

APPLICATION FOR CERTIFICATION
On Behalf of

Harmonix Music Systems, Inc.

Rock Band 2 Wii Wireless Drum

Model Number: NWDMS2

FCC ID: VFRHMXDRM04

Prepared for : Harmonix Music Systems, Inc.
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USA

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Report Number : ACS-F08391
Date of Test : Sep.01~06, 2008
Date of Report : Sep.12, 2008

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TEST REPORT CERTIFICATION

Applicant : Harmonix Music Systems, Inc.
 Manufacturer : Sung Lih Electronic Manufactory Ltd.
 EUT Description : Rock Band 2 Wii Wireless Drum
 FCC ID : VFRHMXDRM04
 (A) MODEL NO. : NWDMS2
 (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 2007

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: Sep.01~06, 2008

Prepared by:

YoYo Wang

YoYo Wang / Assistant

Reviewer:

Jamy Yu

Jamy Yu / Senior Engineer

Approved & Authorized Signer:



Ken Lu / Deputy 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.

Description of Test Item(FHSS)	Standard	Results
Conducted Emission Test	FCC Part 15: 15.207 ANSI C63.4: 2003	N/A
Radiated Emission Test	FCC Part 15: 15.209 ANSI C63.4: 2003	PASS
Carrier Frequency Separation Test	FCC Part 15: 15.247(a)(1) DA 00-705	PASS
20 dB Bandwidth Test	FCC Part 15: 15.247(a)(1) DA 00-705	PASS
Number Of Hopping Frequency Test	FCC Part 15: 15.247(a)(1)(iii) DA 00-705	PASS
Dwell Time Test	FCC Part 15: 15.247(a)(1)(iii)	PASS
Maximum Peak Output Power Test	FCC Part 15: 15.247(b)(1) DA 00-705	PASS
Band Edge Compliance Test	FCC Part 15: 15.247(d) DA 00-705	PASS
Antenna requirement	FCC Part 15: 15.203	PASS
N/A is an abbreviation for Not Applicable.		

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

Description	:	Rock Band 2 Wii Wireless Drum
Model Number	:	NWDMS2
FCC ID	:	VFRHMXDRM04
Operation frequency	:	2.408GHz-----2.476GHz ISM Band
Operation Channel	:	16Channels
Modulation Technology	:	GFSK
Output power	:	-1.97dBm(maximum measured)
Antenna Assembly Gain	:	0dBi(maximum)
Power Supply	:	DC 4.5V (Note: New batteries were used for all test.)
Applicant	:	Harmonix Music Systems, Inc.
		675 Massachusetts Ave 6 th Floor Cambridge, MA 02139 USA
Manufacturer	:	Sung Lih Electronic Manufactory Ltd.
		Da Tian Yang Industrial Zone, Song Kong, Shen Zhen
Date of Test	:	Sep.01~06, 2008
Date of Receipt	:	Aug.30, 2008
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	:	Jun. 13, 2006 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 Dec. 20, 2007 Accredited by NVLAP, USA NVLAP Code: 200372-0 Apr. 01, 2008

2.3. Measurement Uncertainty

No.	Item	MU	Remark
1.	Uncertainty for Conducted Emission Test	2.02dB	
2.	Uncertainty for Radiation Emission test in 3m chamber	3.44 dB	Polarize: V
		3.96 dB	Polarize: H
3.	Uncertainty for Radiation Emission test in 10m chamber	3.46 dB	Distance: 10m Polarize: V
		3.82 dB	Distance: 10m Polarize: H
		3.64 dB	Distance: 3m Polarize: V
		4.02 dB	Distance: 3m Polarize: H
4.	RF frequency	$\pm 0.5 \times 10^{-7}$	
5.	RF power, conducted	± 3 dB	

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	Jun.09, 08	1/2 Year
2.	EMI Spectrum	Agilent	E7403A	MY42000106	May 10, 08	1 Year
3.	Test Receiver	Rohde & Schwarz	ESVS20	830350/005	May 10, 08	1 Year
4.	Amplifier	HP	8447D	2648A04738	Jul.08.08	1/2 Year
5.	Bilog Antenna	Schaffner	CBL6112D	25237	Feb.21, 08	1 Year
6.	RF Cable	JINGCHENG	KLMR400	3# Chamber No.1	Jul.08.08	1/2 Year
7.	RF Cable	JINGCHENG	JB Y400	3# Chamber No.2	Jul.08.08	1/2 Year
8.	RF Cable	JINGCHENG	JB Y400	3# Chamber No.3	Jul.08.08	1/2 Year
9.	RF Cable	JINGCHENG	JB Y400	3# Chamber No.4	Jul.08.08	1/2 Year
10.	Coaxial Switch	Anritsu	MP59B	M73989	Jul.08.08	1/2 Year

Frequency rang: above 1000MHz

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	E4446A	MY41440292	May 10, 08	1 Year
2.	Amp	HP	8449B	3008A00863	May 10, 08	1 Year
3.	Antenna	EMCO	3115	9607-4877	May 27, 08	1.5 Year
4.	Antenna	EMCO	3116	00060088	May 28, 07	1.5Year
5.	HF Cable	Hubersuhne	Sucoflex104	-	May 10, 08	1 Year

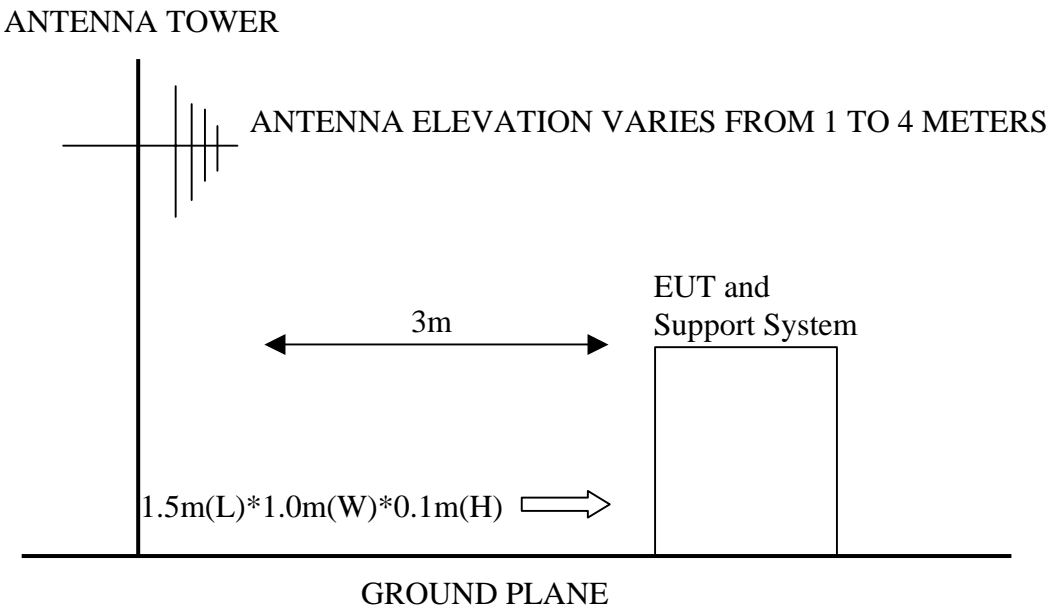
4.2. Block Diagram of Test Setup

4.2.1. Block diagram of connection between the EUT and simulators

EUT

(EUT: Rock Band 2 Wii Wireless Drum)

4.2.2.In Anechoic Chamber



4.3.Radiated Emission Limit

4.3.1.15.209 limits

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 1000	3	74.0 dB(μV)/m (Peak) 54.0 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.

4.3.2. 15.205 Restricted bands of operation

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

All the emissions appearing within these frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

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.Rock Band 2 Wii Wireless Drum (EUT)

Model Number : NWDMS2
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.Let the EUT work in test modes (TX Mode) and test it.

4.6.Test Procedure

EUT and its simulators are placed on a ground plane. The turn table can rotate 360 degrees to determine the position of the maximum emission level. Power on the EUT and let it work normally, we use a keyboard test soft ware, let EUT working in test mode, then test it. 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 are set on test.

The bandwidth of the EMI test receiver (R&S ESVS20) 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) 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.

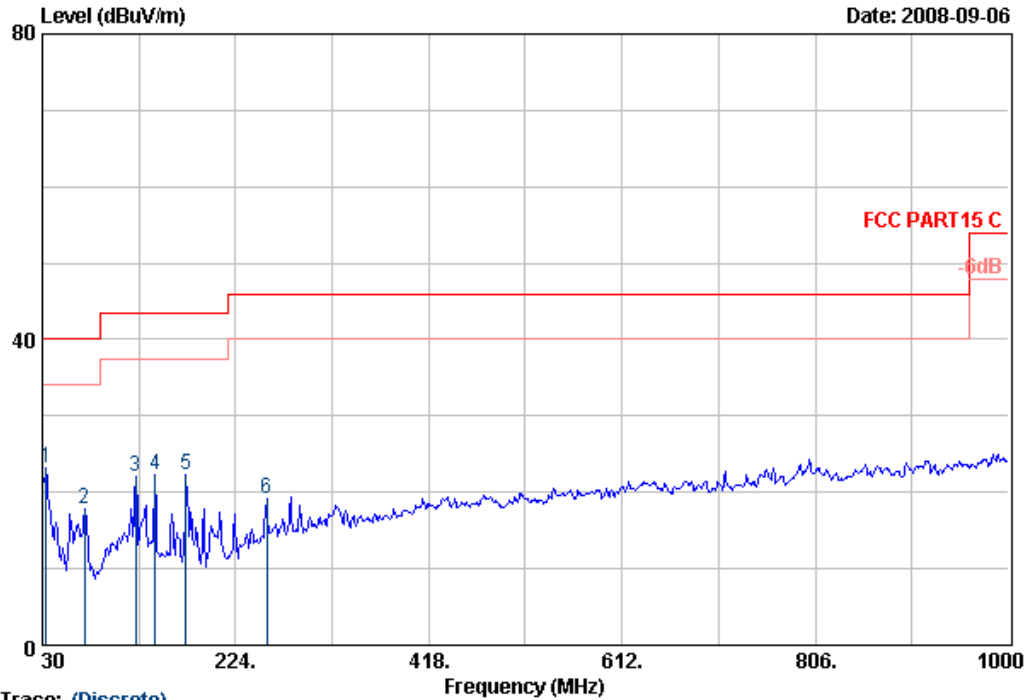
All the emissions from 30MHz to 18GHz are comply with 15.209 limits

Test Frequency: 30MHz-1000MHz



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Data: 4 File: D:\2008 Report Data\HACS8Q1417.EMI (4)



Trace: (Discrete)

Site no. : 3# Chamber Radiation Data no. : 4
Dis. / Ant. : 3m CBL6112D Ant. pol. : HORIZONTAL
Limit : FCC PART15 C
Env. / Ins. : 24°C/56% ESVS20 Engineer : Sunny
EUT : Rock Band 2 Wii Wireless Drum
Power Rating : DC 4.5V
Test Mode : Tx Mode
Memo : M/N:NWDMS2

