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

No. 1 Workshop, M-10, Middle section, Science & Technology Park,
Shenzhen, Guangdong, China 518057

Telephone: +86 (0) 755 2601 2053
Fax: +86 (0) 755 2671 0594
Email: ee.shenzhen@sgs.com

TEST REPORT

Application No.:	SZEM1702001258CR(GZEM1702000946CR)
Applicant:	Mattel Asia Pacific Sourcing Limited
Address of Applicant:	Room 1301, South Tower, World Finance Centre, Harbour City, Tsimshasui, Kowloon, Hong Kong
Manufacturer:	Wah Shing Toys Co., Ltd.
Address of Manufacturer:	5/F, Wah Shing Centre, 5 Fung Yip Street, Chai Wan, Hong Kong
Factory:	EverWin Toys(DongGuan) Co., Ltd
Address of Factory:	Xikeng Industrial Area Qingxi Town, Dongguan Guangdong.
Equipment Under Test (EUT):	
EUT Name:	BRB VG RC ROLLER SKATER
Model No.:	FDN00
FCC ID:	PIYFDN00-16A5R
Standards:	47 CFR Part 15, Subpart C 15.249
Date of Receipt:	2017-02-27
Date of Test:	2017-02-28 to 2017-03-09
Date of Issue:	2017-03-09
Test Result :	**Pass***

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

.

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.

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		2017-03-09		Original

Authorized for issue by:				
Tested By		Peter Geng		2017-03-09
		Peter Geng /Project Engineer		**Date**
Checked By		Eric Fu		2017-03-09
		Eric Fu /Reviewer		**Date**

2 Test Summary

Radio Spectrum Technical Requirement				
Item	**Standard**	**Method**	**Requirement**	**Result**
Antenna Requirement	47 CFR Part 15, Subpart C 15.249	N/A	47 CFR Part 15, Subpart C 15.203	Pass

Radio Spectrum Matter Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
Field Strength of the Fundamental Signal(15.249(a))	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.5&6.6	47 CFR Part 15, Subpart C 15.249(a)	Pass
Radiated Emissions	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.4&6.5&6.6	47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)	Pass
Restricted Band Around Fundamental Frequency	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.4&6.5&6.6	47 CFR Part 15, Subpart C 15.205 & 15.249(d) & 15.209	Pass
20dB Bandwidth	47 CFR Part 15, Subpart C 15.249	ANSI C63.10 (2013) Section 6.9	47 CFR Part 15, Subpart C 15.215	Pass

3 Contents

4 General Information

4.1 Details of E.U.T.

Power supply:	Roller Skater: 6.0V DC(1.5V x 4 “AA” Size Batteries)
Operation frequency:	2408-2464MHz
Channel list:	2408MHz, 2436MHz, 2464MHz
Modulation type:	GFSK
Antenna type:	Integral antenna
Antenna gain:	0dBi

4.2 Description of Support Units

The EUT has been tested as an independent unit.

4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.25×10^{-8}
2	Occupied Bandwidth	3%
3	Radiated Spurious emission test	4.5dB (30MHz-1GHz)
		4.8dB (1GHz-18GHz)
4	Temperature test	1℃
5	Humidity test	3%
6	Supply voltages	1.5%
7	Time	3%

4.4 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.

4.5 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.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None

5 Equipment List

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

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

RE in Chamber

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

20dB Bandwidth					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2016-10-09	2017-10-09
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2016-10-09	2017-10-09
Signal Generator	Rohde & Schwarz	SML03	SEM006-02	2016-04-25	2017-04-25
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2016-10-09	2017-10-09

General used equipment					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-03	2016-10-12	2017-10-12
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2016-10-12	2017-10-12
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2016-10-12	2017-10-12
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2016-05-18	2017-05-18

6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.249

6.1.2 Conclusion

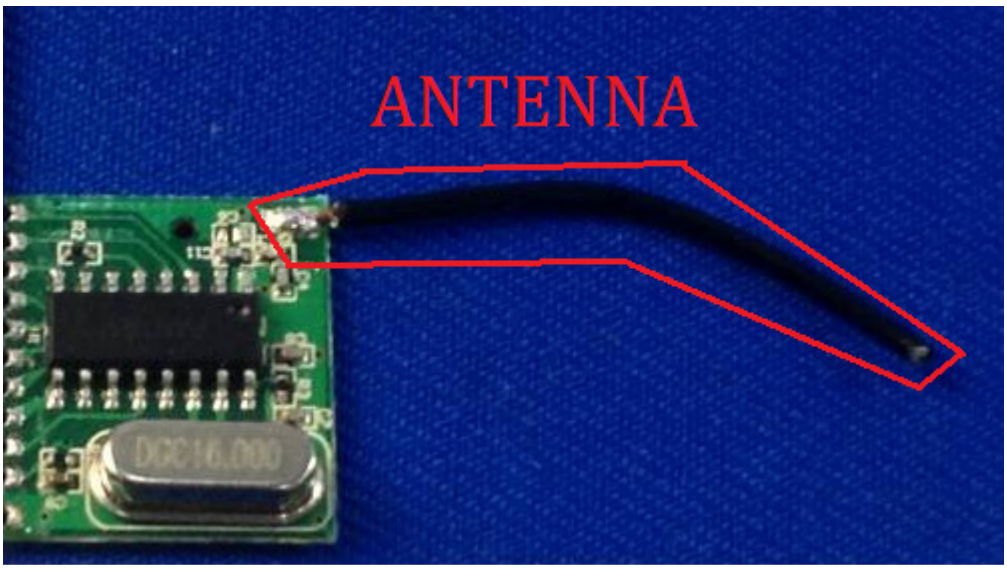
Standard Requirment:

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 0dBi.



