



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

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Report No.: SZEM150400165201
Page: 1 of 31

FCC REPORT

Application No. : SZEM1504001652ET (SGS SZ No.: T51510180079EM)
Applicant/ Supplier: Syma Model Aircraft Industrial Co., Ltd
Factory: Syma Model Aircraft Industrial Co., Ltd
Product Name: Sky Thunder RC D63 Raptor-runner drone4.5Ch 2.4 GHZ
Model No.(EUT): 944842
FCC ID: QV7-GC887552-63
Standards: 47 CFR Part 15, Subpart C (2014)
Date of Receipt: 2015-04-08
Date of Test: 2015-04-21 to 2015-05-08
Date of Issue: 2015-07-14

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.


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2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
00		2015-07-14		Original

Authorized for issue by:				
Tested By				2015-05-08
		(Eric Fu) /Project Engineer		Date
Prepared By				2015-07-14
		(Hedy Wen) /Clerk		Date
Checked By				2015-07-14
		(Emen Li) /Reviewer		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 ©	ANSI C63.10 (2009)	PASS

Remark:

Model No.: 944842

Colors: Orange, Green

Only the orange model was tested, since the circuitry design, PCB layout, electrical components used, internal wiring and functions were identical. Only different on color.



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5 General Information

5.1 Client Information

Applicant/ Supplier:	Syma Model Aircraft Industrial Co., Ltd
Address of Applicant/ Supplier:	No.2 West Xingye Road Laimei Industrial park Chenghai Shantou City Guangdong China
Factory:	Syma Model Aircraft Industrial Co., Ltd
Address of Factory:	No.2 West Xingye Road Laimei Industrial park Chenghai Shantou City Guangdong China

5.2 General Description of EUT

Product Name:	Sky Thunder RC D63 Raptor-runner drone4.5Ch 2.4 GHZ
Model No.:	944842
Country of Origin:	China
Country of Destination:	USA
Carrier Frequency:	2.4G Wireless 2445MHz – 2475MHz
Modulation Type:	GFSK
Number of Channels:	31 (declared by the client)
Sample Type:	Portable production
Antenna Type:	Monopole
Antenna Gain:	2dBi
Power Supply:	TX: DC 6.0V (4*1.5V AA Size battery)



Operation Frequency each of channel					
Channel	Frequency	Channel	Frequency	Channel	Frequency
1CH	2445 MHz	14CH	2458 MHz	27CH	2471 MHz
2CH	2446 MHz	15CH	2459 MHz	28CH	2472 MHz
3CH	2447 MHz	16CH	2460 MHz	29CH	2473 MHz
4CH	2448 MHz	17CH	2461 MHz	30CH	2474 MHz
5CH	2449 MHz	18CH	2462 MHz	31CH	2475 MHz
6CH	2450 MHz	19CH	2463 MHz		
7CH	2451 MHz	20CH	2464 MHz		
8CH	2452 MHz	21CH	2465 MHz		
9CH	2453 MHz	22CH	2466 MHz		
10CH	2454 MHz	23CH	2467 MHz		
11CH	2455 MHz	24CH	2468 MHz		
12CH	2456 MHz	25CH	2469 MHz		
13CH	2457 MHz	26CH	2470 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)	2445MHz
The Middle channel(CH19)	2463MHz
The Highest channel(CH31)	2475MHz



5.3 Test Environment and Mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	52 % RH
Atmospheric Pressure:	1010 mbar
Test mode:	
Transmitting mode:	Keep the EUT in transmitting mode with modulation.

5.4 Description of Support Units

The EUT has been tested independently.

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

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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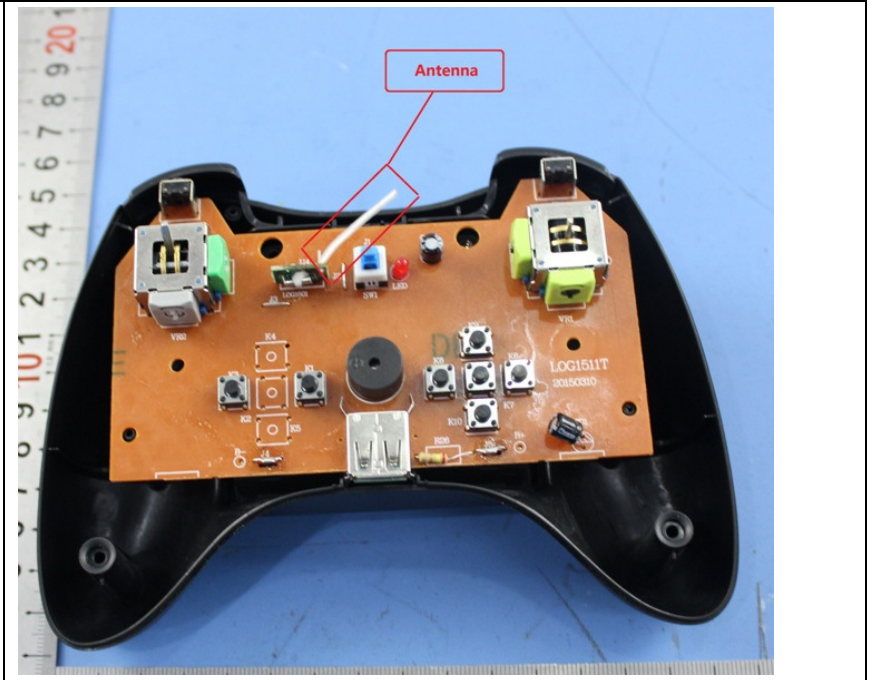
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RF connected test					
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Due date (yyyy-mm-dd)
1	DC Power Supply	Zhao Xin	RXN-305D	SEL0117	2015-10-24
2	Humidity/ Temperature Indicator	HYGRO	ZJ1-2B	SEL0033	2015-10-24
3	Spectrum Analyzer	Rohde & 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.