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	33.88	17.37	0.70	5.17	23.24	40.00	16.76	QP
2	72.68	5.03	0.92	11.84	17.79	40.00	22.21	QP
3	124.09	10.74	1.13	10.19	22.06	43.50	21.44	QP
4	143.49	10.13	1.16	10.98	22.27	43.50	21.23	QP
5	174.53	8.51	1.27	12.40	22.18	43.50	21.32	QP
6	255.04	11.24	1.55	6.32	19.11	46.00	26.89	QP

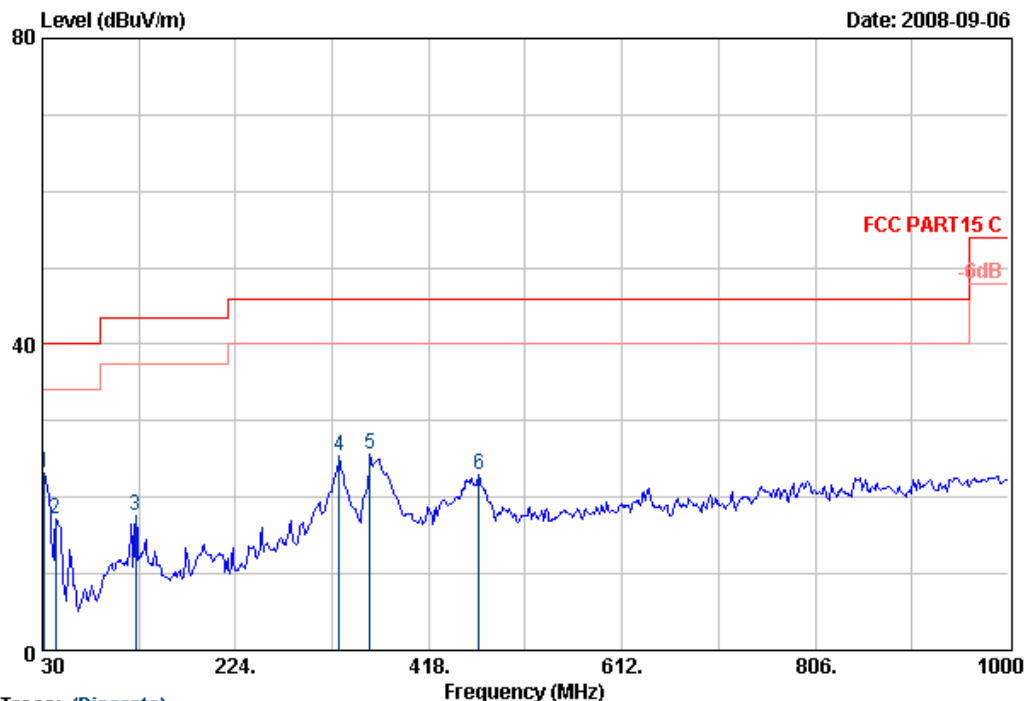
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



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Data: 3 File: D:\2008 Report Data\H\ACS8Q1417.EMI (4)

Date: 2008-09-06



Trace: (Discrete)

Site no. : 3# Chamber Radiation Data no. : 3
Dis. / Ant. : 3m CBL6112D Ant. pol. : VERTICAL
Limit : FCC PART15 C
Env. / Ins. : 24°C/56% ESVS20 Engineer : Sunny
EUT : Rock Band 2 Wii Wireless Drum
Power Rating : DC 4.5V
Test Mode : Tx Mode
Memo : M/N:NWDM52

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	31.94	18.65	0.70	3.74	23.09	40.00	16.91	QP
2	43.58	11.14	0.81	5.18	17.13	40.00	22.87	QP
3	124.09	10.74	1.13	5.82	17.69	43.50	25.81	QP
4	327.79	12.37	1.69	11.28	25.34	46.00	20.66	QP
5	358.83	13.35	1.76	10.48	25.59	46.00	20.41	QP
6	468.44	15.34	2.00	5.68	23.02	46.00	22.98	QP

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

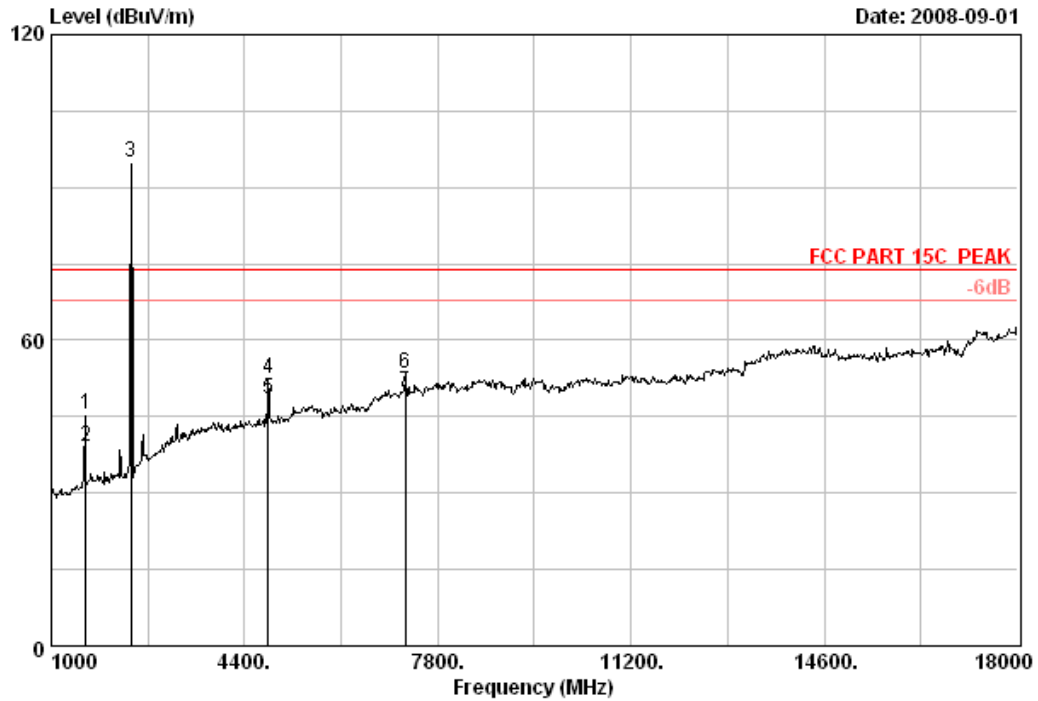
Test Frequency: 1GHz-18GHz



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Data: 1 File: E:\2008 report data\H\ACS8Q1417.EMI (24)

Date: 2008-09-01



Site no. : 3# Chamber Data no. : 1
Dis. / Ant. : 3m 3115 FACTOR Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23°C/54% Engineer : Sunny
EUT : Rock Band 2 Wii Wireless Drum
Power Rating: DC 4.5V
Test mode : Tx 2408MHz
Memo : M/N:NWDM52

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	1605.00	26.00	5.46	35.66	49.58	45.38	74.00	28.62	Peak
2	1605.00	26.00	5.46	35.66	43.37	39.17	54.00	14.83	Average
3	2408.00	29.03	6.73	35.18	94.36	94.94	74.00	-20.94	Peak
4	4816.00	33.98	10.54	34.49	42.32	52.35	74.00	21.65	Peak
5	4816.00	33.98	10.54	34.49	38.56	48.59	54.00	5.41	Average
6	7224.00	37.36	12.16	34.44	38.55	53.63	74.00	20.37	Peak
7	7224.00	37.36	12.16	34.44	34.59	49.67	54.00	4.33	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.

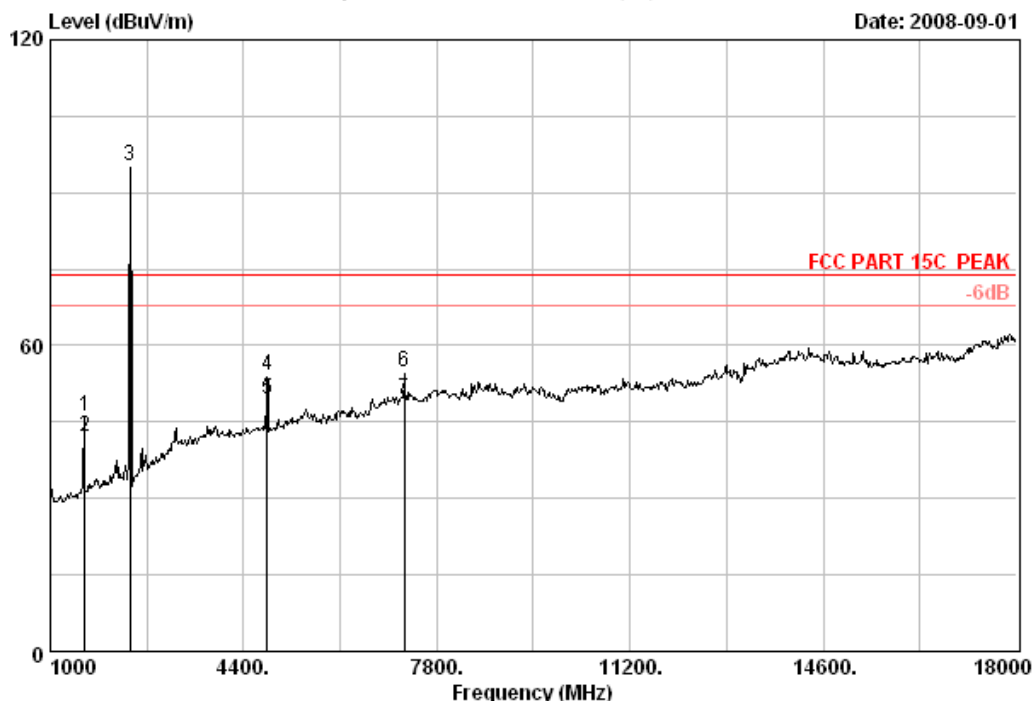


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Data: 2

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Date: 2008-09-01



Site no. : 3# Chamber Data no. : 2
Dis. / Ant. : 3m 3115 FACTOR Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23°C/54% Engineer : Sunny
EUT : Rock Band 2 Wii Wireless Drum
Power Rating: DC 4.5V
Test mode : Tx 2408MHz
Memo : M/N:NWDM52

	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	1605.00	26.00	5.46	35.66	50.21	46.01	74.00	27.99	Peak
2	1605.00	26.00	5.46	35.66	46.38	42.18	54.00	11.82	Average
3	2408.00	29.03	6.73	35.18	94.58	95.16	74.00	-21.16	Peak
4	4816.00	33.98	10.54	34.49	44.14	54.17	74.00	19.83	Peak
5	4816.00	33.98	10.54	34.49	39.33	49.36	54.00	4.64	Average
6	7224.00	37.36	12.16	34.44	39.65	54.73	74.00	19.27	Peak
7	7224.00	37.36	12.16	34.44	34.39	49.47	54.00	4.53	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.

