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

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FCC REPORT

Application No. :	SZEM1612010719CR (SGS HK No.: T31620280055EM)
Applicant:	Waltersons Industry Limited
Manufacturer:	Waltersons Industry Limited
Product Name:	Waltersons 1/24 middleweight radio control tank
Item No.:	Please refer to page 4. ♣
♣	Please refer to section 2 of this report which indicates which item was actually tested and which were electrically identical.
Country of Origin:	China
Labeled Age Grading:	14+
FCC ID:	2AKPW372
Standards:	47 CFR Part 15, Subpart C (2015)
Date of Receipt:	2016-12-14
Date of Test:	2016-12-15 to 2017-01-18
Date of Issue:	2017-01-22
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.

2 Version

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
00		2017-01-20		Original

Authorized for issue by:				
Tested By		Gebin Sun **(Gebin Sun) /Project Engineer**		2017-01-20 **Date**
Checked By		Eric Fu **(Eric Fu) /Reviewer**		2017-01-22 **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 (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

Item No.:

WT-372004A, 1/24 scale German Heavy tank Tiger I
WT-372001A, 1/24 scale German Panzerkampfwagen (Pz.Kpfw.IV)
WT-372002A, 1/24 scale Soviet medium tank T-34-85
WT-372003A, 1/24 scale British Sherman Firefly Ic.
WT-372005A, 1/24 scale German Panzerkampfwagen IV Ausf. D
WT-372006A, 1/24 scale Soviet self-propelled gun, SU-85
WT-372007A, 1/24 scale US Heavy tank M26 Pershing
WT-372008A, 1/24 scale US M1A2 Abrams Main battle tank
WT-372009A, 1/24 scale Lockheed martin MLRS 270 Missile launcher
WT-372010A, 1/24 scale US M4A3E8 Easy Eight HVSS Suspension
WT-372011A, 1/24 scale German Panzerkampfwagen VI Ausf. B (King Tiger Henschel)
WT-372012A, 1/24 scale German Panzerkampfwagen SturmTiger
WT-372013A, 1/24 scale U.S Sherman M4A1 tank (76mm)
WT-372014A, 1/24 scale US Sherman M4A3 tank
WT-372015A, 1/24 scale Soviet medium tank T-34-76
WT-372016A, 1/24 scale German Panzerkampfwagen VI Ausf. B (King Tiger Porsche)
WT-372017A, 1/24 scale German heavy tank destroyer Jagdtiger (type henschel)
WT-372018A, 1/24 scale German heavy tank destroyer Jagdtiger (type Porsche)
WT-372019A, 1/24 scale German Pz. Kpfw IV Ausf F2
WT-372020A, 1/24 scale German heavy tank Panther Ausf G
WT-372021A, 1/24 scale German heavy tank Jagdpanther
WT-372022A, 1/24 scale German light tank destroyer – Jagdpanzer 38
WT-372023A, 1/24 scale US MBT M1A2 Abrams SEP – Tusk II
WT-372024A, 1/24 scale US Heavy tank M46 Patton
WT-372025A, 1/24 scale US tank destroyer M10 Volverine
WT-372026A, 1/24 scale Soviet Self-propelled howitzer SU-122
WT-372027A, 1/24 scale Soviet tank destroyer SU-100
WT-372028A, 1/24 scale British Sherman Firefly Vc.
WT-372029A, 1/24 scale German heavy tank Tiger I (Mid Production)
WT-372030A, 1/24 scale German heavy tank Tiger I (Early Production)
WT-372031A, 1/24 scale German tank destroyer Jagdpanzer IV
WT-372032A, 1/24 scale German armoured infantry support gun Sturmpanzer
WT-372033A, 1/24 scale Flakpanzer IV (Wirbelwind)

Only the item WT-372004A was tested, since the circuitry design, PCB layout, electrical components used, internal wiring and functions were identical for all above items. Only the item number and plastic shell are different.

4 Contents

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5 General Information

5.1 Client Information

Applicant:	Waltersons Industry Limited
Address of Applicant:	Unit S-T, 5/f, 2-12 Au Pui Wan Street, Valiant Industrial Center, Fo Tan, New Territories, Hong Kong
Manufacturer:	Waltersons Industry Limited
Address of Manufacturer:	No.1, YanDong3 Road, Dayan Industrial district, Huangpu town, ZhongShan City, GuangDong, China

5.2 General Description of EUT

Name:	Waltersons 1/24 middleweight radio control tank
Model No.:	WT-372004A
Operating Frequency:	2410MHz~2480MHz
Modulation Type:	GFSK
Sample Type:	Portable production
Antenna Type:	Integral
Antenna Gain:	0.31dBi
Power supply:	6V DC(1.5V x 4 "AA" Size Batteries) for TX

Operation Frequency each of channel

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2410MHz	21	2430MHz	41	2450MHz	61	2470MHz
2	2411MHz	22	2431MHz	42	2451MHz	62	2471MHz
3	2412MHz	23	2432MHz	43	2452MHz	63	2472MHz
4	2413MHz	24	2433MHz	44	2453MHz	64	2473MHz
5	2414MHz	25	2434MHz	45	2454MHz	65	2474MHz
6	2415MHz	26	2435MHz	46	2455MHz	66	2475MHz
7	2416MHz	27	2436MHz	47	2456MHz	67	2476MHz
8	2417MHz	28	2437MHz	48	2457MHz	68	2477MHz
9	2418MHz	29	2438MHz	49	2458MHz	69	2478MHz
10	2419MHz	30	2439MHz	50	2459MHz	70	2479MHz
11	2420MHz	31	2440MHz	51	2460MHz	71	2480MHz
12	2421MHz	32	2441MHz	52	2461MHz		
13	2422MHz	33	2442MHz	53	2462MHz		
14	2423MHz	34	2443MHz	54	2463MHz		
15	2424MHz	35	2444MHz	55	2464MHz		
16	2425MHz	36	2445MHz	56	2465MHz		
17	2426MHz	37	2446MHz	57	2466MHz		
18	2427MHz	38	2447MHz	58	2467MHz		
19	2428MHz	39	2448MHz	59	2468MHz		
20	2429MHz	40	2449MHz	60	2469MHz		

