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Report No.: SZEM141100649601  
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## FCC REPORT

**Application No. :** SZEM1411006496CR (SGS GZ No.:GZEM1411006124CR)  
**Applicant:** ASOKA INCORPORATION  
**Manufacturer:** SHENZHEN ASOKA ELECTRONICS CO.,LTD.  
**Factory:** SHENZHEN ASOKA ELECTRONICS CO.,LTD.  
**Product Name:** Wireless Kama for Wii-bulk  
**Model No.(EUT):** 87027  
**Add Model No.:** 8702X, 8702X-A50 (" X " =0-9 indicate different enclosure colors)  
**Trade Mark:** NYKO, Wireless Kama  
**FCC ID:** SXJ87027-TX  
**Standards:** 47 CFR Part 15, Subpart C (2013)  
**Date of Receipt:** 2014-11-21  
**Date of Test:** 2014-12-10 to 2014-12-12  
**Date of Issue:** 2014-12-16

<b>Test Result:</b>	<b>PASS *</b>
---------------------	---------------

\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Jack Zhang  
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

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. All test results in this report can be traceable to National or International Standards.

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## 2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
00		2014-12-16		Original

Authorized for issue by:				
Tested By		 (Jack Liang) /Project Engineer		2014-12-12
				Date
Prepared By		 (Linlin Lv) /Clerk		2014-12-16
				Date
Checked By		 (Owen Zhou) /Reviewer		2014-12-17
				Date



### 3 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15, Subpart C Section 15.203	ANSI C63.10 (2009)	PASS
Field Strength of the Fundamental Signal	47 CFR Part 15, Subpart C Section 15.249 (a)	ANSI C63.10 (2009)	PASS
Spurious Emissions	47 CFR Part 15, Subpart C Section 15.249 (a)/15.209	ANSI C63.10 (2009)	PASS
Restricted bands around fundamental frequency (Radiated Emission)	47 CFR Part 15, Subpart C Section 15.249(a)/15.205	ANSI C63.10 (2009)	PASS
20dB Occupied Bandwidth	47 CFR Part 15, Subpart C Section 15.215 (c)	ANSI C63.10 (2009)	PASS

Remark:

Model No.: 8702X, 8702X-A50 (" X " =0-9 indicate different enclosure colors)

Only the model 87027 was tested, since the electrical circuit design, layout, components used and internal wiring were identical for the above models, only their model number or outer are different.



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## 5 General Information

### 5.1 Client Information

Applicant:	ASOKA INCORPORATION
Address of Applicant:	5F. NO.9, KUANG FU N.ROAD, TAIPEI, TAIWAN
Manufacturer:	SHENZHEN ASOKA ELECTRONICS CO.,LTD.
Address of Manufacturer:	BAOZHIWEI TECHNOLOGY PARK,GUANGTIAN ROAD,LUOTAN COMMUNITY,SONGGANG TOWN,BAO'AN DISTRICT,SHENZHEN,CHINA
Factory:	SHENZHEN ASOKA ELECTRONICS CO.,LTD.
Address of Factory:	BAOZHIWEI TECHNOLOGY PARK,GUANGTIAN ROAD,LUOTAN COMMUNITY,SONGGANG TOWN,BAO'AN DISTRICT,SHENZHEN,CHINA

### 5.2 General Description of EUT

Product Name:	Wireless Kama for Wii-bulk
Model No.:	87027
Trade Mark:	NYKO, Wireless Kama
EUT Function:	Remote controller with 2.4GHz as carrier
Frequency Range:	2405MHz ~ 2475MHz
Hopping Channel Type:	Adaptive Frequency Hopping systems
Modulation Type:	GFSK
Number of Channels:	36 (declared by the client)
Sample Type:	Portable production
Antenna Type:	Integral
Antenna Gain:	0dBi
Power Supply:	Remote controller : DC3V=2x1.5 SUPPLIED BY “ AAA” battery
Test Voltage:	Remote controller : DC 3V



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Operation Frequency each of channel					
Channel	Frequency	Channel	Frequency	Channel	Frequency
1 CH	2405 MHz	14 CH	2431 MHz	27 CH	2457 MHz
2 CH	2407 MHz	15 CH	2433 MHz	28 CH	2459 MHz
3 CH	2409 MHz	16 CH	2435 MHz	29 CH	2461 MHz
4 CH	2411 MHz	17 CH	2437 MHz	30 CH	2463 MHz
5 CH	2413 MHz	18 CH	2439 MHz	31 CH	2465 MHz
6 CH	2415 MHz	19 CH	2441 MHz	32 CH	2467 MHz
7 CH	2417 MHz	20 CH	2443 MHz	33 CH	2469 MHz
8 CH	2419 MHz	21 CH	2445 MHz	34 CH	2471 MHz
9 CH	2421 MHz	22 CH	2447 MHz	35 CH	2473 MHz
10 CH	2423 MHz	23 CH	2449 MHz	36 CH	2475 MHz
11 CH	2425 MHz	24 CH	2451 MHz		
12 CH	2427 MHz	25 CH	2453 MHz		
13 CH	2429 MHz	26 CH	2455 MHz		

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The Lowest channel(CH1)	2405MHz
The Middle channel(CH20)	2437MHz
The Highest channel(CH39)	2475MHz



### 5.3 Test Environment and Mode

Operating Environment:	
Temperature:	20.0 °C
Humidity:	52 % RH
Atmospheric Pressure:	1010 mbar
Test mode:	
Transmitting mode:	Keep the EUT in transmitting mode .

### 5.4 Description of Support Units

The EUT has been tested with associated equipment below.

Description	Manufacturer	Model No.
Television	HISENSE	TLM19V66
Wii	Nintendo	A-02-031

### 5.5 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch E&E Lab,  
No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China.  
518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.



## **5.6 Test Facility**

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **VCCI**

The 10m Semi-anechoic chamber and Shielded Room (7.5m x 4.0m x 3.0m) of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-823, R-4188, T-1153 and C-2383 respectively.

- **FCC – Registration No.: 556682**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 556682.

- **Industry Canada (IC)**

Two 3m Semi-anechoic chambers of SGS-CSTC Standards Technical Services Co., Ltd. have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1 & 4620C-2.

## **5.7 Deviation from Standards**

None.

## **5.8 Abnormalities from Standard Conditions**

None.

## **5.9 Other Information Requested by the Customer**

None.