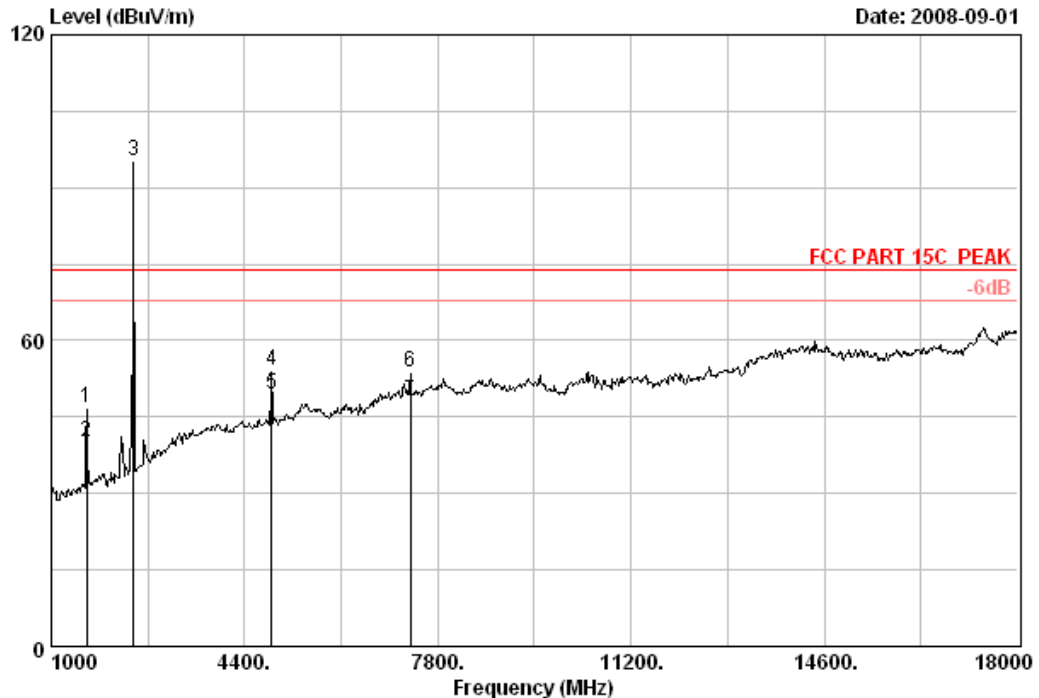


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Data: 3

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Date: 2008-09-01



Site no. : 3# Chamber Data no. : 3
Dis. / Ant. : 3m 3115 FACTOR Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23°C/54% Engineer : Sunny
EUT : Rock Band 2 Wii Wireless Drum
Power Rating: DC 4.5V
Test mode : Tx 2440MHz
Memo : M/N:NWDM52

	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	1626.00	26.09	5.50	35.64	50.80	46.75	74.00	27.25	Peak
2	1626.00	26.09	5.50	35.64	44.15	40.10	54.00	13.90	Average
3	2440.00	29.11	6.80	35.17	94.59	95.33	74.00	-21.33	Peak
4	4880.00	34.16	10.56	34.48	43.90	54.14	74.00	19.86	Peak
5	4880.00	34.16	10.56	34.48	39.30	49.54	54.00	4.46	Average
6	7320.00	37.52	12.20	34.47	38.46	53.71	74.00	20.29	Peak
7	7320.00	37.52	12.20	34.47	33.01	48.26	54.00	5.74	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.

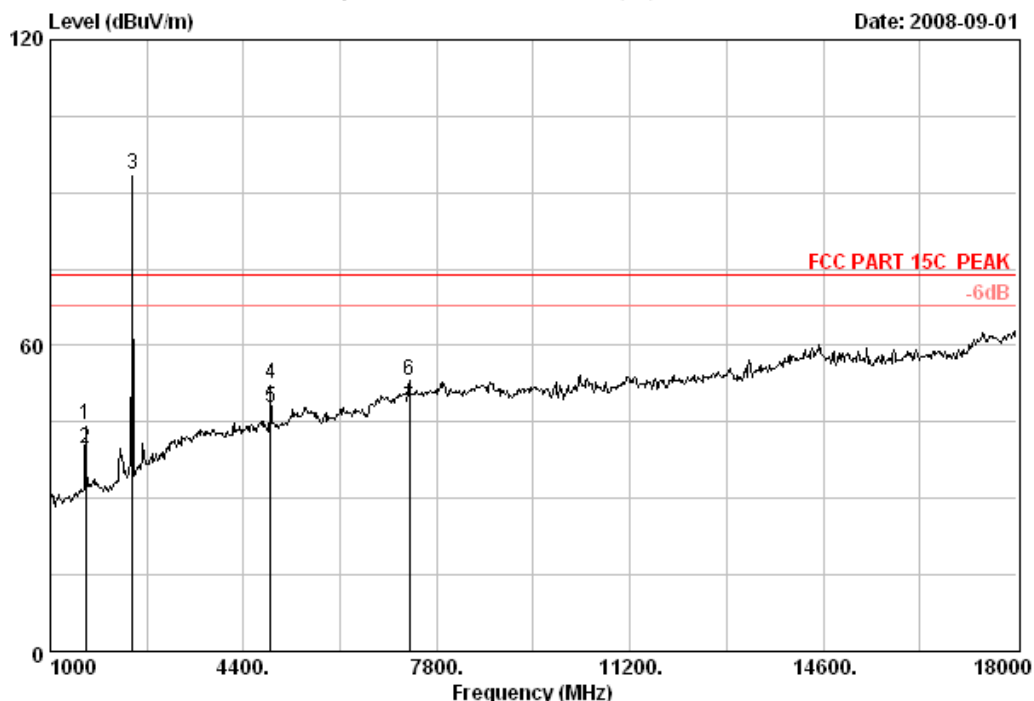


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Site no. : 3# Chamber Data no. : 4
Dis. / Ant. : 3m 3115 FACTOR Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23°C/54% Engineer : Sunny
EUT : Rock Band 2 Wii Wireless Drum
Power Rating: DC 4.5V
Test mode : Tx 2440MHz
Memo : M/N:NWDM52

	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	1626.00	26.09	5.50	35.64	48.54	44.49	74.00	29.51	Peak
2	1626.00	26.09	5.50	35.64	43.85	39.80	54.00	14.20	Average
3	2440.00	29.11	6.80	35.17	92.95	93.69	74.00	-19.69	Peak
4	4880.00	34.16	10.56	34.48	42.20	52.44	74.00	21.56	Peak
5	4880.00	34.16	10.56	34.48	37.57	47.81	54.00	6.19	Average
6	7320.00	37.52	12.20	34.47	37.98	53.23	74.00	20.77	Peak
7	7320.00	37.52	12.20	34.47	32.46	47.71	54.00	6.29	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.

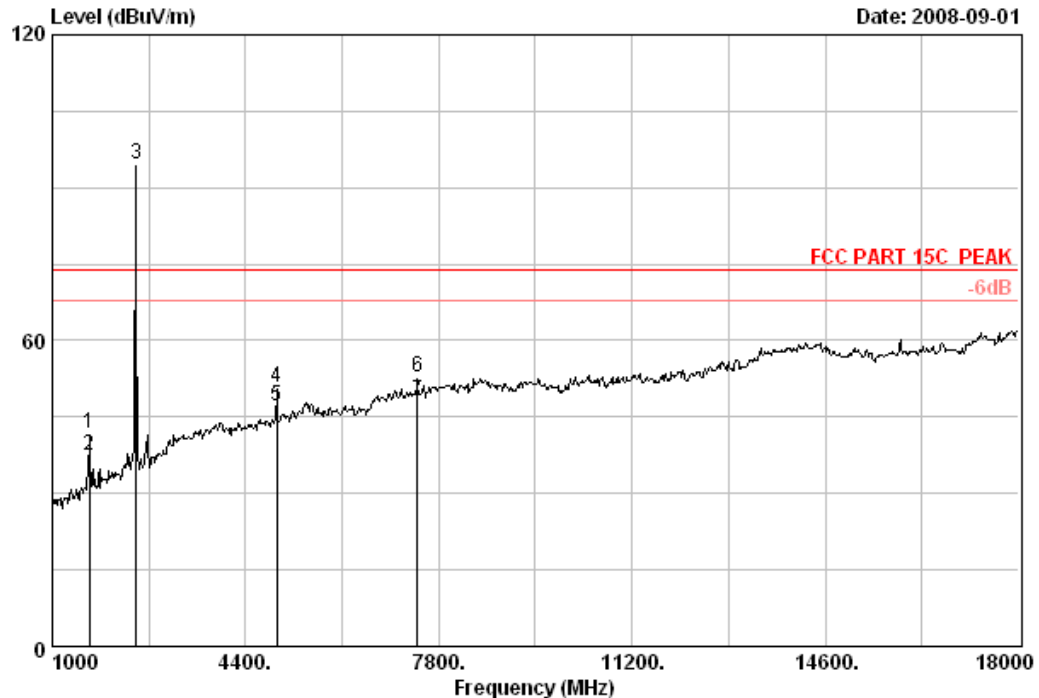


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Data: 5

File: E:\2008 report data\H\ACS8Q1417.EMI (24)

Date: 2008-09-01



Site no. : 3# Chamber Data no. : 5
Dis. / Ant. : 3m 3115 FACTOR Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23°C/54% Engineer : Sunny
EUT : Rock Band 2 Wii Wireless Drum
Power Rating: DC 4.5V
Test mode : Tx 2476MHz
Memo : M/N:NWDM52

	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	1649.00	26.18	5.53	35.61	45.64	41.74	74.00	32.26	Peak
2	1649.00	26.18	5.53	35.61	41.46	37.56	54.00	16.44	Average
3	2476.00	29.19	6.87	35.16	93.58	94.48	74.00	-20.48	Peak
4	4952.00	34.34	10.58	34.46	40.28	50.74	74.00	23.26	Peak
5	4952.00	34.34	10.58	34.46	36.59	47.05	54.00	6.95	Average
6	7428.00	37.69	12.32	34.49	37.35	52.87	74.00	21.13	Peak
7	7428.00	37.69	12.32	34.49	32.46	47.98	54.00	6.02	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.

