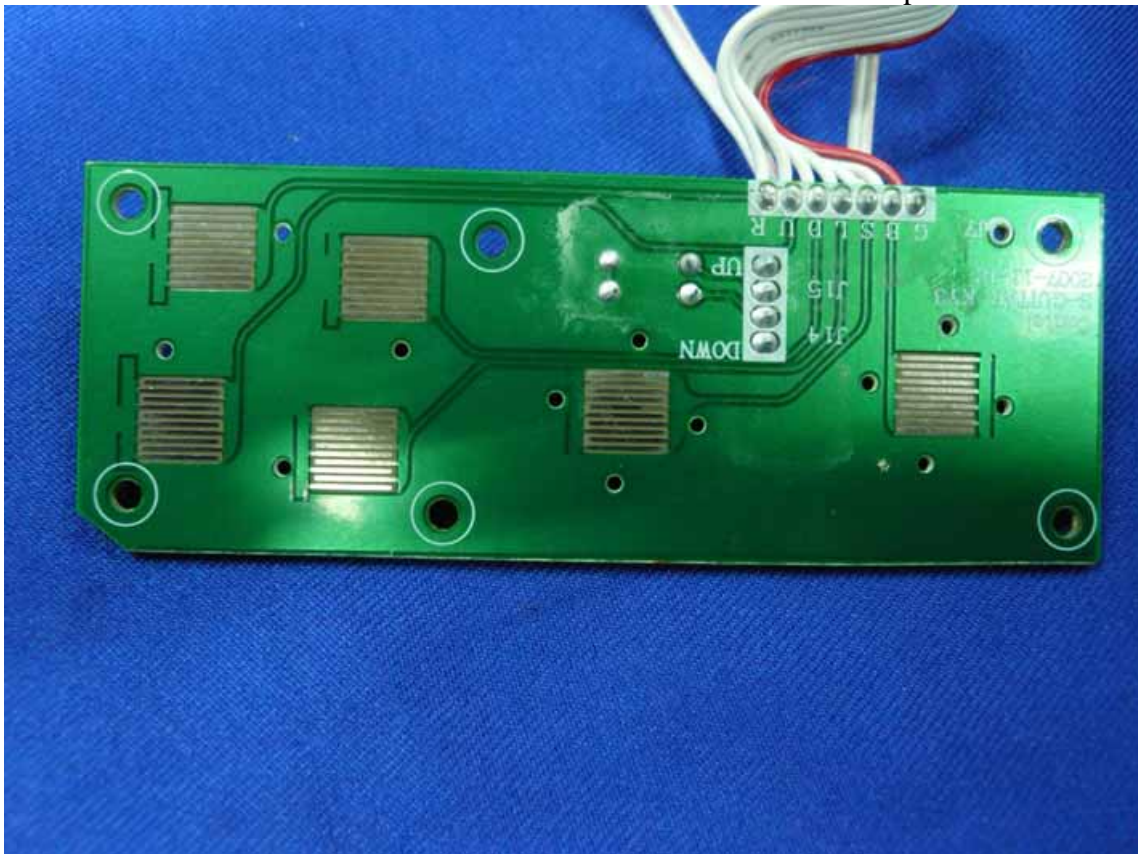
**Figure 7**  
Component Side of the PCB