**5.10 Equipment List**

<b>Conducted Emission</b>					
<b>Item</b>	<b>Test Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Inventory No.</b>	<b>Cal.Due date (yyyy-mm-dd)</b>
1	Shielding Room	ZhongYu Electron	GB-88	SEL0042	2015-06-10
2	LISN	Rohde & Schwarz	ENV216	SEL0152	2015-10-24
3	LISN	ETS-LINDGREN	3816/2	SEL0021	2015-05-16
4	8 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T8-02	SEL0162	2015-08-30
5	4 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T4-02	SEL0163	2015-08-30
6	2 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T2-02	SEL0164	2015-08-30
7	EMI Test Receiver	Rohde & Schwarz	ESCI	SEL0022	2015-05-16
8	Coaxial Cable	SGS	N/A	SEL0025	2015-05-29
9	DC Power Supply	Zhao Xin	RXN-305D	SEL0117	2015-10-24
10	Humidity/ Temperature Indicator	Shanghai Qixiang	ZJ1-2B	SEL0103	2015-10-24
11	Barometer	Chang Chun	DYM3	SEL0088	2015-05-16



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RE in Chamber					
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Due date (yyyy-mm-dd)
1	3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEL0017	2015-06-10
2	EMI Test Receiver	Agilent Technologies	N9038A	SEL0312	2015-09-16
3	EMI Test software	AUDIX	E3	SEL0050	N/A
4	BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEL0015	2015-10-24
5	Double-ridged horn (1-18GHz)	ETS-LINDGREN	3117	SEL0006	2015-10-24
6	Horn Antenna (18-26GHz)	ETS-LINDGREN	3160	SEL0076	2015-10-24
7	Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEL0053	2015-05-16
8	Pre-Amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEL0168	2015-10-24
9	Coaxial cable	SGS	N/A	SEL0027	2015-05-29
10	Coaxial cable	SGS	N/A	SEL0189	2015-05-29
11	Coaxial cable	SGS	N/A	SEL0121	2015-05-29
12	Coaxial cable	SGS	N/A	SEL0178	2015-05-29
13	Band filter	Amindeon	82346	SEL0094	2015-05-16
14	Barometer	Chang Chun	DYM3	SEL0088	2015-05-16
15	DC Power Supply	Zhao Xin	RXN-305D	SEL0117	2015-10-24
16	Humidity/ Temperature Indicator	Shanghai Qixiang	ZJ1-2B	SEL0103	2015-10-24
17	Signal Generator (10M-27GHz)	Rohde & Schwarz	SMR27	SEL0067	2015-05-16
18	Signal Generator	Rohde & Schwarz	SMY01	SEL0155	2015-10-24
19	Loop Antenna	Beijing Daze	ZN30401	SEL0203	2015-06-04

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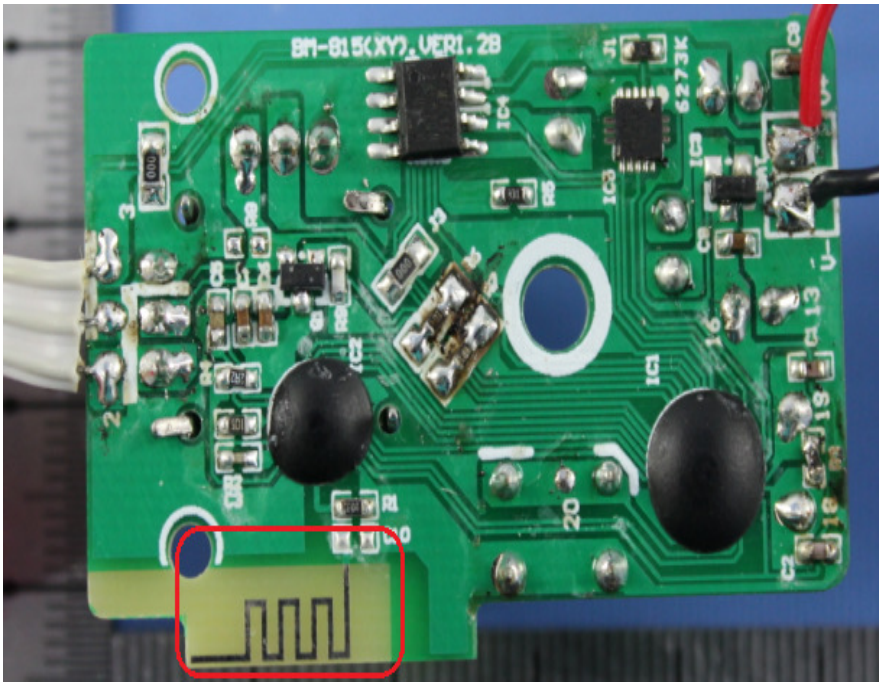
RF connected test					
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Due date (yyyy-mm-dd)
1	DC Power Supply	Zhao Xin	RXN-305D	SEL0117	2015-10-24
2	Humidity/ Temperature Indicator	HYGRO	ZJ1-2B	SEL0033	2015-10-24
3	Spectrum Analyzer	Rohde & Schwarz	FSP	SEL0154	2015-10-24
4	Coaxial cable	SGS	N/A	SEL0178	2015-05-29
5	Coaxial cable	SGS	N/A	SEL0179	2015-05-29
6	Barometer	ChangChun	DYM3	SEL0088	2015-05-16
7	Signal Generator	Rohde & Schwarz	SML03	SEL0068	2015-05-16
8	Band filter	amideon	82346	SEL0094	2015-05-16
9	POWER METER	R & S	NRVS	SEL0144	2015-10-24
10	Attenuator	Beijin feihang taida	TST-2-6dB	SEL0205	2015-05-16
11	Power Divider(splitter)	Agilent Technologies	11636B	SEL0130	2015-10-24

Note: The calibration interval is one year, all the instruments are valid.

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## 6 Test results and Measurement Data

### 6.1 Antenna Requirement

Standard requirement:	47 CFR Part 15C Section 15.203
<p>15.203 requirement:</p> <p>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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</p>	
EUT Antenna:	
Controller:	
<p>The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0dBi.</p>	





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### 6.2 Radiated Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.249 and 15.209				
Test Method:	ANSI C63.10: 2009				
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)				
Receiver Setup:	Frequency	Detector	RBW	VBW	Remark
	0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak
	0.009MHz-0.090MHz	Average	10kHz	30kHz	Average
	0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
	0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak
	0.110MHz-0.490MHz	Average	10kHz	30kHz	Average
	0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	100 kHz	300kHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Peak	1MHz	10Hz	Average
Limit: (Spurious Emissions)	Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
	1.705MHz-30MHz	30	-	-	30
	30MHz-88MHz	100	40.0	Quasi-peak	3
	88MHz-216MHz	150	43.5	Quasi-peak	3
	216MHz-960MHz	200	46.0	Quasi-peak	3
	960MHz-1GHz	500	54.0	Quasi-peak	3
	Above 1GHz	500	54.0	Average	3
Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.					
Limit: (Field strength of the fundamental signal)	Frequency	Limit (dBuV/m @3m)		Remark	
	2400MHz-2483.5MHz	94.0		Average Value	
		114.0		Peak Value	

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## Test Setup:

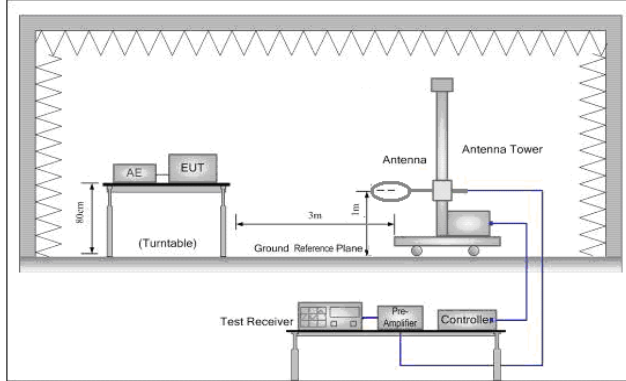


Figure 1. Below 30MHz

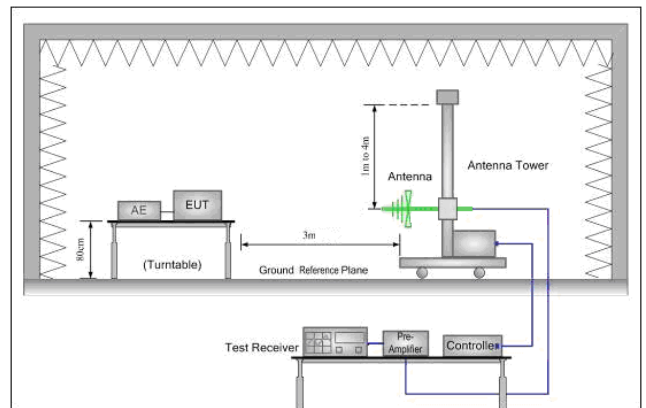


Figure 2. 30MHz to 1GHz

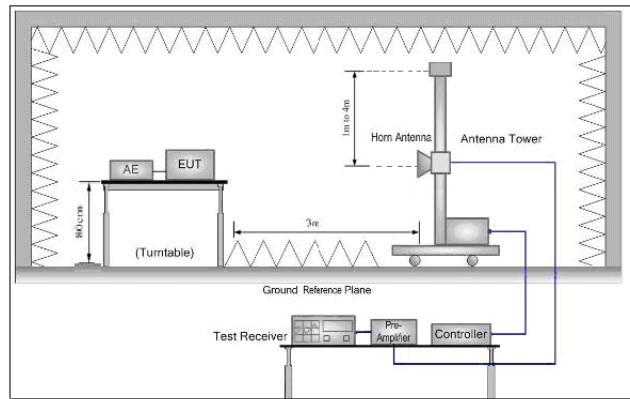


Figure 3. Above 1 GHz

## Test Procedure:

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have

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	<p>10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</p> <p>g. Test the EUT in the lowest channel,the middle channel,the Highest channel</p> <p>h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode,And found the X axis positioning which it is worse case.</p> <p>i. Repeat above procedures until all frequencies measured was complete.</p>
Final Test Mode:	Transmitting mode
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass



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### Measurement Data

#### 6.2.1.1 Field Strength Of The Fundamental Signal

For controller:

Peak value:

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamplifier Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2404.668	4.60	28.80	34.90	88.80	87.30	114.00	-26.70	Vertical
2404.864	4.60	28.80	34.90	92.40	90.90	114.00	-23.10	Horizontal
2437.153	4.60	28.90	34.90	88.90	87.50	114.00	-26.50	Vertical
2437.435	4.60	28.90	34.90	92.50	91.10	114.00	-22.90	Horizontal
2475.130	4.60	29.30	35.00	89.00	87.90	114.00	-26.10	Vertical
2474.650	4.60	29.30	35.00	92.70	91.60	114.00	-23.10	Horizontal

Average value:

Frequency (MHz)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2404.668	-33.63	53.67	94.00	-40.33	Vertical
2404.864		57.27	94.00	-36.73	Horizontal
2437.153		53.87	94.00	-40.13	Vertical
2437.435		57.47	94.00	-36.53	Horizontal
2475.130		54.27	94.00	-39.73	Vertical
2474.650		57.97	94.00	-36.03	Horizontal

Note:

Average value:	
Calculate Formula:	Average value=Peak value + Factor
	Factor=20 log(Duty cycle)
	Duty cycle= T on time / T period
Test data:	T <sub>on time</sub> =0.203525641ms
	T <sub>period</sub> =9.775641ms

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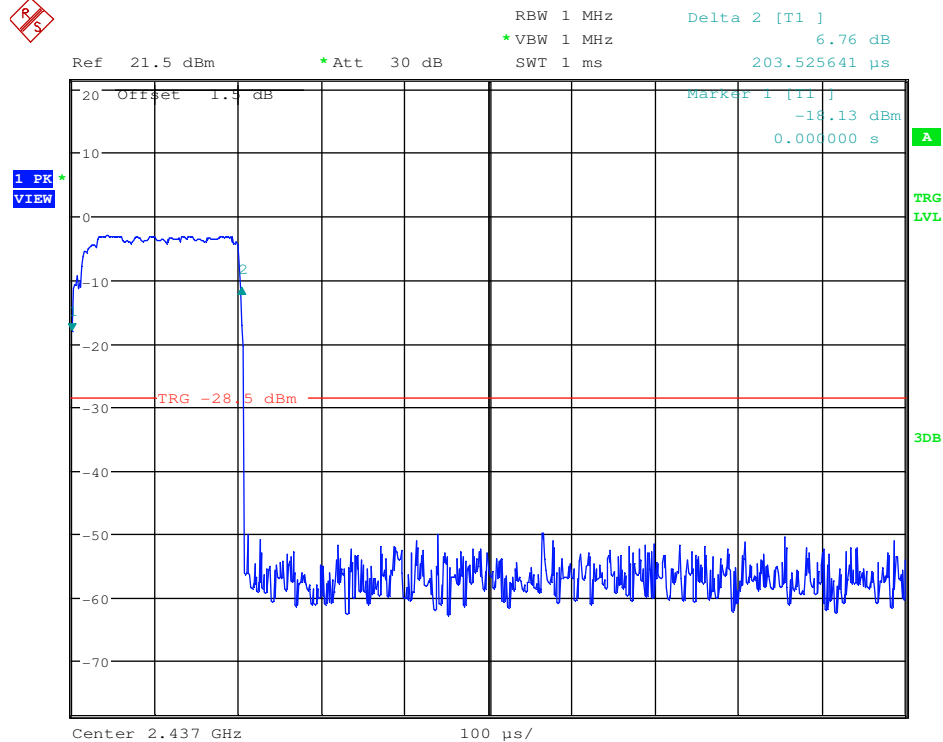