7 Radio Spectrum Matter Test Results

7.1 Field Strength of the Fundamental Signal(15.249(a))

Test Requirement: 47 CFR Part 15, Subpart C 15.249
Test Method: ANSI C63.10 (2013) Section 6.5&6.6
Measurement Distance: 3m
Limit:

Frequency	Limit (dBuV/m @3m)	Remark
2400MHz-2483.5MHz	94.0	Average Value
	114.0	Peak Value

7.1.1 E.U.T. Operation

Operating Environment:

Temperature:	24.0 °C	Humidity:	54 % RH	Atmospheric Pressure:	1020 mbar
Pretest these mode to find the worst case:	b: Tx mode(for ROLLER SKATER)				
The worst case for final test:	b: Tx mode(for ROLLER SKATER)				

7.1.2 Measurement Data

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 camber. 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 camber. 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 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 (2408MHz),the middle channel (2436MHz),the Highest channel (2464MHz)

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j. Repeat above procedures until all frequencies measured was complete.

Mode:b; Polarization:Horizontal; Modulation Type:GFSK; ; Channel:Low; Peak Detector

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
2408.264	29.13	5.35	37.96	90.33	86.85	114	-27.15

Mode:b; Polarization:Vertical; Modulation Type:GFSK; ; Channel:Low; Peak Detector

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
2408.06	29.13	5.35	37.96	89.91	86.43	114	-27.57

Mode:b; Polarization:Horizontal; Modulation Type:GFSK; ; Channel:middle; Peak Detector

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
2436.02	29.21	5.37	37.96	90.4	87.02	114	-26.98

Mode:b; Polarization:Vertical; Modulation Type:GFSK; ; Channel:middle; Peak Detector

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
2436.04	29.21	5.37	37.96	89.68	86.3	114	-27.7

Mode:b; Polarization:Horizontal; Modulation Type:GFSK; Channel:High; Peak Detector

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
2464.249	29.3	5.39	37.95	90.02	86.76	114	-27.24

Mode:b; Polarization:Vertical; Modulation Type:GFSK; Channel:High; Peak Detector

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
2464.368	29.3	5.39	37.95	89.46	86.2	114	-27.8

7.2 Radiated Emissions

Test Requirement: 47 CFR Part 15, Subpart C 15.249
Test Method: ANSI C63.10 (2013) Section 6.4&6.5&6.6
Measurement Distance: 3m
Limit:

Frequency(MHz)	Field strength (microvolts/meter)	Limit (dBuV/m)	Detector	Measurement Distance (meters)
0.009-0.490	2400/F(kHz)	-	-	300
0.490-1.705	24000/F(kHz)	-	-	30
1.705-30	30	-	-	30
30-88	100	40.0	QP	3
88-216	150	43.5	QP	3
216-960	200	46.0	QP	3
960-1000	500	54.0	QP	3
Above 1000	500	54.0	AV	3