Using test software was control EUT work in continuous transmitter and receiver mode.and select test channel as below:

Channel	Frequency
The lowest channel (CH1)	2410MHz
The middle channel (CH36)	2445MHz
The highest channel (CH71)	2480MHz

5.3 Test Environment and Mode

Operating Environment:	
Temperature:	25.0 °C
Humidity:	55 % RH
Atmospheric Pressure:	1010mbar
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,
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 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Radio frequency	7.25×10^{-8}
2	RF power (conducted)	0.75dB
3	Radiated Spurious emission	4.5dB (30MHz-1GHz)
		4.8dB (1GHz-25GHz)
4	Temperature test	1℃
5	Humidity test	3%
6	DC and low frequency voltages test	0.5%

5.11 Equipment List

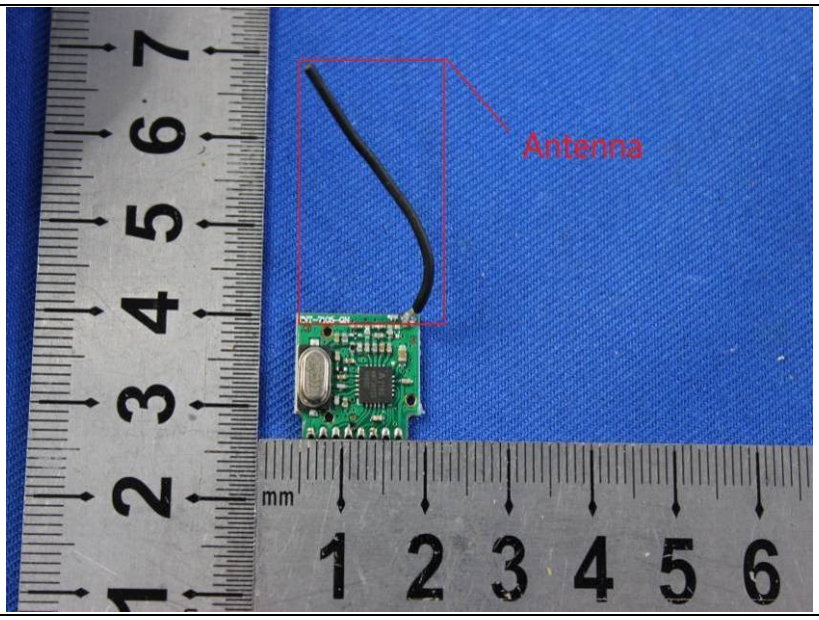
RE in Chamber						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. Date (yyyy-mm-dd)**	**Cal. Due date (yyyy-mm-dd)**
1	3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2016-05-13	2017-05-13
2	EMI Test Receiver	Agilent Technologies	N9038A	SEM004-05	2016-10-09	2017-10-09
3	BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-01	2014-11-01	2017-11-01
4	Double-ridged horn (1-18GHz)	ETS-LINDGREN	3117	SEM003-11	2015-10-17	2018-10-17
5	Horn Antenna (18-26GHz)	ETS-LINDGREN	3160	SEM003-12	2014-11-24	2017-11-24
6	Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2016-04-25	2017-04-25
7	Band filter	Amindeon	Asi 3314	SEM023-01	N/A	N/A
8	DC Power Supply	Zhao Xin	RXN-305D	SEM011-02	2016-10-09	2017-10-09
9	Loop Antenna	Beijing Daze	ZN30401	SEM003-09	2015-05-13	2018-05-13

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

RF connected test						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. Date (yyyy-mm-dd)**	**Cal. Due date (yyyy-mm-dd)**
1	DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2016-10-09	2017-10-09
2	Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2016-10-09	2017-10-09
3	Signal Generator	Rohde & Schwarz	SML03	SEM006-02	2016-04-25	2017-04-25
4	Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2016-10-09	2017-10-09

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:	
The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0.31dBi.	

6.2 Spurious Emissions

6.2.1 Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.249 and 15.209
Test Method:	ANSI C63.10: 2013 Clause 6.4,6.5 and 6.6
Test Site:	Measurement Distance: 3m

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:

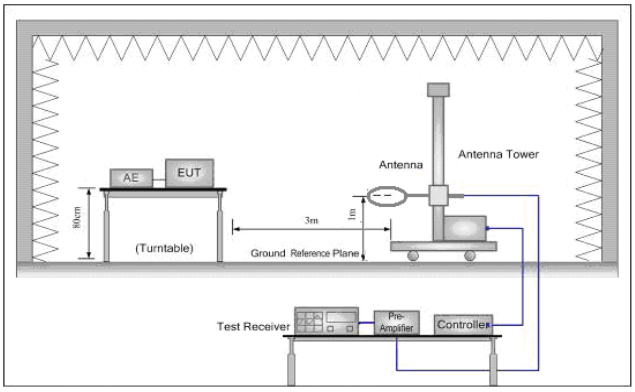


Figure 1. Below 30MHz

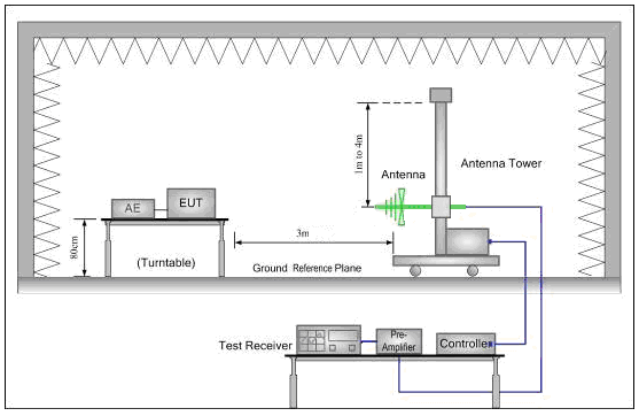


Figure 2. 30MHz to 1GHz

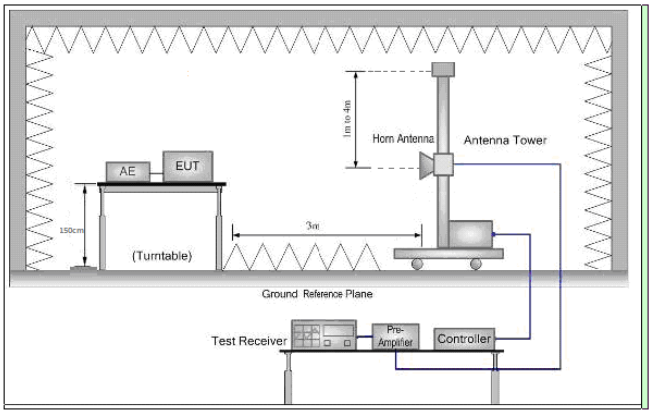


Figure 3. Above 1 GHz

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 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 (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 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.