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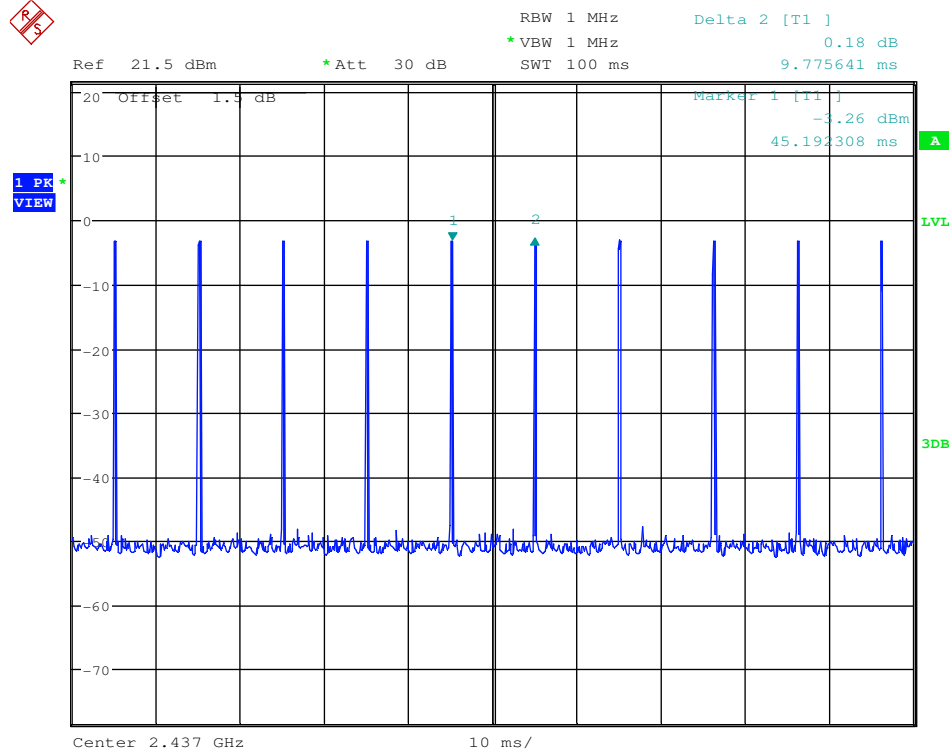
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T<sub>on</sub> time



T<sub>period</sub>



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## 6.2.1.2 Spurious Emissions

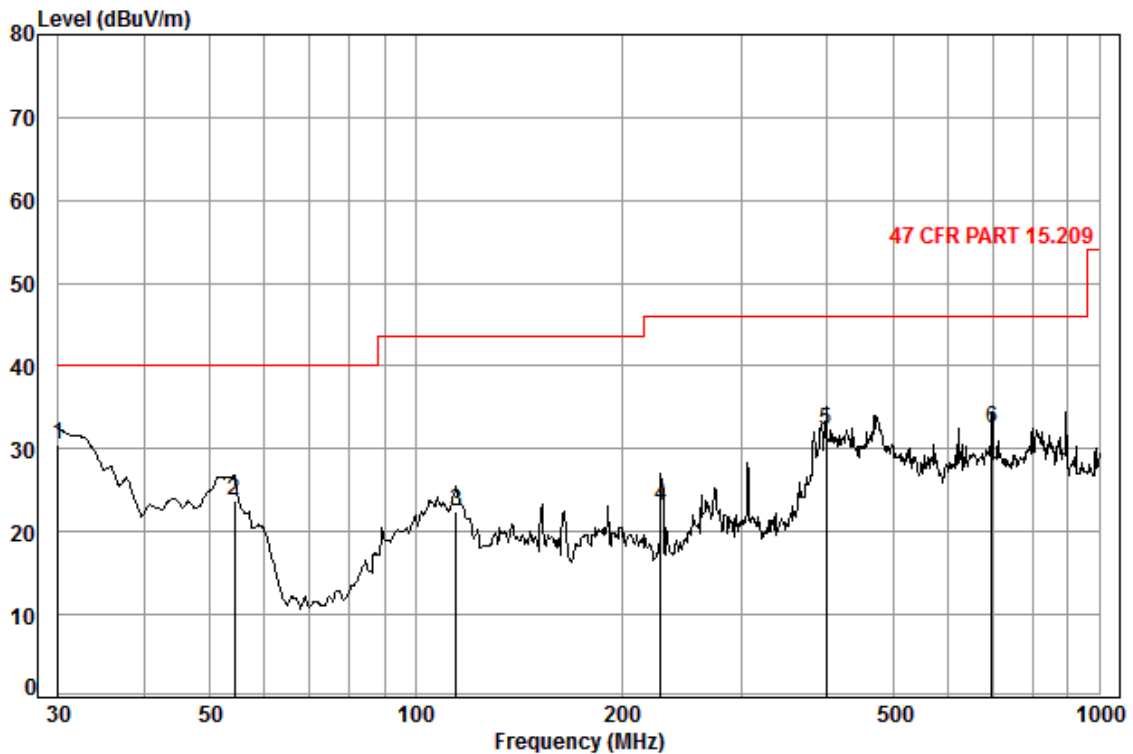
30MHz~1GHz

Test mode: Transmitting

For Controller:

Vertical

Data: 42



Condition: 47 CFR PART 15.209 3m 3142C Vertical

Job No. : 6496CR

Test mode: Wii connection  
: Controller

	Cable	Ant	Preamp	Read	Limit	Over	
Freq	Loss	Factor	Factor	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	30.00	0.60	18.70	27.36	38.60	30.54	40.00 -9.46
2	54.26	0.80	8.06	27.28	42.16	23.74	40.00 -16.26
3	114.51	1.24	8.28	27.10	40.08	22.50	43.50 -21.00
4	228.49	1.56	11.61	26.60	36.47	23.04	46.00 -22.96
5	399.03	2.20	16.29	27.13	40.80	32.16	46.00 -13.84
6	696.86	2.90	21.57	27.41	35.48	32.54	46.00 -13.46

