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Report No.: SZEM161201070603
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FCC REPORT

Application No. : SZEM1612010706CR
Applicant: Shantou Helicute Model Aircraft Industrial Co., Ltd
Manufacturer: Shantou Helicute Model Aircraft Industrial Co., Ltd
Factory: Shantou Helicute Model Aircraft Industrial Co., Ltd
Product Name: Flying Saucer Series
Model No.(EUT): H816HW
Add Model No.: H05NL, H05NCL, H07L, H07CL, H07NL, H07NCL, H07NHC, H07NHW, H09NL, H09NCL, H107R, M801R, M803R, H805, H805C, H805W, H805S, H805H, H805HC, H805HW, H806, H806C, H806W, H806S, H806H, H806HC, H806HW, H807, H807C, H808, H808C, H809, H809C, H809W, H809H, H809HC, H809HW, H809S, H809SC, H809SW, H811C, H811W, H812, H812R, S812, H815H, H815HW, H815HS, H815HC, H816H, H816HC, H817, H817C, H817W, H818H, H818HC, H818HW, H819, H819C, H819W, H820H, H820HC, H820HW, H821H, H821HC, H821HW, H821S, H821SC, H821SW, H822H, H822HC, H822HW, H823H, H823HC, H823HW, H802G, H802W, H02G, H01C

FCC ID: 2AKPPHLTH816
Standards: 47 CFR Part 15, Subpart C (2016)
Date of Receipt: 2016-12-15
Date of Test: 2017-01-17 to 2017-02-14
Date of Issue: 2017-02-17

Test Result:	PASS *
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* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Jack Zhang
EMC Laboratory Manager

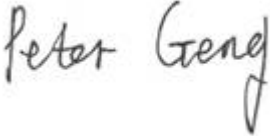

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant 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		2017-02-17		Original

Authorized for issue by:			
Tested By			2017-02-14
	<hr/>		<hr/>
	(Peter Geng) /Project Engineer		Date
Checked By			2017-02-17
	<hr/>		<hr/>
	(Eric Fu) /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 (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

Remark:

Model No.: H816HW, H05NL, H05NCL, H07L, H07CL, H07NL, H07NCL, H07NHC, H07NHW, H09NL, H09NCL, H107R, M801R, M803R, H805, H805C, H805W, H805S, H805H, H805HC, H805HW, H806, H806C, H806W, H806S, H806H, H806HC, H806HW, H807, H807C, H808, H808C, H809, H809C, H809W, H809H, H809HC, H809HW, H809S, H809SC, H809SW, H811C, H811W, H812, H812R, S812, H815H, H815HW, H815HS, H815HC, H816H, H816HC, H817, H817C, H817W, H818H, H818HC, H818HW, H819, H819C, H819W, H820H, H820HC, H820HW, H821H, H821HC, H821HW, H821S, H821SC, H821SW, H822H, H822HC, H822HW, H823H, H823HC, H823HW, H802G, H802W, H02G, H01C

Only the model H816HW was tested, since the electrical circuit design, layout, components used and internal wiring were identical for all above models, only different on model No., color, appearance and packaging.



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5 General Information

5.1 Client Information

Applicant:	Shantou Helicute Model Aircraft Industrial Co., Ltd
Address of Applicant:	Jiangbei Road, Longtian, Guangyi Street, Chenghai District, Chenghai, Shantou City, Guangdong, China.
Manufacturer:	Shantou Helicute Model Aircraft Industrial Co., Ltd
Address of Manufacturer:	Jiangbei Road, Longtian, Guangyi Street, Chenghai District, Chenghai, Shantou City, Guangdong, China.
Factory:	Shantou Helicute Model Aircraft Industrial Co., Ltd
Address of Factory:	Jiangbei Road, Longtian, Guangyi Street, Chenghai District, Chenghai, Shantou City, Guangdong, China.

5.2 General Description of EUT

Name:	Flying Saucer Series
Model No.:	H816HW
Frequency Range:	2407MHz to 2480 MHz
Modulation Type:	GFSK
Number of Channels:	72
Antenna Type:	Integral
Antenna Gain:	0dBi
Power Supply:	DC 6V by 4 x 1.5V "AAA" batteries



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Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2407	24	2431	48	2455
1	2408	25	2432	49	2456
2	2409	26	2433	50	2457
3	2410	27	2434	51	2458
4	2411	28	2435	52	2459
5	2412	29	2436	53	2460
6	2413	30	2437	54	2461
7	2414	31	2438	55	2462
8	2415	32	2439	56	2463
9	2416	33	2440	57	2464
10	2417	34	2441	58	2465
11	2418	35	2442	59	2466
12	2419	36	2443	60	2467
13	2420	37	2444	61	2468
14	2421	38	2445	62	2469
15	2422	39	2446	63	2470
16	2423	40	2447	64	2471
17	2424	41	2448	65	2472
18	2425	42	2449	66	2473
19	2426	43	2450	67	2474
20	2427	44	2451	68	2475
21	2428	45	2452	69	2476
22	2429	46	2453	70	2477
23	2430	47	2454	71	2478

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(CH0)	2407MHz
The Middle channel(CH35)	2442MHz
The Highest channel(CH71)	2478MHz



5.3 Test Environment and Mode

Operating Environment:	
Temperature:	25.0 °C
Humidity:	55 % RH
Atmospheric Pressure:	1015mbar
Test mode:	
Transmitting mode:	Keep the EUT in transmitting mode with all kind of modulation and all kind of data rate.

5.4 Description of Support Units

The EUT has been tested independent unit.

5.5 Test Location

All tests were performed at:

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

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.

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- **VCCI**

The 10m Semi-anechoic chamber and Shielded Room 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 and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.