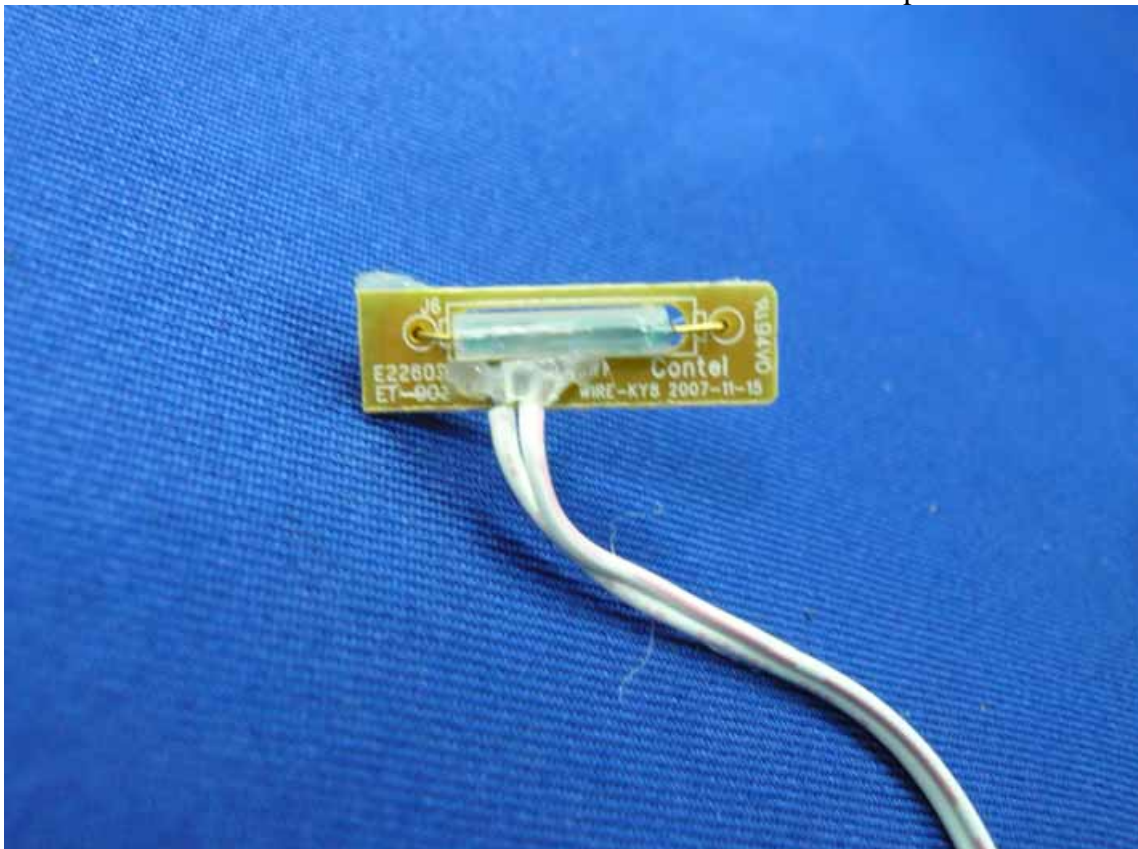
**Figure 8**  
Component Side of the PCB