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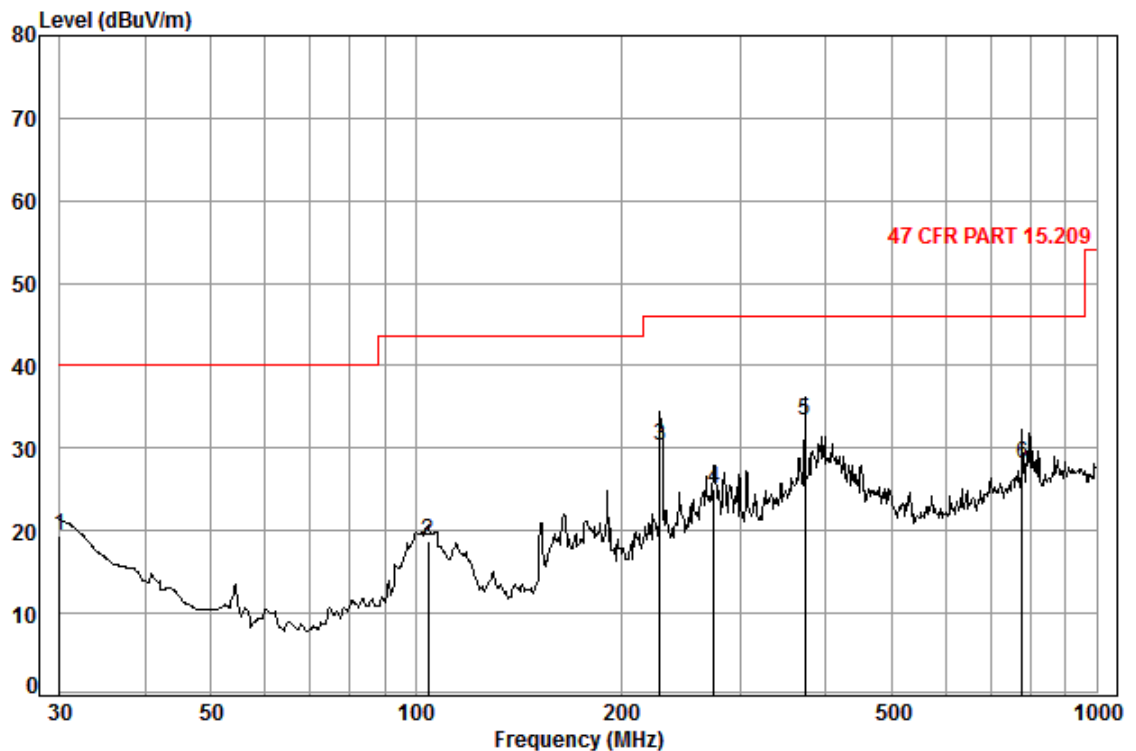
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Horizontal

Data: 43



Condition: 47 CFR PART 15.209 3m 3142C Horizontal

Job No. : 6496CR

Test mode: Wii connection

: Controller

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	30.00	0.60	18.70	27.36	27.39	19.33	40.00	-20.67	
2	104.17	1.21	8.89	27.17	35.88	18.81	43.50	-24.69	
3	228.49	1.56	11.61	26.60	43.81	30.38	46.00	-15.62	
4	274.19	1.79	12.78	26.47	36.91	25.01	46.00	-20.99	
5	373.31	2.13	15.86	26.95	42.23	33.27	46.00	-12.73	
6	776.88	3.14	22.01	27.32	30.40	28.23	46.00	-17.77	

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### For Controller:

Test mode:	Transmitting	Test channel:	Lowest	Remark:	Peak		
Freq.(MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant.F. (dB/m)	Amp.G. (dB)	Cbl.L. (dB)	Pol.
4810.000	58.60	74	15.40	34.30	35.10	7.60	V
7215.000	61.60	74	12.40	35.80	33.80	9.90	V
9620.000	61.50	74	12.50	37.20	32.50	12.00	V
4810.000	59.00	74	15.00	34.30	35.10	7.60	H
7215.000	57.70	74	16.30	35.80	33.80	9.90	H
9620.000	60.80	74	13.20	37.20	32.50	12.00	H

Test mode:	Transmitting	Test channel:	Lowest	Remark:	Average
Frequency (MHz)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin (dB)	Pol.
4810.000	-33.63	24.97	54	29.03	V
7215.000		27.97	54	26.03	V
9620.000		27.87	54	26.13	V
4810.000		25.37	54	28.63	H
7215.000		24.07	54	29.93	H
9620.000		27.17	54	26.83	H

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Test mode:	Transmitting	Test channel:	Middle	Remark:	Peak		
Freq.(MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant.F. (dB/m)	Amp.G. (dB)	Cbl.L. (dB)	Pol.
4874.000	52.20	74	21.80	34.50	35.20	7.60	V
7311.000	63.00	74	11.00	35.70	33.80	10.00	V
9748.000	62.20	74	11.80	37.30	32.10	12.30	V
4874.000	52.50	74	21.50	34.50	35.20	7.60	H
7311.000	59.60	74	14.40	35.70	33.80	10.00	H
9748.000	60.90	74	13.10	37.30	32.10	12.30	H

Test mode:	Transmitting	Test channel:	Middle	Remark:	Average
Frequency (MHz)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin (dB)	Pol.
4874.000	-33.63	18.57	54	35.43	V
7311.000		29.37	54	24.63	V
9748.000		28.57	54	25.43	V
4874.000		18.87	54	35.13	H
7311.000		25.97	54	28.03	H
9748.000		27.27	54	26.73	H

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Test mode:		Transmitting		Test channel:		Highest		Remark:		Peak					
Freq.(MHz)		Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)		Ant.F. (dB/m)		Amp.G. (dB)		Cbl.L. (dB)		Pol.	
4950.000		65.90		74		8.10		34.60		35.30		7.60		V	
7425.000		59.30		74		14.70		35.70		33.90		10.10		V	
9900.000		60.80		74		13.20		37.30		32.10		12.30		V	
4950.000		52.30		74		21.70		34.60		35.30		7.60		H	
7425.000		58.30		74		15.70		35.70		33.90		10.10		H	
9900.000		60.30		74		13.70		37.30		32.10		12.30		H	

Test mode:	Transmitting	Test channel:	Highest	Remark:	Average
Frequency (MHz)	Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin (dB)	Pol.
4950.000	-33.63	32.27	54	21.73	V
7425.000		25.67	54	28.33	V
9900.000		27.17	54	26.83	V
4950.000		18.67	54	35.33	H
7425.000		24.67	54	29.33	H
9900.000		26.67	54	27.33	H



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Remark:

- 1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

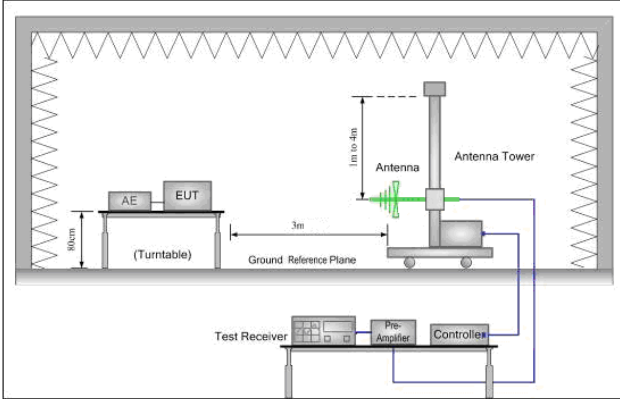
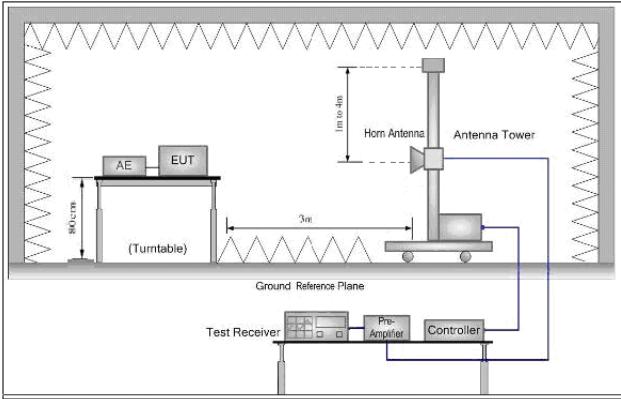
Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

- 2) Scan from 9kHz to 25GHz, The disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported .
- 3) As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.