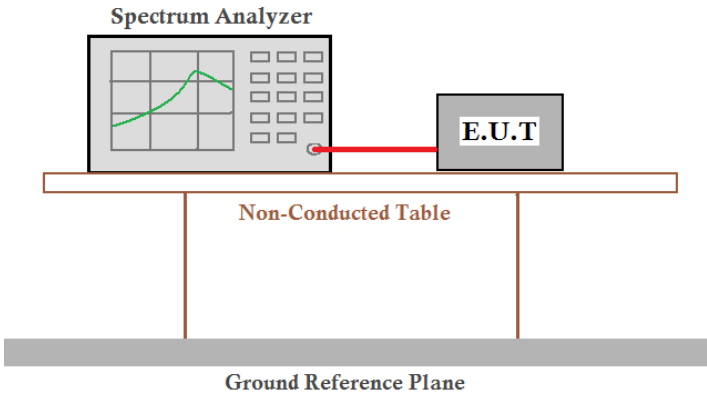
6 Test results and Measurement Data

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:	
<p>The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 2dBi.</p>	

6.2 Spurious Emissions

6.2.1 Duty Cycle

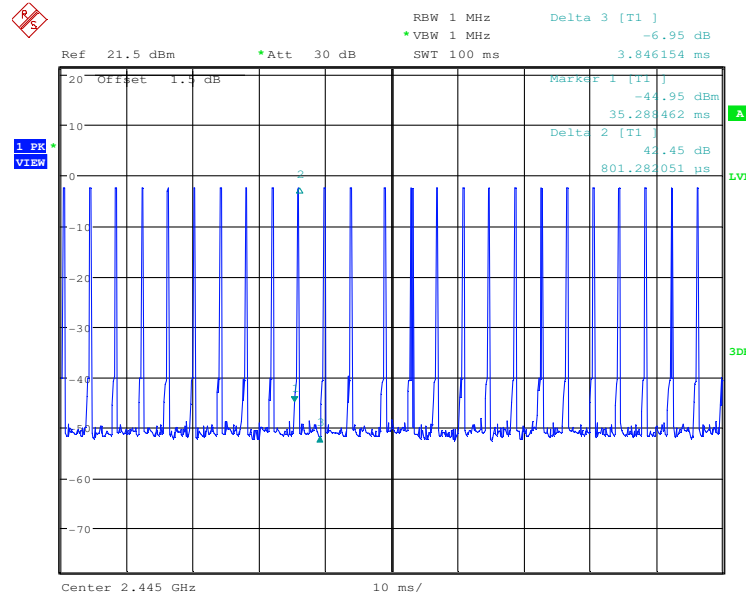
Test Requirement:	47 CFR Part 15C Section 15.35 (c)
Test Method:	ANSI C63.10:2009
Test Setup:	
Instruments Used:	Refer to section 5.10 for details.
Limit:	N/A
Test Mode:	Transmitting mode.
Test Results:	Pass

Measurement Data

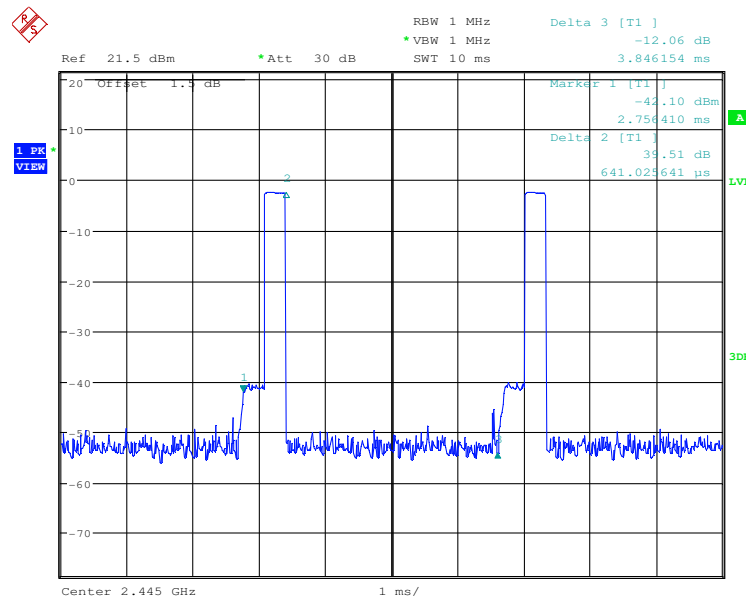
Calculate Formula:	$PDCF = 20 \log(\text{Duty cycle})$
	$\text{Duty cycle} = T_{\text{on time}} / T_{\text{period}}$
Test data:	Ton time = 0.641ms
	T period = 3.846ms
	PDCF = -15.56



Test plot as follows:
Duty cycle numbers



Time slot:

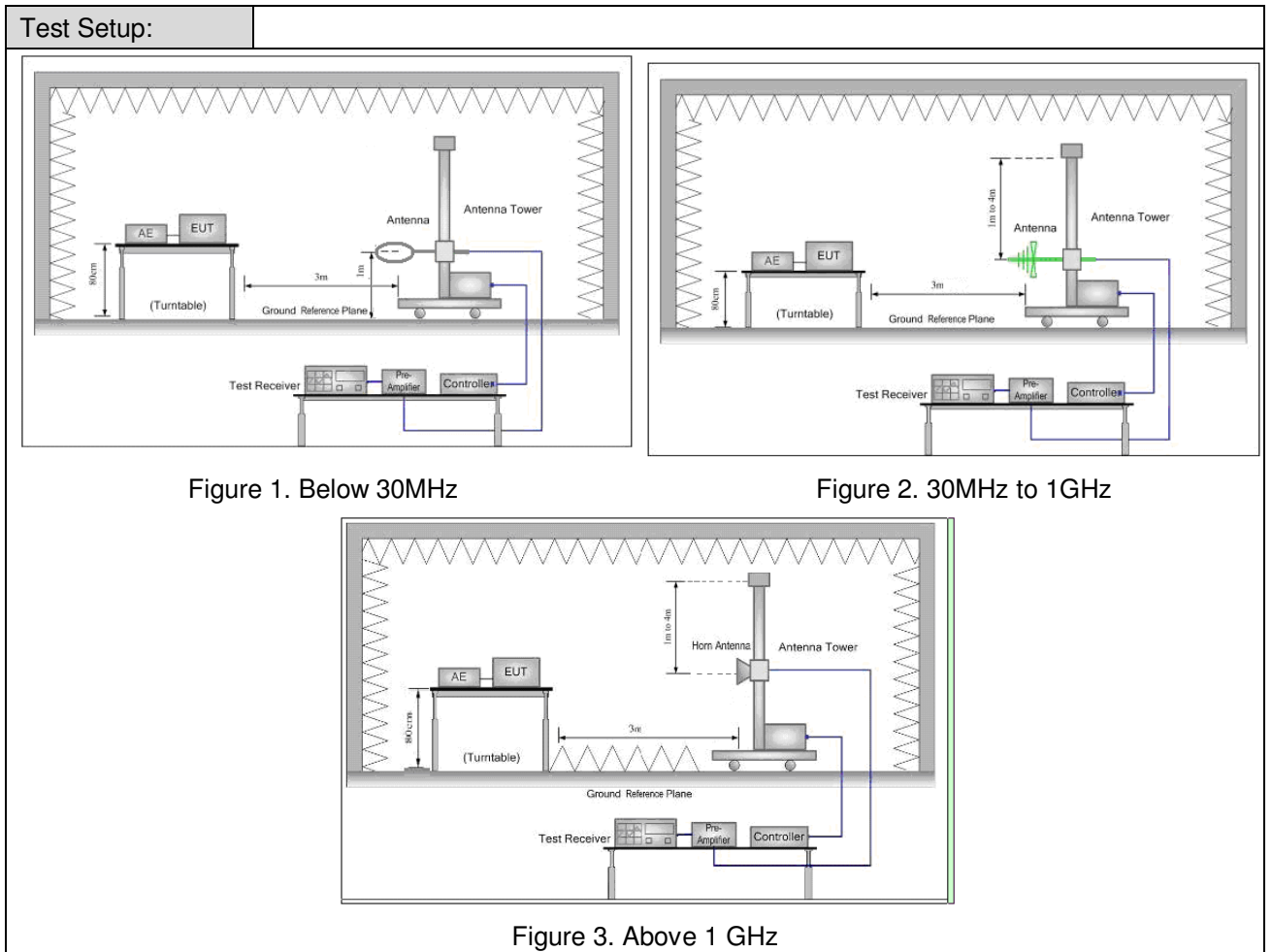




6.2.2 Spurious Emissions

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 Procedure:	<ol style="list-style-type: none"> 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. 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.
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	<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>
Instruments Used:	Refer to section 5.10 for details.
Test Mode:	Transmitting mode.
Test Results:	Pass



Measurement Data

6.2.2.1 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)
2445.000	4.98	32.43	38.46	95.01	93.96	114.00	-20.04
2463.000	3.44	32.43	38.46	90.53	87.94	114.00	-26.06
2480.000	5.02	32.44	38.47	91.21	90.20	114.00	-23.80

Average value=Peak value+PDCF :

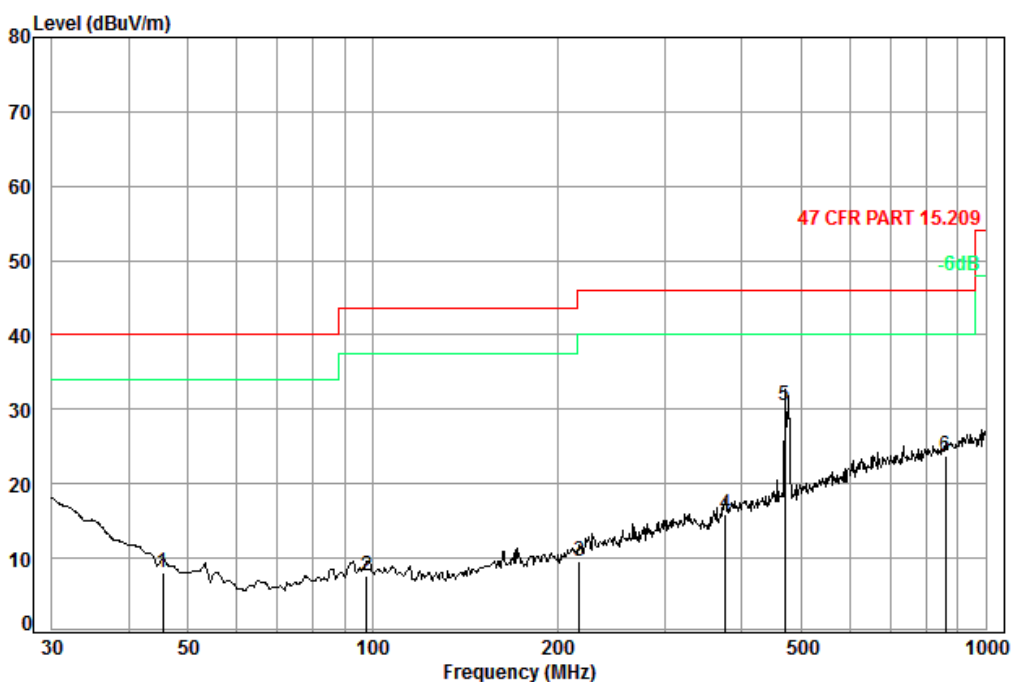
Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
2445.000	78.40	94.00	-15.56
2463.000	72.38	94.00	-21.62
2480.000	74.64	94.00	-19.36





6.2.2.2 Spurious Emissions

Radiated Emission below 1GHz			
Test mode:	Transmitting mode	Polarization:	Vertical