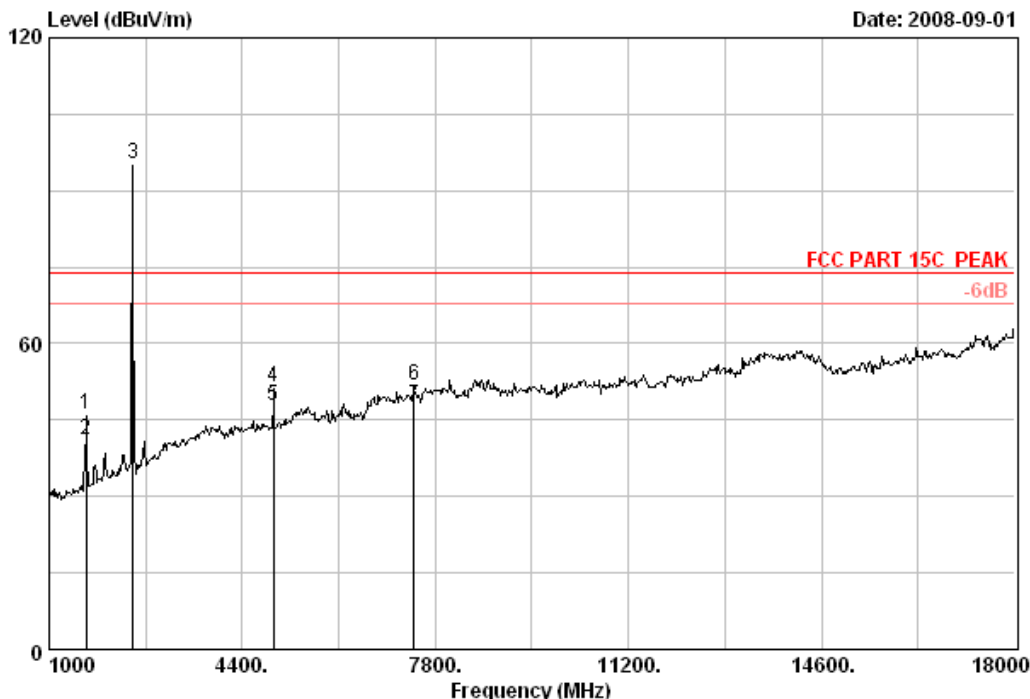


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Postcode:518057

Data: 6

File: E:\2008 report data\H\ACS8Q1417.EMI (24)

Date: 2008-09-01



Site no. : 3# Chamber Data no. : 6
Dis. / Ant. : 3m 3115 FACTOR Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23°C/54% Engineer : Sunny
EUT : Rock Band 2 Wii Wireless Drum
Power Rating: DC 4.5V
Test mode : Tx 2476MHz
Memo : M/N:NWDMS2

	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	1649.00	26.18	5.53	35.61	50.03	46.13	74.00	27.87	Peak
2	1649.00	26.18	5.53	35.61	45.11	41.21	54.00	12.79	Average
3	2476.00	29.19	6.87	35.16	94.39	95.29	74.00	-21.29	Peak
4	4952.00	34.34	10.58	34.46	41.07	51.53	74.00	22.47	Peak
5	4952.00	34.34	10.58	34.46	37.46	47.92	54.00	6.08	Average
6	7428.00	37.69	12.32	34.49	36.46	51.98	74.00	22.02	Peak
7	7428.00	37.69	12.32	34.49	32.27	47.79	54.00	6.21	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.

5. CARRIER FREQUENCY SEPARATION TEST

5.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum Analyzer	Agilent	E4446A	US44300459	May,10, 08	1 Year
2	Horn Antenna	EMCO	3115	9607-4877	May,27, 08	1.5 Year
3	RF Cable	Hubersuhner	SUCOFLEX 102	2861812	May,28, 08	1 Year
4	RF Cable	Hubersuhner	SUCOFLEX 102	28862212	May,28, 08	1 Year

5.2. Test Information

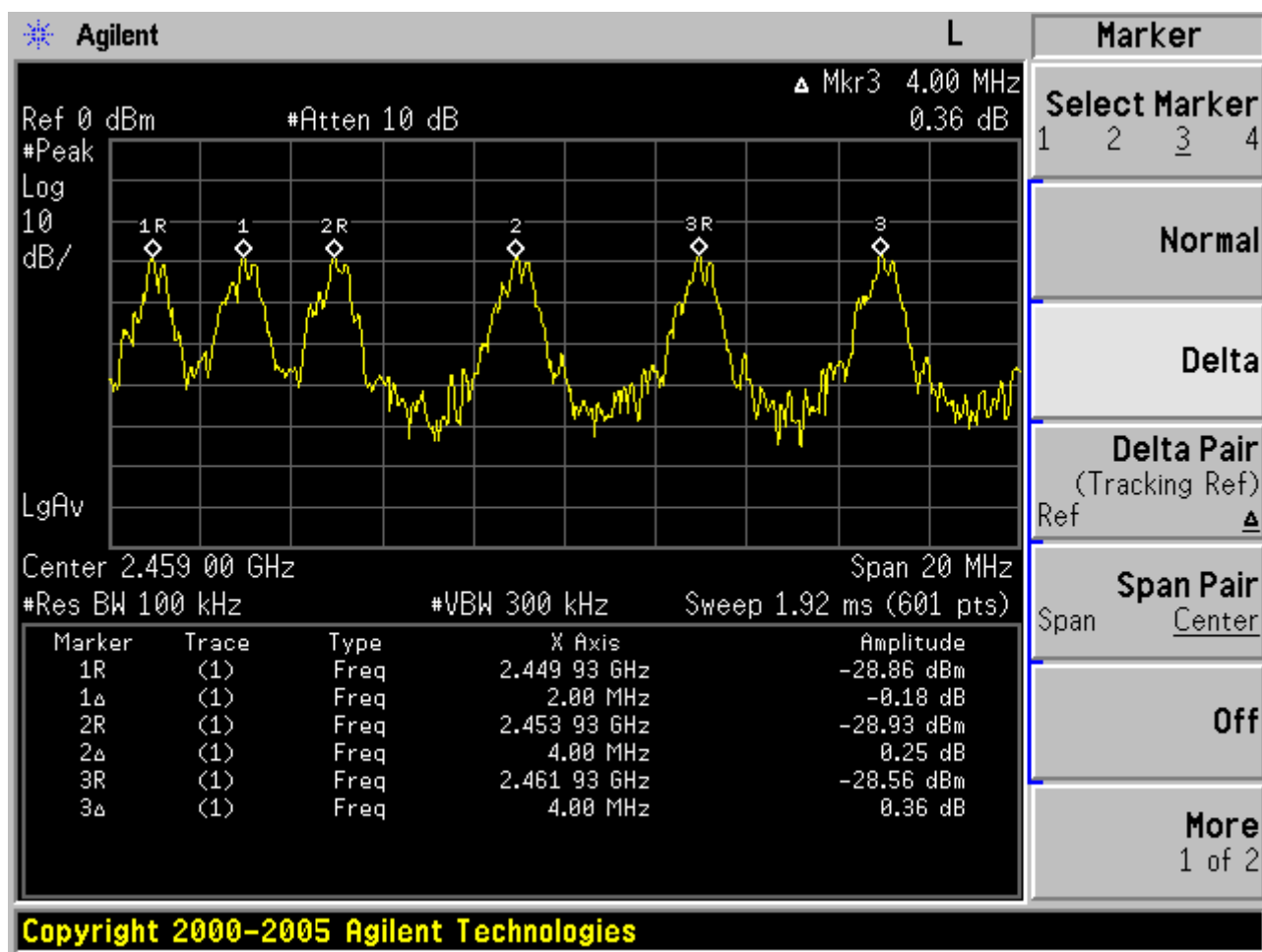
EUT:	Rock Band 2 Wii Wireless Drum
M/N:	NWDMS2
Test Date:	Sep.01, 2008
Ambient Temperature:	23°C
Relative Humidity:	54%
Test standard:	FCC PART 15C: 15.247(a)(1)
Test mode:	TX (Hopping on)
Test By:	Sunny

5.3. Limit

Frequency hopping systems shall have hopping channel carrier frequency separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater.

5.4. Test Results (Pass.)

carrier frequency separating	20dB Bandwidth (MHz)	Conclusion
2MHz(minimum) 4MHz(maximum)	1.067(see below test data)	PASS



6. 20 DB BANDWIDTH TEST

6.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum Analyzer	Agilent	E4446A	US44300459	May,10, 08	1 Year
2	Attenuator	Agilent	8491B	MY39262165	May,28, 08	1 Year
3	Horn Antenna	EMCO	3115	9607-4877	May, 27, 08	1.5 Year
4	RF Cable	Hubersuhner	SUCOFLEX 102	2861812	May,28, 08	1Year
5	RF Cable	Hubersuhner	SUCOFLEX 102	28862212	May,28, 08	1 Year

6.2.Test Information

EUT:	Rock Band 2 Wii Wireless Drum
M/N:	NWDMS2
Test Date:	Sep.01, 2008
Ambient Temperature:	23°C
Relative Humidity:	54%
Test standard:	FCC PART 15C: 15.247(a)(1)
Test mode:	TX (Hopping off)
Test Frequency:	Low: 2408MHz Mid: 2440MHz High: 2476MHz
Test By:	Sunny

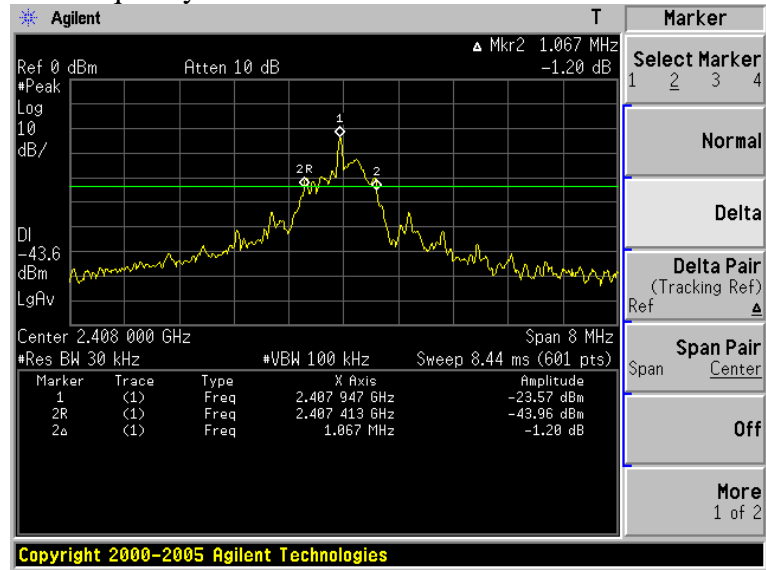
6.3.Test Procedure

The transmitter output was coupled to a spectrum analyzer via a antenna. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30kHz RBW and 100kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

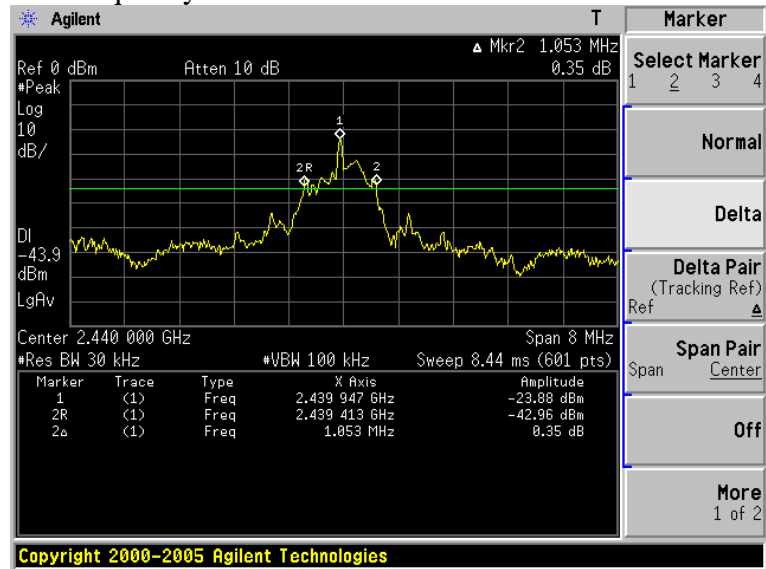
6.4.Test Results

CH	20dB Bandwidth (MHz)	Limit (kHz)	Conclusion
(Low)	1.067	---	PASS
(Mid)	1.053	---	PASS
(High)	1.053	---	PASS