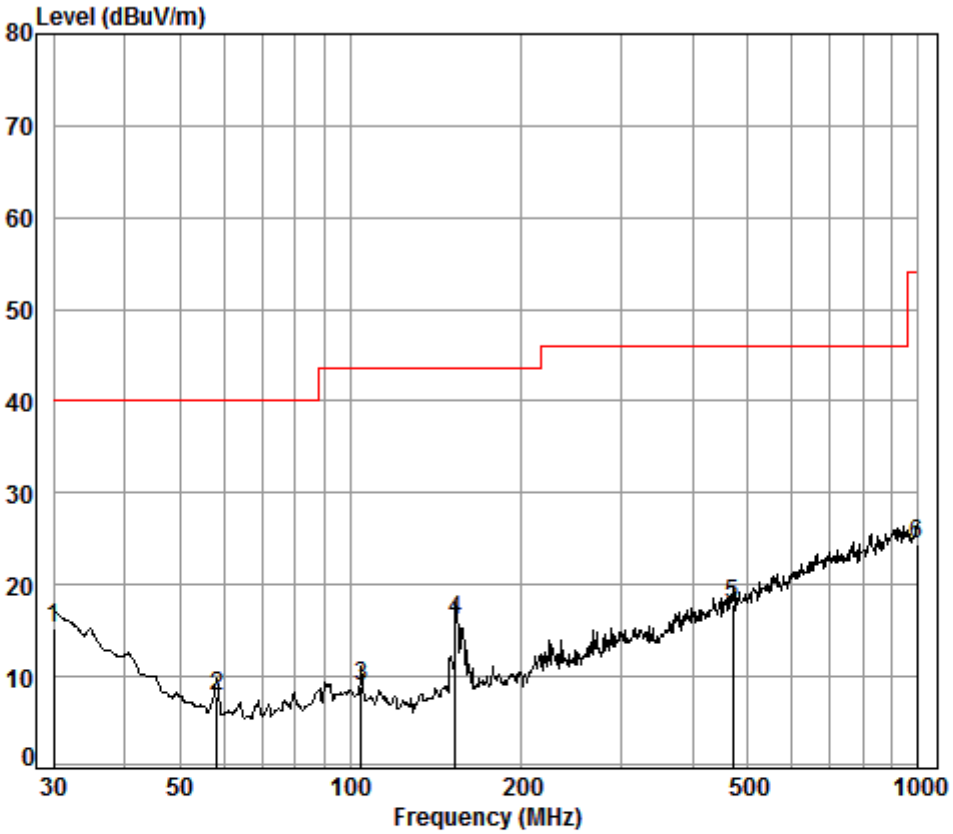
7.2.1 E.U.T. Operation

Operating Environment:
Temperature: 24.0 °C Humidity: 54 % RH Atmospheric Pressure: 1020 mbar
Pretest these mode to find the worst case: b: Tx mode(for Roller Skater)
The worst case for final test: b: Tx mode(for Roller Skater)

7.2.2 Measurement Data

For testing performed with the loop antenna, the center of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specified distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane. Only the worst position of vertical was shown in the report.

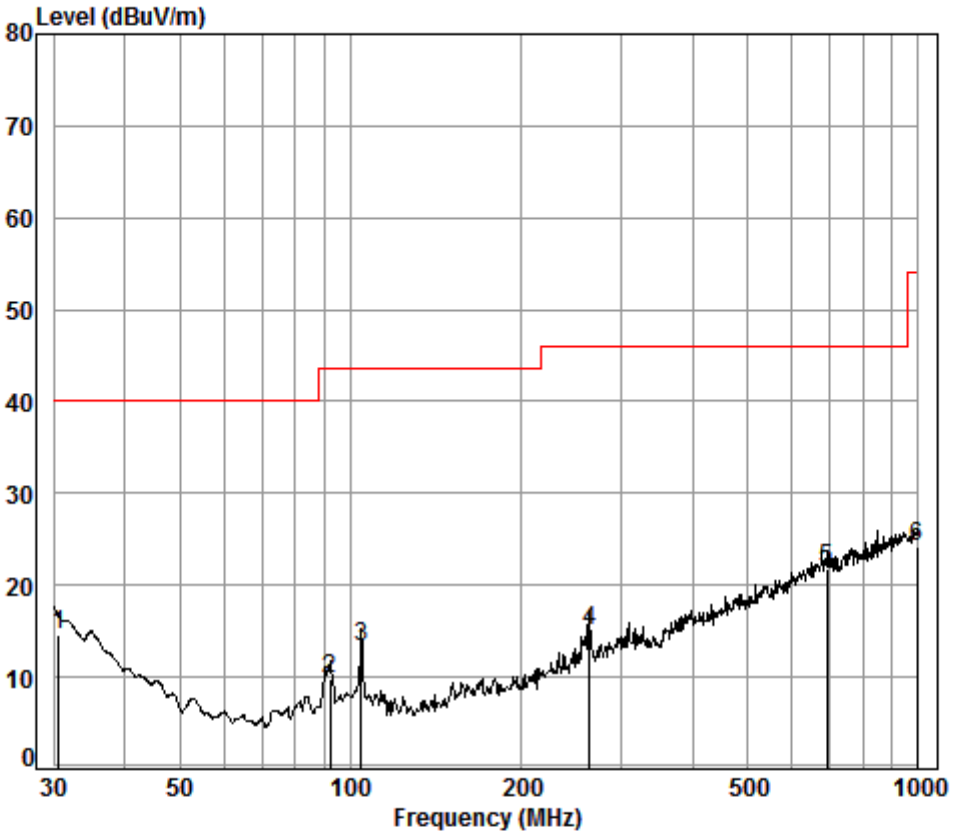
Radiated Emission below 1GHz		
30MHz~1GHz (QP)		
Test mode:	Tx mode	Horizontal



Condition: 3m Horizontal
Job No. : 1258CR
Test Mode: TX
: Skater

	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 pp	30.00	0.60	18.70	27.36	23.39	15.33	40.00	-24.67
2	58.20	0.80	7.47	27.27	26.75	7.75	40.00	-32.25
3	104.54	1.21	8.87	27.17	26.11	9.02	43.50	-34.48
4	153.20	1.32	9.19	26.89	32.44	16.06	43.50	-27.44
5	472.18	2.50	17.70	27.56	25.14	17.78	46.00	-28.22
6	993.01	3.69	24.02	26.33	23.13	24.51	54.00	-29.49

Test mode:	Tx mode	Vertical



Condition: 3m VERTICAL
Job No. : 1258CR
Test Mode: TX
: Skater

	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	30.64	0.60	18.34	27.35	23.07	14.66	40.00	-25.34
2	92.14	1.12	8.79	27.21	27.00	9.70	43.50	-33.80
3	104.54	1.21	8.87	27.17	30.44	13.35	43.50	-30.15
4	263.82	1.74	12.58	26.50	27.33	15.15	46.00	-30.85
5 pp	689.56	2.88	21.52	27.43	24.81	21.78	46.00	-24.22
6	996.50	3.70	24.16	26.33	22.58	24.11	54.00	-29.89

Mode:b; Polarization:Horizontal; Modulation Type:GFSK; Channel:Low; Peak Detector