**Figure 9**  
Component Side of the PCB

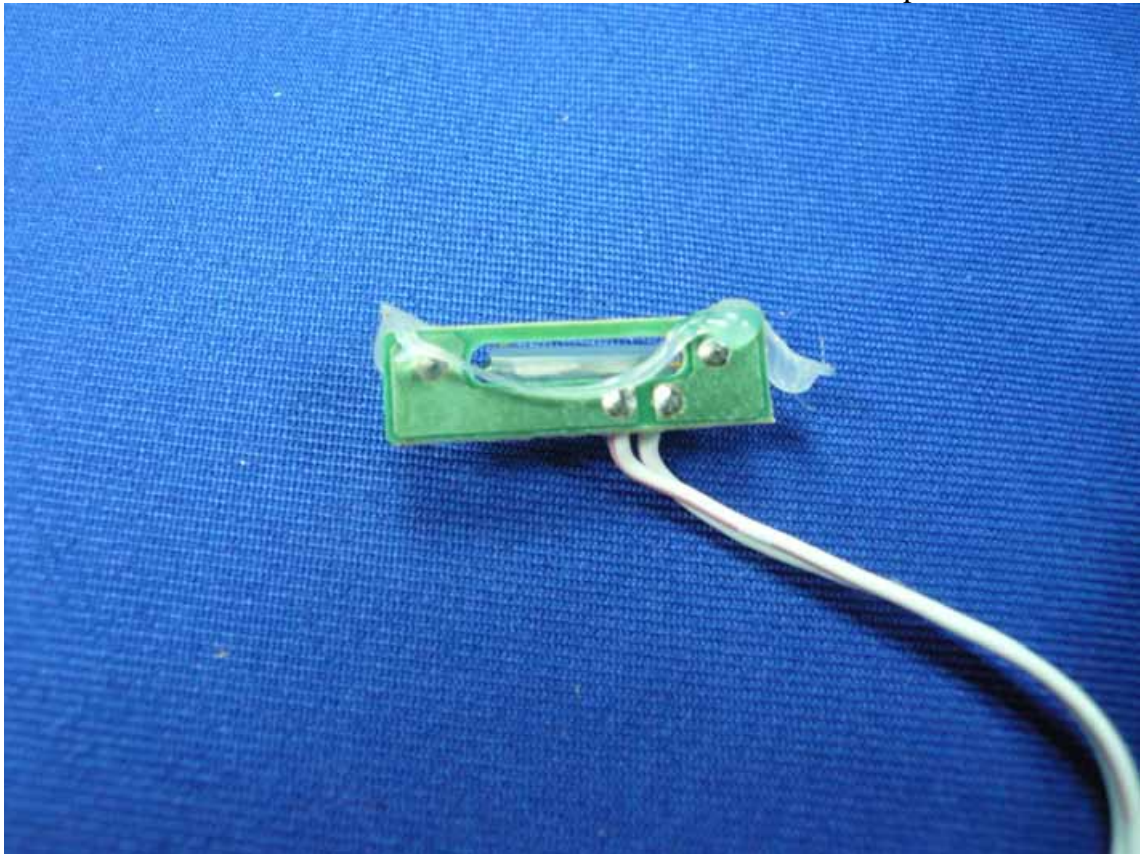


**Figure 10**  
Component Side of the PCB

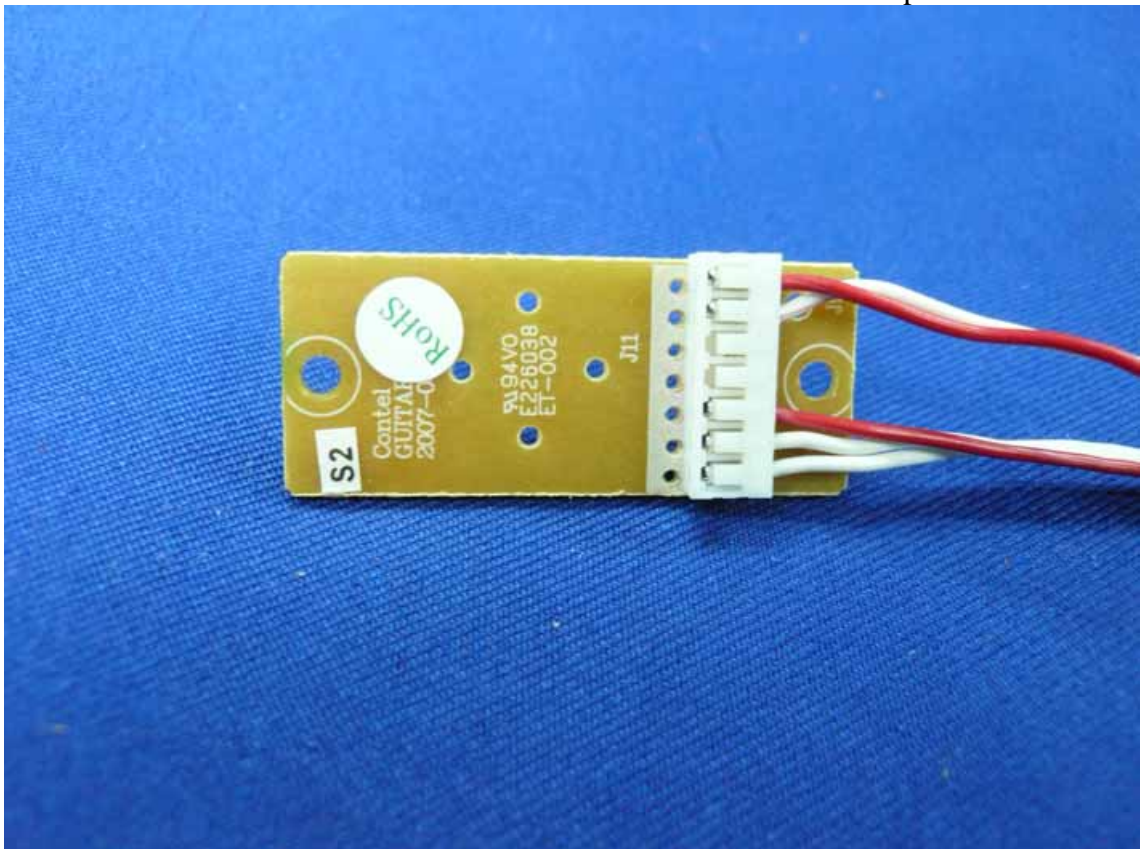