4)

Average value:	
Calculate Formula:	Average value=Peak value + Factor
	Factor=20 log(Duty cycle)
	Duty cycle= T on time / T period

### 6.3 Restricted bands around fundamental frequency

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205		
Test Method:	ANSI C63.10: 2009		
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)		
Limit(band edge):	Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.		
	Frequency	Limit (dBuV/m @3m)	Remark
	30MHz-88MHz	40.0	Quasi-peak Value
	88MHz-216MHz	43.5	Quasi-peak Value
	216MHz-960MHz	46.0	Quasi-peak Value
	960MHz-1GHz	54.0	Quasi-peak Value
	Above 1GHz	54.0	Average Value
		74.0	Peak Value
Test Setup:	<div style="display: flex; justify-content: space-around;">   </div>		
	<div style="display: flex; justify-content: space-around;"> <p>Figure 1. 30MHz to 1GHz</p> <p>Figure 2. Above 1 GHz</p> </div>		





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Test Procedure:	<ul style="list-style-type: none"><li>a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.</li><li>b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li><li>c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</li><li>d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</li><li>e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li><li>f. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel</li><li>g. Test the EUT in the lowest channel , the Highest channel</li><li>h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case.</li><li>i. Repeat above procedures until all frequencies measured was complete.</li></ul>
Final Test Mode:	Transmitting mode
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass



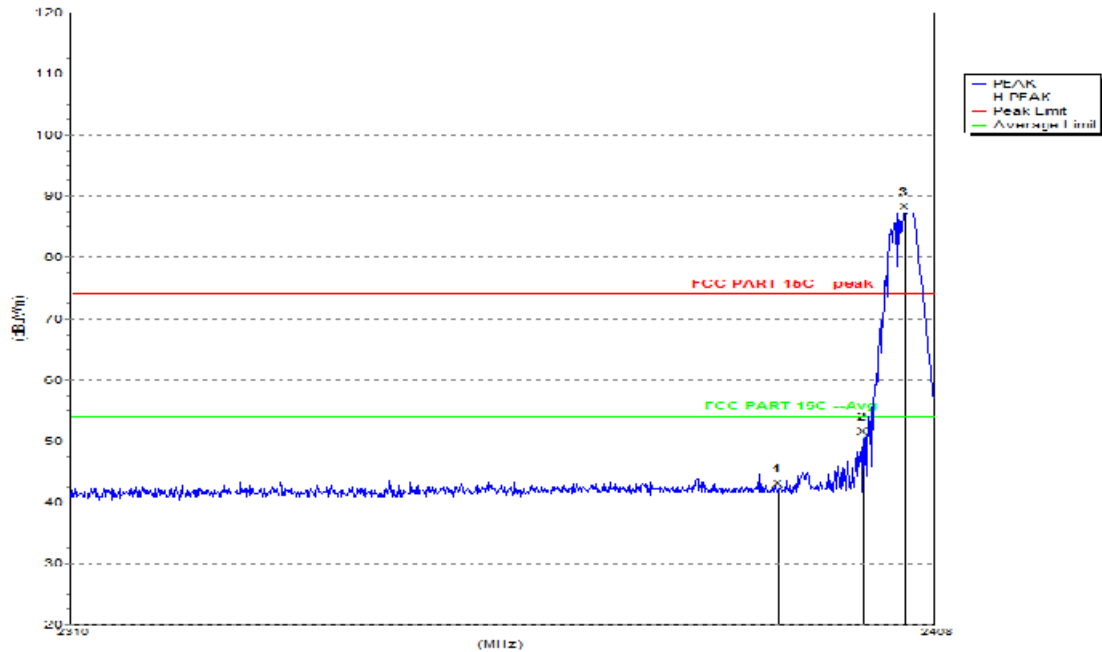
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### Test plot as follows:

Controller



Freq.(MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant.F. (dB/m)	Amp.G. (dB)	Cbl.L. (dB)	Pol.
2390.000	42.00	74	32.00	28.70	34.80	4.60	V
2400.000	50.60	74	23.40	28.80	34.90	4.60	V
2404.668	87.30	74	-13.30	28.80	34.90	4.60	V

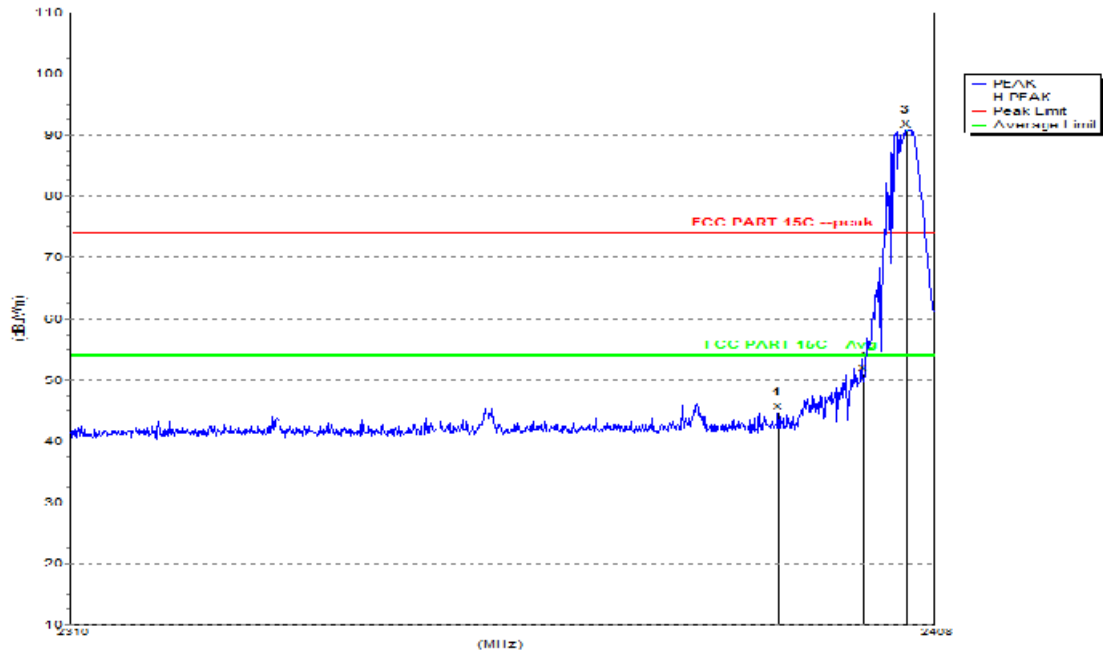
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Freq.(MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant.F. (dB/m)	Amp.G. (dB)	Cbl.L. (dB)	Pol.
2390.000	44.60	74	29.40	28.70	34.80	4.60	H
2400.000	50.90	74	23.10	28.80	34.90	4.60	H
2404.864	90.90	74	-16.90	28.80	34.90	4.60	H