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
3814.467	33.10	7.75	37.98	44.50	47.37	74	-26.63
4816.000	34.18	8.88	38.41	50.29	54.94	74	-19.06
6078.201	34.76	10.46	38.22	44.80	51.80	74	-22.20
7224.000	36.41	10.69	37.10	42.99	52.99	74	-21.01
9632.000	37.53	12.51	35.08	37.11	52.07	74	-21.93
12050.440	38.63	14.52	35.72	36.33	53.76	74	-20.24

Mode:b; Polarization:Horizontal; Modulation Type:GFSK; Channel:Low; Average Detector

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
4816.000	34.18	8.88	38.41	38.17	42.82	54	-11.18

Mode:b; Polarization:Vertical; Modulation Type:GFSK; ; Channel:Low; Peak Detector

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
3620.861	32.56	7.68	37.96	44.85	47.13	74	-26.87
4816.000	34.18	8.88	38.41	48.32	52.97	74	-21.03
5896.291	34.64	10.27	38.32	45.02	51.61	74	-22.39
7224.000	36.41	10.69	37.10	42.92	52.92	74	-21.08
9632.000	37.53	12.51	35.08	37.84	52.80	74	-21.20
12067.890	38.64	14.50	35.76	35.79	53.17	74	-20.83

Mode:b; Polarization:Horizontal; Modulation Type:GFSK; Channel:middle; Peak Detector

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
3847.726	33.19	7.76	37.98	44.52	47.49	74	-26.51
4872.000	34.28	8.96	38.44	51.74	56.54	74	-17.46
6104.642	34.79	10.42	38.20	44.89	51.90	74	-22.10
7308.000	36.38	10.72	37.02	42.80	52.88	74	-21.12
9744.000	37.55	12.57	35.03	37.61	52.70	74	-21.30
12208.390	38.73	14.39	36.10	36.44	53.46	74	-20.54

Mode:b; Polarization:Horizontal; Modulation Type:GFSK; Channel:middle; Average Detector

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
4872.000	34.28	8.96	38.44	40.14	44.94	54	-9.06

Mode:b; Polarization:Vertical; Modulation Type:GFSK; Channel:middle; Peak Detector

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
3647.151	32.63	7.69	37.96	44.23	46.59	74	-27.41
4872.000	34.28	8.96	38.44	48.19	52.99	74	-21.01
5939.103	34.66	10.39	38.31	44.51	51.25	74	-22.75
7308.000	36.38	10.72	37.02	42.16	52.24	74	-21.76
9744.000	37.55	12.57	35.03	37.03	52.12	74	-21.88
12085.370	38.65	14.49	35.8	36.49	53.83	74	-20.17

Mode:b; Polarization:Horizontal; Modulation Type:GFSK; Channel:High; Peak Detector

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
3663.017	32.68	7.69	37.97	43.58	45.98	74	-28.02
4928.000	34.38	9.04	38.46	51.91	56.87	74	-17.13
5982.226	34.69	10.51	38.3	44.19	51.09	74	-22.91
7392.000	36.34	10.75	36.95	41.81	51.95	74	-22.05
9856.000	37.57	12.63	34.97	37.10	52.33	74	-21.67
12208.390	38.73	14.39	36.1	36.86	53.88	74	-20.12

Mode:b; Polarization:Horizontal; Modulation Type:GFSK; Channel:High; Average Detector

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
4928.000	34.38	9.04	38.46	41.35	46.31	54	-7.69

Mode:b; Polarization:Vertical; Modulation Type:GFSK; Channel:High; Peak Detector

Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Level (dBμV/m)	Limit (dBμV/m)	Over limit (dB)
3668.321	32.69	7.69	37.97	44.35	46.76	74	-27.24
4928.000	34.38	9.04	38.46	48.54	53.50	74	-20.50
6087.002	34.77	10.45	38.21	44.17	51.18	74	-22.82
7392.000	36.34	10.75	36.95	41.88	52.02	74	-21.98
9856.000	37.57	12.63	34.97	37.56	52.79	74	-21.21
12350.530	38.81	14.27	36.44	36.71	53.35	74	-20.65

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 .

7.3 Restricted Band Around Fundamental Frequency

Test Requirement: 47 CFR Part 15, Subpart C 15.249
Test Method: ANSI C63.10 (2013) Section 6.4&6.5&6.6
Measurement Distance: 3m
Limit:

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
Above 1GHz	74.0	Peak Value
Emission 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.		

7.3.1 E.U.T. Operation

Operating Environment:

Temperature:	24.0 °C	Humidity:	54 % RH	Atmospheric Pressure:	1020	mbar	
Pretest these mode to find the worst case:	b: Tx mode(for Roller Skater).						
The worst case for final test:	b: Tx mode(for Roller Skater).						

7.3.2 Measurement Data

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.