**Figure 11**  
Component Side of the PCB

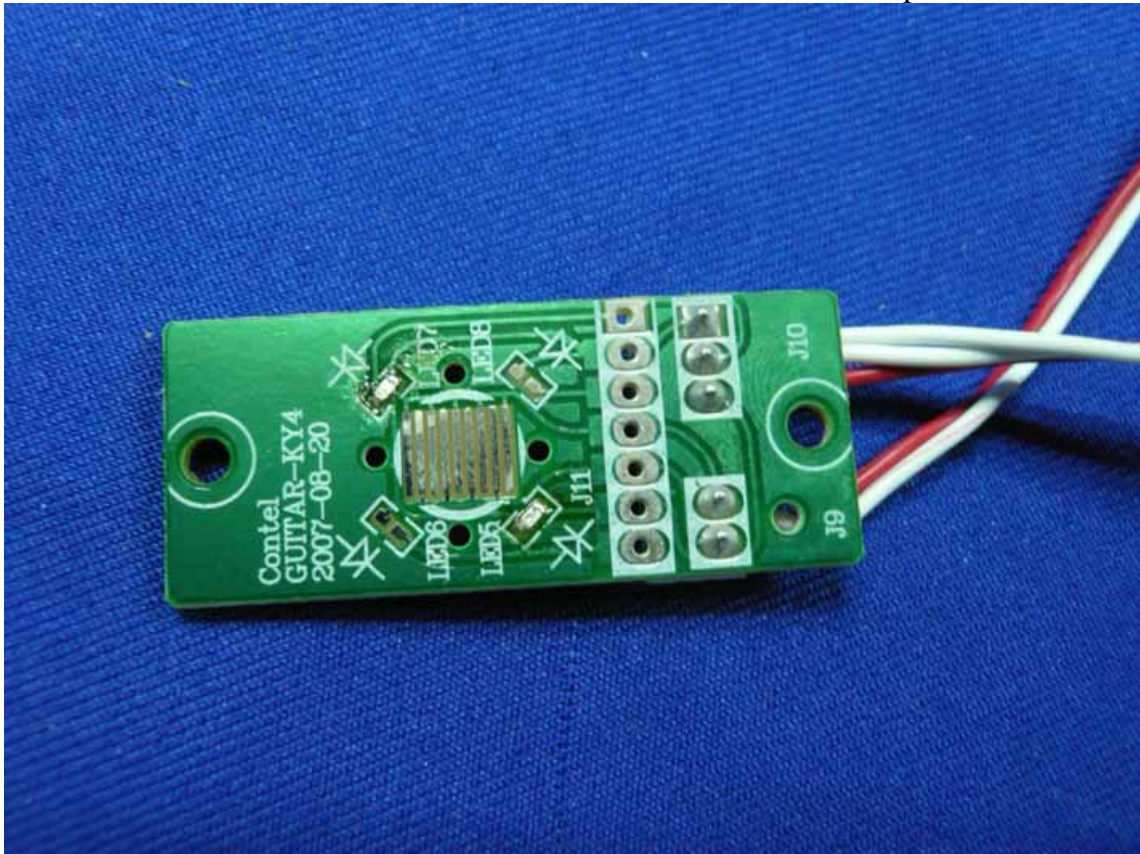


**Figure 12**  
Component Side of the PCB