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

RF conducted test						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
1	Temperature Chamber	GuangZhou GongWen	GDJW-100	SEM002-02	2016-07-18	2017-07-18
2	DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2016-10-09	2017-10-09
3	Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2016-10-09	2017-10-09
4	Barometer	ChangChun	DYM3	SEM002-01	2016-04-25	2017-04-25
5	Signal Generator	Rohde & Schwarz	SML03	SEM006-02	2016-04-25	2017-04-25
6	Band filter	Amindeon	Asi 3314	SEM023-01	N/A	N/A
7	Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2016-10-09	2017-10-09
8	NOISE GENERATOR	Beijin Daming Jidian	DM1660	EMC0047	2016-08-21	2017-08-21

RE in Chamber						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
1	10m Semi-Anechoic Chamber	SAEMC	FSAC1018	SEM001-03	2016-05-13	2017-05-13
2	EMI Test Receiver (9k-7GHz)	Rohde & Schwarz	ESR	SEM004-03	2016-04-25	2017-04-25
3	Trilog-Broadband Antenna(30M-1GHz)	Schwarzbeck	VULB9168	SEM003-18	2016-06-29	2019-06-29
4	Pre-amplifier	Sonoma Instrument Co	310N	SEM005-03	2016-07-06	2017-07-06
5	Loop Antenna	ETS-Lindgren	6502	SEM003-08	2015-08-14	2018-08-14



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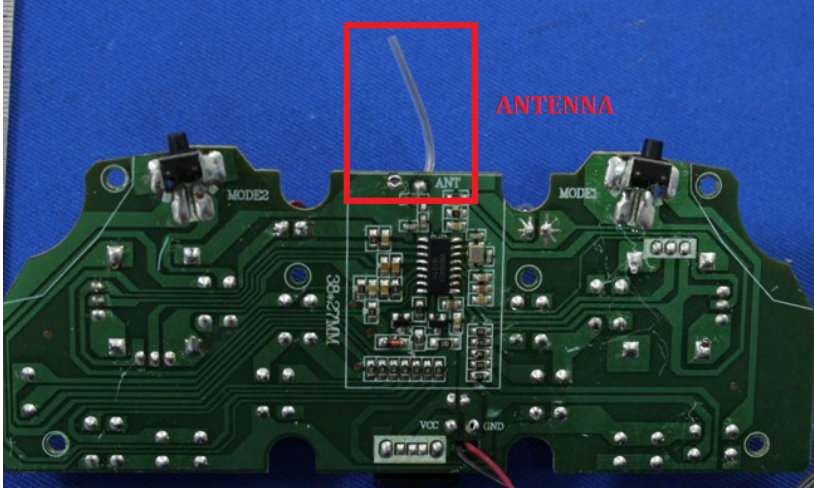
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RE in Chamber						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
1	3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2016-05-13	2017-05-13
2	EXA Spectrum Analyzer	Agilent Technologies Inc	N9010A	SEM004-09	2016-07-19	2017-07-19
3	BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-02	2014-11-15	2017-11-15
4	Amplifier (0.1-1300MHz)	HP	8447D	SEM005-02	2016-10-09	2017-10-09
5	Horn Antenna (1-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2015-06-14	2018-06-14
6	Horn Antenna (18-26GHz)	ETS-Lindgren	3160	SEM003-12	2014-11-24	2017-11-24
7	Horn Antenna(26GHz-40GHz)	A.H.Systems, inc.	SAS-573	SEM003-13	2015-02-12	2018-02-12
8	Low Noise Amplifier	Black Diamond Series	BDLNA-0118-352810	SEM005-05	2016-10-09	2017-10-09
9	Band filter	Amindeon	Asi 3314	SEM023-01	N/A	N/A

6 Test results and Measurement Data

6.1 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:	
<p>The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0dBi.</p>	



6.2 Radiated Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.249 and 15.209				
Test Method:	ANSI C63.10: 2013				
Test Site:	Below 1GHz: Measurement Distance: 10m (Semi-Anechoic Chamber) Above 1GHz: Measurement Distance: 3m (Full-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	

Test Setup:

