SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch

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FCC REPORT

Application No. :	SZEM1507004544CR
Applicant:	DEI Sales, Inc. dba Definitive Technology
Manufacturer:	DEI Sales, Inc. dba Definitive Technology
Factory:	Zhao Yang Electronic (ShenZhen) Co., Ltd.
Product Name:	W Studio Micro System
Model No.(EUT):	W STUDIO MICRO SOUNDBAR
Trade mark:	Definitive Technology
FCC ID:	IPUSTUDIOMICRO
Standards:	47 CFR Part 15, Subpart C (2014)
Date of Receipt:	2015-07-24
Date of Test:	2015-08-06 to 2015-08-24
Date of Issue:	2015-08-26
Test Result:	**PASS ***

. * 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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"

1 Version

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
00		2015-08-26		Original

Authorized for issue by:				
Tested By		(Chris Zhong) /Project Engineer		2015-08-24 **Date**
Prepared By		(Hedy Wen) /Clerk		2015-08-26 **Date**
Checked By		(Eric Fu) /Reviewer		2015-08-26 **Date**

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2 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15, Subpart C Section 15.203	ANSI C63.10 (2013)	PASS
AC Power Line Conducted Emission	47 CFR Part 15, Subpart C Section 15.207	ANSI C63.10 (2013)	PASS
Field Strength of the Fundamental Signal	47 CFR Part 15, Subpart C Section 15.249 (a)	ANSI C63.10 (2013)	PASS
Spurious Emissions	47 CFR Part 15, Subpart C Section 15.249 (a)/15.209	ANSI C63.10 (2013)	PASS
Restricted bands around fundamental frequency (Radiated Emission)	47 CFR Part 15, Subpart C Section 15.249(a)/15.205	ANSI C63.10 (2013)	PASS
20dB Occupied Bandwidth	47 CFR Part 15, Subpart C Section 15.215 (c)	ANSI C63.10 (2013)	PASS

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4 General Information

4.1 Client Information

Applicant:	DEI Sales, Inc. dba Definitive Technology
Address of Applicant:	1 Viper Way, Vista, CA 92081 USA
Manufacturer:	DEI Sales, Inc. dba Definitive Technology
Address of Manufacturer:	1 Viper Way, Vista, CA 92081 USA
Factory:	Zhao Yang Electronic (ShenZhen) Co., Ltd.
Address of Factory:	Section A, 4th Floor, Building 1 & Building 2, De Yong Jia Industrial Park, Guang Qiao Road, Yu Lv Community, Gong Ming Street, Guang Ming New District, Shenzhen, Guangdong, P.R.C

4.2 General Description of EUT

Product Name:	W Studio Micro System
Model No.:	W STUDIO MICRO SOUNDBAR
Trade Mark:	Definitive Technology
Operation Frequency:	2.4G Wireless(2403.5MHz-2477.3MHz)
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	FSK
Number of Channel:	49
Sample Type:	Fixed production
Antenna Type:	Integral
Antenna Gain:	2.28dBi
EUT Power Supply:	Adapter Model: DYS902-240400W Input: AC 100-240V 50/60Hz 1.5A MAX Output: DC 24.0V 4.0A Remote Control: DC 3.0V (1*3.0V “CR2032” Button Cell)
Test Voltage:	AC 120V 60Hz

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Operation Frequency each of channel					
Channel	Frequency	Channel	Frequency	Channel	Frequency
1CH	2403.5 MHz	18CH	2429.7 MHz	35CH	2455.8 MHz
2CH	2405.1 MHz	19CH	2431.2 MHz	36CH	2457.3 MHz
3CH	2406.6 MHz	20CH	2432.7 MHz	37CH	2458.9 MHz
4CH	2408.1 MHz	21CH	2434.3 MHz	38CH	2460.4 MHz
5CH	2409.7 MHz	22CH	2435.8 MHz	39CH	2461.9 MHz
6CH	2411.2 MHz	23CH	2437.4 MHz	40CH	2463.5 MHz
7CH	2412.8 MHz	24CH	2438.9 MHz	41CH	2465.0 MHz
8CH	2414.3 MHz	25CH	2440.4 MHz	42CH	2466.6 MHz
9CH	2415.8 MHz	26CH	2442.0 MHz	43CH	2468.1 MHz
10CH	2417.4 MHz	27CH	2443.5 MHz	44CH	2469.6 MHz
11CH	2418.9 MHz	28CH	2445.0 MHz	45CH	2471.2 MHz
12CH	2420.4 MHz	29CH	2446.6 MHz	46CH	2472.7 MHz
13CH	2422.0 MHz	30CH	2448.1 MHz	47CH	2474.2 MHz
14CH	2423.5 MHz	31CH	2449.6 MHz	48CH	2475.8 MHz
15CH	2425.1 MHz	32CH	2451.2 MHz	49CH	2477.3 MHz
16CH	2426.6 MHz	33CH	2452.7 MHz		
17CH	2428.1 MHz	34CH	2454.3 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)	2403.5MHz
The Middle channel(CH25)	2440.4MHz
The Highest channel(CH49)	2477.3MHz

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4.3 Test Environment and Mode

Operating Environment:	
Temperature:	25.0 °C
Humidity:	50 % RH
Atmospheric Pressure:	1010 mbar
Test mode:	
Transmitting mode:	Keep the EUT in transmitting mode with modulation.

4.4 Description of Support Units

The EUT has been tested independently.

4.5 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.

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4.6 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-2.

4.7 Deviation from Standards

None.

4.8 Abnormalities from Standard Conditions

None.

4.9 Other Information Requested by the Customer

None.

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4.10 Equipment List

Conducted Emission					
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Due date (yyyy-mm-dd)**
1	Shielding Room	ZhongYu Electron	GB-88	SEL0042	2016-05-13
2	LISN	Rohde & Schwarz	ENV216	SEL0152	2015-10-24
3	LISN	ETS-LINDGREN	3816/2	SEL0021	2016-05-13
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	2016-05-13
8	Coaxial Cable	SGS	N/A	SEL0025	2016-05-13
9	DC Power Supply	Zhao Xin	RXN-305D	SEL0117	2015-10-24
10	Humidity/ Temperature Indicator	Shanhai Qixiang	ZJ1-2B	SEL0103	2015-10-24
11	Barometer	Chang Chun	DYM3	SEL0088	2016-05-13

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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	2016-05-13
2	Spectrum Analyzer	Rohde & Schwarz	FSU43	SEL0270	2016-04-25
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	Horn Antenna(26GHz-40 GHz)	A.H.Systems, inc.	SAS-573	SEL0349	2016-03-20
8	Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEL0053	2016-05-16
9	Pre-Amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEL0168	2015-10-24
10	Pre-amplifier(26GHz -40GHz)	Compliance Directions Systems Inc.	PAP-2640-50	SEL0350	2016-03-20
11	Coaxial cable	SGS	N/A	SEL0027	2016-05-29
12	Coaxial cable	SGS	N/A	SEL0189	2016-05-29
13	Coaxial cable	SGS	N/A	SEL0121	2016-05-29
14	Coaxial cable	SGS	N/A	SEL0178	2016-05-29
16	Barometer	Chang Chun	DYM3	SEL0088	2016-05-13
17	DC Power Supply	Zhao Xin	RXN-305D	SEL0117	2015-10-24
18	Humidity/ Temperature Indicator	Shanhai Qixiang	ZJ1-2B	SEL0103	2015-10-24
19	Signal Generator (10M-27GHz)	Rohde & Schwarz	SMR27	SEL0067	2016-05-16
20	Signal Generator	Rohde & Schwarz	SMY01	SEL0155	2015-10-24
21	Loop Antenna	Beijing Daze	ZN30401	SEL0203	2016-05-13