Condition: 47 CFR PART 15.209 3m 3142C Vertical

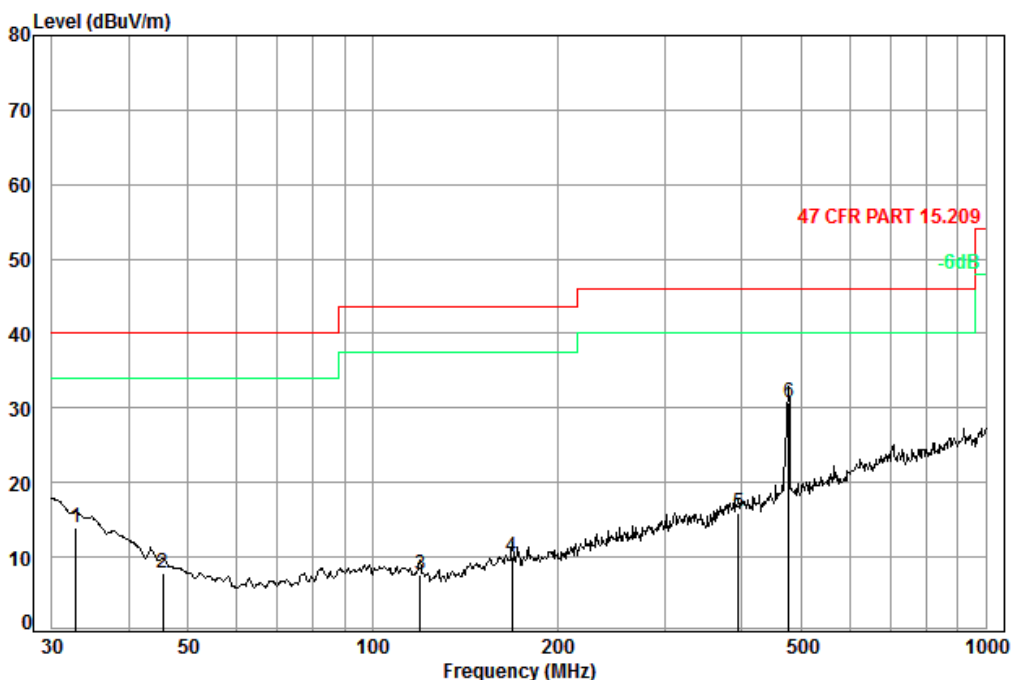
Job No. : 1652ET

Test mode: TX mode

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	45.53	0.72	10.66	27.30	23.99	8.07	40.00	-31.93
2	97.80	1.18	9.01	27.20	24.69	7.68	43.50	-35.82
3	217.54	1.50	11.11	26.63	23.72	9.70	46.00	-36.30
4	375.94	2.13	16.01	26.97	24.77	15.94	46.00	-30.06
5	470.52	2.49	17.64	27.56	38.04	30.61	46.00	-15.39
6	860.04	3.45	22.64	26.99	24.56	23.66	46.00	-22.34



Test mode:	Transmitting mode	Polarization:	Horizontal
------------	-------------------	---------------	------------



Condition: 47 CFR PART 15.209 3m 3142C Horizontal

Job No. : 1652ET

Test mode: TX mode

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	32.86	0.60	17.10	27.35	23.69	14.00	40.00	-25.96
2	45.53	0.72	10.66	27.30	23.80	7.88	40.00	-32.12
3	119.44	1.25	7.94	27.07	25.48	7.60	43.50	-35.90
4	169.01	1.35	9.51	26.82	25.94	9.98	43.50	-33.52
5	394.85	2.19	16.24	27.09	24.58	15.92	46.00	-30.08
6	477.17	2.52	17.80	27.60	38.10	30.82	46.00	-15.18



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Transmitter Emission above 1GHz									
Test mode:		Transmitting		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	
3548.251	6.94	32.94	38.76	46.18	47.30	74	-26.70	Vertical	
4890.000	6.61	34.79	39.27	64.02	66.15	74	-7.85	Vertical	
5999.562	8.08	36.30	39.18	46.36	51.56	74	-22.44	Vertical	
7335.000	9.09	35.49	39.06	45.86	51.38	74	-22.62	Vertical	
9780.000	9.89	37.86	37.83	42.30	52.22	74	-21.78	Vertical	
11339.940	10.36	38.14	38.39	43.31	53.42	74	-20.58	Vertical	
3673.633	6.87	33.06	38.82	46.14	47.25	74	-26.75	Horizontal	
4890.000	6.61	34.79	39.27	54.08	56.21	74	-17.79	Horizontal	
6025.661	8.07	36.27	39.18	45.49	50.65	74	-23.35	Horizontal	
7335.000	9.09	35.49	39.06	45.24	50.76	74	-23.24	Horizontal	
9780.000	9.89	37.86	37.83	42.32	52.24	74	-21.76	Horizontal	
11455.380	10.38	38.19	38.45	44.36	54.48	74	-19.52	Horizontal	

Average value=Peak value+PDCF :

Frequency (MHz)	Emission Level (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Polarization
3548.251	31.74	54	-22.26	Vertical
4890.000	50.59	54	-3.41	Vertical
5999.562	36.00	54	-18.00	Vertical
7335.000	35.82	54	-18.18	Vertical
9780.000	36.66	54	-17.34	Vertical
11339.940	37.86	54	-16.14	Vertical
3673.633	31.69	54	-22.31	Horizontal
4890.000	40.65	54	-13.35	Horizontal
6025.661	35.09	54	-18.91	Horizontal
7335.000	35.20	54	-18.80	Horizontal
9780.000	36.68	54	-17.32	Horizontal
11455.380	38.92	54	-15.08	Horizontal