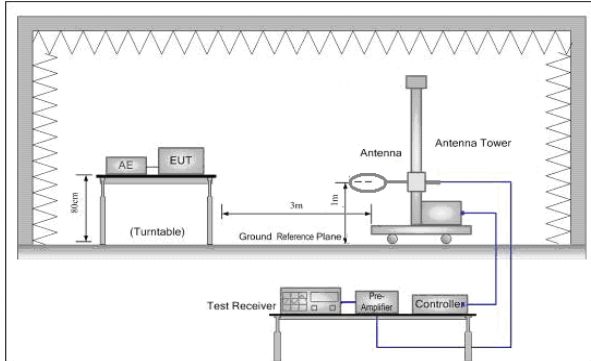


Figure 1. Below 30MHz

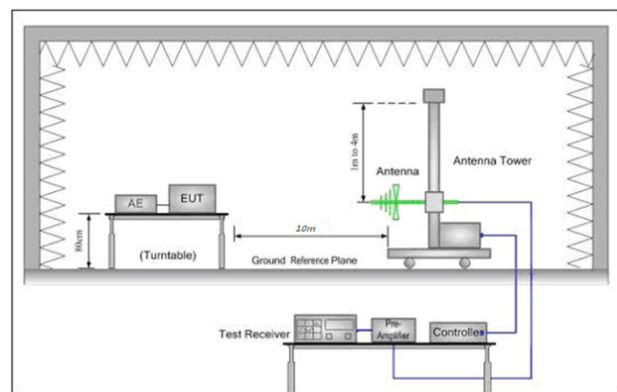


Figure 2. 30MHz to 1GHz

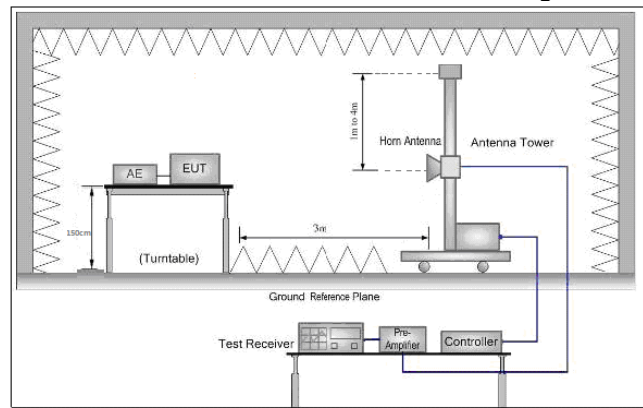


Figure 3. Above 1 GHz

Test Procedure:

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 and 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. 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.
- e. 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.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the



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	<p>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.</p> <p>h. Test the EUT in the lowest channel,the middle channel,the Highest channel</p> <p>i. 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>j. Repeat above procedures until all frequencies measured was complete.</p>
Exploratory Test Mode:	Transmitting mode
Final Test Mode:	Transmitting mode
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass



Measurement Data

6.3.1 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)	Polarization
2406.938	29.13	5.35	37.96	99.08	95.60	114.00	-18.40	Horizontal
2407.040	29.13	5.35	37.96	96.80	93.32	114.00	-20.68	Vertical
2442.000	29.23	5.38	37.96	98.64	95.29	114.00	-18.71	Horizontal
2442.020	29.23	5.38	37.96	96.12	92.77	114.00	-21.23	Vertical
2478.012	29.34	5.40	37.95	99.08	95.87	114.00	-18.13	Horizontal
2477.713	29.34	5.40	37.95	94.57	91.36	114.00	-22.64	Vertical

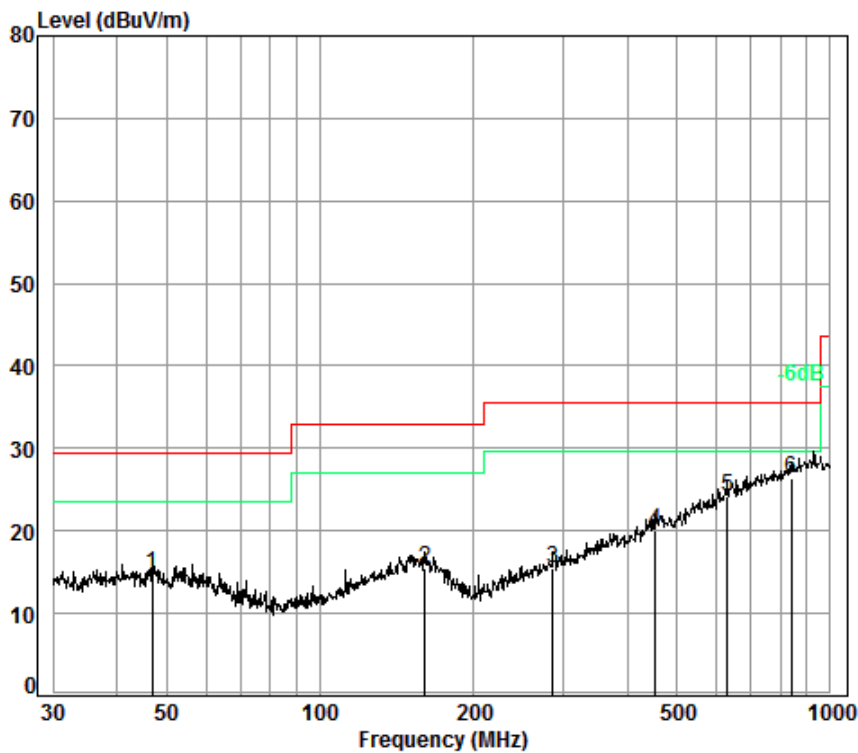
Average value:

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)	Polarization
2406.938	29.13	5.35	37.96	77.8	74.32	94.00	-19.68	Horizontal
2442.000	29.23	5.38	37.96	76.5	74.26	94.00	-20.71	Horizontal
2478.012	29.34	5.40	37.95	77.61	73.29	94.00	-19.74	Horizontal