	h. Test the EUT in the lowest channel, the middle channel, the Highest channel 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. j. Repeat above procedures until all frequencies measured was complete.
Instruments Used:	Refer to section 5.10 for details
Exploratory Test Mode:	Transmitting mode
Final Test Mode:	Transmitting mode Only the worst case is recorded in the report.
Test Results:	Pass

Measurement Data

6.2.1.1 Field Strength Of The Fundamental Signal

Peak value:

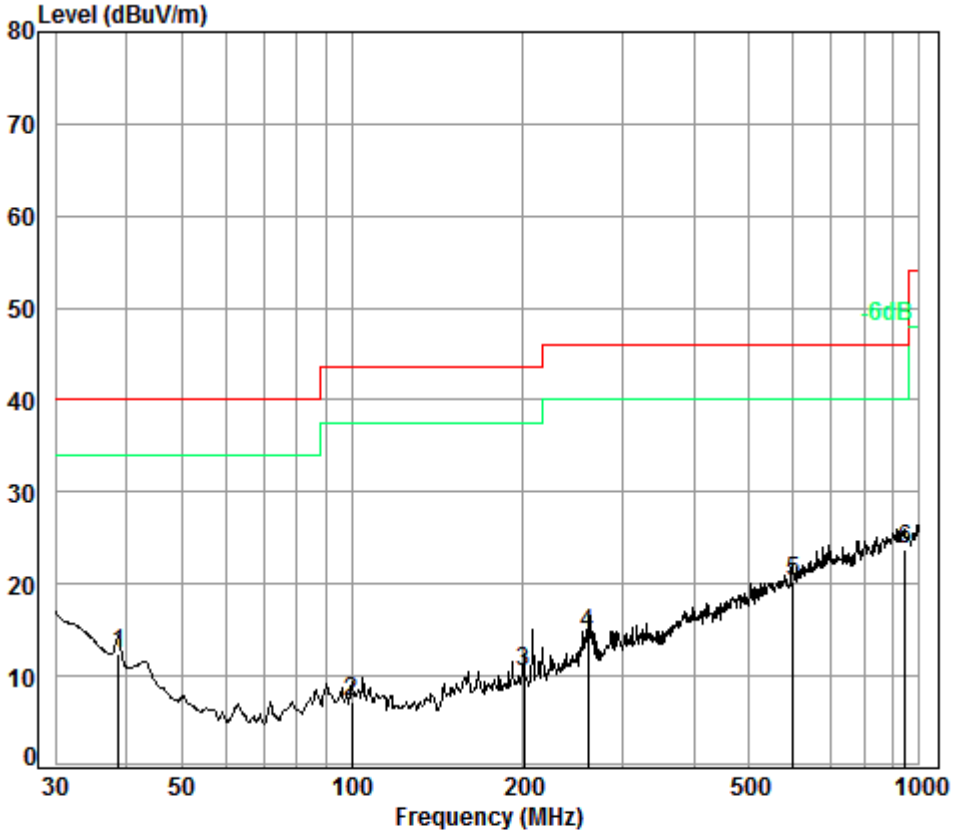
Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2410.113	29.14	5.35	37.96	93.72	90.25	114.00	-23.75	Vertical
2410.113	29.14	5.35	37.96	93.70	90.23	114.00	-23.77	Horizontal
2444.878	29.24	5.38	37.96	95.76	92.42	114.00	-21.58	Vertical
2445.158	29.24	5.38	37.96	94.88	91.54	114.00	-22.46	Horizontal
2479.855	29.34	5.41	37.95	94.87	91.67	114.00	-22.33	Vertical
2479.905	29.34	5.41	37.95	91.49	88.29	114.00	-25.71	Horizontal

Remark:

The peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.

6.2.1.2 Spurious Emissions

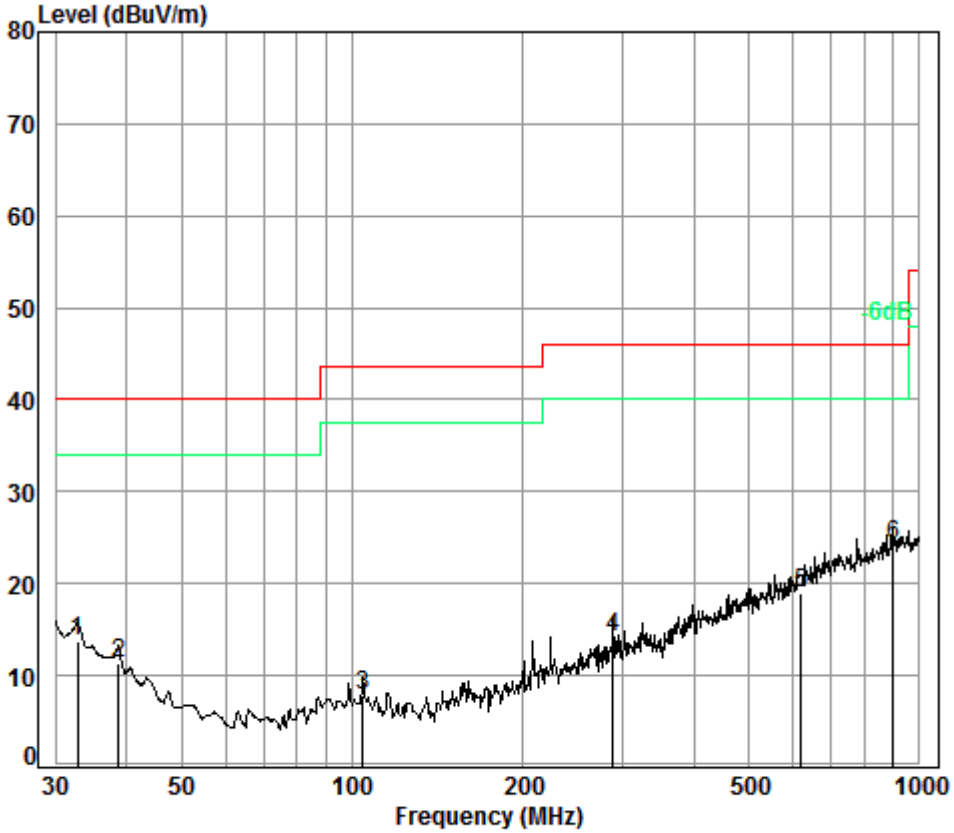
30MHz~1GHz			
Test worse mode:	Transmitter mode(Lowest channel)	Polarization:	Vertical