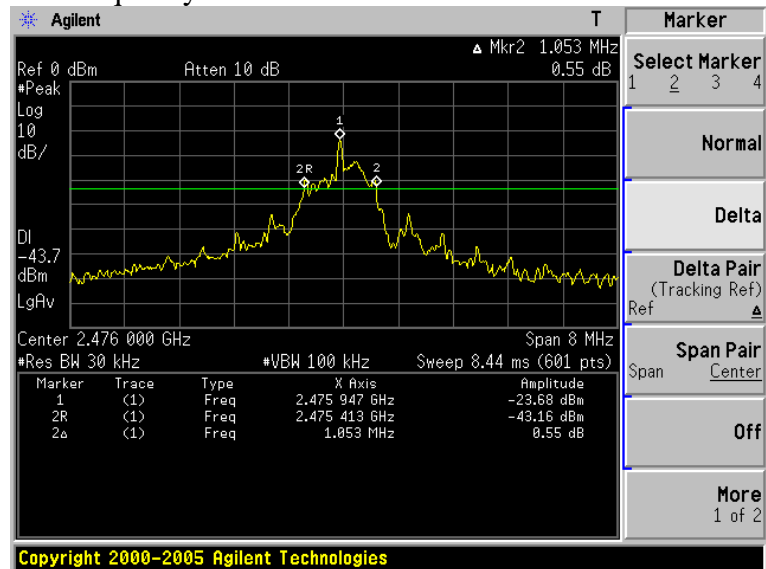
Test Frequency: 2408MHz



Test Frequency: 2440MHz



Test Frequency: 2476MHz



7. NUMBER OF HOPPING FREQUENCY TEST

7.1. Test Equipment

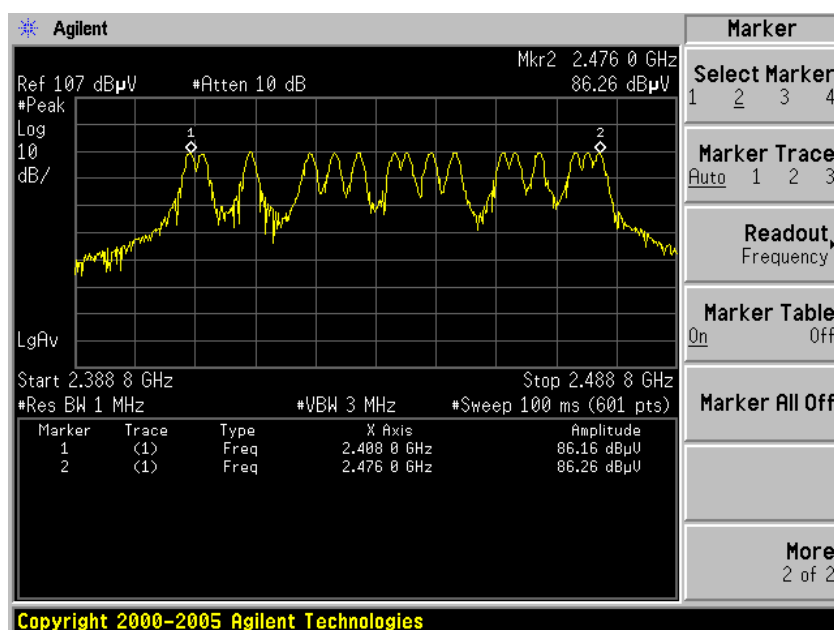
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum Analyzer	Agilent	E4446A	US44300459	May,10, 08	1 Year
2	Attenuator	Agilent	8491B	MY39262165	May,28, 08	1 Year
3	Horn Antenna	EMCO	3115	9607-4877	May, 27, 08	1.5 Year
4	RF Cable	Hubersuhner	SUCOFLEX 102	2861812	May,28, 08	1 Year
5	RF Cable	Hubersuhner	SUCOFLEX 102	28862212	May,28, 08	1 Year

7.2. Test Information

EUT:	Rock Band 2 Wii Wireless Drum
M/N:	NWDMS2
Test Date:	Sep.01, 2008
Ambient Temperature:	23°C
Relative Humidity:	54%
Test standard:	FCC PART 15C: 15.247(a)(1)(iii)
Test mode:	TX (Hopping on)
Test Frequency:	From 2408MHz to 2476MHz
Test By:	Sunny

7.3. Test Results

Number of channel	Limit	Conclusion
16	≥ 15	PASS



8. DWELL TIME TEST

8.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum Analyzer	Agilent	E4446A	US44300459	May,10, 08	1 Year
2	Attenuator	Agilent	8491B	MY39262165	May,28, 08	1 Year
3	Horn Antenna	EMCO	3115	9607-4877	May, 27, 08	1.5 Year
4	RF Cable	Hubersuhner	SUCOFLEX 102	2861812	May,28, 08	1 Year
5	RF Cable	Hubersuhner	SUCOFLEX 102	28862212	May,28, 08	1 Year

8.2. Test Information

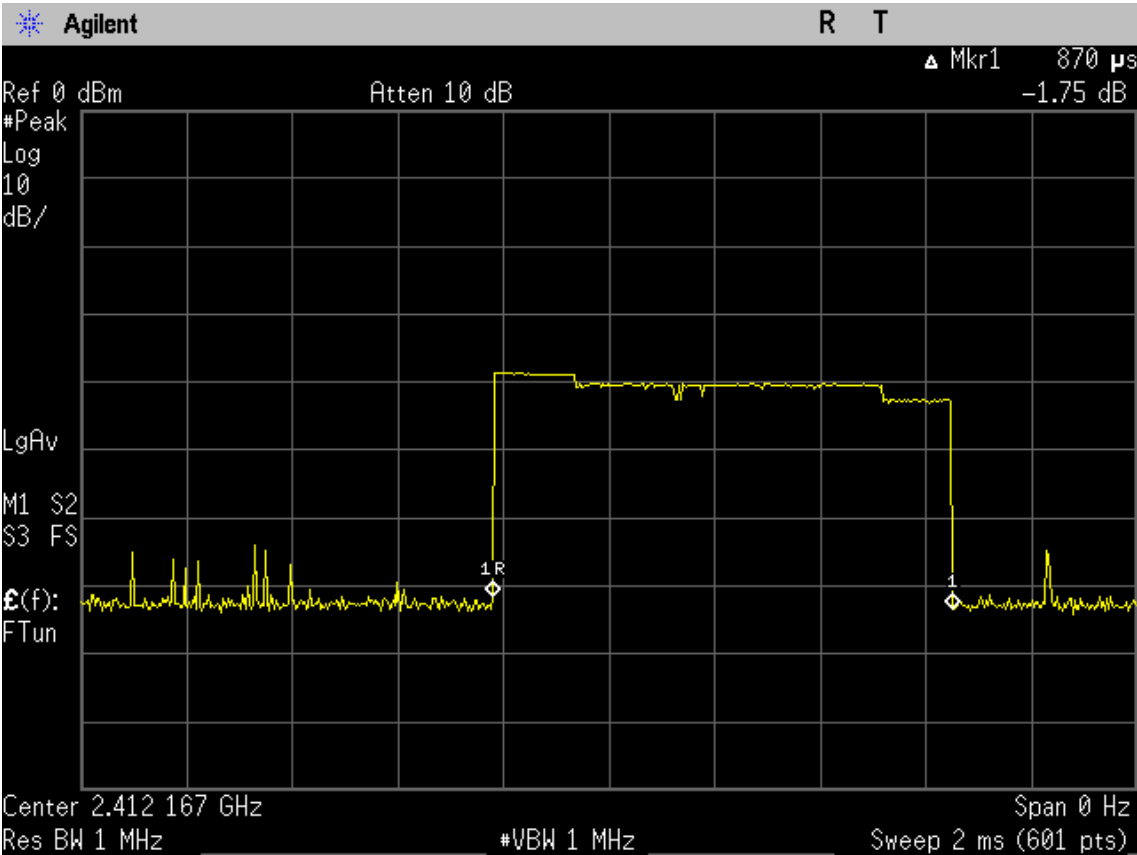
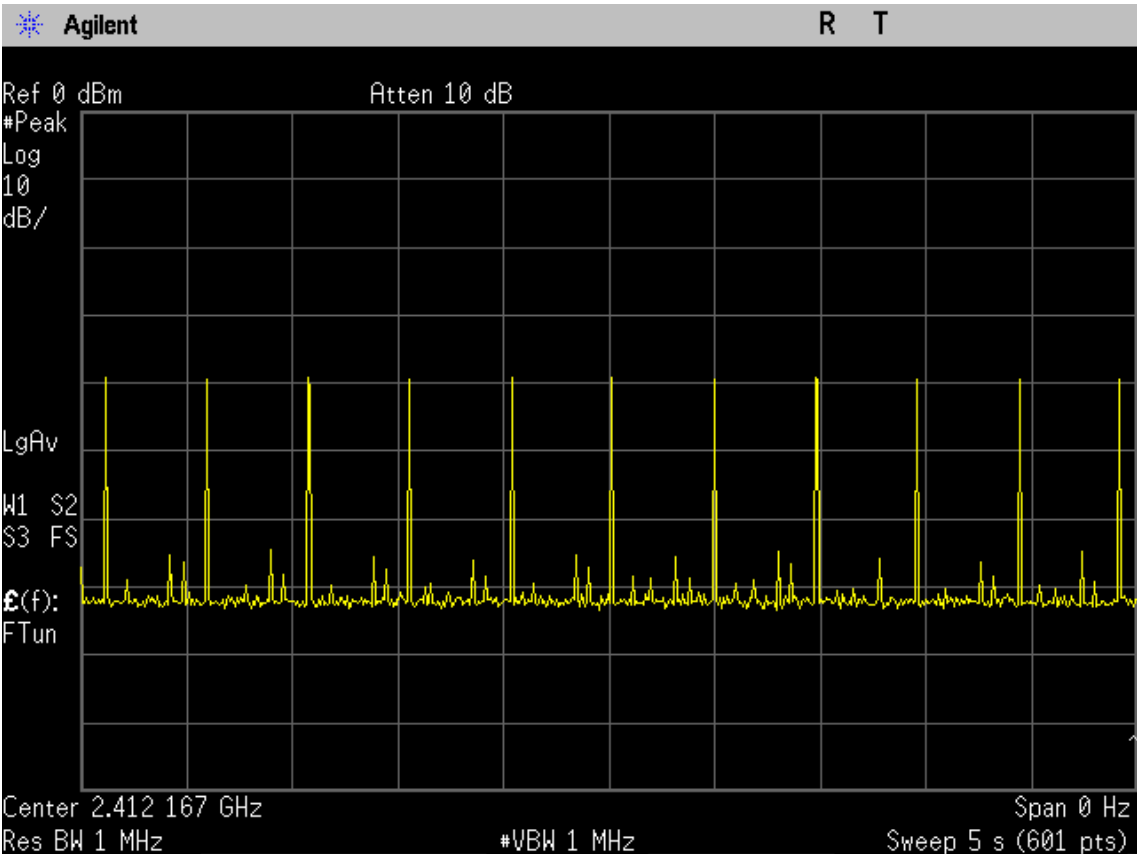
EUT:	Rock Band 2 Wii Wireless Drum
M/N:	NWDMS2
Test Date:	Sep.01, 2008
Ambient Temperature:	23°C
Relative Humidity:	54%
Test standard:	FCC PART 15C: 15.247(a)(1)(iii)
Test mode:	Transmitting, Hopping off
Test Frequency:	Normal
Test By:	Sunny