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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	2016-05-13
5	Coaxial cable	SGS	N/A	SEL0179	2016-05-13
6	Barometer	ChangChun	DYM3	SEL0088	2016-05-13
7	Signal Generator	Rohde & Schwarz	SML03	SEL0068	2016-04-25
8	Band filter	amideon	82346	SEL0094	2016-05-13
9	POWER METER	R & S	NRVS	SEL0144	2015-10-24
10	Attenuator	Beijin feihang taida	TST-2-6dB	SEL0205	2016-04-25
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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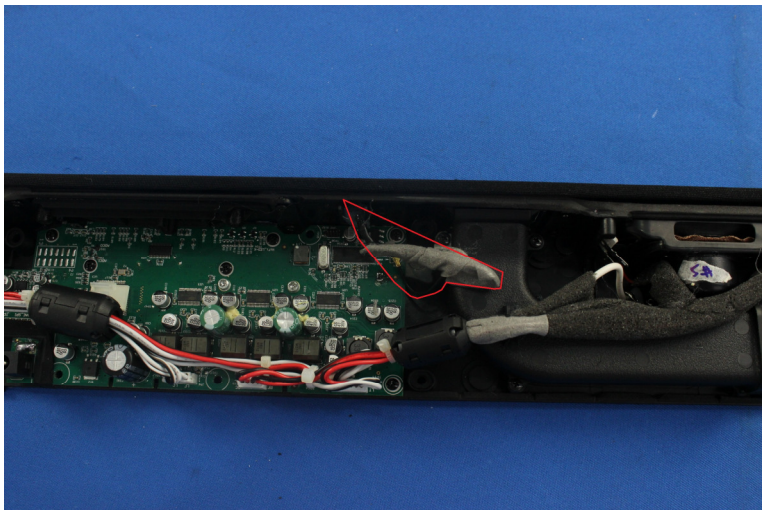
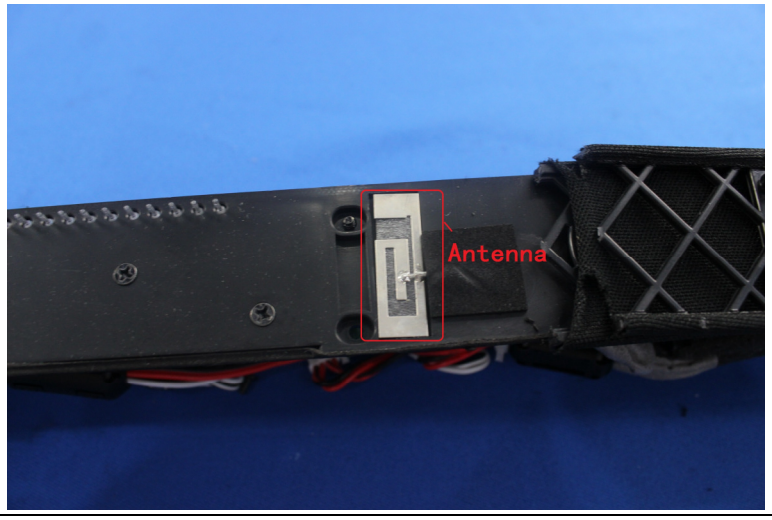
5 Test results and Measurement Data

5.1 Antenna Requirement

Standard requirement:	47 CFR Part 15C Section 15.203
15.203 requirement: 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.	
EUT Antenna:	 
The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 2.28dBi.	

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5.2 Conducted Emissions

<table>
<tr><td>Test Requirement:</td><td>47 CFR Part 15C Section 15.207</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10: 2013</td></tr>
<tr><td>Test Frequency Range:</td><td>150kHz to 30MHz</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><th rowspan="2">Frequency range (MHz)</th><th colspan="2">Limit (dBuV)</th></tr>
<tr><th>Quasi-peak</th><th>Average</th></tr>
<tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr>
<tr><td>0.5-5</td><td>56</td><td>46</td></tr>
<tr><td>5-30</td><td>60</td><td>50</td></tr>
</table>
* Decreases with the logarithm of the frequency.</td></tr>
<tr><td>Test Procedure:</td><td>1) The mains terminal disturbance voltage test was conducted in a shielded room.
2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane.
4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.</td></tr>
</table>

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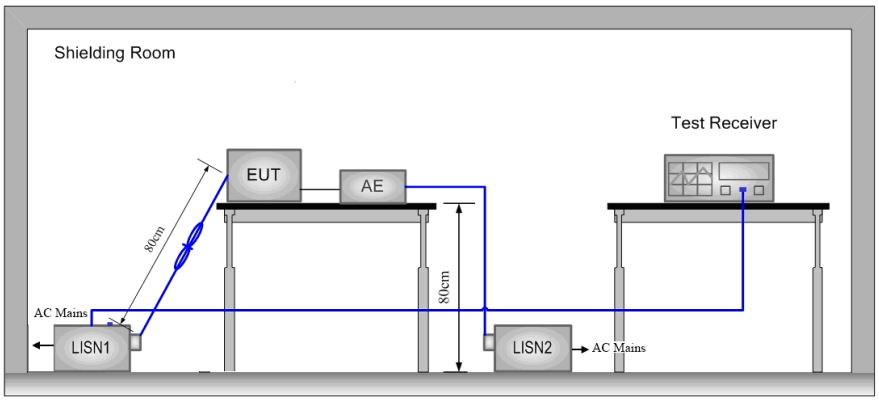
Test Setup:	
Instruments Used:	Refer to section 4.10 for details.
Test Mode:	Transmitting mode.
Test Results:	Pass

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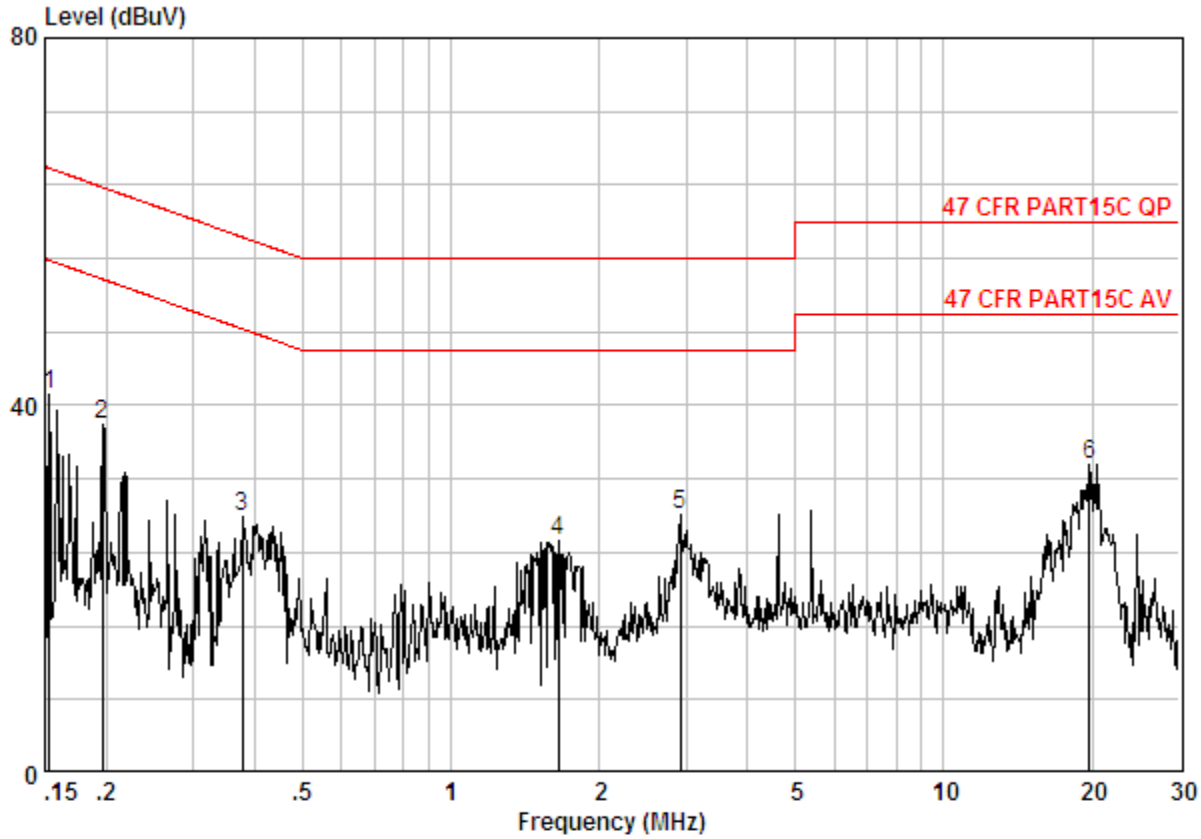
Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Live Line:



Site : Shielding Room
Condition : 47 CFR PART15C AV CE LINE
Job No. : 4544CR
Test Mode : TX

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1 @	0.15321	0.02	9.82	31.44	41.28	55.82	-14.54	Peak
2	0.19654	0.02	9.83	28.11	37.95	53.76	-15.80	Peak
3	0.37711	0.01	9.85	18.09	27.95	48.34	-20.39	Peak
4	1.654	0.02	9.93	15.27	25.23	46.00	-20.77	Peak
5	2.915	0.02	10.02	18.05	28.09	46.00	-17.91	Peak
6	19.740	0.02	10.29	23.20	33.52	50.00	-16.48	Peak