Condition: 3m VERTICAL
Job No. : 10719CR
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	38.75	0.60	13.80	27.32	25.34	12.42	40.00	-27.58
2	99.88	1.20	9.10	27.20	24.18	7.28	43.50	-36.22
3	200.69	1.40	10.24	26.70	25.52	10.46	43.50	-33.04
4	260.14	1.72	12.50	26.51	26.89	14.60	46.00	-31.40
5	599.32	2.70	19.78	27.54	25.28	20.22	46.00	-25.78
6 pp	942.13	3.64	23.30	26.58	23.49	23.85	46.00	-22.15

Test worse mode:	Transmitter mode(Lowest channel)	Polarization:	Horizontal



Condition: 3m HORIZONTAL
Job No. : 10719CR
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	32.86	0.60	17.10	27.35	23.46	13.81	40.00	-26.19
2	38.75	0.60	13.80	27.32	24.30	11.38	40.00	-28.62
3	104.54	1.21	8.87	27.17	24.87	7.78	43.50	-35.72
4	287.99	1.85	13.37	26.43	25.46	14.25	46.00	-31.75
5	618.54	2.74	20.32	27.51	23.47	19.02	46.00	-26.98
6 pp	900.15	3.60	23.20	26.78	24.09	24.11	46.00	-21.89

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
3584.372	32.45	7.66	37.96	44.39	46.54	74.00	-27.46	Vertical
4820.000	34.19	8.89	38.41	49.79	54.46	74.00	-19.54	Vertical
5947.702	34.67	10.42	38.31	44.57	51.35	74.00	-22.65	Vertical
7230.000	36.41	10.69	37.09	41.85	51.86	74.00	-22.14	Vertical
9640.000	37.53	12.52	35.08	37.39	52.36	74.00	-21.64	Vertical
12350.530	38.81	14.27	36.44	36.46	53.10	74.00	-20.90	Vertical
3589.562	32.46	7.66	37.96	45.58	47.74	74.00	-26.26	Horizontal
4820.000	34.19	8.89	38.41	49.84	54.51	74.00	-19.49	Horizontal
5913.378	34.65	10.32	38.32	44.94	51.59	74.00	-22.41	Horizontal
7230.000	36.41	10.69	37.09	41.39	51.40	74.00	-22.60	Horizontal
9640.000	37.53	12.52	35.08	37.40	52.37	74.00	-21.63	Horizontal
12279.260	38.77	14.33	36.27	36.55	53.38	74.00	-20.62	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
4820.000	34.19	8.89	38.41	40.10	44.77	54.00	-9.23	Vertical
4820.000	34.19	8.89	38.41	40.20	44.87	54.00	-9.13	Horizontal

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
3563.687	32.39	7.65	37.96	44.64	46.72	74.00	-27.28	Vertical
4890.000	34.31	8.99	38.44	46.06	50.92	74.00	-23.08	Vertical
6016.949	34.71	10.54	38.28	44.49	51.46	74.00	-22.54	Vertical
7335.000	36.36	10.73	37.00	41.78	51.87	74.00	-22.13	Vertical
9780.000	37.56	12.59	35.01	37.13	52.27	74.00	-21.73	Vertical
11980.900	38.58	14.54	35.60	35.84	53.36	74.00	-20.64	Vertical
3765.116	32.97	7.73	37.98	45.03	47.75	74.00	-26.25	Horizontal
4890.000	34.31	8.99	38.44	45.67	50.53	74.00	-23.47	Horizontal
6016.949	34.71	10.54	38.28	43.73	50.70	74.00	-23.30	Horizontal
7335.000	36.36	10.73	37.00	41.65	51.74	74.00	-22.26	Horizontal
9780.000	37.56	12.59	35.01	37.36	52.50	74.00	-21.50	Horizontal
12102.870	38.66	14.47	35.85	35.81	53.09	74.00	-20.91	Horizontal

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
3579.190	32.43	7.66	37.96	44.99	47.12	74.00	-26.88	Vertical
4960.000	34.43	9.09	38.48	58.97	64.01	74.00	-9.99	Vertical
5939.103	34.66	10.39	38.31	44.84	51.58	74.00	-22.42	Vertical
7440.000	36.32	10.77	36.90	52.18	62.37	74.00	-11.63	Vertical
9920.000	37.58	12.67	34.94	36.82	52.13	74.00	-21.87	Vertical
12085.370	38.65	14.49	35.80	36.22	53.56	74.00	-20.44	Vertical
3825.521	33.13	7.75	37.98	44.03	46.93	74.00	-27.07	Horizontal
4960.000	34.43	9.09	38.48	61.81	66.85	74.00	-7.15	Horizontal
6157.871	34.83	10.36	38.14	43.72	50.77	74.00	-23.23	Horizontal
7440.000	36.32	10.77	36.90	54.60	64.79	74.00	-9.21	Horizontal
9926.563	37.59	12.67	34.94	37.03	52.35	74.00	-21.65	Horizontal
12261.500	38.76	14.34	36.23	36.55	53.42	74.00	-20.58	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
4960.000	34.43	9.09	38.48	45.90	50.94	54.00	-3.06	Vertical
7440.000	36.32	10.77	36.90	41.48	51.67	54.00	-2.33	Vertical
4960.000	34.43	9.09	38.48	47.11	52.15	54.00	-1.85	Horizontal
7440.000	36.32	10.77	36.90	42.43	52.62	54.00	-1.38	Horizontal

Remark:

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

2) Scan from 9kHz to 25GHz,The disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported .

3) As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits.

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 Clause 6.10
Test site:	Measurement Distance: 3m
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:

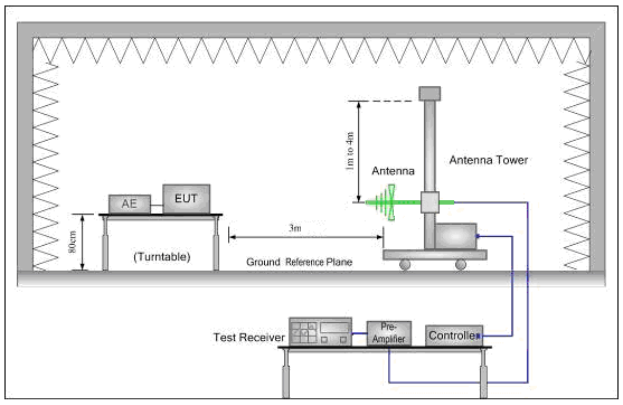


Figure 1. 30MHz to 1GHz

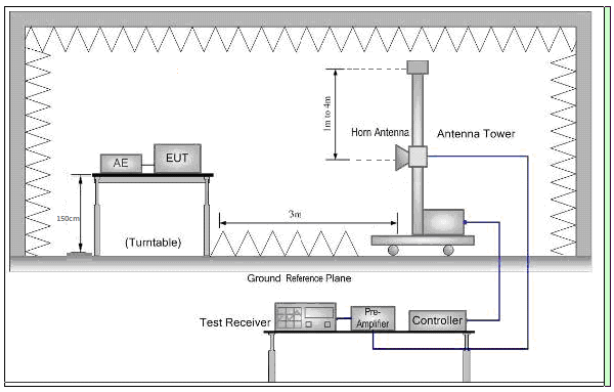
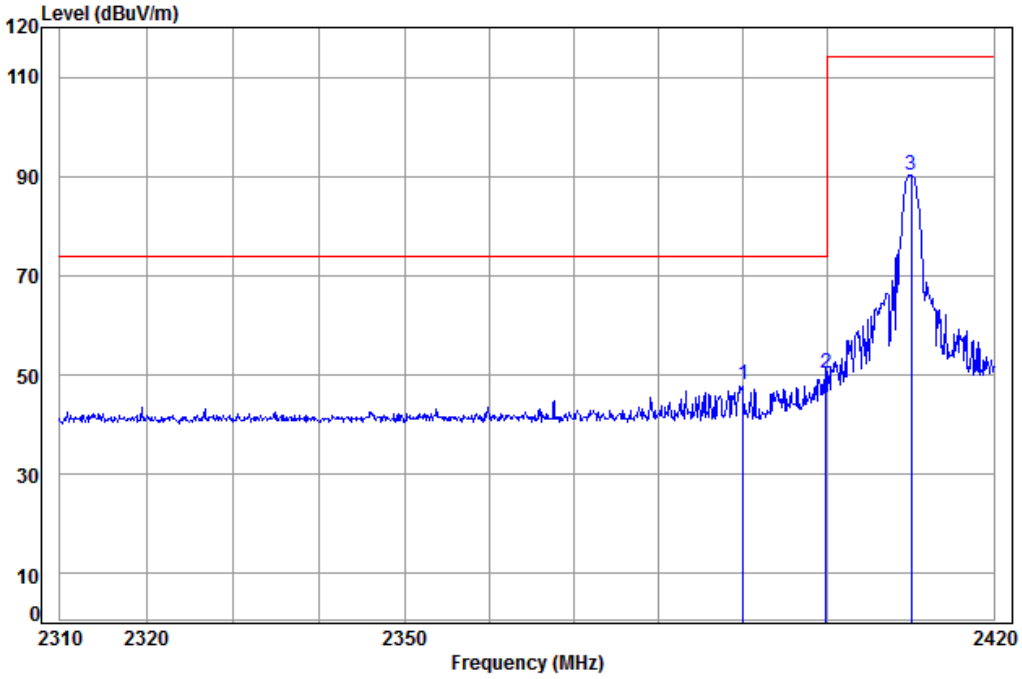


Figure 2. Above 1 GHz

Test Procedure:	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 channel h. Test the EUT in the lowest channel , the Highest channel 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.. j. Repeat above procedures until all frequencies measured was complete.
Instruments Used:	Refer to section 5.10 for details
Test Mode:	Transmitting with GFSK modulation.
Test Results:	Pass