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Test mode:		Transmitting		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		
3770.567	6.81	33.13	38.86	51.60	52.68	74	-21.32	Vertical		
4926.000	6.68	34.83	39.28	62.87	65.10	74	-8.90	Vertical		
5982.226	8.05	36.27	39.19	46.76	51.89	74	-22.11	Vertical		
7389.000	9.17	35.43	39.05	45.83	51.38	74	-22.62	Vertical		
9852.000	9.85	38.07	37.79	43.05	53.18	74	-20.82	Vertical		
11521.870	10.40	38.24	38.48	43.66	53.82	74	-20.18	Vertical		
3759.672	6.82	33.12	38.85	47.43	48.52	74	-25.48	Horizontal		
4926.000	6.68	34.83	39.28	60.06	62.29	74	-11.71	Horizontal		
5956.314	8.01	36.22	39.19	47.17	52.21	74	-21.79	Horizontal		
7389.000	9.17	35.43	39.05	45.85	51.40	74	-22.60	Horizontal		
9852.000	9.85	38.07	37.79	42.22	52.35	74	-21.65	Horizontal		
11488.580	10.39	38.22	38.46	43.44	53.59	74	-20.41	Horizontal		

Average value=Peak value+PDCF :

Frequency (MHz)	Emission Level (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Polarization
3770.567	37.12	54	-16.88	Vertical
4926.000	49.54	54	-4.46	Vertical
5982.226	36.33	54	-17.67	Vertical
7389.000	35.82	54	-18.18	Vertical
9852.000	37.62	54	-16.38	Vertical
11521.870	38.26	54	-15.74	Vertical
3759.672	32.96	54	-21.04	Horizontal
4926.000	46.73	54	-7.27	Horizontal
5956.314	36.65	54	-17.35	Horizontal
7389.000	35.84	54	-18.16	Horizontal
9852.000	36.79	54	-17.21	Horizontal
11488.580	38.03	54	-15.97	Horizontal

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Test mode:		Transmitting		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		
3574.015	6.93	32.97	38.77	45.52	46.65	74	-27.35	Vertical		
4950.000	6.76	34.86	39.29	62.02	64.35	74	-9.65	Vertical		
5982.226	8.05	36.27	39.19	47.16	52.29	74	-21.71	Vertical		
7425.000	9.23	35.43	39.05	46.41	52.02	74	-21.98	Vertical		
9900.000	9.81	38.27	37.75	42.51	52.84	74	-21.16	Vertical		
11274.500	10.34	38.13	38.36	43.30	53.41	74	-20.59	Vertical		
3512.494	6.96	32.91	38.75	46.07	47.19	74	-26.81	Horizontal		
4950.000	6.76	34.86	39.29	59.03	61.36	74	-12.64	Horizontal		
5879.252	7.89	36.07	39.20	46.36	51.12	74	-22.88	Horizontal		
7425.000	9.23	35.43	39.05	45.76	51.37	74	-22.63	Horizontal		
9900.000	9.81	38.27	37.75	42.05	52.38	74	-21.62	Horizontal		
11356.360	10.36	38.14	38.40	43.51	53.61	74	-20.39	Horizontal		

Average value=Peak value+PDCF :

Frequency (MHz)	Emission Level (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Polarization
3574.015	31.09	54	-22.91	Vertical
4950.000	48.79	54	-5.21	Vertical
5982.226	36.73	54	-17.27	Vertical
7425.000	36.46	54	-17.54	Vertical
9900.000	37.28	54	-16.72	Vertical
11274.500	37.85	54	-16.15	Vertical
3512.494	31.63	54	-22.37	Horizontal
4950.000	45.80	54	-8.20	Horizontal
5879.252	35.56	54	-18.44	Horizontal
7425.000	35.81	54	-18.19	Horizontal
9900.000	36.82	54	-17.18	Horizontal
11356.360	38.05	54	-15.95	Horizontal

Remark:

- 1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Pre-amplifier. The basic equation with a sample calculation is as follows:
Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Pre-amplifier 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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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:

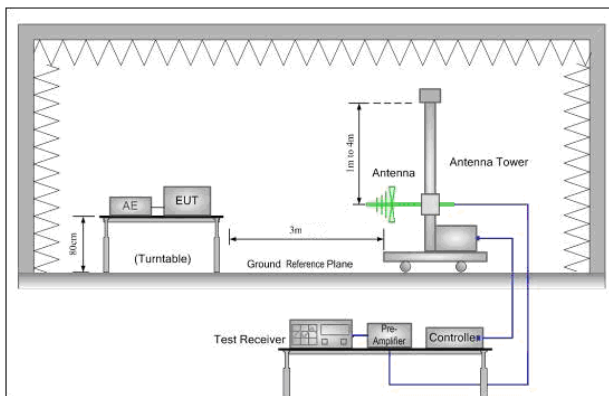


Figure 1. 30MHz to 1GHz

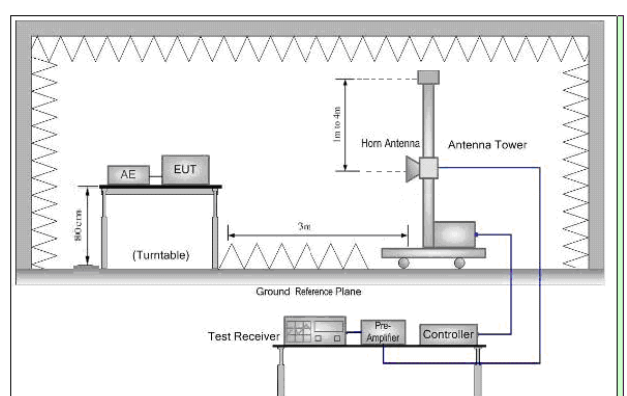


Figure 2. Above 1GHz



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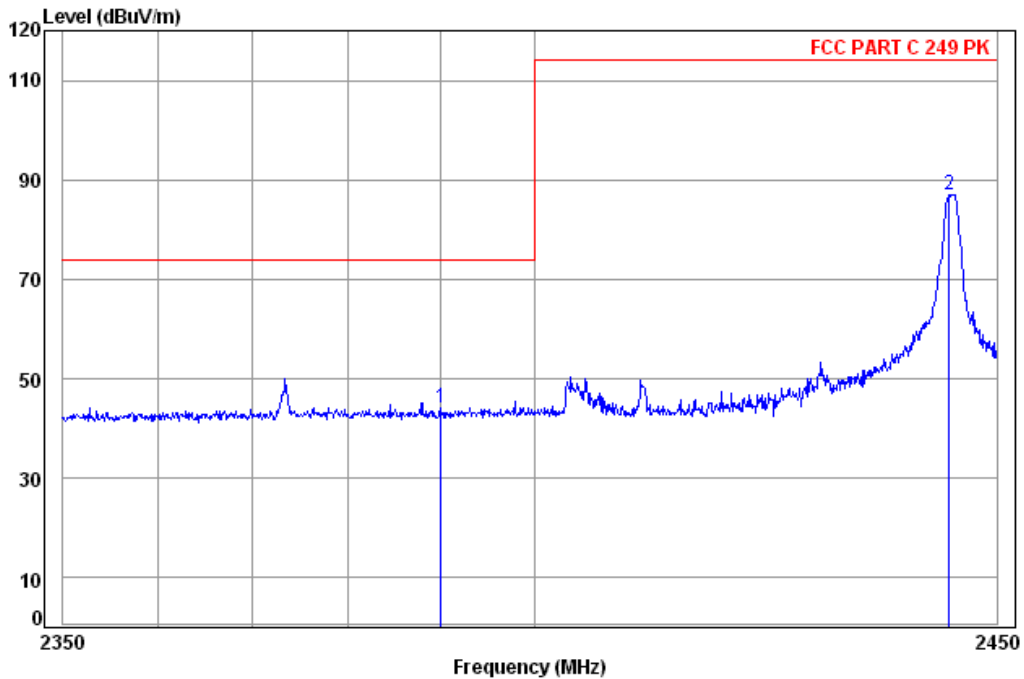
Test Procedure:	<ul style="list-style-type: none">a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.b. The EUT was set 3 meters away from the interference-receiving 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 channelh. 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.i. Repeat above procedures until all frequencies measured was complete.
Instruments Used:	Refer to section 5.10 for details.
Exploratory Test Mode:	Transmitting mode.
Test Results:	Pass



Test plot as follows:

Worse case mode:	Transmitting	Test channel:	Lowest	Remark:	Peak	Vertical
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Data: 54



Site : chamber
 Condition: FCC PART C 249 PK 3m Vertical
 Job No: : 1652ET
 Mode: : 2445 Band edge

	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	2390.00	4.90	32.35	38.46	45.51	44.30	74.00	-29.70
2 pp	2444.80	4.98	32.43	38.46	88.18	87.13	114.00	-26.87

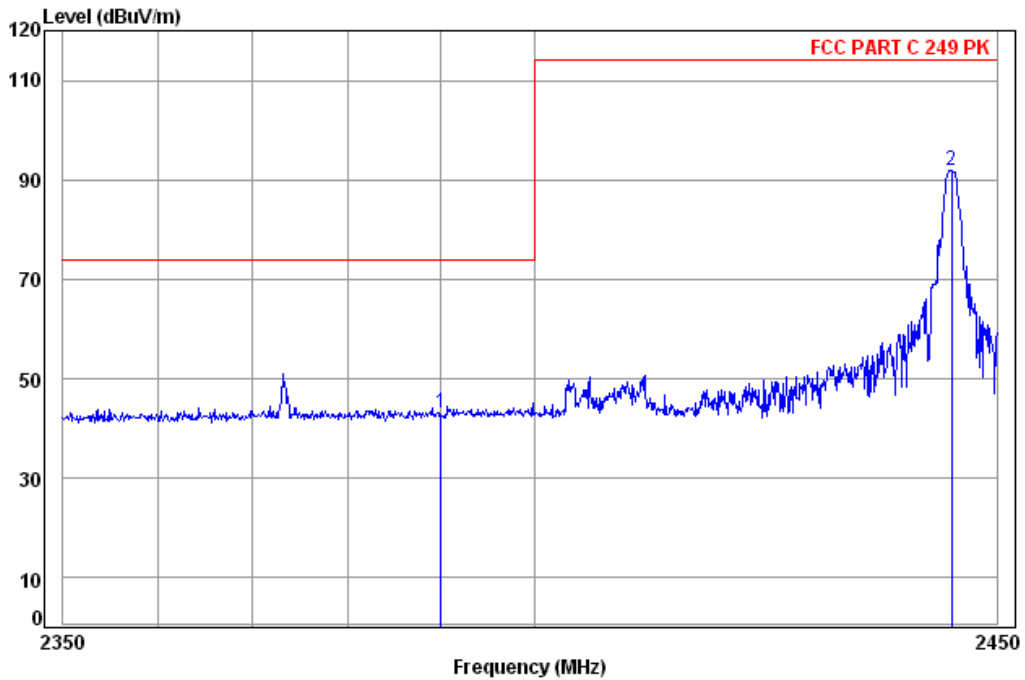
Average value=Peak value+PDCF :

Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
2490.00	28.74	54.00	-25.26
2444.80	71.57	94.00	-22.43



Worse case mode:	Transmitting	Test channel:	Lowest	Remark:	Peak	Horizontal
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Data: 53



Site : chamber
 Condition: FCC PART C 249 PK 3m Horizontal
 Job No: : 1652ET
 Mode: : 2445 Band edge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dB
1	2390.00	4.90	32.35	38.46	44.24	74.00	-30.97
2 pp	2445.10	4.98	32.43	38.46	92.92	114.00	-22.13

Average value=Peak value+PDCF :

Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
2490.00	27.47	54.00	-26.53
2445.10	76.31	94.00	-17.69