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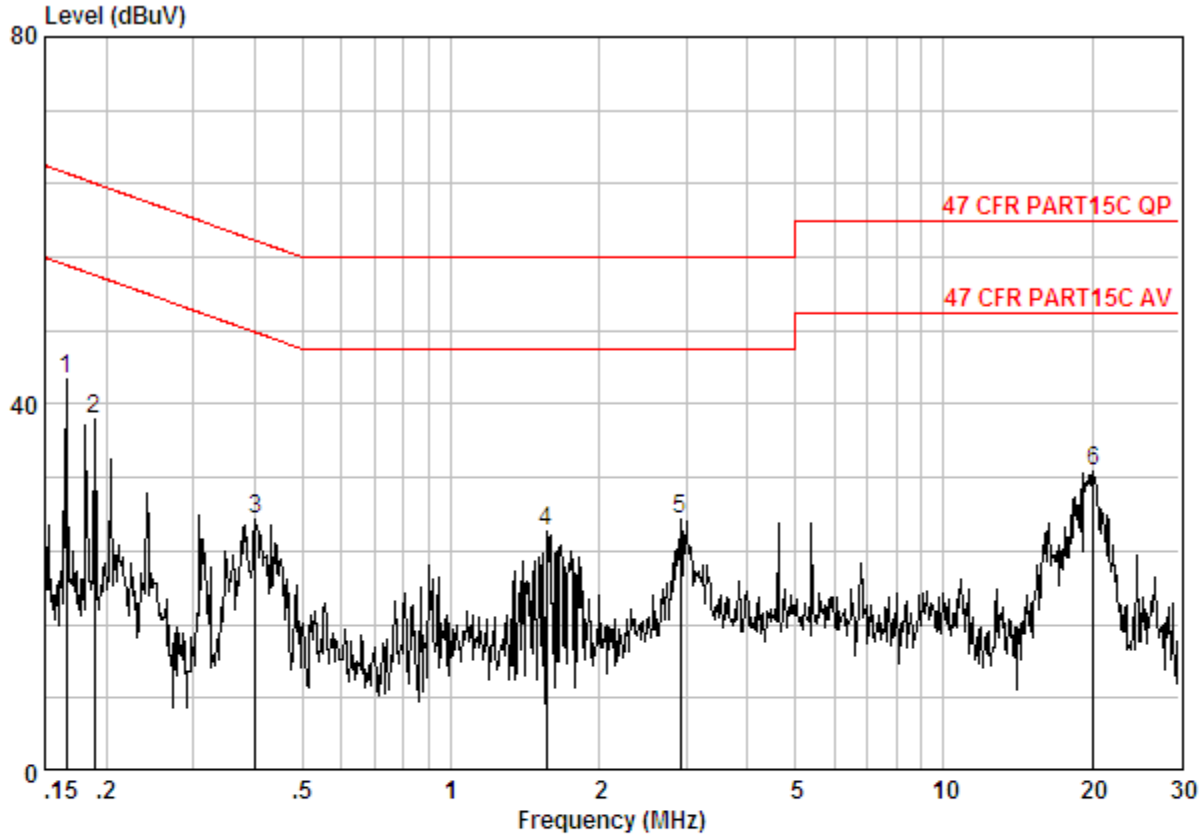
Neutral Line:



Site : Shielding Room
Condition : 47 CFR PART15C AV CE NEUTRAL
Job No. : 4544CR
Test Mode : TX

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1 @	0.16589	0.02	9.80	32.93	42.75	55.16	-12.41	Peak
2	0.18938	0.02	9.84	28.52	38.38	54.06	-15.69	Peak
3	0.40187	0.01	9.87	17.64	27.52	47.81	-20.30	Peak
4	1.560	0.02	10.08	16.07	26.17	46.00	-19.83	Peak
5	2.915	0.02	10.12	17.26	27.40	46.00	-18.60	Peak
6	20.162	0.02	10.39	22.29	32.70	50.00	-17.30	Peak

Notes:

1. *The following Quasi-Peak and Average measurements were performed on the EUT:*
2. *Final Test Level =Receiver Reading + LISN Factor + Cable Loss.*

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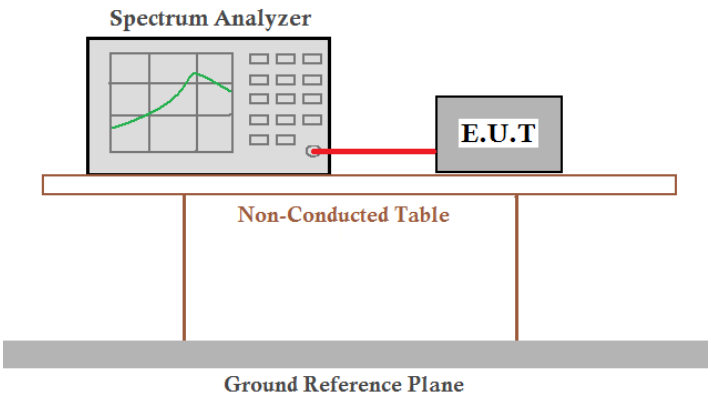
5.3 Spurious Emissions

5.3.1 Duty Cycle

Test Requirement:	47 CFR Part 15C Section 15.35 (c)
Test Method:	ANSI C63.10:2013
Test Setup:	
Instruments Used:	Refer to section 4.10 for details.
Limit:	N/A
Test Mode:	Transmitting mode.
Test Results:	Pass

Measurement Data

Calculate Formula:	PDCF=20 log(Duty cycle)
	Duty cycle= T on time / T period
Test data:	Ton time =0.444*3=1.332ms
	T period =15.689ms
	PDCF = -21.42

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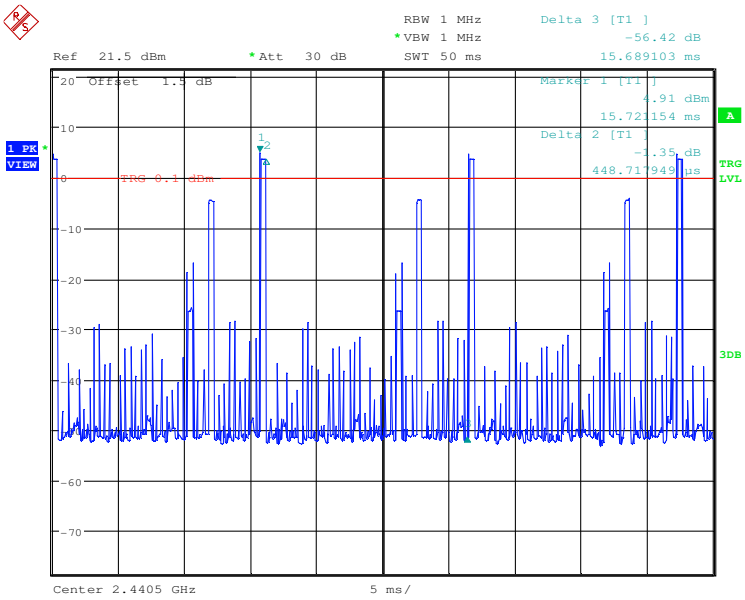
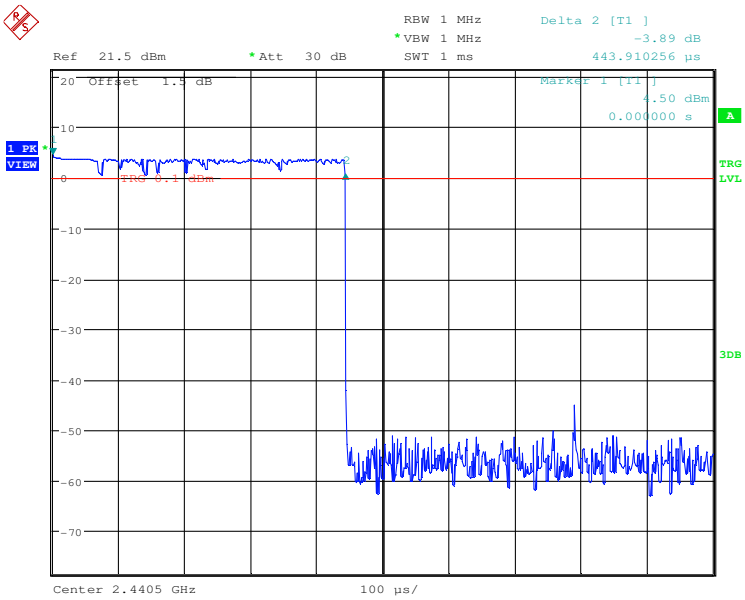
Test plot as follows:

Time slot:





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5.3.2 Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.249 and 15.209
Test Method:	ANSI C63.10: 2013
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:

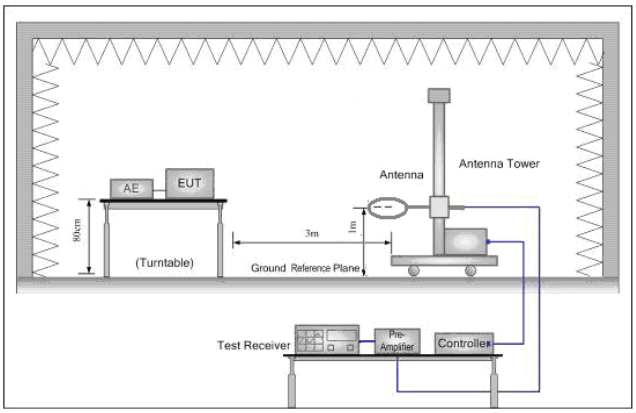

Figure 1. Below 30MHz

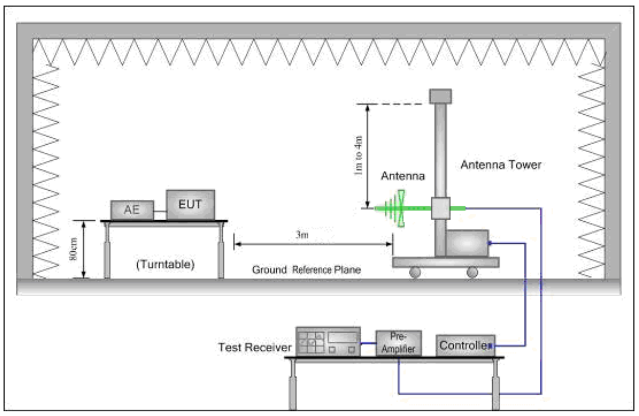

Figure 2. 30MHz to 1GHz

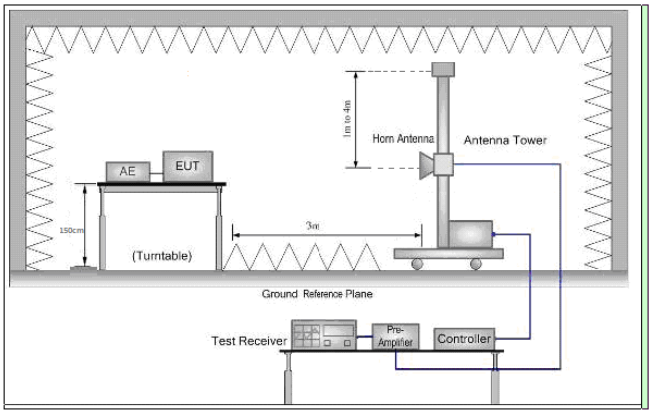

Figure 3. Above 1 GHz

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Test Procedure:	a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation. 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. 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. 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 (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. e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. f. 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 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. g. Test the EUT in the lowest channel, the middle channel, the Highest channel h. Repeat above procedures until all frequencies measured was complete.
Instruments Used:	Refer to section 4.10 for details
Test Mode:	Transmitting mode.
Test Results:	Pass

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Measurement Data

5.3.2.1 Field Strength Of The Fundamental Signal

Peak value:

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
2403.500	4.92	32.41	38.46	79.26	78.13	114.00	-35.87
2440.000	4.97	32.42	38.46	78.85	77.78	114.00	-36.22
2477.300	5.02	32.44	38.47	79.79	78.78	114.00	-35.22

Average value=Peak value + PDCF:

Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
2403.500	56.71	94.00	-37.29
2440.000	56.36	94.00	-37.64
2477.300	57.36	94.00	-36.64

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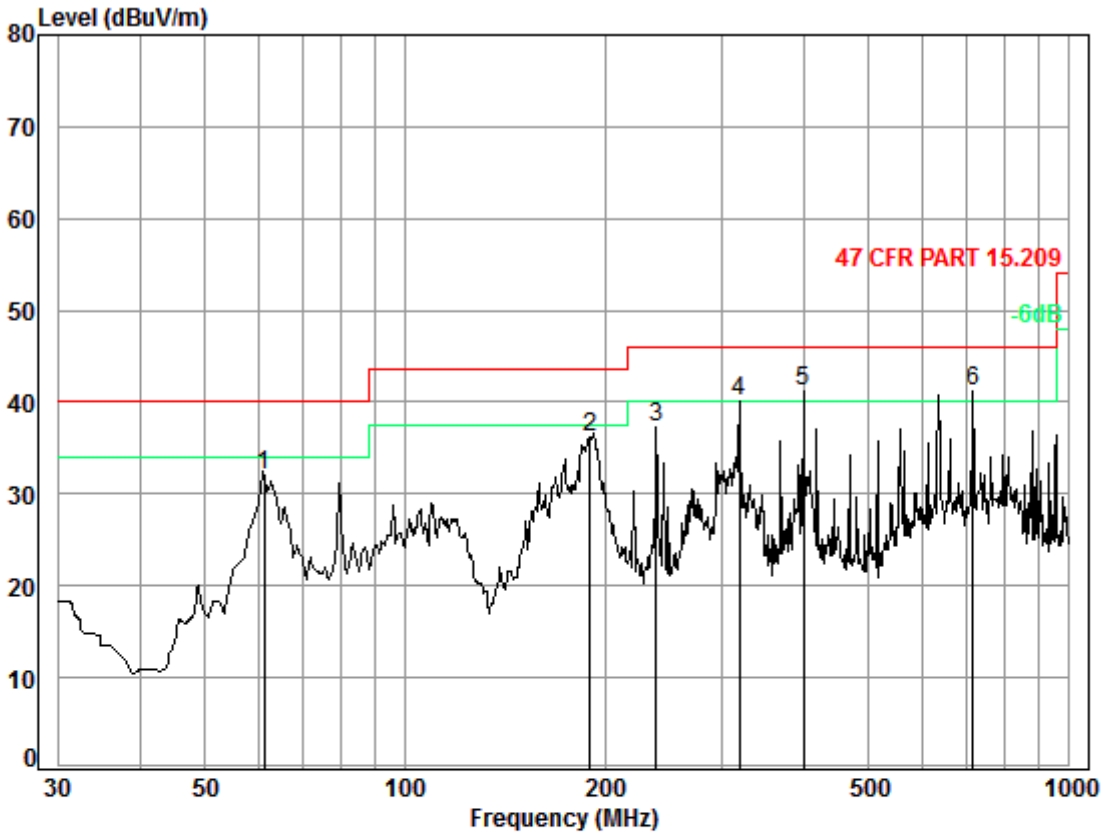
5.3.2.2 Spurious Emissions

30MHz~1GHz	
Test mode:	Transmitting mode



Condition: 47 CFR PART 15.209 3m 3142C Horizontal
Job No. : 4544CR
Test Mode: TX

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	61.35	0.80	7.16	27.26	51.26	31.96	40.00	-8.04
2	189.74	1.38	10.09	26.74	51.39	36.12	43.50	-7.38
3	239.15	1.62	11.95	26.57	50.19	37.19	46.00	-8.81
4	318.82	1.96	14.58	26.54	50.21	40.21	46.00	-5.79
5	399.03	2.20	16.29	27.13	49.91	41.27	46.00	-4.73
6	716.68	2.96	21.60	27.39	44.01	41.18	46.00	-4.82