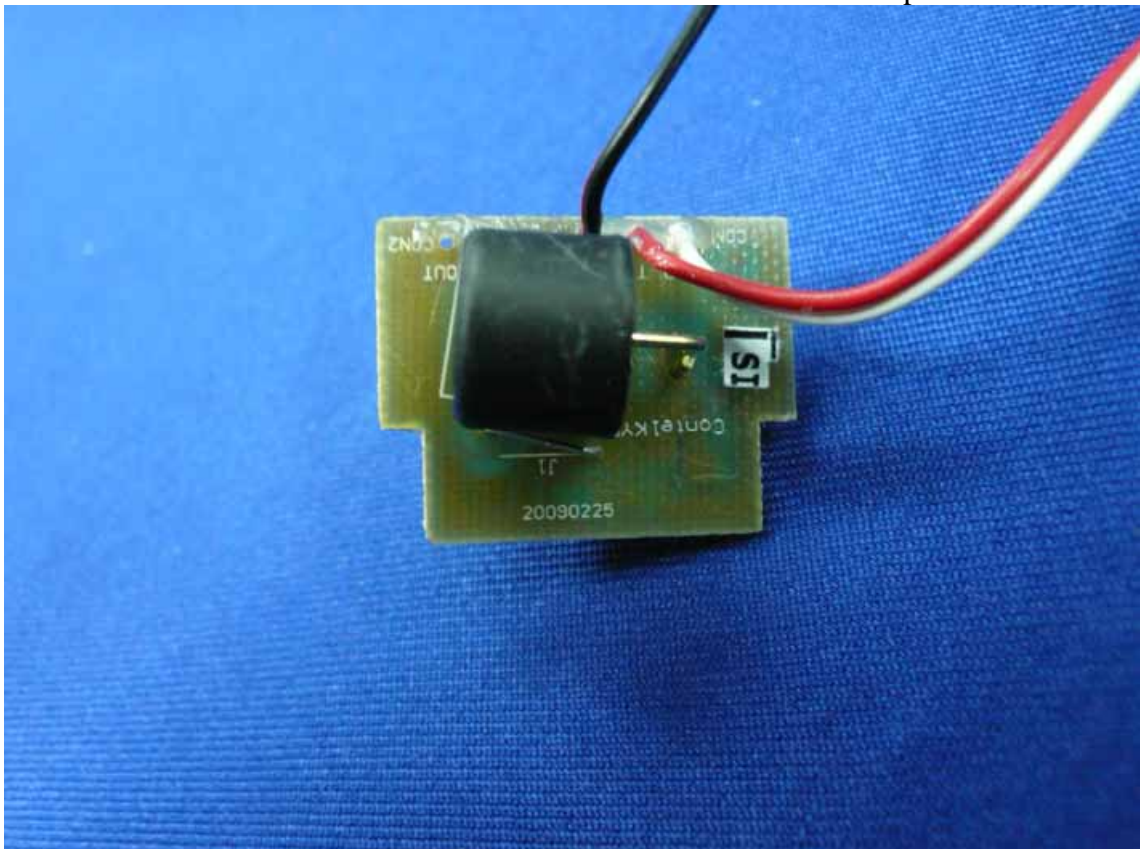




**Figure 13**  
Component Side of the PCB



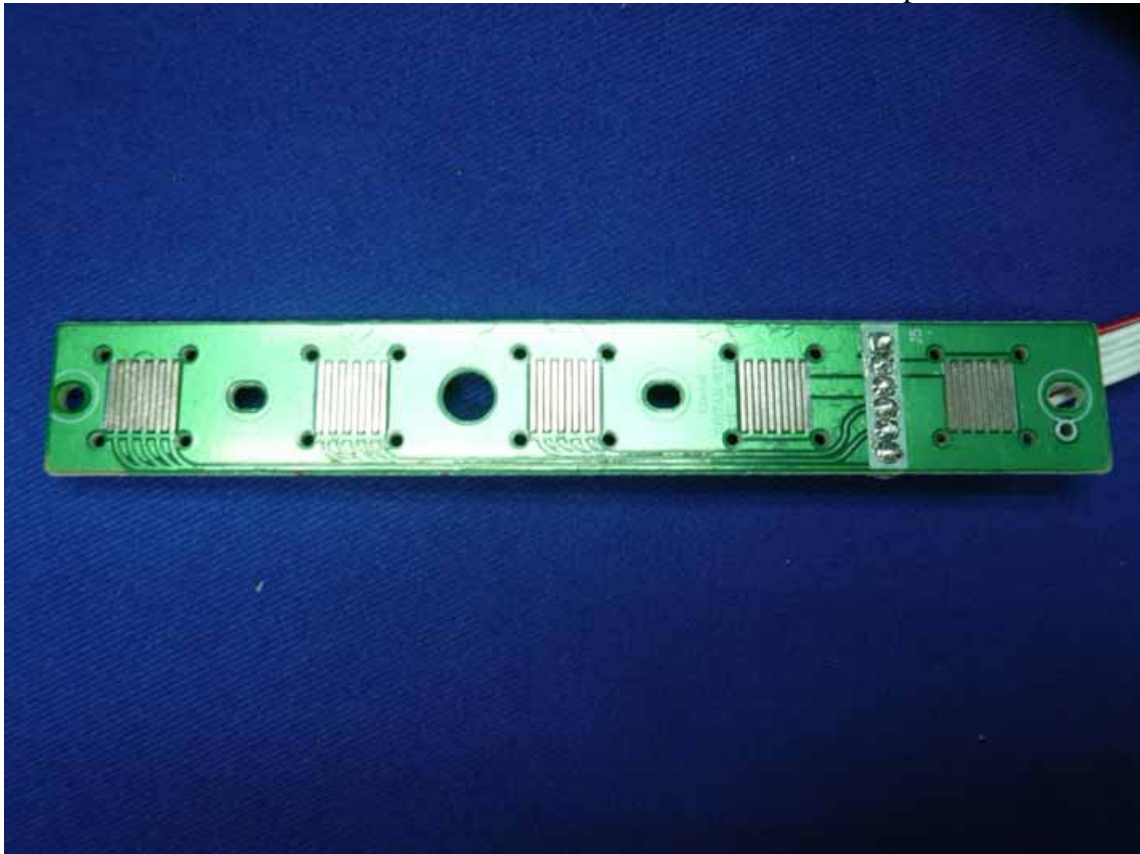
**Figure 14**  
Component Side of the PCB