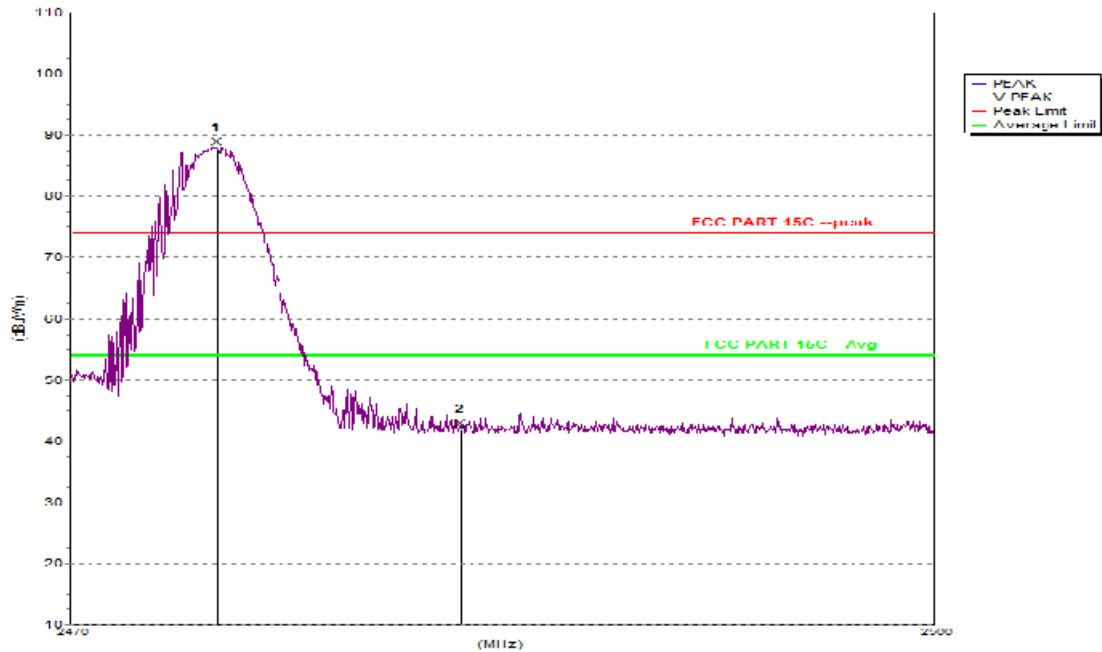
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Freq.(MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant.F. (dB/m)	Amp.G. (dB)	Cbl.L. (dB)	Pol.
2475.130	87.90	74	-13.90	29.30	35.00	4.60	V
2483.500	41.90	74	32.10	29.30	35.00	4.50	V

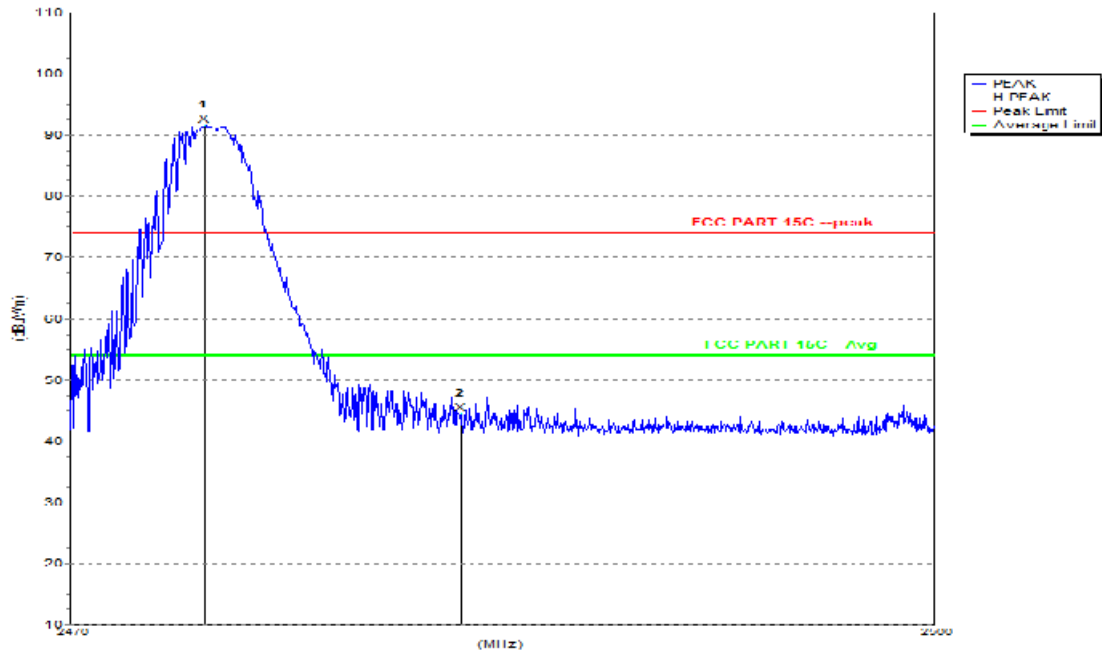
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Freq.(MHz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant.F. (dB/m)	Amp.G. (dB)	Cbl.L. (dB)	Pol.
2474.650	91.60	74	-17.60	29.30	35.00	4.60	H
2483.500	44.50	74	29.50	29.30	35.00	4.50	H

### Note:

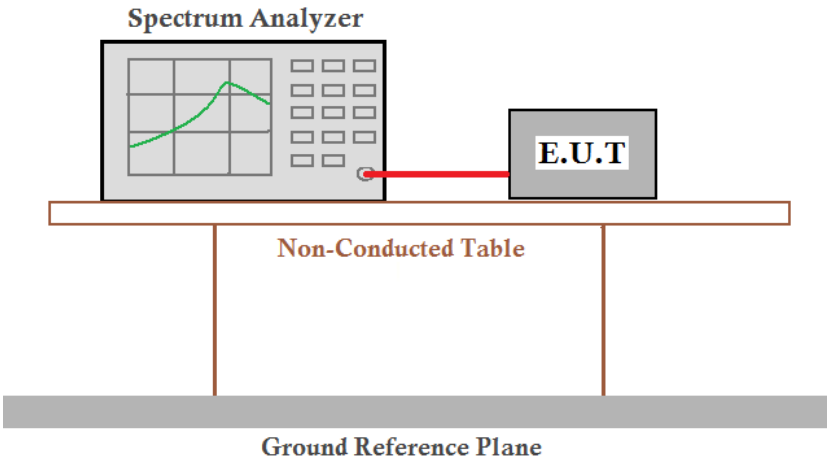
The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation

with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

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## 6.4 20dB Bandwidth

Test Requirement:	47 CFR Part 15C Section 15.215
Test Method:	ANSI C63.10:2009
Test Setup:	
Limit:	N/A
Final Test Mode:	Transmitter mode
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass