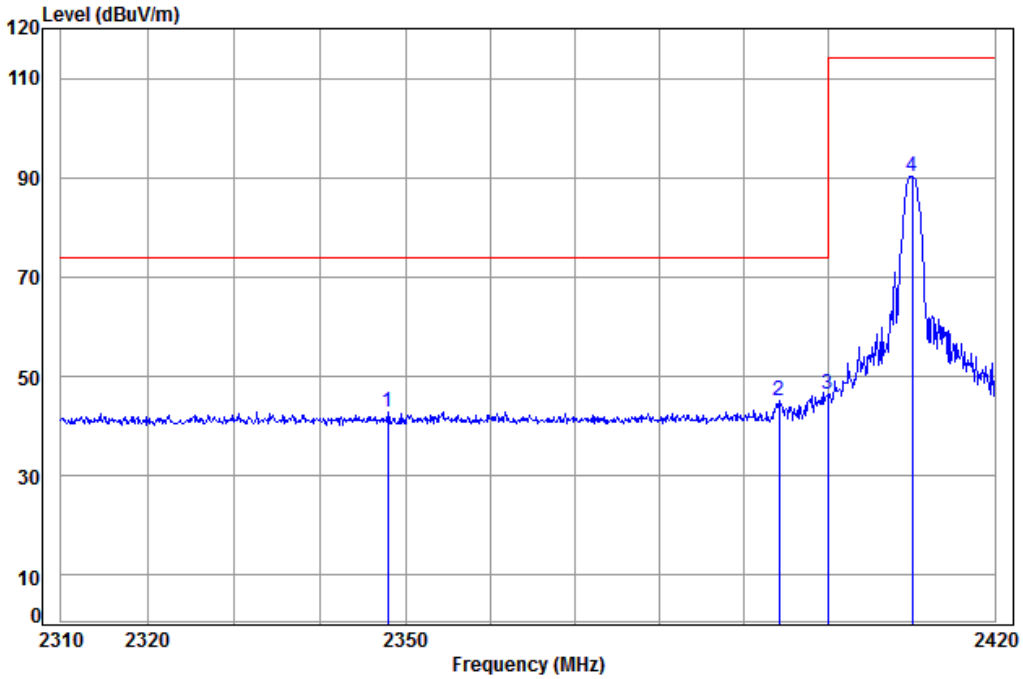
Band edge (Radiated Emission)					
Test mode:	Transmitting	Test channel:	Lowest	Remark:	Vertical



Condition: 3m VERTICAL
Job No: : 10719CR
Mode: : 2410 Bandedge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2390.000	5.34	29.08	37.96	51.53	47.99	74.00	-26.01	
2 pp	2399.821	5.34	29.11	37.96	53.90	50.39	74.00	-23.61	
3	2410.113	5.35	29.14	37.96	93.72	90.25	114.00	-23.75	

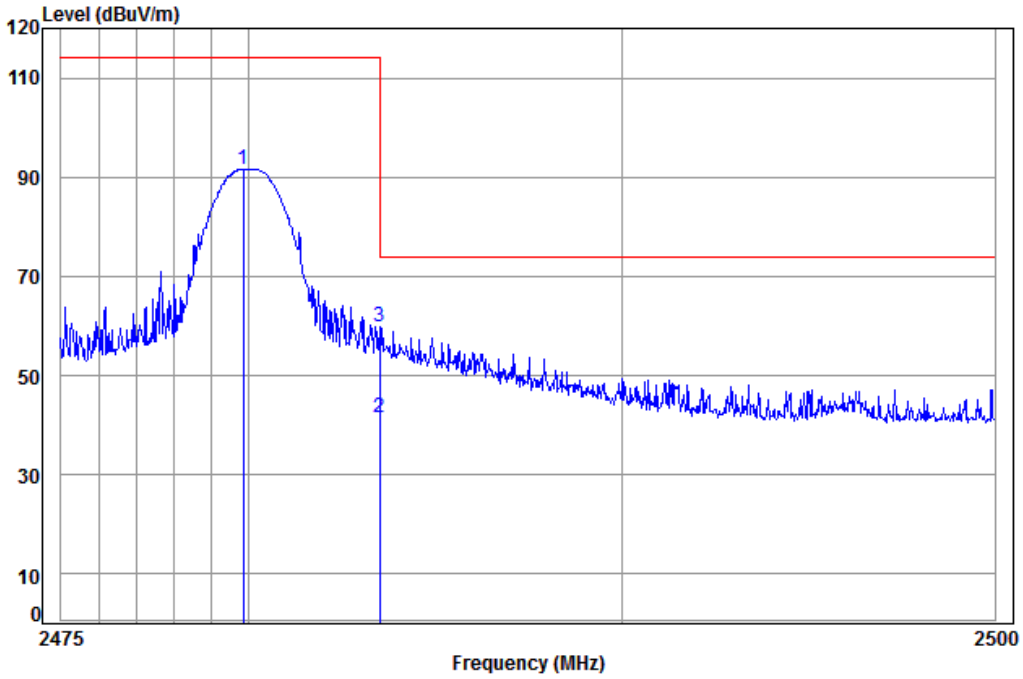
Test mode:	Transmitting	Test channel:	Lowest	Remark:	Horizontal



Condition: 3m HORIZONTAL
Job No: : 10719CR
Mode: : 2410 Bandedge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2347.919	5.30	28.95	37.97	46.55	42.83	74.00	-31.17	
2	2394.134	5.34	29.09	37.96	48.51	44.98	74.00	-29.02	
3	2400.000	5.34	29.11	37.96	49.90	46.39	74.00	-27.61	
4 pp	2410.113	5.35	29.14	37.96	93.70	90.23	114.00	-23.77	

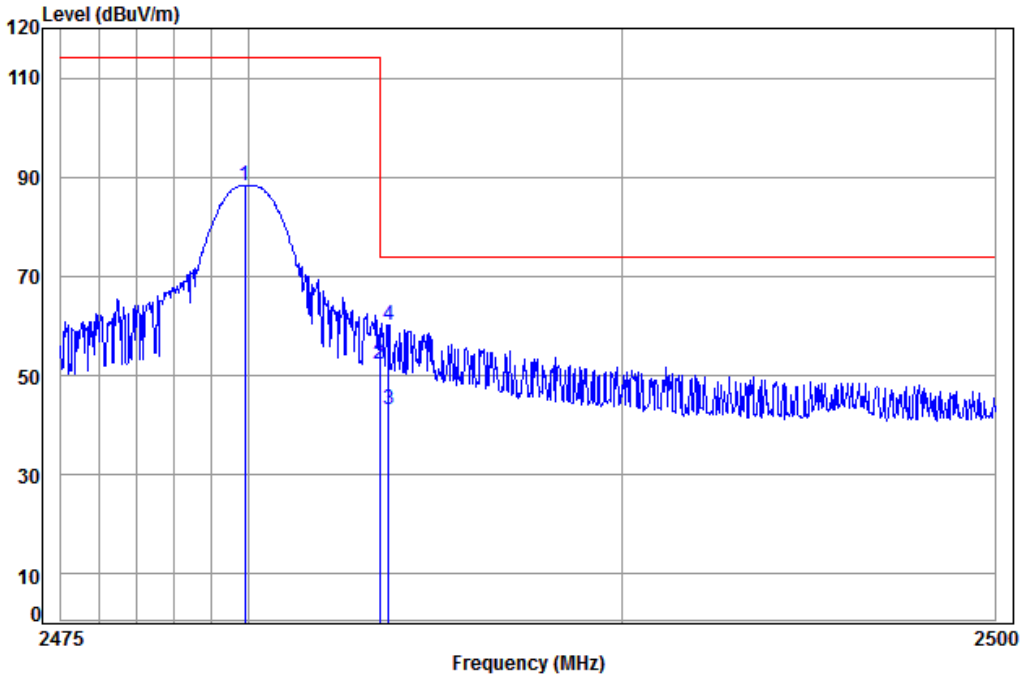
Test mode:	Transmitting	Test channel:	Highest	Remark:	Vertical