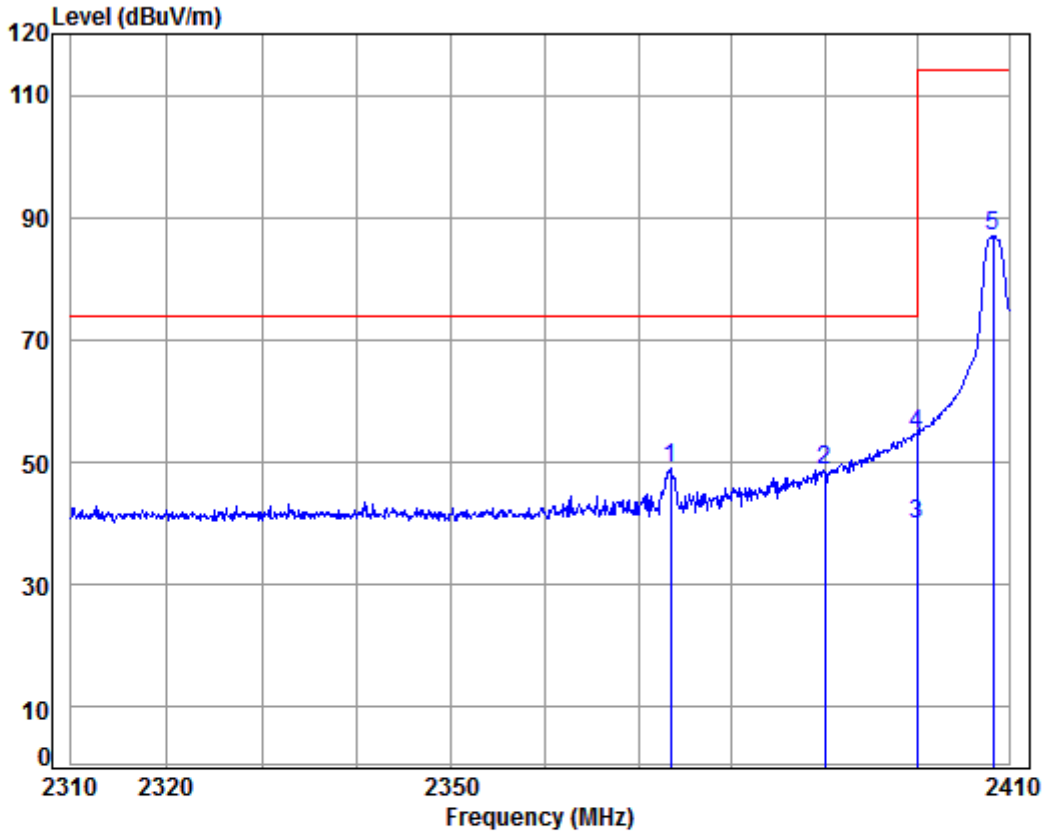
g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h. Test the EUT in the lowest channel (2408MHz),the middle channel (2436MHz),the Highest channel (2464MHz)

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j. Repeat above procedures until all frequencies measured was complete.

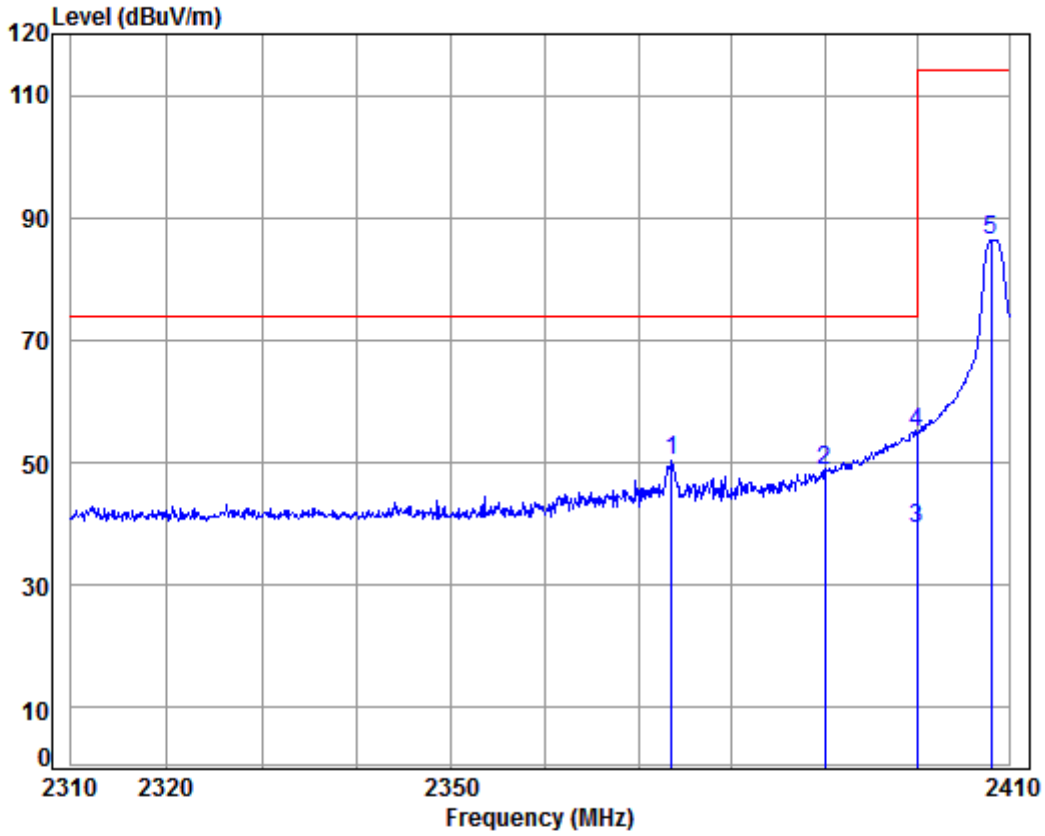
Mode:b; Polarization:Horizontal; Modulation Type:GFSK; Channel:Low