8.3. Test Results

This system hopping 11 hops in any 5s, and for each hop it transmit 1 pulses, the pulse dwell are 0.870ms, so the dwell times are:

$$11/5*16*0.4*0.870=12.25\text{ms}$$

dwell time	Limit	Conclusion
12.25ms	<400ms	PASS



9. MAXIMUM PEAK OUTPUT POWER TEST

9.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	E4446A	US44300459	May,10, 08	1 Year
2	Horn Antenna	EMCO	3115	9607-4877	May, 27, 08	1.5 Year
3	Horn Antenna	EMCO	3115	9510-4580	May,11, 07	1.5 Year
4	Signal Generator	HP	83732B	6K00003262	May,10, 08	1 Year
5	RF Cable	Hubersuhner	SUCOFLEX	182769/4	May,28, 08	1Year
6	RF Cable	Hubersuhner	SUCOFLEX	182768/4	May,28, 08	1Year
7	RF Cable	Hubersuhner	SUCOFLEX	182771/4	May,28, 08	1Year
8	RF Cable	Hubersuhner	SUCOFLEX 102	2861812	May,28, 08	1Year
9	RF Cable	Hubersuhner	SUCOFLEX 104	27147314	May,28, 08	1Year
10	Amplifier	HP	8449B	3008A00863	May,10, 08	1 Year

9.2. Test Procedure

- (1). The EUT was placed on a 0.8m high table in the chamber and turned on in continuously transmitting mode.
- (2). The maximum fundamental emission at 3m distance was measured and recorded with receive antenna in both vertical and horizontal by rotating the turntable and by lowering the receive antenna.
- (3). The EUT was then removed and replaced with a substitution antenna in the same position and the substitution antenna must have the same polarization with the receive antenna.
- (4). A signal which have the same frequency obtained in step 2 was fed to the substitution, the receive antenna was raised and lowered to obtain a maximum reading at the test receiver, the level of the signal generator was adjusted until the measured field strength level in step 2 was obtained, recorded the level of the signal generator.
- (5). Repeated step 4 with both antenna polarizations
- (6). The radiated power is equal to the power supplied by the signal generator and corrections due to the gain of the substitution antenna and the cable loss between the signal generator and the substitution antenna.

9.3.Test Information

EUT:	Rock Band 2 Wii Wireless Drum
M/N:	NWDMS2
Test Date:	Sep.06, 2008
Ambient Temperature:	24℃
Relative Humidity:	50%
Test standard:	FCC PART 15C: 15.247(b)(1)
Test mode:	TX (Hopping off)
Test Frequency:	Low: 2408MHz Mid: 2440MHz High: 2476MHz
Test By:	Jamy

9.4.Test Results

CH	Freq (MHz)	Ant Pol.	Electric Field Strength (dBuV/m)	SG Reading (dBm)	Tx Cable Loss (dB)	Tx Ant. Gain (dBi)	Out put power Result (dBm)	Limit 0.125W 21(dBm)	Margin (dB)
Low	2408	H	94.94	-5.20	6.06	9.25	-2.01	21	23.01
	2408	V	95.16	-5.18	6.06	9.25	-1.99	21	22.99
Mid	2440	H	93.69	-6.48	6.08	9.30	-3.26	21	24.26
	2440	V	95.33	-5.19	6.08	9.30	-1.97	21	22.97
Hig	2476	H	94.48	-5.68	6.14	9.33	-2.49	21	23.49
	2476	V	95.29	-5.25	6.14	9.33	-2.06	21	23.06
Result = SG Reading – Tx Cable Loss + Tx Antenna Gain – Antenna Gain									

10.BAND EDGE COMPLIANCE TEST

10.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum Analyzer	Agilent	E4446A	US44300459	May,10, 08	1 Year
2	Horn Antenna	EMCO	3115	9607-4877	May,27, 08	1.5 Year
3	Amplifier	HP	8449B	3008A00863	May,10, 08	1 Year
4	RF Cable	Hubersuhner	SUCOFLEX	182769/4	May,28, 08	1 Year
5	RF Cable	Hubersuhner	SUCOFLEX	182768/4	May,28, 08	1 Year
6	RF Cable	Hubersuhner	SUCOFLEX	182771/4	May,28, 08	1 Year

10.2.Limit

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

10.3.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

10.4.Test Results

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

Hopping on:

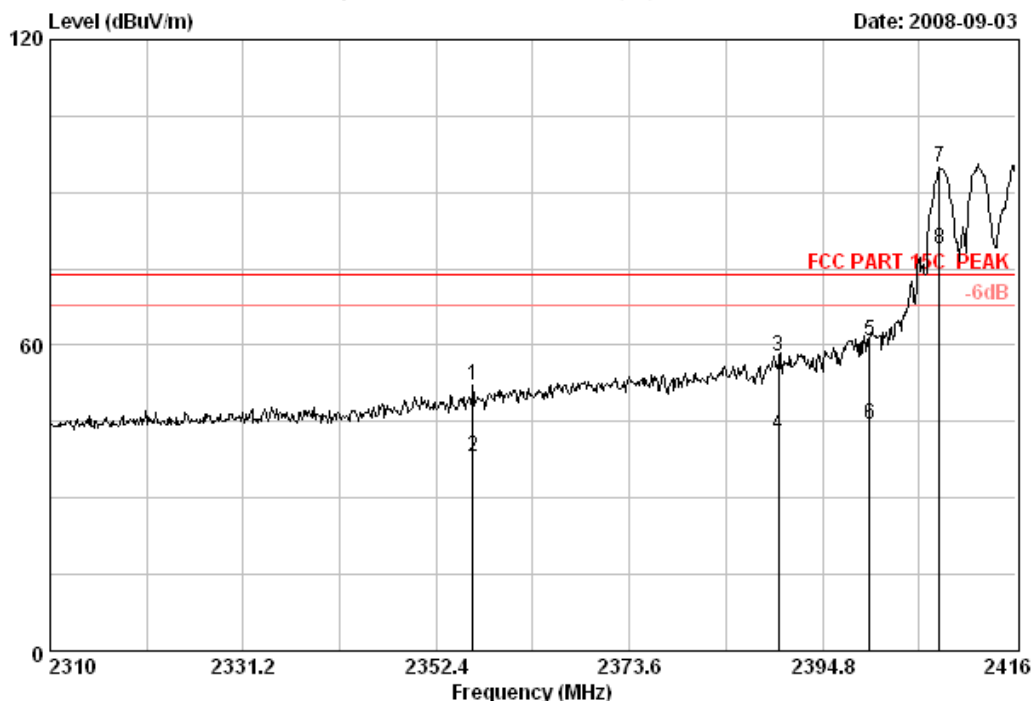


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Data: 25

File: E:\2008 report data\H\ACS801417.EMI (28)

Date: 2008-09-03



Site no. : 3# Chamber Data no. : 25
Dis. / Ant. : 3m 3115 FACTOR Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23°C/54% Engineer : Sunny
EUT : Rock Band 2 Wii Wireless Drum
Power Rating: DC 4.5V
Test mode : Tx 2408MHz
Memo : M/N:NWDM52

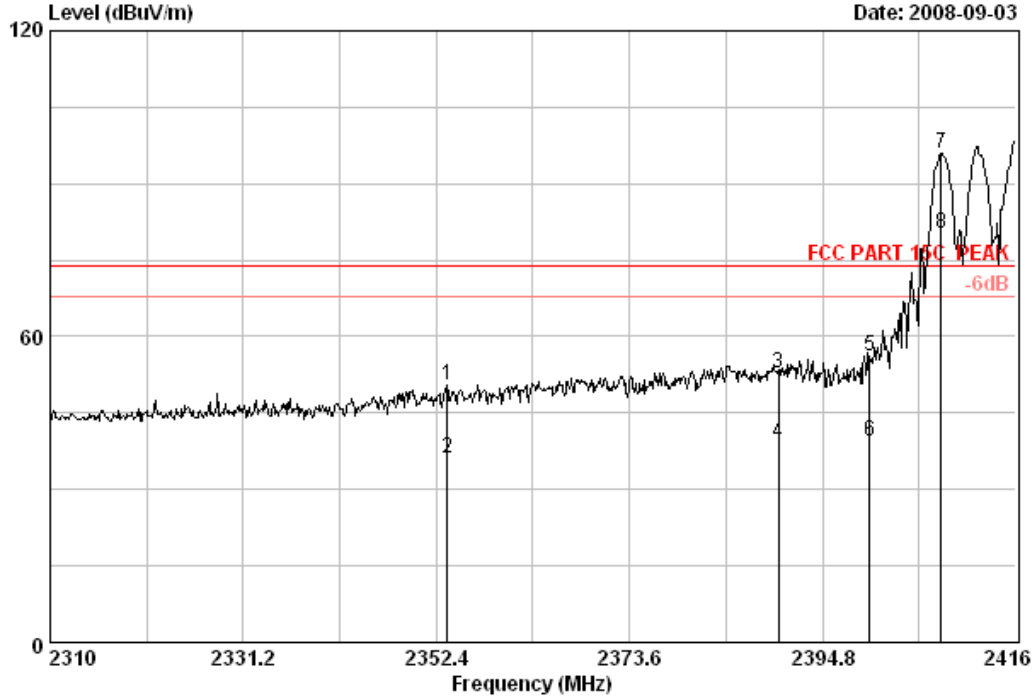
	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2356.43	28.91	6.69	35.19	51.88	52.29	74.00	21.71	Peak
2	2356.43	28.91	6.69	35.19	37.55	37.96	54.00	16.04	Average
3	2390.00	28.99	6.71	35.18	57.40	57.92	74.00	16.08	Peak
4	2390.00	28.99	6.71	35.18	41.89	42.41	54.00	11.59	Average
5	2400.00	28.99	6.73	35.18	60.39	60.93	74.00	13.07	Peak
6	2400.00	28.99	6.73	35.18	43.89	44.43	54.00	9.57	Average
7	2407.63	29.03	6.73	35.18	94.22	94.80	74.00	-20.80	Peak
8	2407.63	29.03	6.73	35.18	78.26	78.84	54.00	-24.84	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: 26 File: E:\2008 report data\H\ACS8Q1417.EMI (28)



Site no. : 3# Chamber Data no. : 26
Dis. / Ant. : 3m 3115 FACTOR Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23°C/54% Engineer : Sunny
EUT : Rock Band 2 Wii Wireless Drum
Power Rating: DC 4.5V
Test mode : Tx 2408MHz
Memo : M/N:NWDMS2