6.3.2 Spurious Emissions

30MHz~1GHz		
Test mode:	Transmitting	Vertical



Condition: 10m VERTICAL

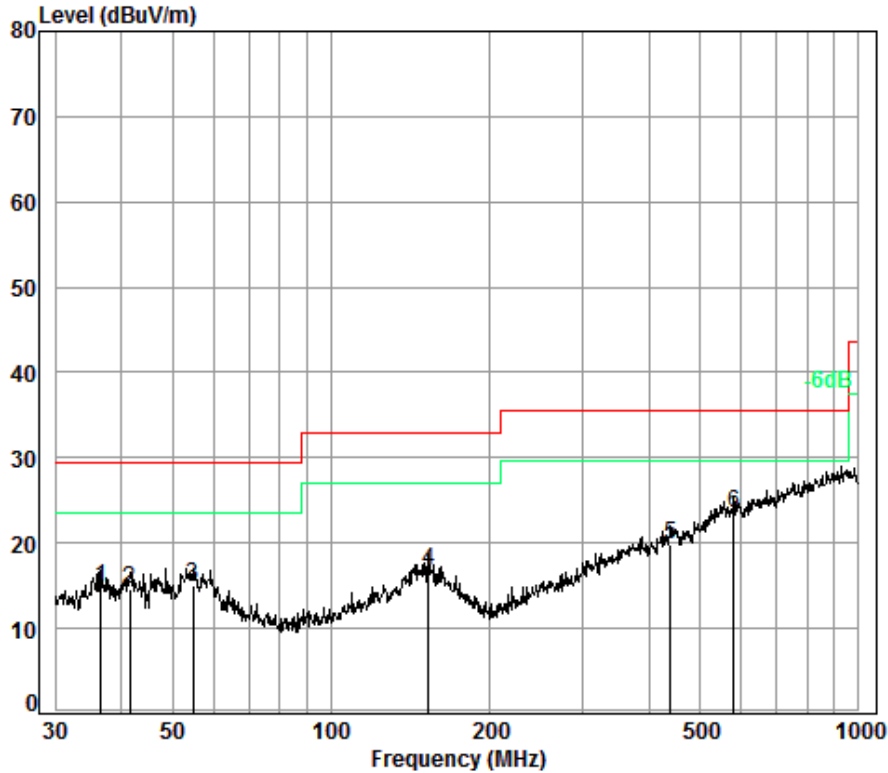
Job No. : 10706CR

Test Mode: a

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit	Over
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	46.99	6.84	12.85	33.00	28.10	14.79	29.50	-14.71
2	160.91	7.50	13.30	32.73	27.31	15.38	33.00	-17.62
3	285.98	8.02	12.31	32.61	27.75	15.47	35.60	-20.13
4	454.31	8.44	16.23	32.60	27.98	20.05	35.60	-15.55
5	629.48	8.97	19.28	32.60	28.55	24.20	35.60	-11.40
6 pp	839.18	9.30	21.52	32.56	28.03	26.29	35.60	-9.31



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



Condition: 10m HORIZONTAL

Job No. : 10706CR

Test Mode: a

	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	36.64	6.73	12.87	32.98	28.17	14.79	29.50	-14.71
2	41.57	6.80	13.18	32.99	27.62	14.61	29.50	-14.89
3	54.83	7.00	12.39	32.97	28.67	15.09	29.50	-14.41
4	153.20	7.47	13.40	32.74	28.56	16.69	33.00	-16.31
5	440.20	8.40	15.94	32.60	28.17	19.91	35.60	-15.69
6 pp	580.70	8.85	18.30	32.60	29.02	23.57	35.60	-12.03



Below 1GHz

The test was performed at a 10m test site. According to below formulate and the test data at 10m test distance,

$$L_3 / L_{10} = D_{10} / D_3$$

Note:

L₃: Level @ 3m distance. Unit: uV/m;

L₁₀: Level @ 10m distance. Unit: uV/m;

D₃: 3m distance. Unit: m

D₁₀: 10m distance. Unit: m

The level at 3m test distance is below:

Frequency (MHz)	Level @ 10m (dBuV/m)	Level @ 10m (uV/m)	Level @ 3m (uV/m)	Level @ 3m (dBuV/m)	Limit @ 3m (dBuV/m)	Margin (dB)	Ant. Polarization
46.99	14.79	5.49	18.30	25.25	40.00	-14.75	V
160.91	15.38	5.87	19.58	25.84	43.50	-17.66	V
285.98	15.47	5.94	19.79	25.93	46.00	-20.07	V
454.31	20.05	10.06	33.53	30.51	46.00	-15.49	V
629.48	24.20	16.22	54.06	34.66	46.00	-11.34	V
839.18	26.29	20.63	68.77	36.75	46.00	-9.25	V
36.64	14.79	5.49	18.30	25.25	40.00	-14.75	H
41.57	14.61	5.38	17.92	25.07	40.00	-14.93	H
54.83	15.09	5.68	18.94	25.55	40.00	-14.45	H
153.20	16.69	6.83	22.77	27.15	43.50	-16.35	H
440.20	19.91	9.90	32.99	30.37	46.00	-15.63	H
580.70	23.57	15.08	50.28	34.03	46.00	-11.97	H



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Above 1GHz										
Test mode:		Transmitting		Test channel:		Lowest		Remark:		Peak
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization		
3781.495	33.01	7.73	37.98	44.12	46.88	74.00	-27.12	Vertical		
4814.000	34.18	8.88	38.41	64.32	68.97	74.00	-5.03	Vertical		
6016.949	34.71	10.54	38.28	44.17	51.14	74.00	-22.86	Vertical		
7221.000	36.41	10.69	37.10	49.38	59.38	74.00	-14.62	Vertical		
9628.000	37.53	12.51	35.09	42.21	57.16	74.00	-16.84	Vertical		
12173.120	38.71	14.42	36.02	36.21	53.32	74.00	-20.68	Vertical		
3858.877	33.22	7.76	37.99	45.34	48.33	74.00	-25.67	Horizontal		
4814.000	34.18	8.88	38.41	68.89	73.54	74.00	-0.46	Horizontal		
6016.949	34.71	10.54	38.28	44.94	51.91	74.00	-22.09	Horizontal		
7221.000	36.41	10.69	37.10	46.87	56.87	74.00	-17.13	Horizontal		
9628.000	37.53	12.51	35.09	45.76	60.71	74.00	-13.29	Horizontal		
11946.280	38.55	14.50	35.59	36.41	53.87	74.00	-20.13	Horizontal		

Test mode:		Transmitting		Test channel:		Lowest		Remark:		Average
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization		
4814.000	34.18	8.88	38.41	35.10	39.75	54.00	-14.25	Vertical		
7221.000	36.41	10.69	37.10	32.17	42.17	54.00	-11.83	Vertical		
9628.000	37.53	12.51	35.09	29.18	44.13	54.00	-9.87	Vertical		
7221.000	36.41	10.69	37.10	32.17	42.17	54.00	-11.83	Horizontal		
9628.000	37.53	12.51	35.09	29.18	44.13	54.00	-9.87	Horizontal		
4814.000	34.18	8.88	38.41	36.13	40.78	54.00	-13.22	Horizontal		