Condition: 3m HORIZONTAL
Job No: : 1258CR
Mode: : 2408 Bandedge
: 2.4G Roller

	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	2373.410	5.32	29.03	37.96	52.73	49.12	74.00	-24.88	
2	2390.000	5.34	29.08	37.96	52.25	48.71	74.00	-25.29	
3 pp	2400.000	5.34	29.11	37.96	43.35	39.84	54.00	-14.16	Average
4 pk	2400.000	5.34	29.11	37.96	58.10	54.59	74.00	-19.41	Peak
5	2408.264	5.35	29.13	37.96	90.33	86.85	114.00	-27.15	

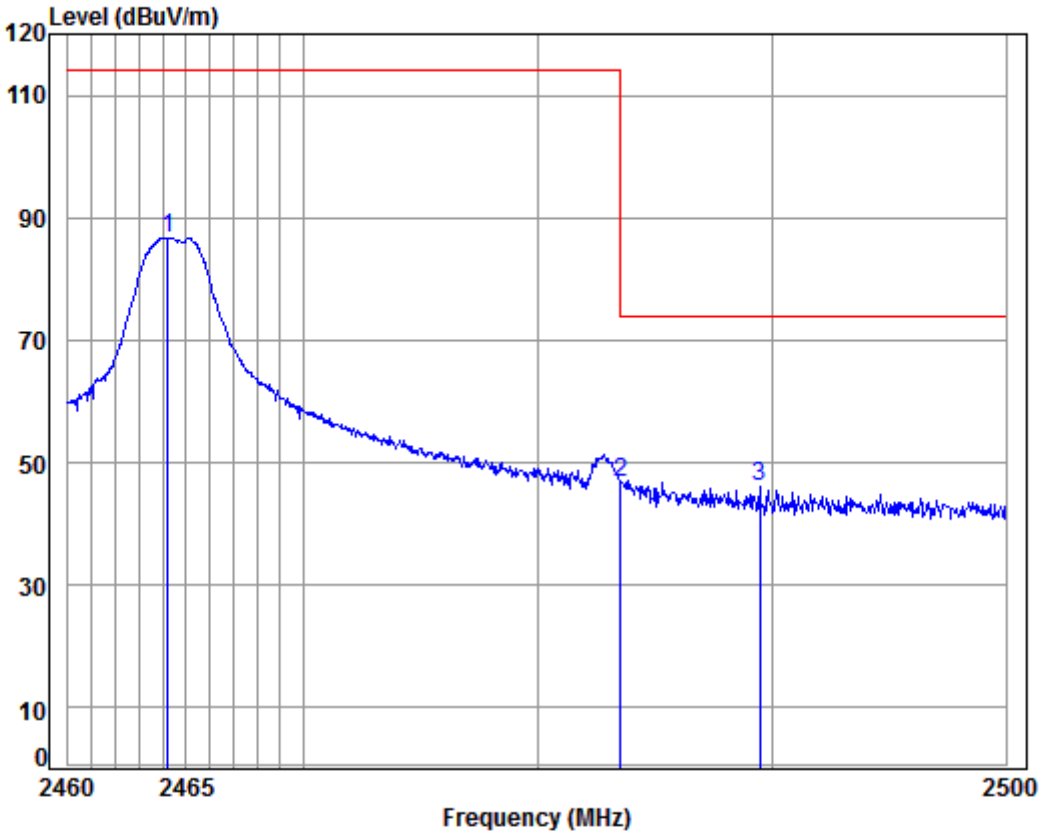
Mode:b; Polarization:Vertical; Modulation Type:GFSK; Channel:Low



Condition: 3m VERTICAL
Job No: : 1258CR
Mode: : 2408 Bandedge
: 2.4G Roller

	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	2373.511	5.32	29.03	37.96	54.02	50.41	74.00	-23.59	
2	2390.000	5.34	29.08	37.96	52.27	48.73	74.00	-25.27	
3 pp	2400.000	5.34	29.11	37.96	42.71	39.20	54.00	-14.80	Average
4 pk	2400.000	5.34	29.11	37.96	58.45	54.94	74.00	-19.06	Peak
5	2408.060	5.35	29.13	37.96	89.91	86.43	114.00	-27.57	