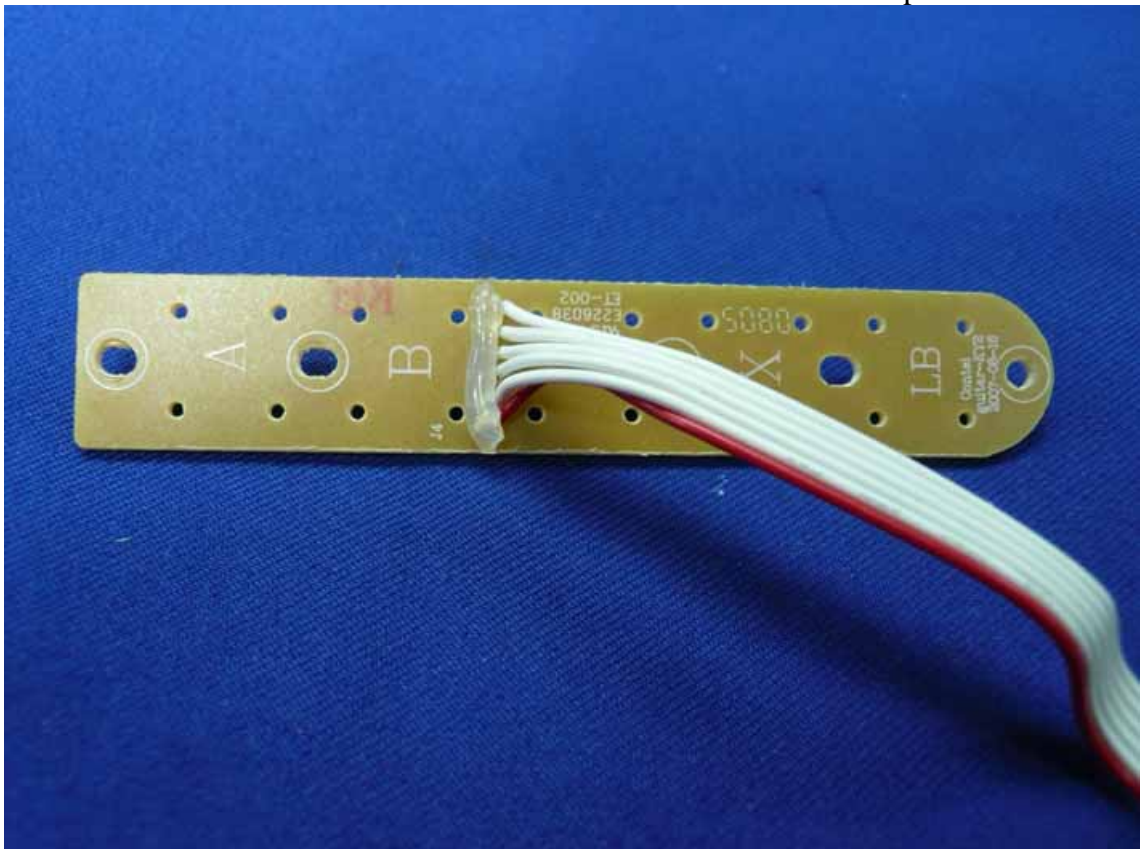




**Figure 17**  
Component Side of the PCB

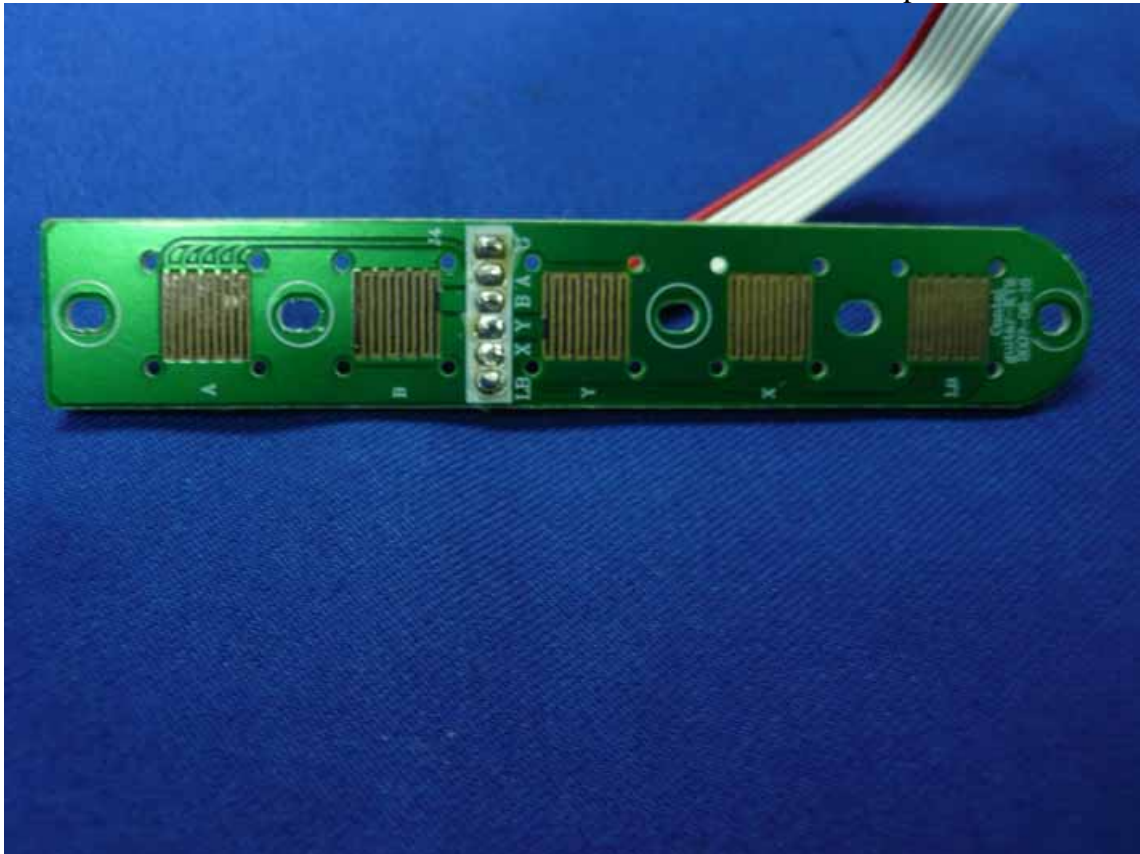