	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	2353.57	28.91	6.67	35.19	50.15	50.54	74.00	23.46	Peak
2	2353.57	28.91	6.67	35.19	35.67	36.06	54.00	17.94	Average
3	2390.00	28.99	6.71	35.18	52.26	52.78	74.00	21.22	Peak
4	2390.00	28.99	6.71	35.18	38.68	39.20	54.00	14.80	Average
5	2400.00	28.99	6.73	35.18	55.66	56.20	74.00	17.80	Peak
6	2400.00	28.99	6.73	35.18	38.98	39.52	54.00	14.48	Average
7	2407.84	29.03	6.73	35.18	95.20	95.78	74.00	-21.78	Peak
8	2407.84	29.03	6.73	35.18	79.69	80.27	54.00	-26.27	Average

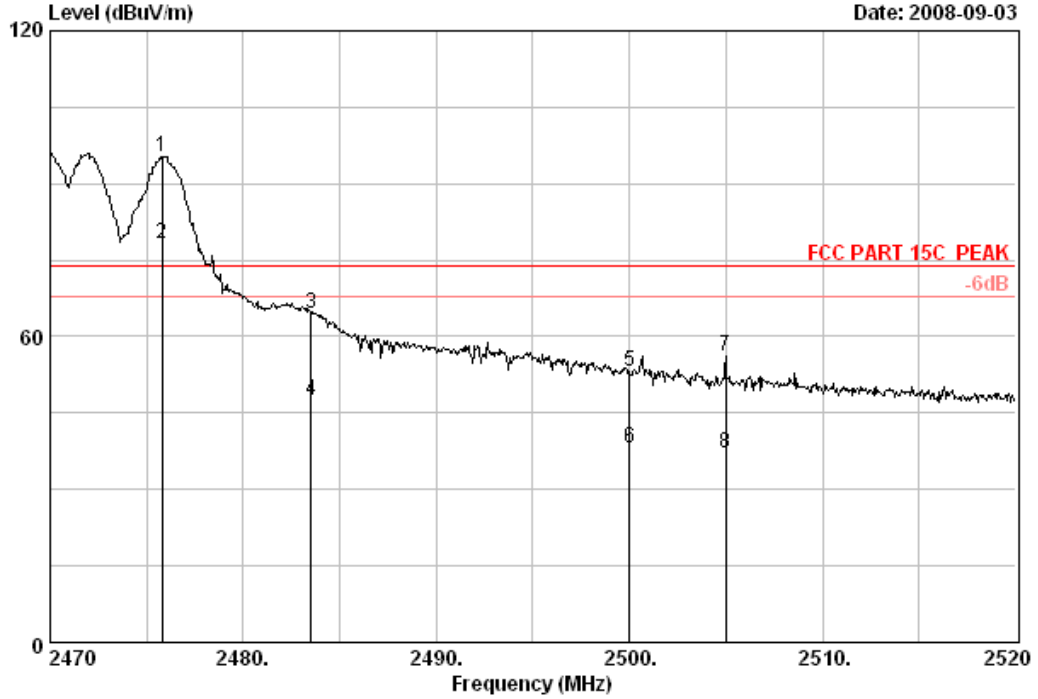
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



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Data: 27 File: E:\2008 report data\H\ACS8Q1417.EMI (28)

Date: 2008-09-03



Site no. : 3# Chamber Data no. : 27
Dis. / Ant. : 3m 3115 FACTOR Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23°C/54% Engineer : Sunny
EUT : Rock Band 2 Wii Wireless Drum
Power Rating: DC 4.5V
Test mode : Tx 2476MHz
Memo : M/N:NWDMS2

	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	2475.80	29.19	6.87	35.16	94.40	95.30	74.00	-21.30	Peak
2	2475.80	29.19	6.87	35.16	77.24	78.14	54.00	-24.14	Average
3	2483.50	29.19	6.87	35.16	63.45	64.35	74.00	9.65	Peak
4	2483.50	29.19	6.87	35.16	46.63	47.53	54.00	6.47	Average
5	2500.00	29.23	6.91	35.15	52.15	53.14	74.00	20.86	Peak
6	2500.00	29.23	6.91	35.15	37.12	38.11	54.00	15.89	Average
7	2505.00	29.29	6.91	35.15	55.00	56.05	74.00	17.95	Peak
8	2505.00	29.29	6.91	35.15	36.10	37.15	54.00	16.85	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.

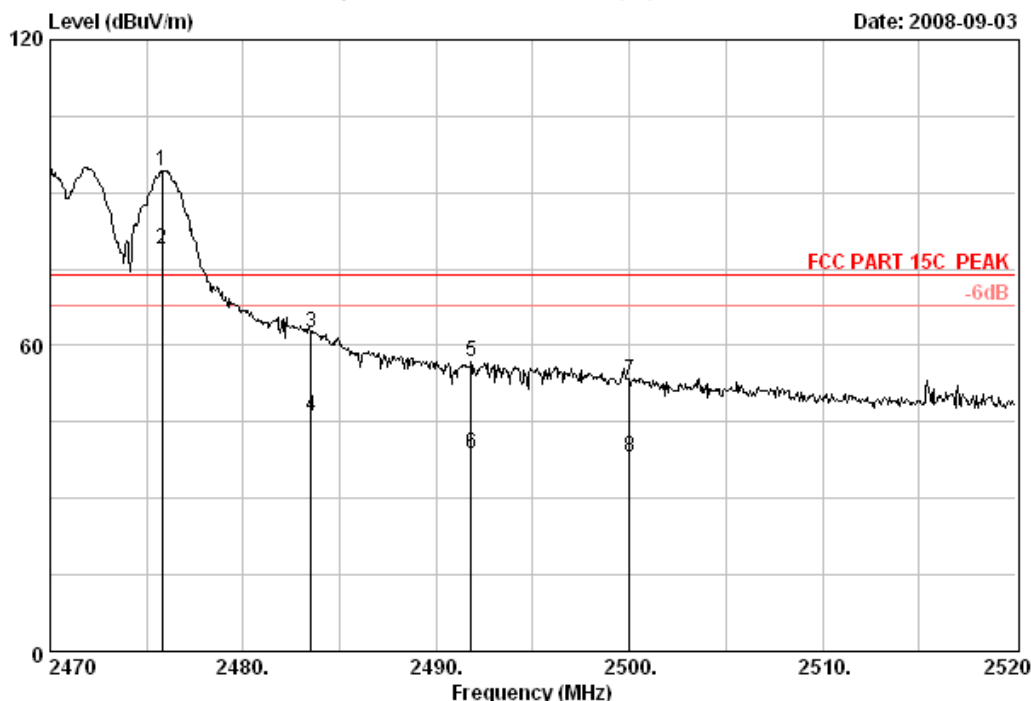


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Postcode:518057

Data: 28

File: E:\2008 report data\H\ACS8Q1417.EMI (28)

Date: 2008-09-03



Site no. : 3# Chamber Data no. : 28
Dis. / Ant. : 3m 3115 FACTOR Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23°C/54% Engineer : Sunny
EUT : Rock Band 2 Wii Wireless Drum
Power Rating: DC 4.5V
Test mode : Tx 2476MHz
Memo : M/N:NWDM52

	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	2475.80	29.19	6.87	35.16	93.49	94.39	74.00	-20.39	Peak
2	2475.80	29.19	6.87	35.16	78.13	79.03	54.00	-25.03	Average
3	2483.50	29.19	6.87	35.16	61.47	62.37	74.00	11.63	Peak
4	2483.50	29.19	6.87	35.16	45.13	46.03	54.00	7.97	Average
5	2491.80	29.23	6.91	35.15	55.77	56.76	74.00	17.24	Peak
6	2491.80	29.23	6.91	35.15	37.69	38.68	54.00	15.32	Average
7	2500.00	29.23	6.91	35.15	52.24	53.23	74.00	20.77	Peak
8	2500.00	29.23	6.91	35.15	37.08	38.07	54.00	15.93	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.

Hopping off:

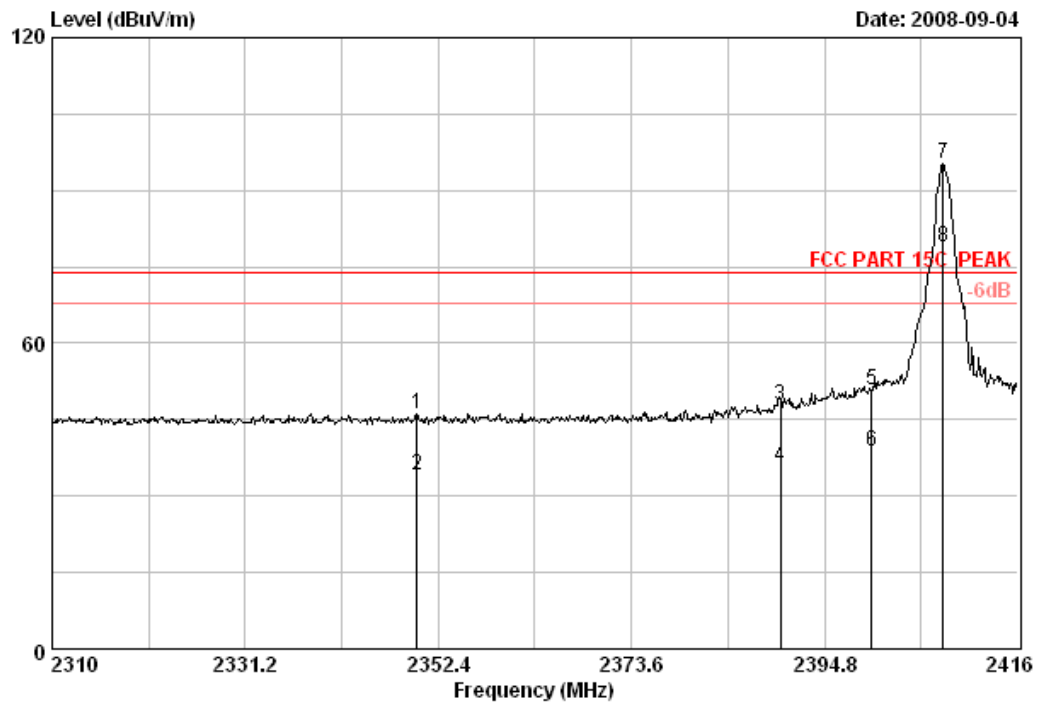


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Data: 29

File: E:\2008 report data\H\ACS801417.EMI (32)

Date: 2008-09-04



Site no. : 3# Chamber Data no. : 29
Dis. / Ant. : 3m 3115 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23°C/54% Engineer : Sunny
EUT : Rock Band 2 Wii Wireless Drum
Power Rating: DC 4.5V
Test mode : Tx 2408MHz
Memo : M/N:NWDM52

	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	2350.07	28.38	6.67	35.19	46.21	46.07	74.00	27.93	Peak
2	2350.07	28.38	6.67	35.19	34.15	34.01	54.00	19.99	Average
3	2390.00	28.46	6.71	35.18	47.74	47.73	74.00	26.27	Peak
4	2390.00	28.46	6.71	35.18	35.69	35.68	54.00	18.32	Average
5	2400.00	28.46	6.73	35.18	50.75	50.76	74.00	23.24	Peak
6	2400.00	28.46	6.73	35.18	38.69	38.70	54.00	15.30	Average
7	2407.84	28.48	6.73	35.18	95.20	95.23	74.00	-21.23	Peak
8	2407.84	28.48	6.73	35.18	78.96	78.99	54.00	-24.99	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.