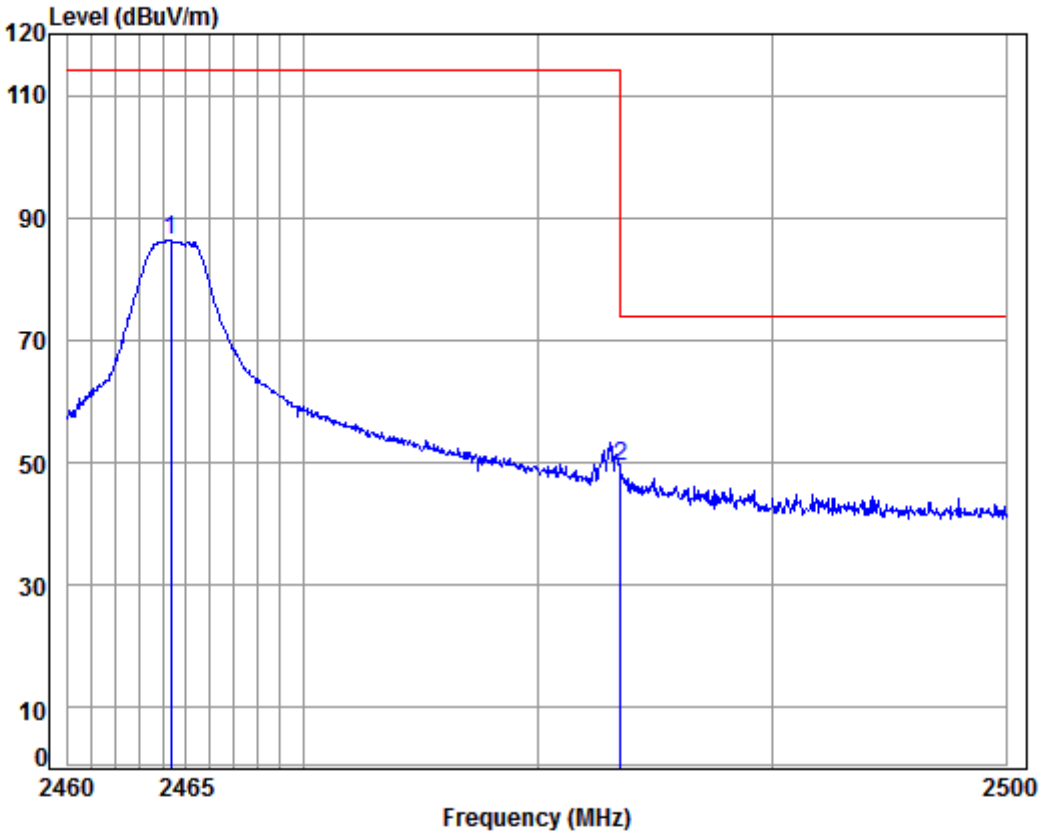
Mode:b; Polarization:Horizontal; Modulation Type:GFSK; Channel:High



Condition: 3m HORIZONTAL
Job No: : 1258CR
Mode: : 2464 Bandedge
: 2.4G Roller

	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	pp 2464.249	5.39	29.30	37.95	90.02	86.76	114.00	-27.24	
2	2483.500	5.41	29.35	37.95	49.87	46.68	74.00	-27.32	
3	2489.458	5.41	29.37	37.95	49.23	46.06	74.00	-27.94	

Mode:b; Polarization:Vertical; Modulation Type:GFSK; Channel:High



Condition: 3m VERTICAL
Job No: : 1258CR
Mode: : 2464 Bandedge
: 2.4G Roller

	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	2464.368	5.39	29.30	37.95	89.46	86.20	114.00	-27.80	
2 pp	2483.500	5.41	29.35	37.95	52.55	49.36	74.00	-24.64	

7.4 20dB Bandwidth

Test Requirement:	47 CFR Part 15, Subpart C 15.249
Test Method:	ANSI C63.10 (2013) Section 6.9
Limit:	N/A

7.4.1 E.U.T. Operation

Operating Environment:

Temperature:	23.0 °C	Humidity:	56 % RH	Atmospheric Pressure:	1020	mbar	
Pretest these mode to find the worst case:	b: Tx mode(for Roller Skater)						
The worst case for final test:	b: Tx mode(for Roller Skater)						