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Test mode:		Transmitting		Test channel:		Middle		Remark:		Peak
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization		
3759.672	32.95	7.73	37.98	44.40	47.10	74.00	-26.90	Vertical		
4884.000	34.30	8.98	38.44	62.70	67.54	74.00	-6.46	Vertical		
6069.413	34.76	10.47	38.23	43.93	50.93	74.00	-23.07	Vertical		
7326.000	36.37	10.73	37.01	49.68	59.77	74.00	-14.23	Vertical		
9768.000	37.55	12.59	35.02	40.22	55.34	74.00	-18.66	Vertical		
12226.070	38.74	14.37	36.14	36.83	53.80	74.00	-20.20	Vertical		
3563.687	32.39	7.65	37.96	44.04	46.12	74.00	-27.88	Horizontal		
4884.000	34.30	8.98	38.44	68.33	73.17	74.00	-0.83	Horizontal		
6034.386	34.73	10.52	38.27	44.00	50.98	74.00	-23.02	Horizontal		
7326.000	36.37	10.73	37.01	46.51	56.60	74.00	-17.40	Horizontal		
9768.000	37.55	12.59	35.02	44.92	60.04	74.00	-13.96	Horizontal		
12261.500	38.76	14.34	36.23	36.97	53.84	74.00	-20.16	Horizontal		

Test mode:		Transmitting		Test channel:		Middle		Remark:		Average
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization		
4884.000	34.30	8.98	38.44	40.35	45.19	54.00	-8.81	Vertical		
7326.000	36.37	10.73	37.01	32.18	42.27	54.00	-11.73	Vertical		
9768.000	37.55	12.59	35.02	28.31	43.43	54.00	-10.57	Vertical		
7326.000	36.37	10.73	37.01	32.18	42.27	54.00	-11.73	Horizontal		
9768.000	37.55	12.59	35.02	28.31	43.43	54.00	-10.57	Horizontal		
4884.000	34.30	8.98	38.44	38.56	43.40	54.00	-10.60	Horizontal		

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Test mode:		Transmitting		Test channel:		Highest		Remark:		Peak
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization		
3584.372	32.45	7.66	37.96	45.49	47.64	74.00	-26.36	Vertical		
4956.000	34.42	9.08	38.48	64.71	69.73	74.00	-4.27	Vertical		
6175.716	34.84	10.33	38.12	44.25	51.30	74.00	-22.70	Vertical		
7434.000	36.33	10.77	36.91	48.63	58.82	74.00	-15.18	Vertical		
9912.000	37.58	12.66	34.94	41.10	56.40	74.00	-17.60	Vertical		
12279.260	38.77	14.33	36.27	36.47	53.30	74.00	-20.70	Vertical		
3825.521	33.13	7.75	37.98	44.70	47.60	74.00	-26.40	Horizontal		
4956.000	34.42	9.08	38.48	68.46	73.48	74.00	-0.52	Horizontal		
6043.124	34.74	10.50	38.26	43.89	50.87	74.00	-23.13	Horizontal		
7434.000	36.33	10.77	36.91	46.10	56.29	74.00	-17.71	Horizontal		
9912.000	37.58	12.66	34.94	42.71	58.01	74.00	-15.99	Horizontal		
12067.890	38.64	14.50	35.76	35.71	53.09	74.00	-20.91	Horizontal		

Test mode:		Transmitting		Test channel:		Highest		Remark:		Average
Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization		
4956.000	34.42	9.08	38.48	38.68	43.70	54.00	-10.30	Vertical		
7434.000	36.33	10.77	36.91	34.28	44.47	54.00	-9.53	Vertical		
9912.000	37.58	12.66	34.94	29.61	44.91	54.00	-9.09	Vertical		
7434.000	36.33	10.77	36.91	34.28	44.47	54.00	-9.53	Horizontal		
9912.000	37.58	12.66	34.94	29.61	44.91	54.00	-9.09	Horizontal		
4956.000	34.42	9.08	38.48	37.98	43.00	54.00	-11.00	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 .

6.3 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 (Fully-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:			