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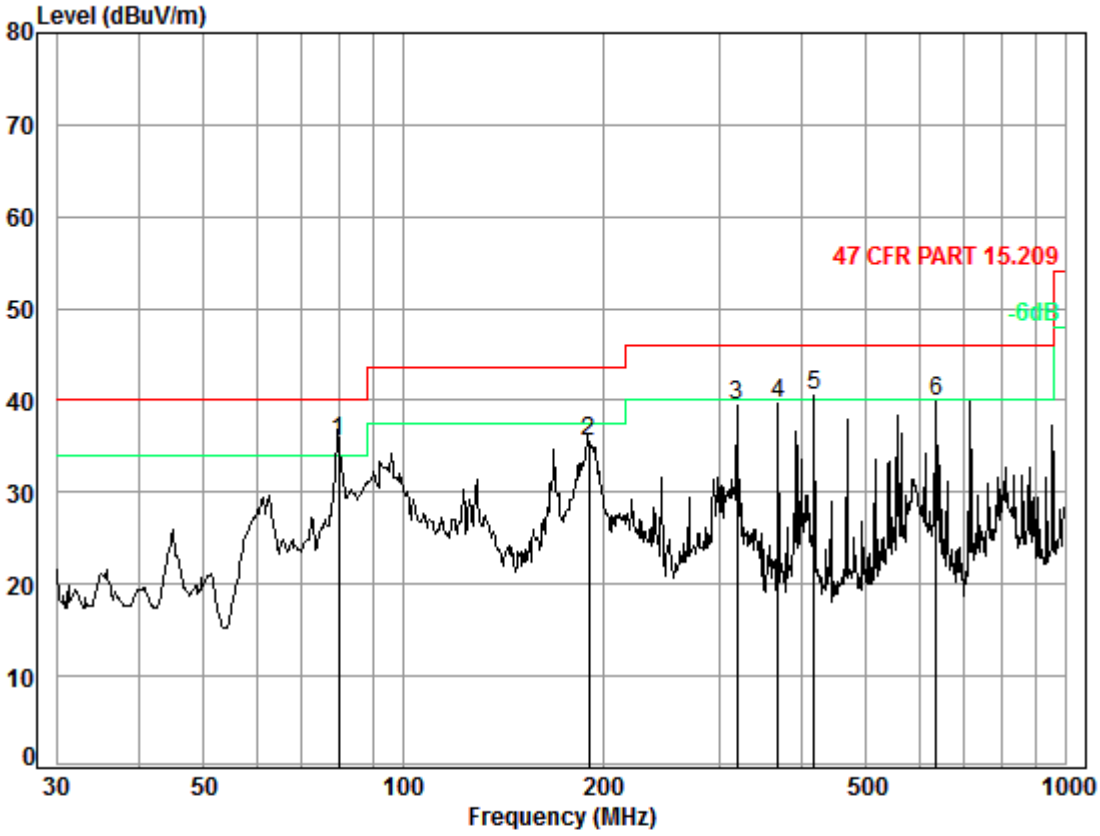

Condition: 47 CFR PART 15.209 3m 3142C Vertical
Job No. : 4544CR
Test Mode: TX

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	79.80	1.09	7.68	27.23	54.07	35.61	40.00	-4.39
2	190.41	1.39	10.10	26.73	50.71	35.47	43.50	-8.03
3	318.82	1.96	14.58	26.54	49.46	39.46	46.00	-6.54
4	368.11	2.11	15.42	26.93	49.01	39.61	46.00	-6.39
5	417.64	2.28	16.37	27.25	49.12	40.52	46.00	-5.48
6	638.37	2.78	20.55	27.49	44.12	39.96	46.00	-6.04

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Above 1GHz								
Worse case mode:	FSK	Test channel:	Lowest	Remark:	Peak			
Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
3308.185	5.86	32.54	38.65	43.36	43.11	74.00	-30.89	Vertical
4807.000	5.50	34.71	39.24	44.22	45.19	74.00	-28.81	Vertical
6109.670	7.43	36.18	39.17	45.62	50.06	74.00	-23.94	Vertical
7210.500	8.28	35.63	39.07	44.42	49.26	74.00	-24.74	Vertical
9614.000	9.26	37.34	37.93	41.94	50.61	74.00	-23.39	Vertical
10805.680	9.65	37.93	38.12	41.42	50.88	74.00	-23.12	Vertical
3805.334	5.72	33.16	38.87	46.86	46.87	74.00	-27.13	Horizontal
4807.000	5.50	34.71	39.24	45.29	46.26	74.00	-27.74	Horizontal
6032.401	7.49	36.26	39.18	46.09	50.66	74.00	-23.34	Horizontal
7210.500	8.28	35.63	39.07	46.72	51.56	74.00	-22.44	Horizontal
9614.000	9.26	37.34	37.93	43.95	52.62	74.00	-21.38	Horizontal
11140.850	9.76	38.11	38.29	44.32	53.90	74.00	-20.10	Horizontal

Average value=Peak value+ PDCF

Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
3308.185	21.69	54	-32.31	Vertical
4807.000	23.77	54	-30.23	Vertical
6109.670	28.64	54	-25.36	Vertical
7210.500	27.84	54	-26.16	Vertical
9614.000	29.19	54	-24.81	Vertical
10805.680	29.46	54	-24.54	Vertical
3805.334	25.45	54	-28.55	Horizontal
4807.000	24.84	54	-29.16	Horizontal
6032.401	29.24	54	-24.76	Horizontal
7210.500	30.14	54	-23.86	Horizontal
9614.000	31.20	54	-22.80	Horizontal
11140.850	32.48	54	-21.52	Horizontal

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Worse case mode:	FSK	Test channel:	Middle	Remark:	Peak

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
3588.939	5.85	32.99	38.78	45.85	45.91	74.00	-28.09	Vertical
4880.000	5.69	34.78	39.26	45.13	46.34	74.00	-27.66	Vertical
6063.190	7.46	36.23	39.18	46.62	51.13	74.00	-22.87	Vertical
7320.000	8.41	35.51	39.06	46.28	51.14	74.00	-22.86	Vertical
9760.000	9.18	37.80	37.84	42.93	52.07	74.00	-21.93	Vertical
10999.950	9.64	38.10	38.22	43.55	53.07	74.00	-20.93	Vertical
3436.944	5.89	32.82	38.71	45.82	45.82	74.00	-28.18	Horizontal
4880.000	5.69	34.78	39.26	43.77	44.98	74.00	-29.02	Horizontal
5986.509	7.48	36.27	39.19	45.69	50.25	74.00	-23.75	Horizontal
7320.000	8.41	35.51	39.06	44.66	49.52	74.00	-24.48	Horizontal
9760.000	9.18	37.80	37.84	42.30	51.44	74.00	-22.56	Horizontal
10944.090	9.64	38.05	38.19	42.63	52.13	74.00	-21.87	Horizontal

Average value=Peak value+ PDCF

Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
3588.939	24.49	54	-29.51	Vertical
4880.000	24.92	54	-29.08	Vertical
6063.190	29.71	54	-24.29	Vertical
7320.000	29.72	54	-24.28	Vertical
9760.000	30.65	54	-23.35	Vertical
10999.950	31.65	54	-22.35	Vertical
3436.944	24.40	54	-29.60	Horizontal
4880.000	23.56	54	-30.44	Horizontal
5986.509	28.83	54	-25.17	Horizontal
7320.000	28.10	54	-25.90	Horizontal
9760.000	30.02	54	-23.98	Horizontal
10944.090	30.71	54	-23.29	Horizontal

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Worse case mode:	FSK	Test channel:	Highest	Remark:	Peak

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
3598.087	5.85	33.00	38.78	46.85	46.92	74.00	-27.08	Vertical
4954.600	5.88	34.86	39.29	48.11	49.56	74.00	-24.44	Vertical
6001.768	7.51	36.30	39.18	46.77	51.40	74.00	-22.60	Vertical
7431.900	8.53	35.43	39.05	47.17	52.08	74.00	-21.92	Vertical
9909.200	9.10	38.24	37.75	43.23	52.82	74.00	-21.18	Vertical
10999.950	9.64	38.10	38.22	44.07	53.59	74.00	-20.41	Vertical
3454.486	5.90	32.84	38.72	46.47	46.49	74.00	-27.51	Horizontal
4954.600	5.88	34.86	39.29	50.26	51.71	74.00	-22.29	Horizontal
6032.401	7.49	36.26	39.18	47.34	51.91	74.00	-22.09	Horizontal
7431.900	8.53	35.43	39.05	46.66	51.57	74.00	-22.43	Horizontal
9909.200	9.10	38.24	37.75	43.02	52.61	74.00	-21.39	Horizontal
11056.090	9.69	38.11	38.25	44.13	53.68	74.00	-20.32	Horizontal

Average value=Peak value+ PDCF

Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
3598.087	25.50	54	-28.50	Vertical
4954.600	28.14	54	-25.86	Vertical
6001.768	29.98	54	-24.02	Vertical
7431.900	30.66	54	-23.34	Vertical
9909.200	31.40	54	-22.60	Vertical
10999.950	32.17	54	-21.83	Vertical
3454.486	25.07	54	-28.93	Horizontal
4954.600	30.29	54	-23.71	Horizontal
6032.401	30.49	54	-23.51	Horizontal
7431.900	30.15	54	-23.85	Horizontal
9909.200	31.19	54	-22.81	Horizontal
11056.090	32.26	54	-21.74	Horizontal

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 .