## Measurement Data

Controller

Test Channel	20dB bandwidth (MHz)	Results
Lowest	1.813	Pass
Middle	2.588	Pass
Highest	2.082	Pass



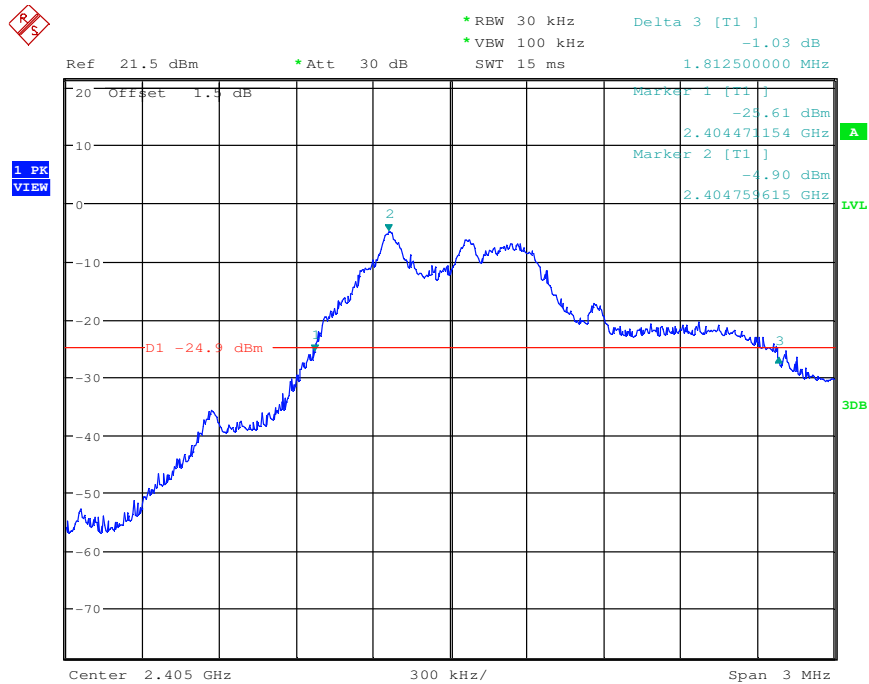
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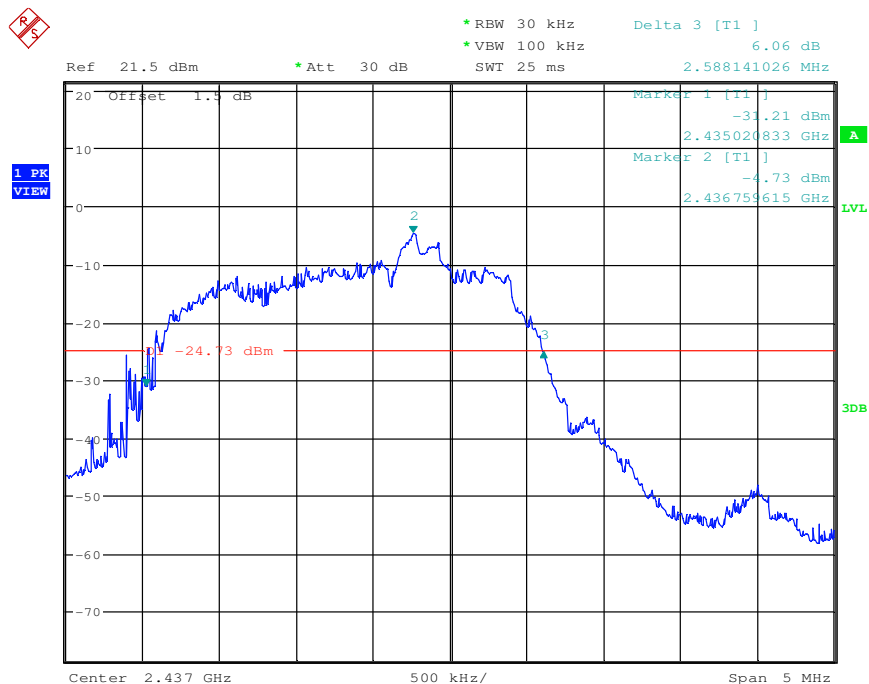
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Test plot as follows:

Test channel:	Lowest
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Test channel:	Middle
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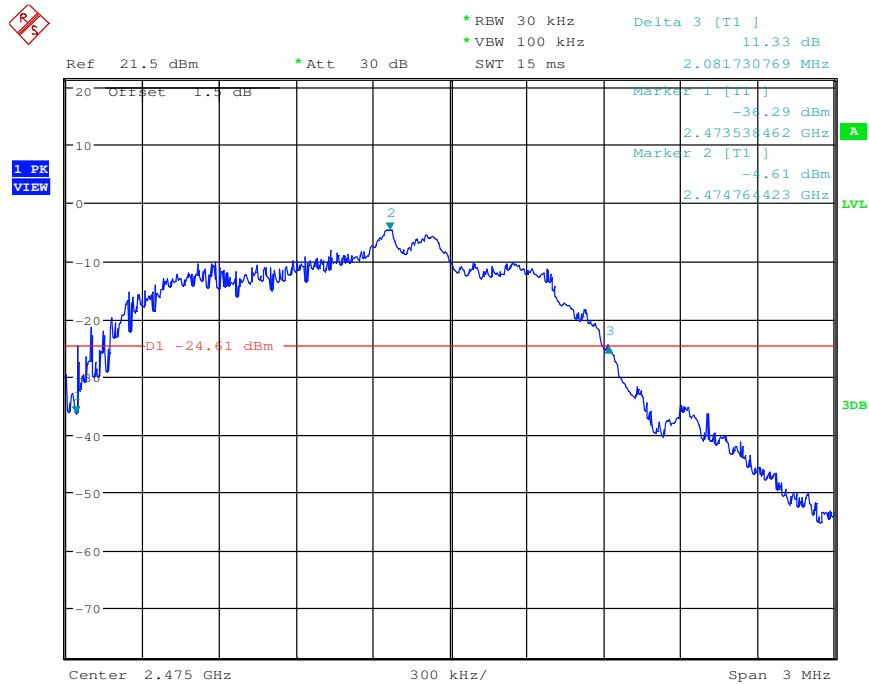


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Test channel:	Highest
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