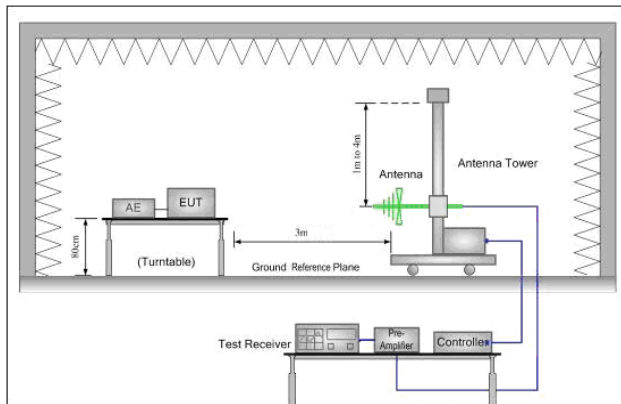


Figure 1. 30MHz to 1GHz

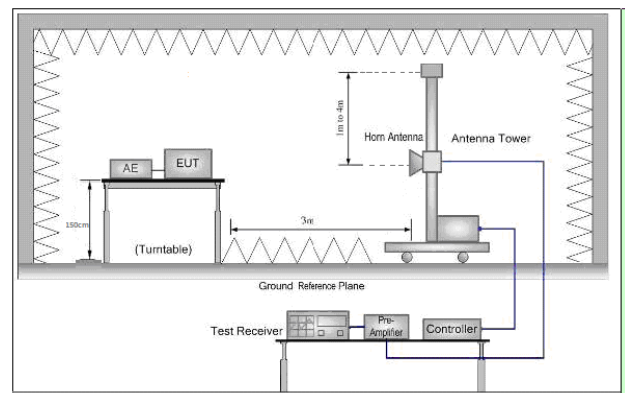


Figure 2. Above 1 GHz

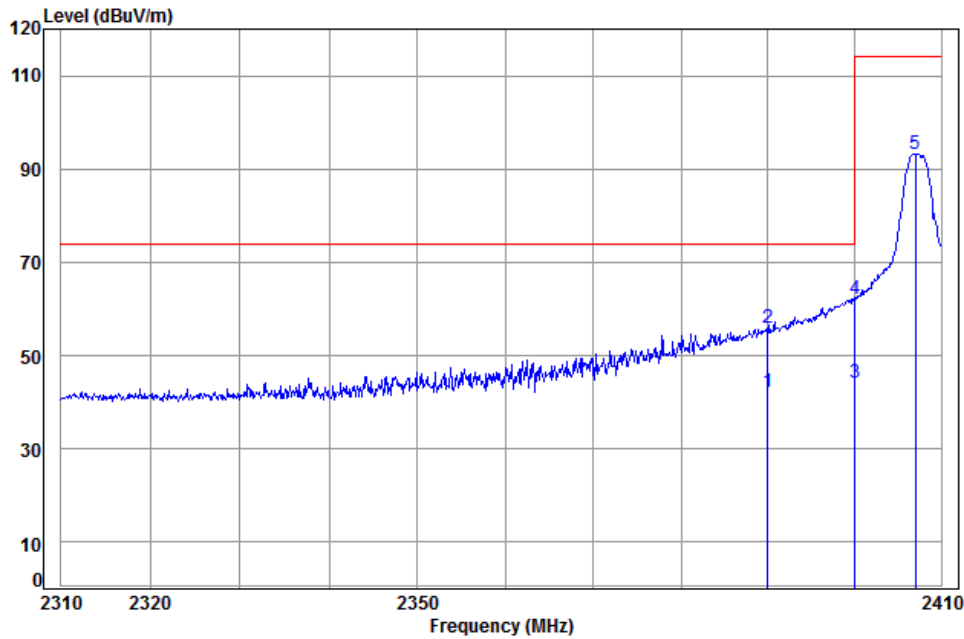


Test Procedure:	<ul style="list-style-type: none">a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.c. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.d. 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.e. 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.f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.g. 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 channelh. Test the EUT in the lowest channel , the Highest channeli. 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.j. Repeat above procedures until all frequencies measured was complete.
Exploratory Test Mode:	Transmitting mode
Final Test Mode:	Transmitting mode
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass



Test plot as follows:

Test mode:	Transmitting	Test channel:	Lowest	Remark:	Peak	Vertical
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Condition: 3m Vertical

Job No: : 10706CR

Mode: : 2407 Bandedge

: 2.4G

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2390.000	5.34	29.08	37.96	45.67	42.13	54.00	-11.87 Average
2	2390.000	5.34	29.08	37.96	59.53	55.99	74.00	-18.01 Peak
3 pp	2400.000	5.34	29.11	37.96	47.54	44.03	54.00	-9.97 Average
4 pk	2400.000	5.34	29.11	37.96	65.67	62.16	74.00	-11.84 Peak
5	2407.040	5.35	29.13	37.96	96.80	93.32	114.00	-20.68