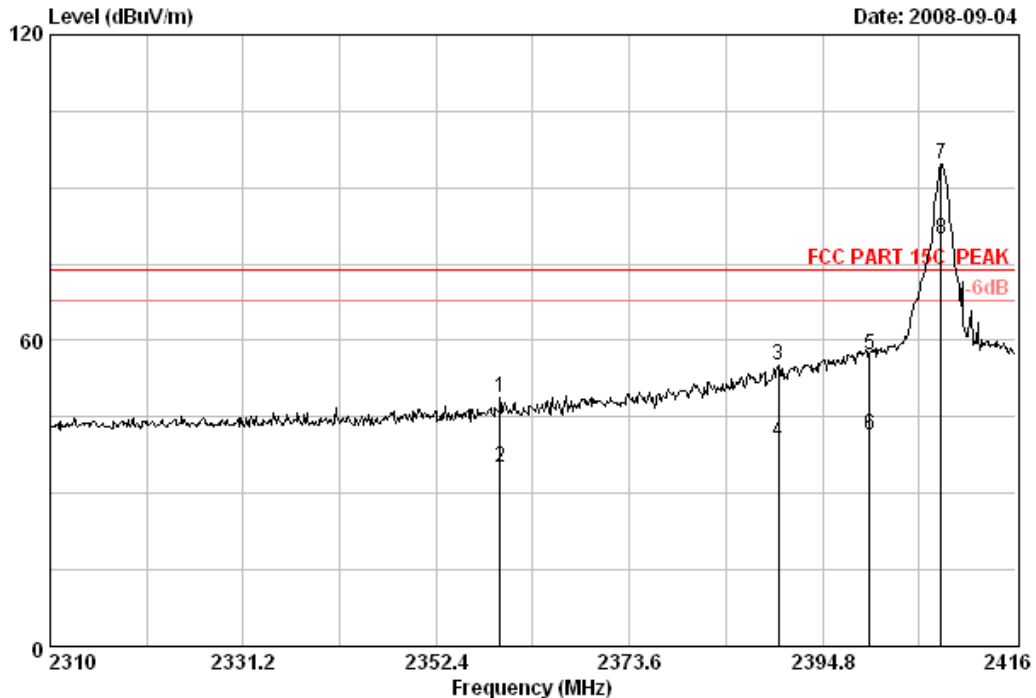


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Data: 30

File: E:\2008 report data\H\ACS8Q1417.EMI (32)

Date: 2008-09-04



Site no. : 3# Chamber Data no. : 30
Dis. / Ant. : 3m 3115 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23°C/54% Engineer : Sunny
EUT : Rock Band 2 Wii Wireless Drum
Power Rating: DC 4.5V
Test mode : Tx 2408MHz
Memo : M/N:NWDM52

	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	2359.40	28.41	6.69	35.19	48.75	48.66	74.00	25.34	Peak
2	2359.40	28.41	6.69	35.19	35.11	35.02	54.00	18.98	Average
3	2390.00	28.46	6.71	35.18	55.21	55.20	74.00	18.80	Peak
4	2390.00	28.46	6.71	35.18	39.98	39.97	54.00	14.03	Average
5	2400.00	28.46	6.73	35.18	57.13	57.14	74.00	16.86	Peak
6	2400.00	28.46	6.73	35.18	41.48	41.49	54.00	12.51	Average
7	2407.84	28.48	6.73	35.18	94.68	94.71	74.00	-20.71	Peak
8	2407.84	28.48	6.73	35.18	79.95	79.98	54.00	-25.98	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.

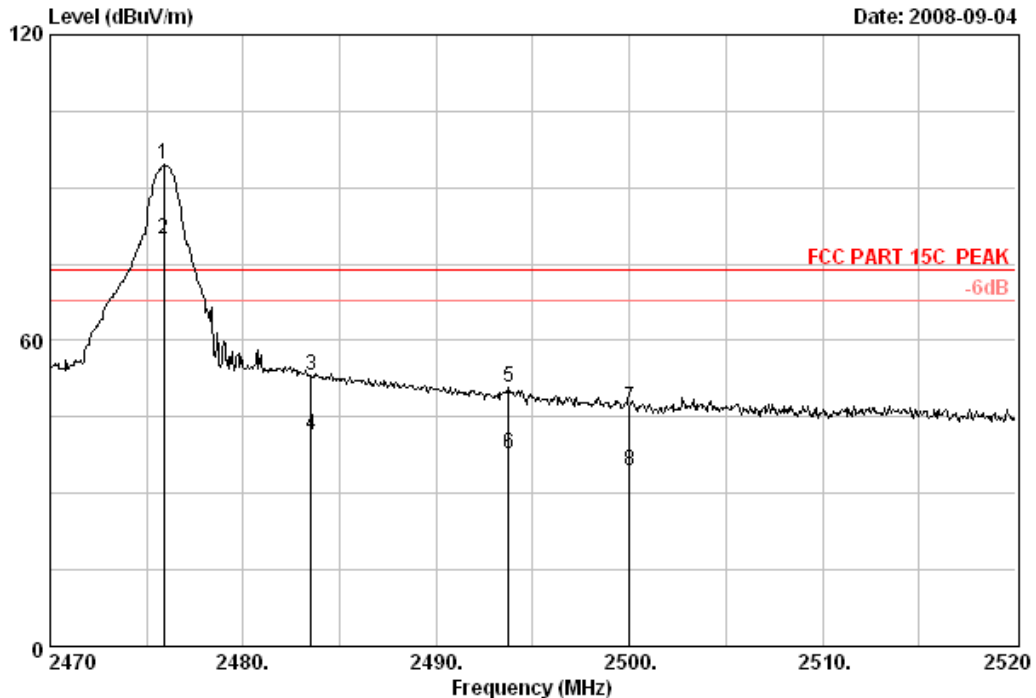


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Data: 31

File: E:\2008 report data\H\ACS8Q1417.EMI (32)

Date: 2008-09-04



Site no. : 3# Chamber Data no. : 31
Dis. / Ant. : 3m 3115 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23°C/54% Engineer : Sunny
EUT : Rock Band 2 Wii Wireless Drum
Power Rating: DC 4.5V
Test mode : Tx 2476MHz
Memo : M/N:NWDMS2

	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	2475.90	28.58	6.87	35.16	94.21	94.50	74.00	-20.50	Peak
2	2475.90	28.58	6.87	35.16	79.68	79.97	54.00	-25.97	Average
3	2483.50	28.58	6.87	35.16	52.93	53.22	74.00	20.78	Peak
4	2483.50	28.58	6.87	35.16	41.14	41.43	54.00	12.57	Average
5	2493.75	28.60	6.91	35.15	50.55	50.91	74.00	23.09	Peak
6	2493.75	28.60	6.91	35.15	37.48	37.84	54.00	16.16	Average
7	2500.00	28.60	6.91	35.15	46.48	46.84	74.00	27.16	Peak
8	2500.00	28.60	6.91	35.15	33.97	34.33	54.00	19.67	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.

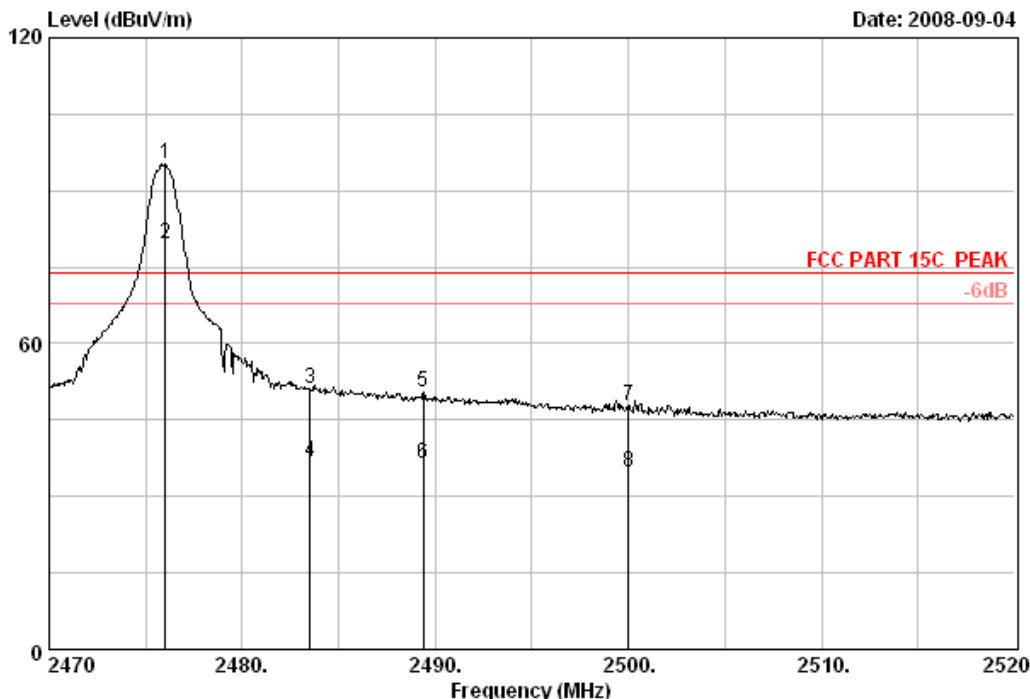


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Data: 32

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Date: 2008-09-04



Site no. : 3# Chamber Data no. : 32
Dis. / Ant. : 3m 3115 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23°C/54% Engineer : Sunny
EUT : Rock Band 2 Wii Wireless Drum
Power Rating: DC 4.5V
Test mode : Tx 2476MHz
Memo : M/N:NWDMS2

	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	2476.00	28.58	6.87	35.16	94.82	95.11	74.00	-21.11	Peak
2	2476.00	28.58	6.87	35.16	79.26	79.55	54.00	-25.55	Average
3	2483.50	28.58	6.87	35.16	50.69	50.98	74.00	23.02	Peak
4	2483.50	28.58	6.87	35.16	36.59	36.88	54.00	17.12	Average
5	2489.40	28.60	6.91	35.15	50.06	50.42	74.00	23.58	Peak
6	2489.40	28.60	6.91	35.15	36.18	36.54	54.00	17.46	Average
7	2500.00	28.60	6.91	35.15	47.33	47.69	74.00	26.31	Peak
8	2500.00	28.60	6.91	35.15	34.26	34.62	54.00	19.38	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.

11. ANTENNA REQUIREMENT

10.1 STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

10.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used for this product is a PCB integral antenna that no antenna other than that furnished by the responsible party shall be used with the device, The maximum peak gain of this antenna is only 0dBi.

12.DEVIATION TO TEST SPECIFICATIONS

[NONE]