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5.4 Restricted bands around fundamental frequency

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205
Test Method:	ANSI C63.10: 2013
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:

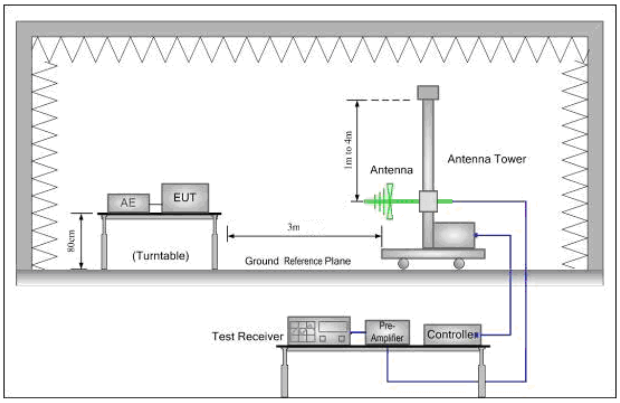

Figure 1. 30MHz to 1GHz

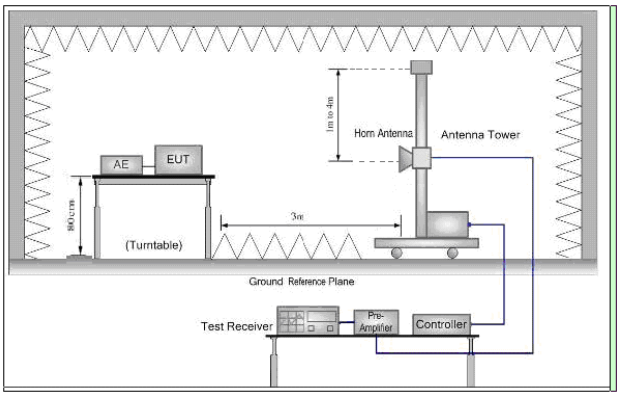

Figure 2. Above 1 GHz

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Test Procedure:	a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation. 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. 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. 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. e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 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 g. Test the EUT in the lowest channel , the Highest channel h. Repeat above procedures until all frequencies measured was complete.
Instruments Used:	Refer to section 4.10 for details.
Test Mode:	Transmitting mode.
Test Results:	Pass

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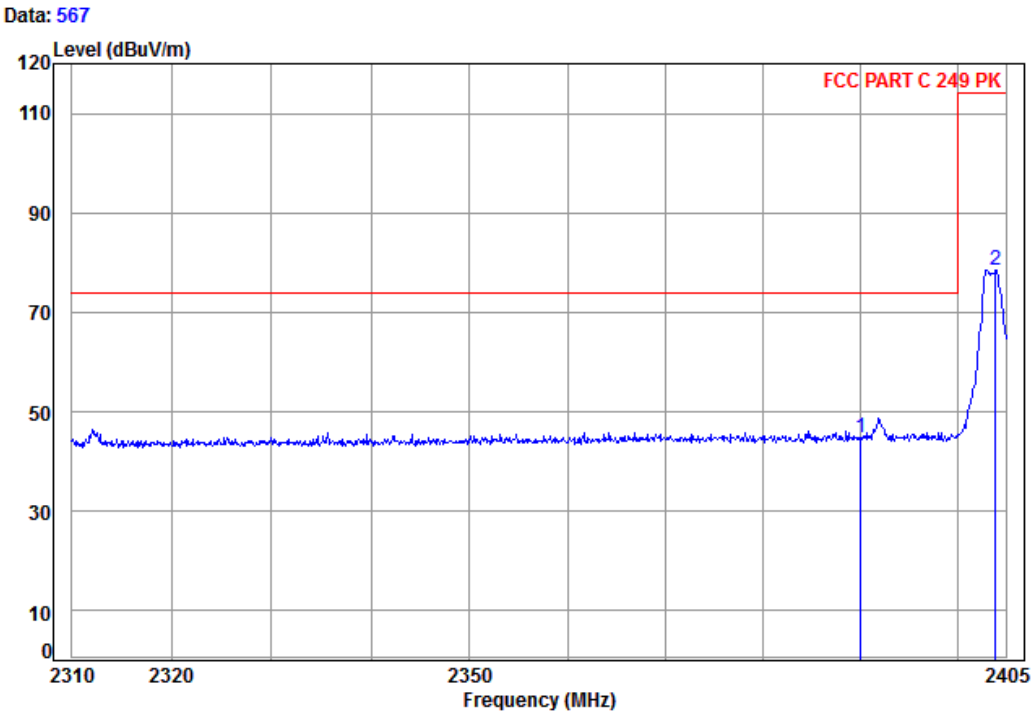
Test plot as follows:

Worse case mode:	FSK	Test channel:	Lowest	Remark:	Peak	Vertical




```
Site      : chamber
Condition: FCC PART C 249 PK 3m Vertical
Job No:   : 4544CR
Mode:     : 2403.5 Band edge
                Cable    Ant Preamp   Read         Limit   Over
          Freq   Loss Factor Factor  Level  Level   Line  Limit
        _______ ______ ______ ______ ______ ______ ______ ______
            MHz     dB   dB/m     dB   dBuV dBuV/m dBuV/m     dB

  1 pp  2390.00   4.90  32.35  38.46  45.93  44.72  74.00 -29.28
  2     2403.93   4.92  32.41  38.46  79.55  78.42 114.00 -35.58
```

Average value=Peak value+ PDCF

Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
2390.00	23.30	54.00	-30.70
2403.93	57.00	94.00	-37.00

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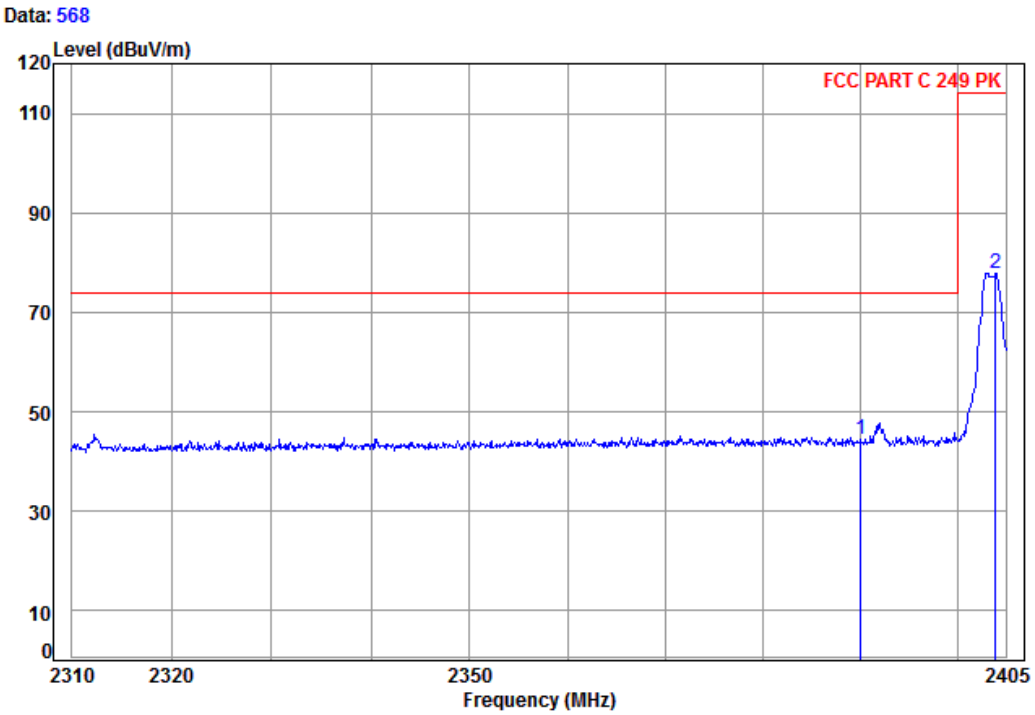
Worse case mode:	FSK	Test channel:	Lowest	Remark:	Peak	Horizontal




```
Site      : chamber
Condition: FCC PART C 249 PK 3m Horizontal
Job No:   : 4544CR
Mode:     : 2403.5 Band edge
                 Cable    Ant Preamp   Read          Limit   Over
           Freq   Loss Factor Factor  Level   Level   Line  Limit
      ________ ______ ______ ______ ______ ______ ______ ______
            MHz     dB   dB/m     dB   dBuV dBuV/m dBuV/m     dB

  1 pp  2390.00   4.90  32.35  38.46  45.52  44.31  74.00 -29.69
  2     2403.93   4.92  32.41  38.46  78.99  77.86 114.00 -36.14
```