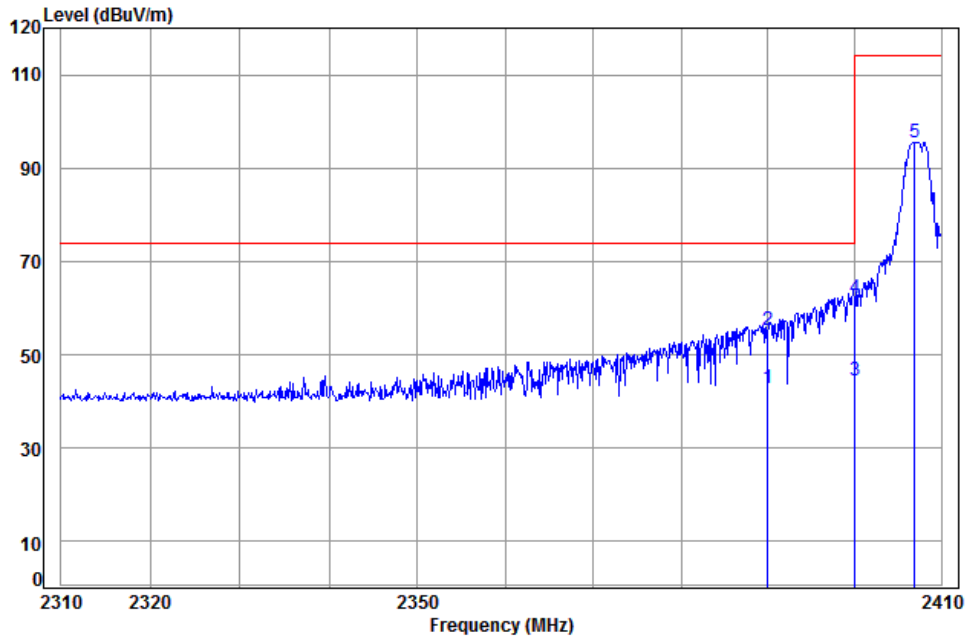


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Test mode:	Transmitting	Test channel:	Lowest	Remark:	Peak	Horizontal
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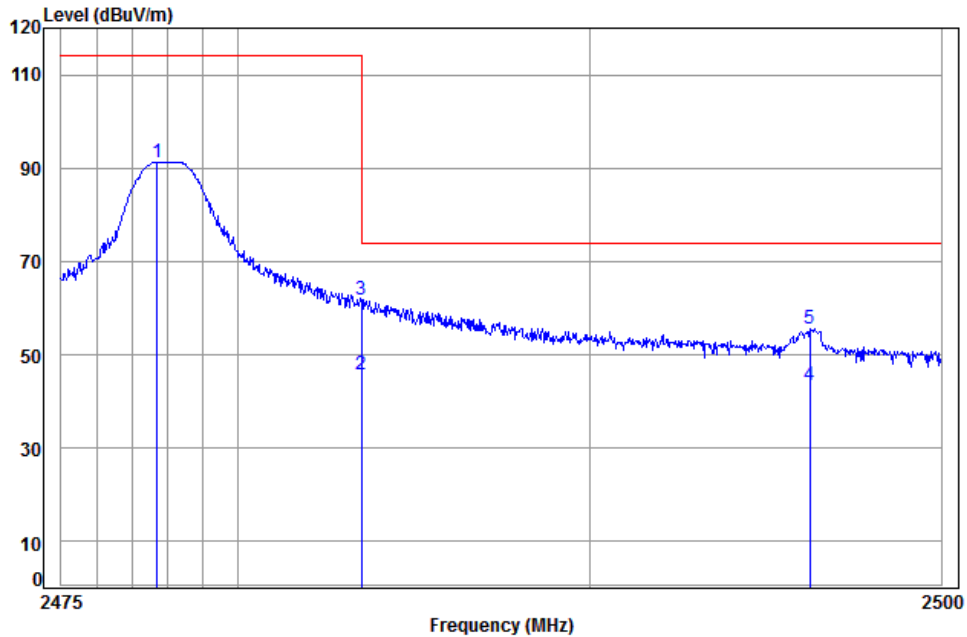


Condition: 3m HORIZONTAL
 Job No: : 10706CR
 Mode: : 2407 Bandedge
 : 2.4G

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2390.000	5.34	29.08	37.96	46.38	42.84	54.00	-11.16 Average
2	2390.000	5.34	29.08	37.96	58.64	55.10	74.00	-18.90 Peak
3	pp 2400.000	5.34	29.11	37.96	47.91	44.40	54.00	-9.60 Average
4	pk 2400.000	5.34	29.11	37.96	65.63	62.12	74.00	-11.88 Peak
5	2406.938	5.35	29.13	37.96	99.08	95.60	114.00	-18.40



Test mode:	Transmitting	Test channel:	Highest	Remark:	Peak	Vertical
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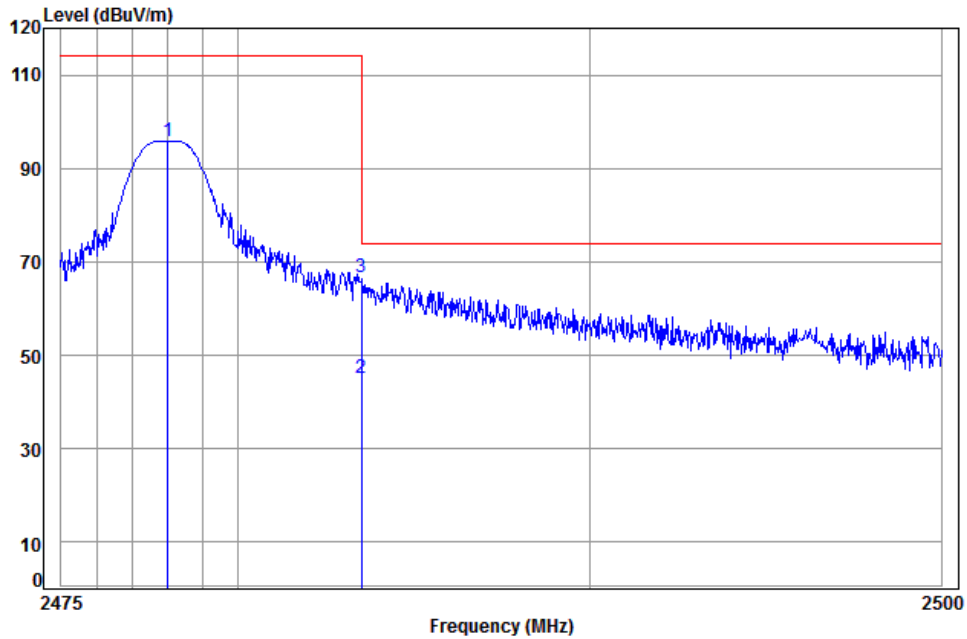


Condition: 3m VERTICAL
 Job No: : 10706CR
 Mode: : 2478 Bandedge
 : 2.4G

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2477.713	5.40	29.34	37.95	94.57	91.36	114.00	-22.64
2 pp	2483.500	5.41	29.35	37.95	48.81	45.62	54.00	-8.38 Average
3 pk	2483.500	5.41	29.35	37.95	65.08	61.89	74.00	-12.11 Peak
4	2496.259	5.42	29.39	37.95	46.66	43.52	54.00	-10.48 Average
5	2496.259	5.42	29.39	37.95	58.74	55.60	74.00	-18.40 Peak



Test mode:	Transmitting	Test channel:	Highest	Remark:	Peak	Horizontal
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Condition: 3m HORIZONTAL
 Job No: : 10706CR
 Mode: : 2478 Bandedge
 : 2.4G

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	2478.012	5.40	29.34	37.95	99.08	95.87	114.00	-18.13
2	av 2483.500	5.41	29.35	37.95	48.28	45.09	54.00	-8.91 Average
3	pp 2483.500	5.41	29.35	37.95	69.76	66.57	74.00	-7.43 Peak