**Figure 18**  
Component Side of the PCB

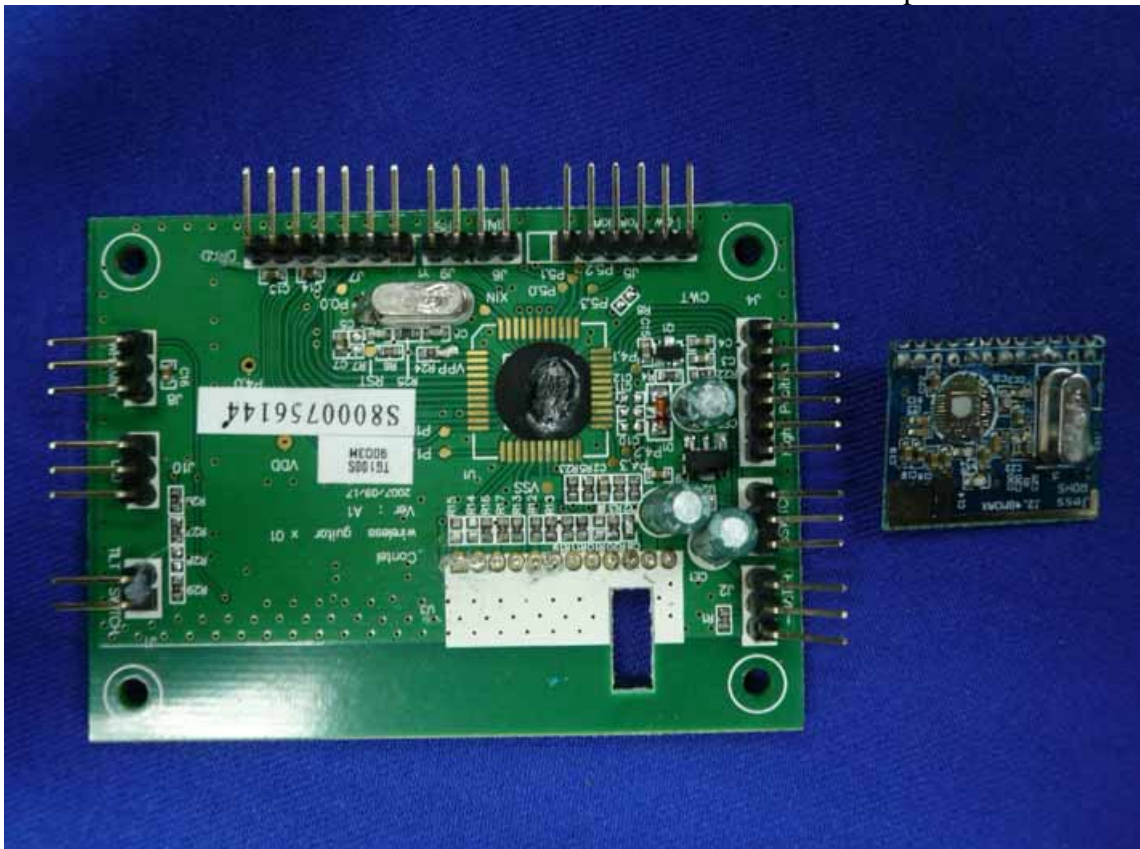




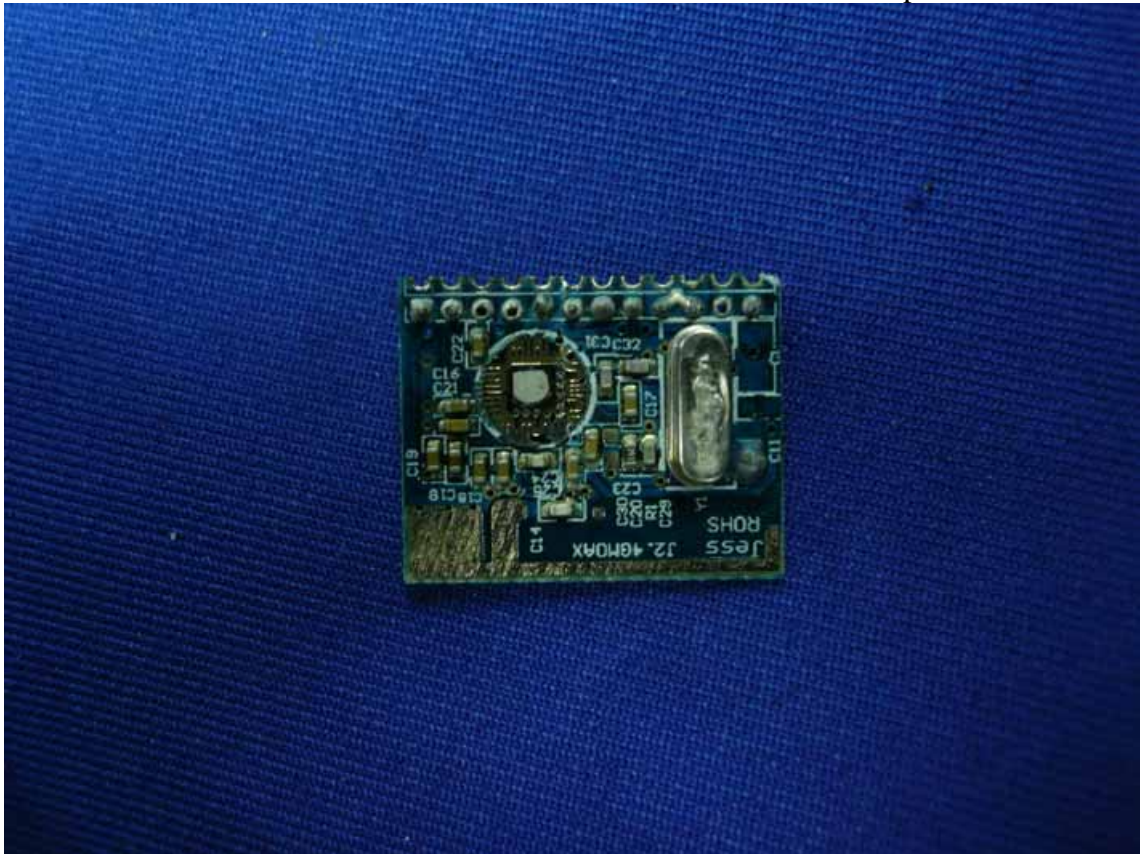
**Figure 19**  
Component Side of the PCB



**Figure 20**  
Component Side of the PCB



**Figure 21**  
Component Side of the PCB



**Figure 22**  
Component Side of the PCB