Condition: 3m VERTICAL
Job No: : 10719CR
Mode: : 2480 Bandedge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2479.855	5.41	29.34	37.95	94.87	91.67	114.00	-22.33	
2	pp 2483.500	5.41	29.35	37.95	44.59	41.40	54.00	-12.60	Average
3	pk 2483.500	5.41	29.35	37.95	63.05	59.86	74.00	-14.14	Peak

Test mode:	Transmitting	Test channel:	Highest	Remark:	Horizontal



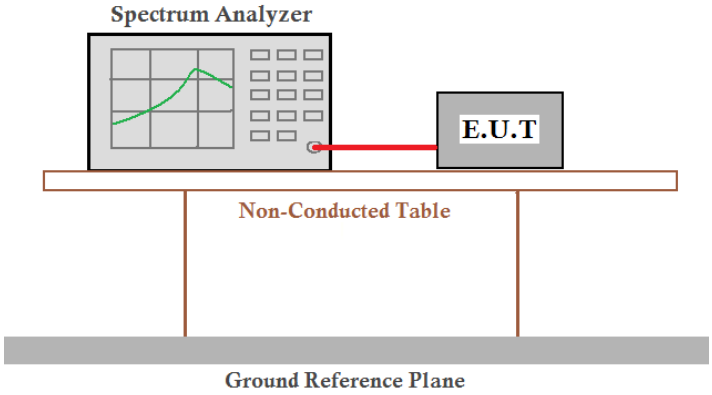
Condition: 3m HORIZONTAL
Job No: : 10719CR
Mode: : 2480 Bandedge

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2479.905	5.41	29.34	37.95	91.49	88.29	114.00	-25.71	
2	2483.500	5.41	29.35	37.95	55.46	52.27	74.00	-21.73	
3 pp	2483.746	5.41	29.35	37.95	46.19	43.00	54.00	-11.00	Average
4 pk	2483.746	5.41	29.35	37.95	63.39	60.20	74.00	-13.80	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:

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

6.4 20dB Bandwidth

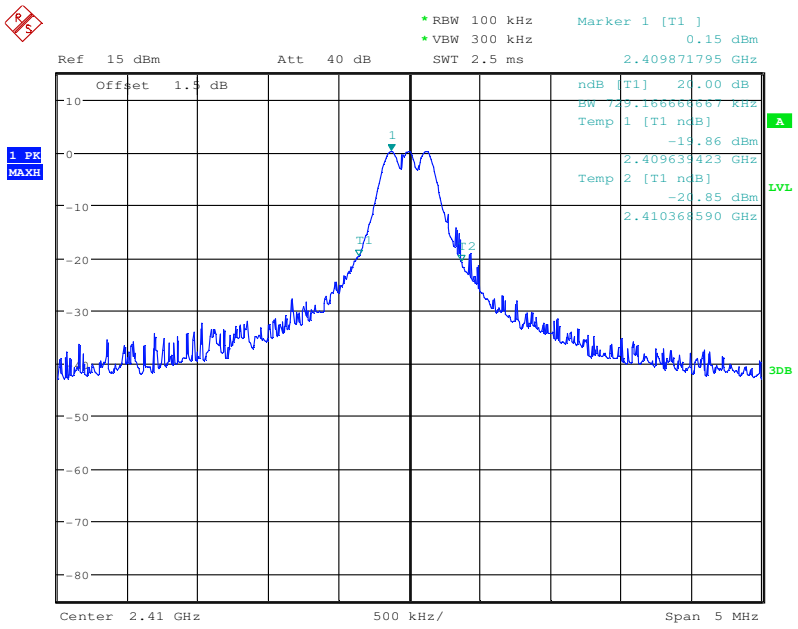
Test Requirement:	47 CFR Part 15C Section 15.215
Test Method:	ANSI C63.10:2013 Clause 6.9
Test Setup:	
Instruments Used:	Refer to section 5.10 for details
Test mode:	Transmitting mode
Limit:	Within the band 2400MHz-2483.5MHz
Test Results:	Pass

Measurement Data

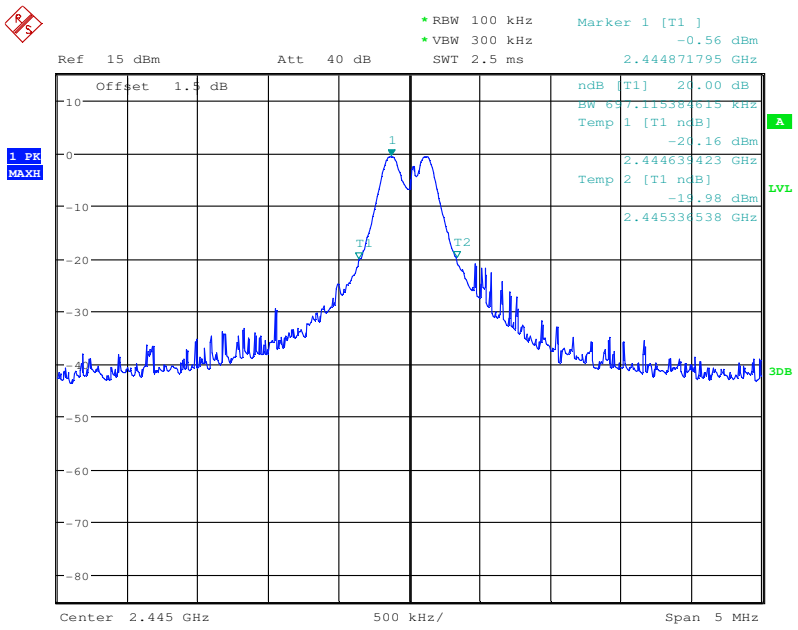
Test channel	20dB bandwidth (MHz)	Results
Lowest	0.729	Pass
Middle	0.697	Pass
Highest	0.721	Pass