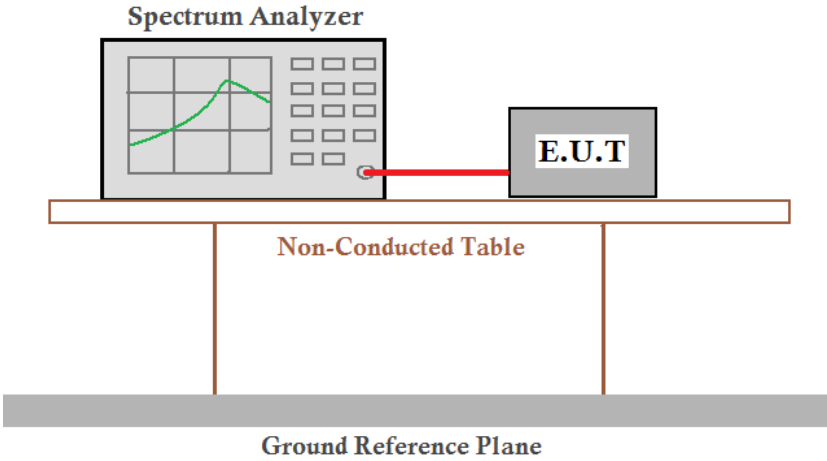
Note:

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

with a sample calculation is as follows:

$$\text{Final Test Level} = \text{Receiver Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Preamplifier Factor}$$

6.4 20dB Bandwidth

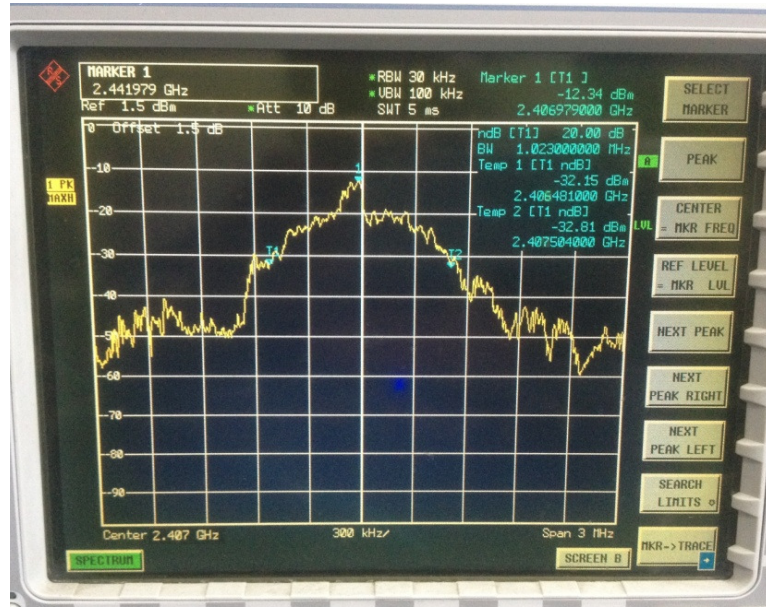
Test Requirement:	47 CFR Part 15C Section 15.215
Test Method:	ANSI C63.10:2013
Test Setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p>
Limit:	N/A
Exploratory Test Mode:	Transmitter mode
Final Test Mode:	Transmitter mode
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass

Measurement Data

Test Channel	20dB bandwidth (MHz)	Results
Lowest	1.023	Pass
Middle	1.089	Pass
Highest	1.014	Pass

Test plot as follows:

Test channel:	Lowest
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Test channel:	Middle
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Test channel:	Highest
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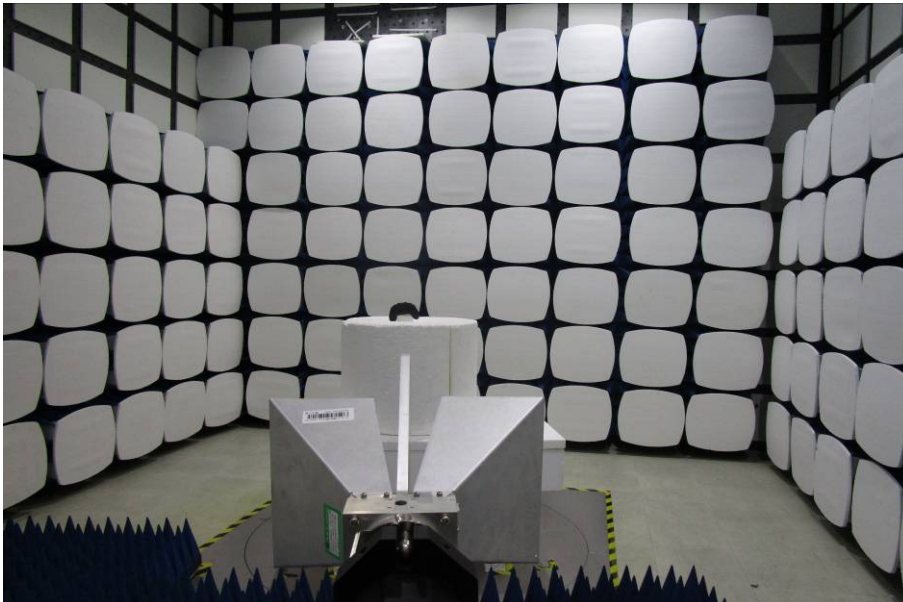
7 Photographs - EUT Test Setup

Test model No.: H816HW

7.1 Radiated Emission



7.2 Radiated Spurious Emission





8 Photographs - EUT Constructional Details

Refer to Appendix A - Photographs of EUT Constructional Details for SZEM1612010706CR.