Average value=Peak value+ PDCF

Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
2390.00	22.89	54.00	-31.11
2403.93	56.44	74.00	-37.56

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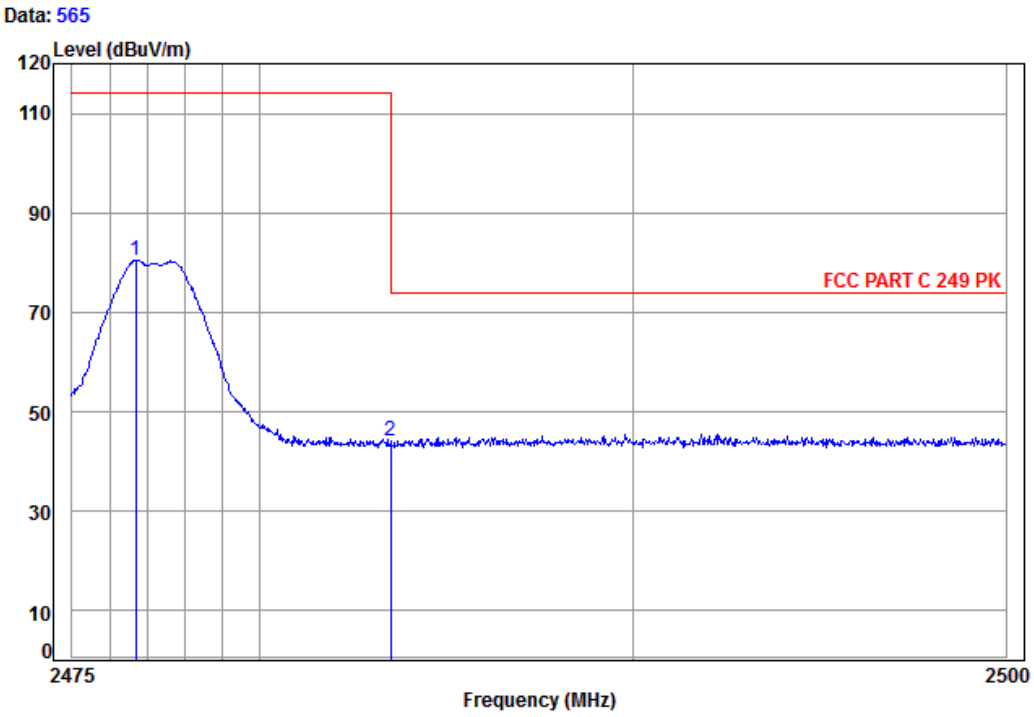
Worse case mode:	FSK	Test channel:	Highest	Remark:	Peak	Vertical




```
Site      : chamber
Condition: FCC PART C 249 PK 3m Vertical
Job No:   : 4544CR
Mode:     : 2477.3 Band edge
                 Cable    Ant Preamp   Read          Limit   Over
           Freq   Loss Factor Factor  Level   Level   Line  Limit
      ________ ______ ______ ______ ______ ______ ______ ______
            MHz     dB   dB/m     dB   dBuV dBuV/m dBuV/m     dB

  1     2476.69   5.02  32.44  38.47  81.46  80.45 114.00 -33.55
  2 pp  2483.50   5.03  32.44  38.47  45.01  44.01  74.00 -29.99
```

Average value=Peak value+ PDCF

Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
2476.69	59.03	94.00	-34.97
2483.50	22.59	54.00	-31.41

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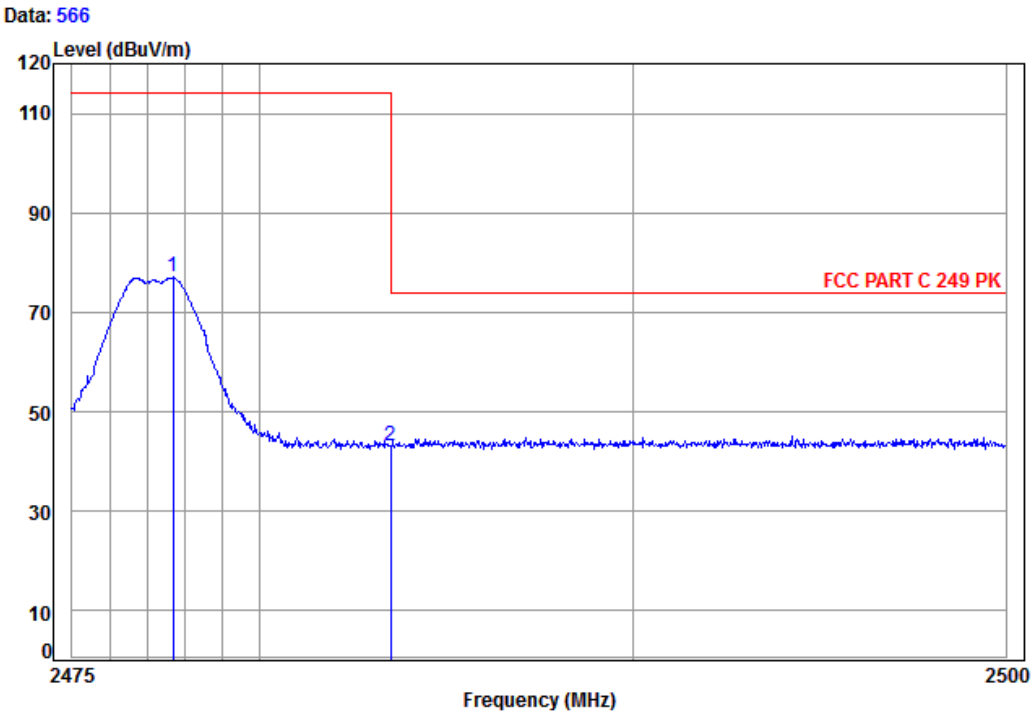
Worse case mode:	FSK	Test channel:	Highest	Remark:	Peak	Horizontal




```
Site      : chamber
Condition: FCC PART C 249 PK 3m Horizontal
Job No:   : 4544CR
Mode:     : 2477.3 Band edge
                 Cable    Ant Preamp   Read         Limit   Over
           Freq   Loss Factor Factor  Level  Level   Line  Limit
        _________ ______ ______ ______ ______ ______ ______ ______
              MHz     dB   dB/m     dB   dBuV dBuV/m dBuV/m     dB

  1     2477.69   5.02  32.44  38.47  78.04  77.03 114.00 -36.97
  2 pp  2483.50   5.03  32.44  38.47  44.14  43.14  74.00 -30.86
```

Average value=Peak value+ PDCF

Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
2477.69	55.61	94.00	-38.39
2483.50	21.72	54.00	-32.28

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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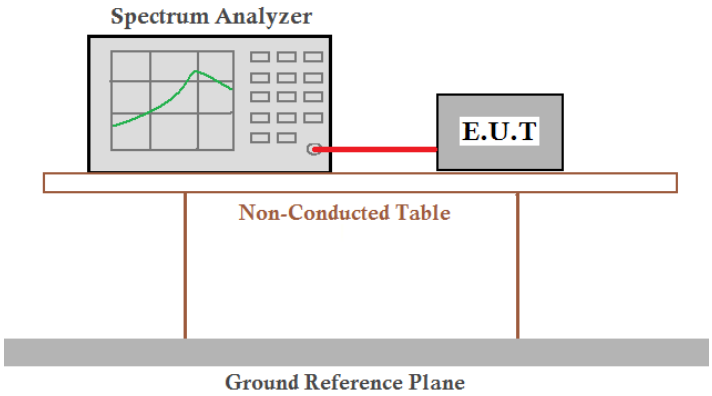
5.5 20dB Bandwidth

Test Requirement:	47 CFR Part 15C Section 15.215
Test Method:	ANSI C63.10:2013
Test Setup:	
Instruments Used:	Refer to section 4.10 for details.
Test mode:	Transmitting mode.
Limit:	Within the band 2400MHz-2483.5MHz
Test Results:	Pass

Measurement Data

Test channel	20dB bandwidth (kHz)	Results
Lowest	2219.551	Pass
Middle	2275.641	Pass
Highest	2299.679	Pass