Test plot as follows:

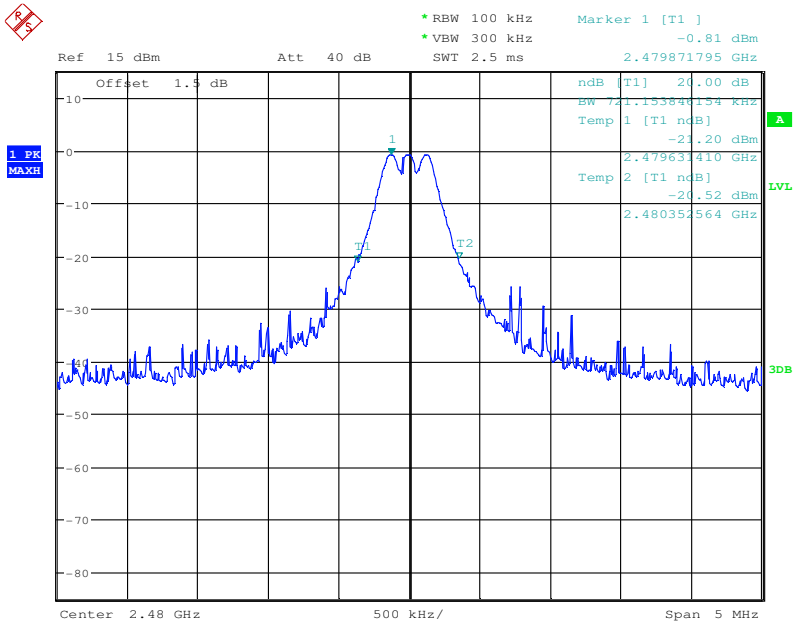
Test channel:	Lowest



Test channel:	Middle



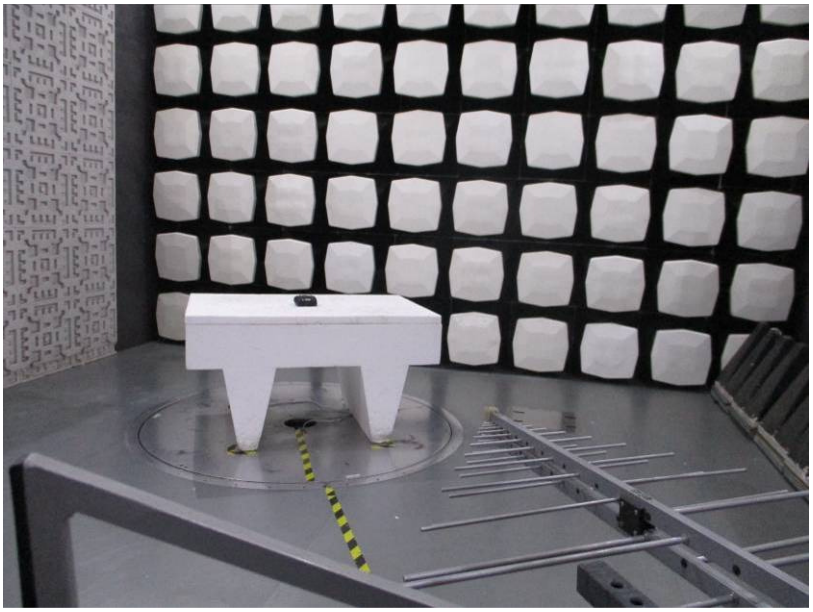
Test channel:	Highest



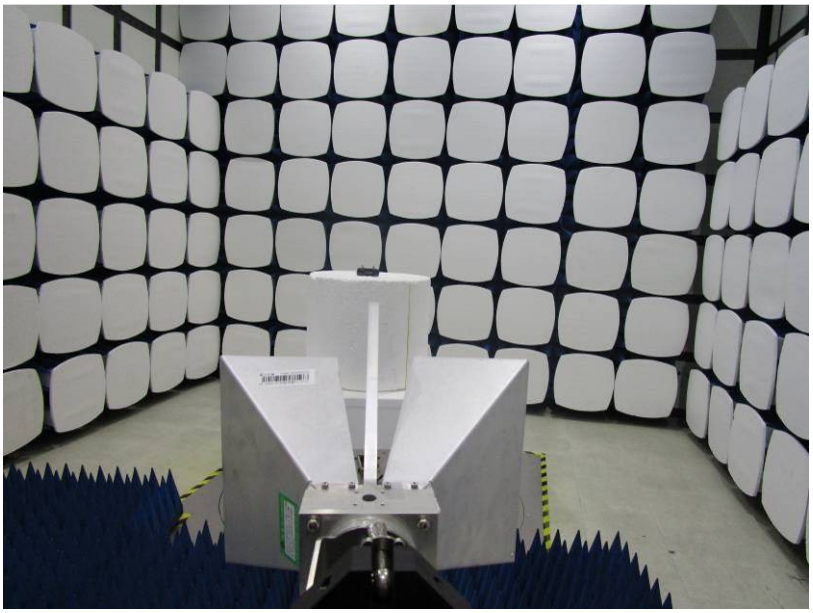
7 Photographs

Test model No.: WT-372004

7.1 Radiated Emission Test Setup



7.2 Radiated Spurious Emission Test Setup



7.3 EUT Constructional Details