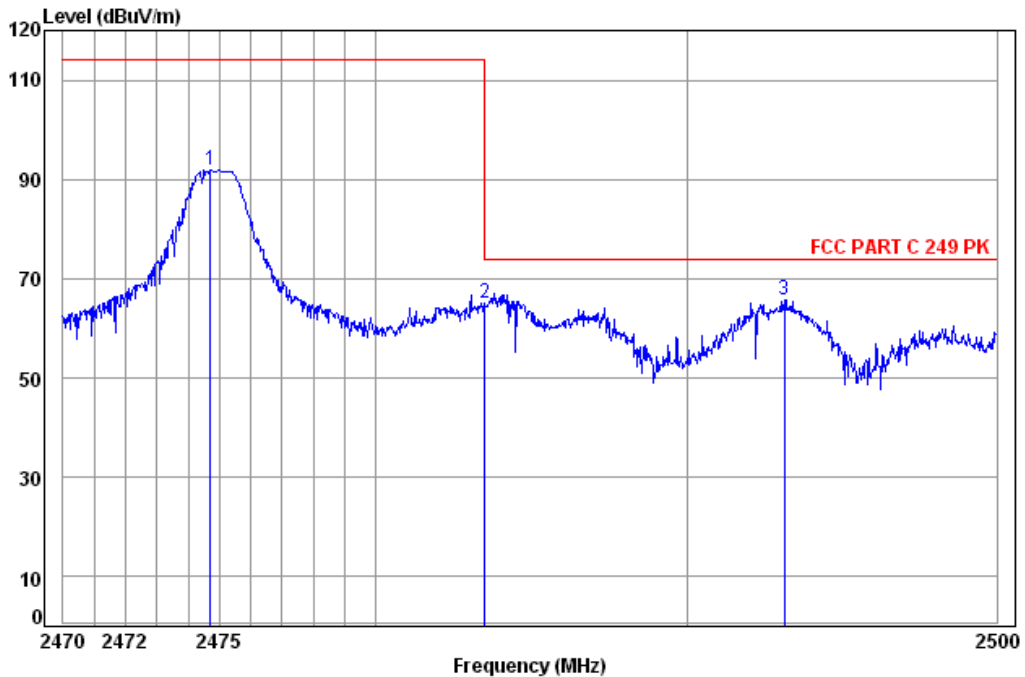
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Worse case mode:	Transmitting	Test channel:	Highest	Remark:	Peak	Vertical
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Data: 65



Site : chamber
 Condition: FCC PART C 249 PK 3m Vertical
 Job No: : 1652ET
 Mode: : 2475 Band edge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dB
1	2474.72	5.02	32.44	38.46	92.78	114.00	-22.22
2	2483.50	5.03	32.44	38.47	66.10	74.00	-8.90
3 pp	2493.16	5.04	32.44	38.47	66.66	74.00	-8.33

Average value=Peak value+PDCF :

Frequency (MHz)	Level (dBUV/m)	Limit Line (dBUV/m)	Over Limit (dB)
2474.72	76.22	94.00	-17.78
2483.50	49.54	54.00	-4.46
2493.16	50.11	54.00	-3.89



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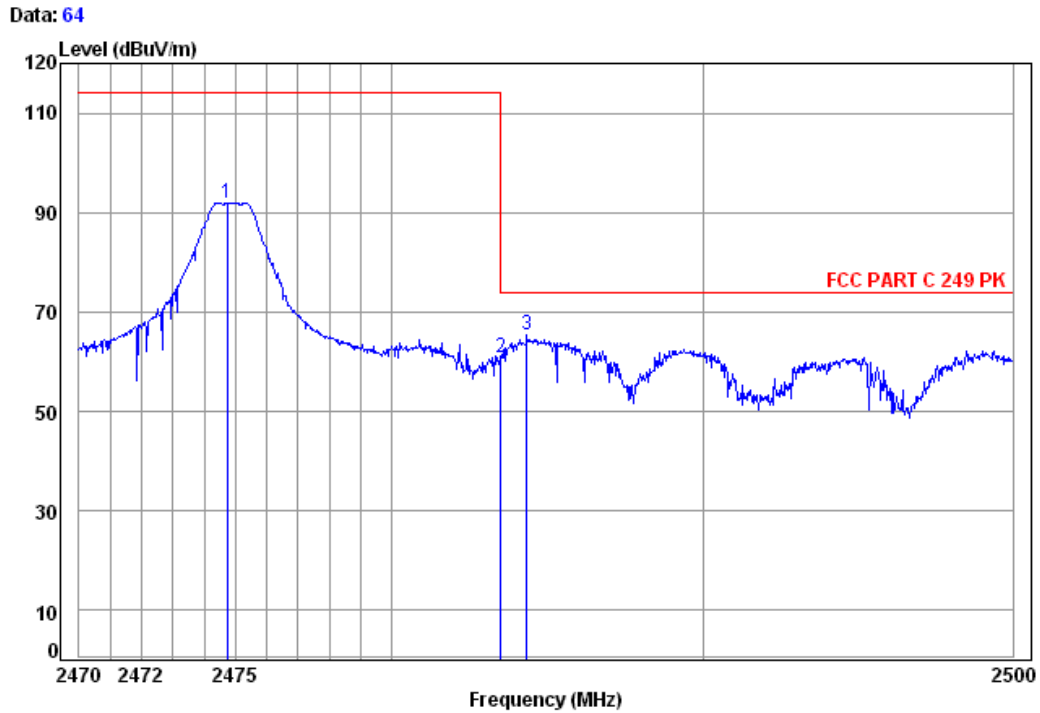


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Worse case mode:	Transmitting	Test channel:	Highest	Remark:	Peak	Horizontal
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Site : chamber
Condition: FCC PART C 249 PK 3m Horizontal
Job No: : 1652ET
Mode: : 2475 Band edge

	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	2474.75	5.02	32.44	38.46	92.96	91.96	114.00	-22.04
2	2483.50	5.03	32.44	38.47	61.80	60.80	74.00	-13.20
3 pp	2484.36	5.03	32.44	38.47	66.25	65.25	74.00	-8.75

Average value=Peak value+PDCF :

Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
2474.75	76.40	94.00	-17.60
2483.50	45.24	54.00	-8.76
2484.36	49.69	54.00	-4.31

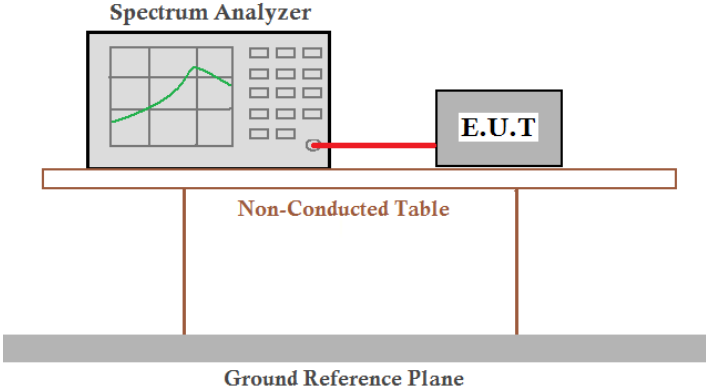
Note:

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:	
Instruments Used:	Refer to section 5.10 for details.
Test mode:	Transmitting mode.
Limit:	N/A
Test Results:	Pass

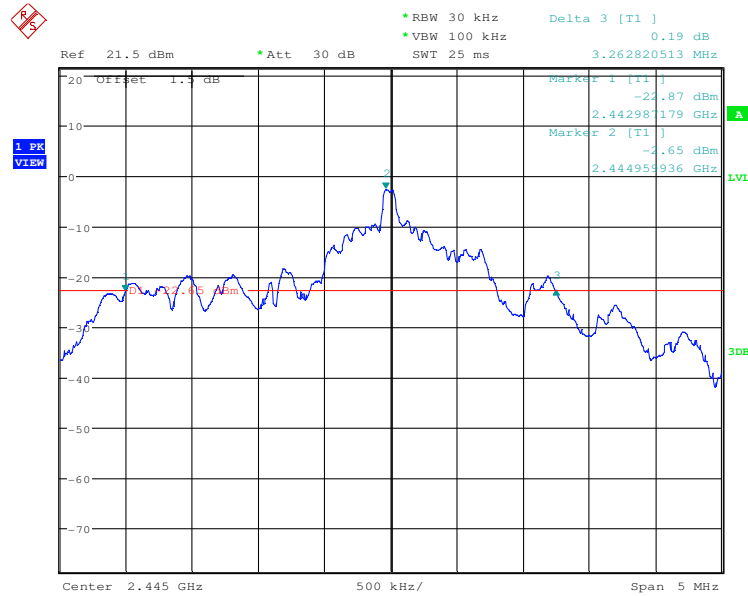
Measurement Data

Test channel	20dB bandwidth (MHz)	Results
Lowest	3.263	Pass
Middle	3.934	Pass
Highest	3.542	Pass

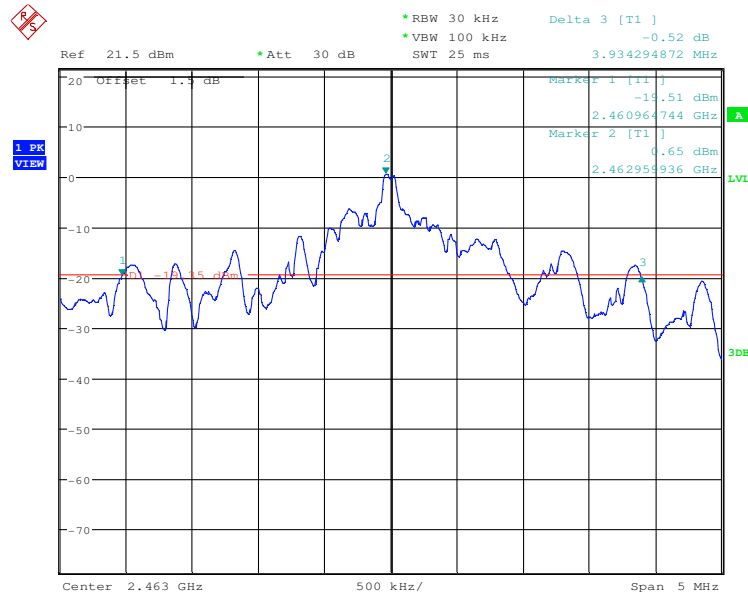


Test plot as follows:

Test channel:	Lowest
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Test channel:	Middle
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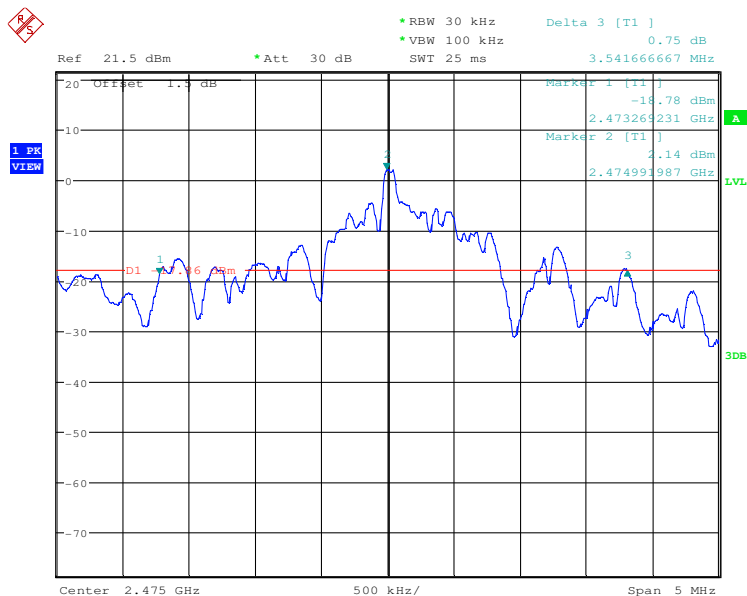


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Test channel:	Highest
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