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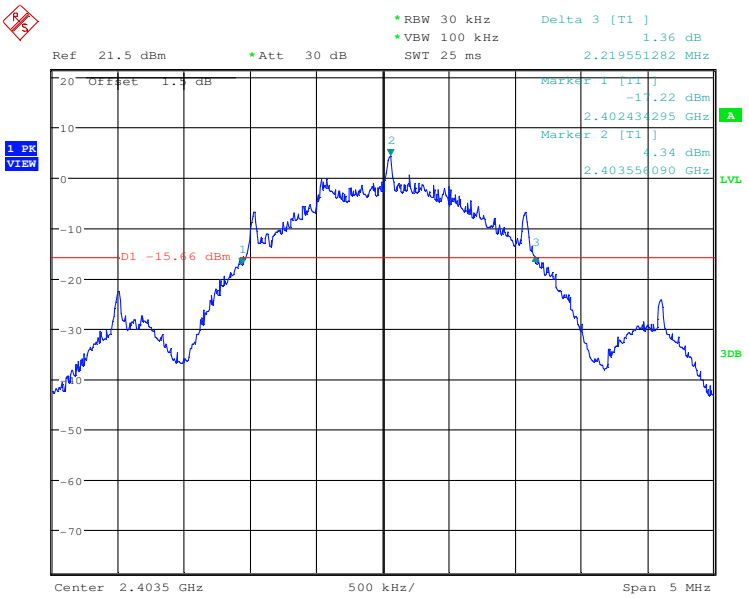
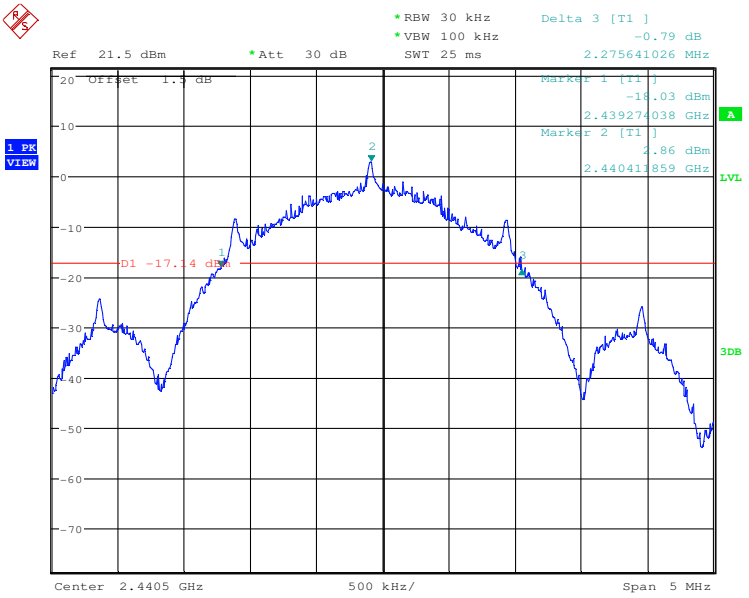
Test plot as follows:

Test channel:	Lowest



Test channel:	Middle



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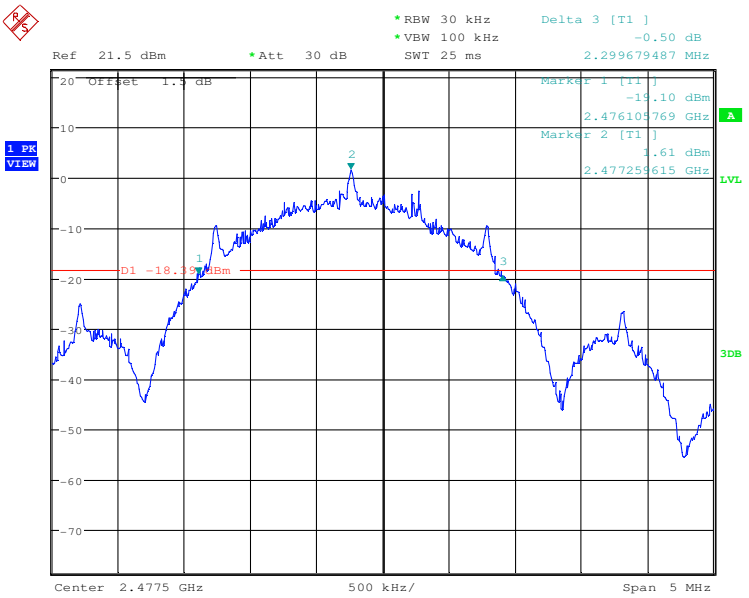
Test channel:	Highest



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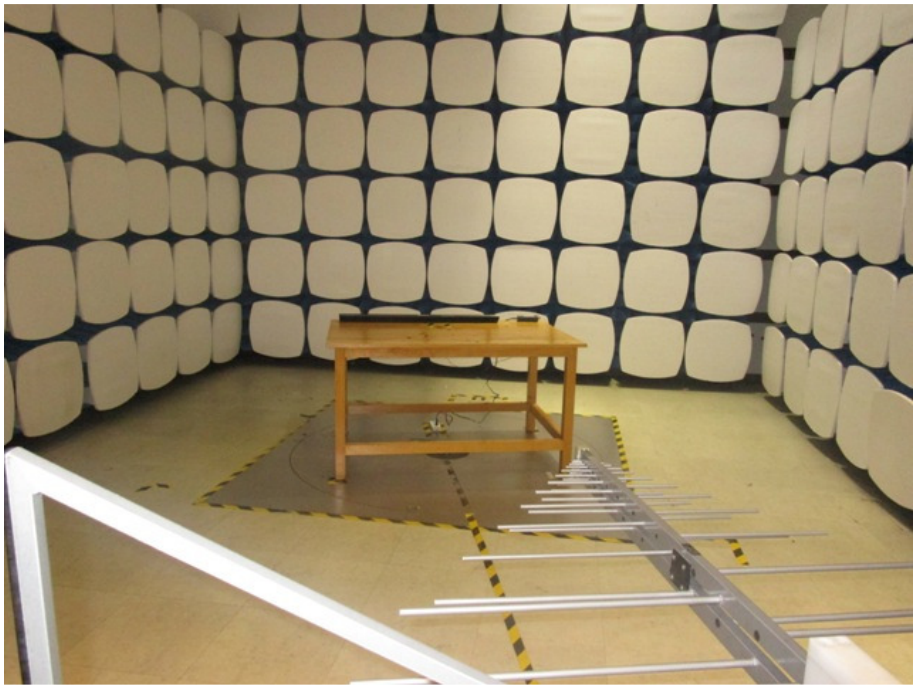
6 Photographs

Test model No.: W STUDIO MICRO SOUNDBAR

6.1 Conducted Emission Test Setup

6.2 Radiated Emission Test Setup



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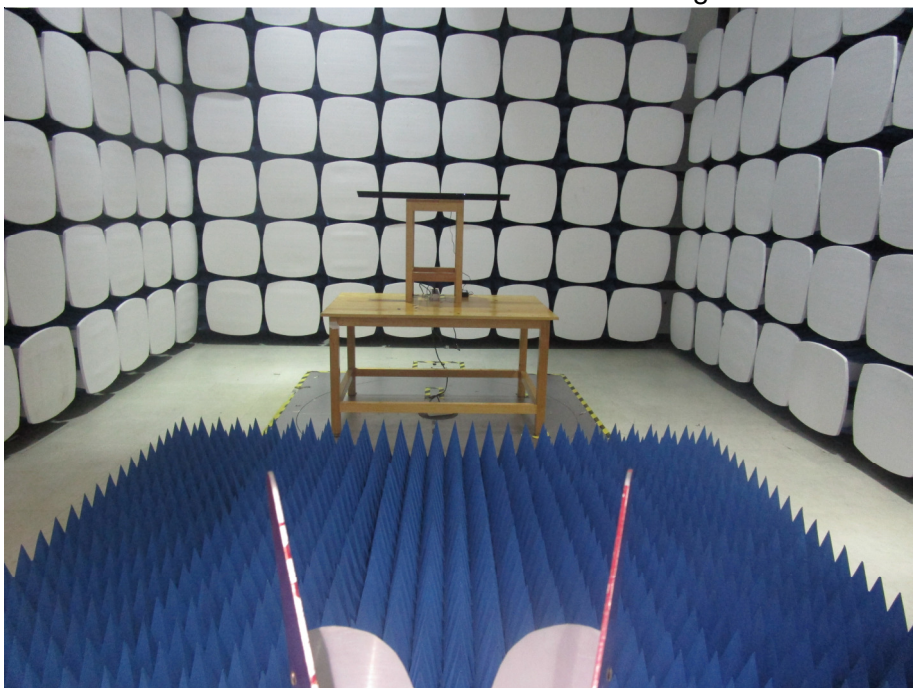

6.3 EUT Constructional Details

Refer to Appendix A - Photographs of EUT Constructional Details for SZEM1507004544CR.

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