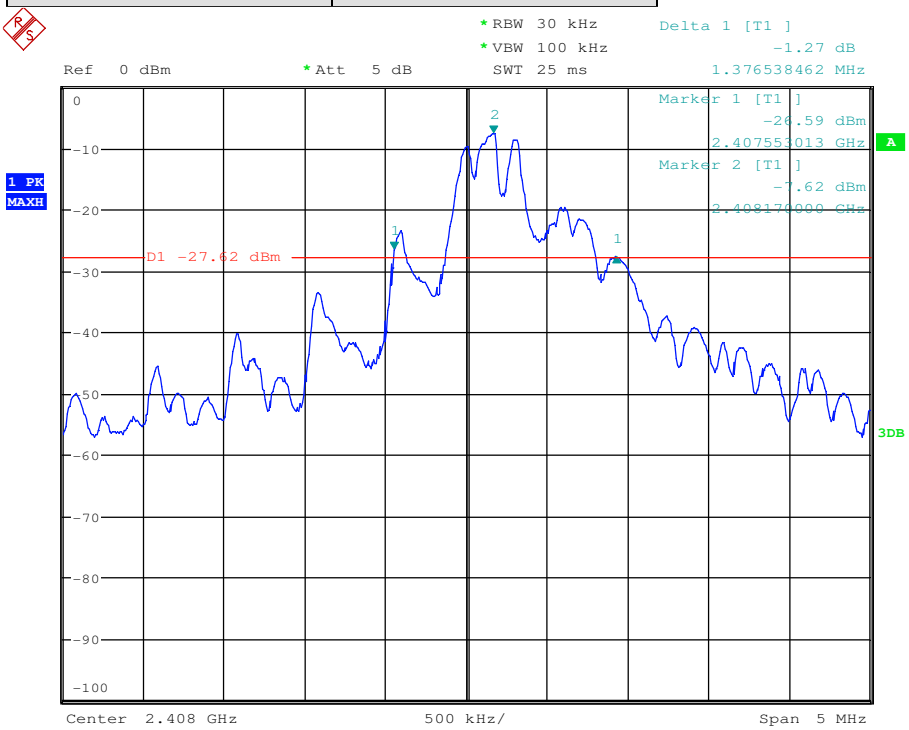
7.4.2 Measurement Data

Measurement Data

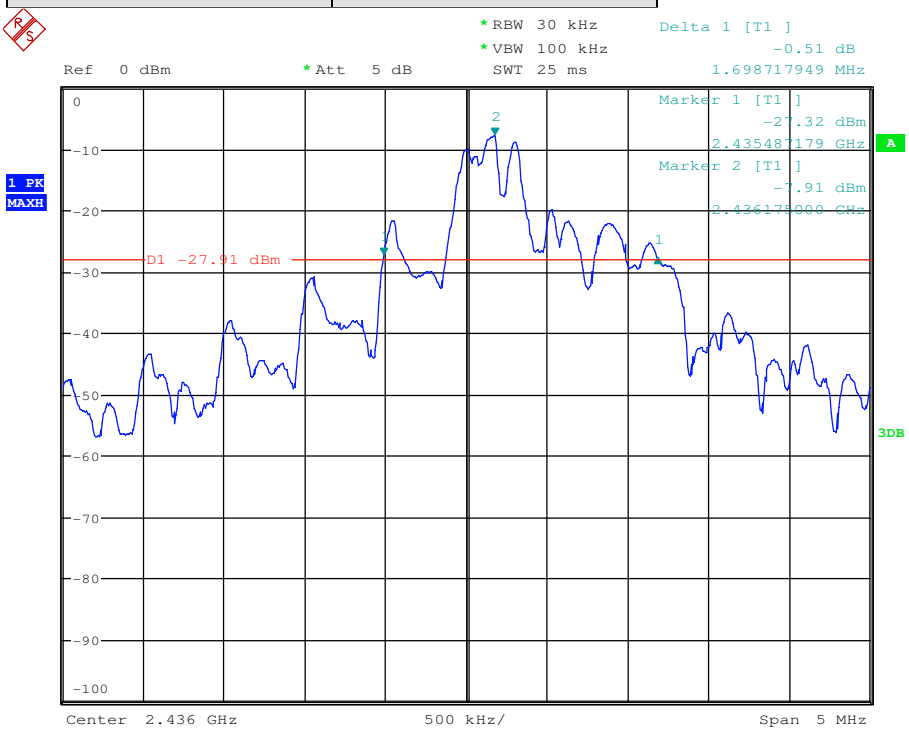
Test Channel	20dB bandwidth (MHz)	Results
Lowest	1.377	Pass
Middle	1.699	Pass
Highest	1.980	Pass

Test plot as follows:

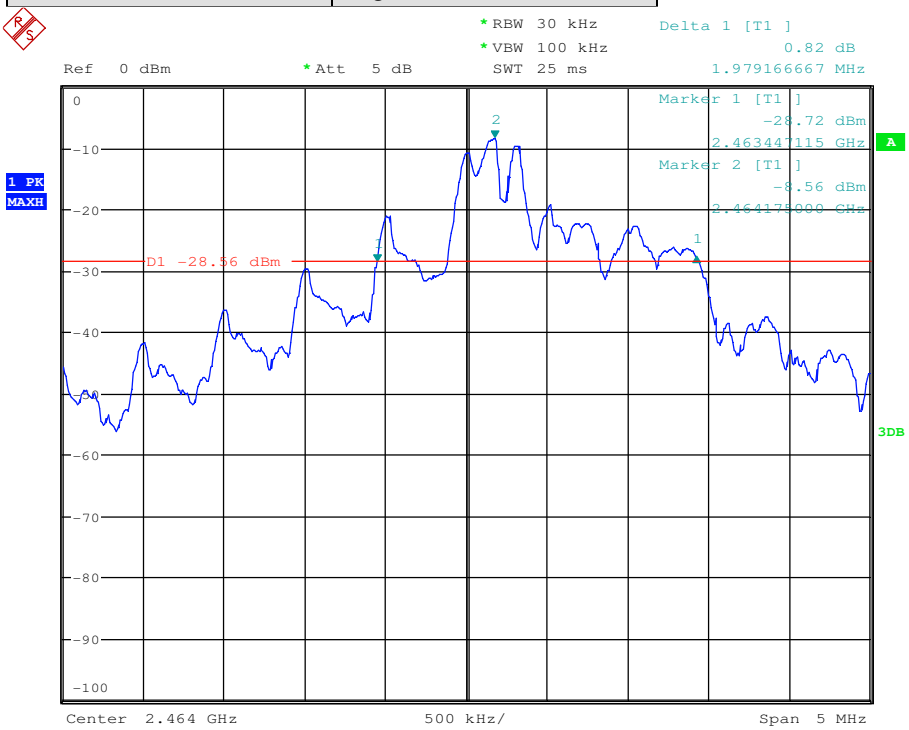
Test channel:	Lowest



Test channel:	Middle

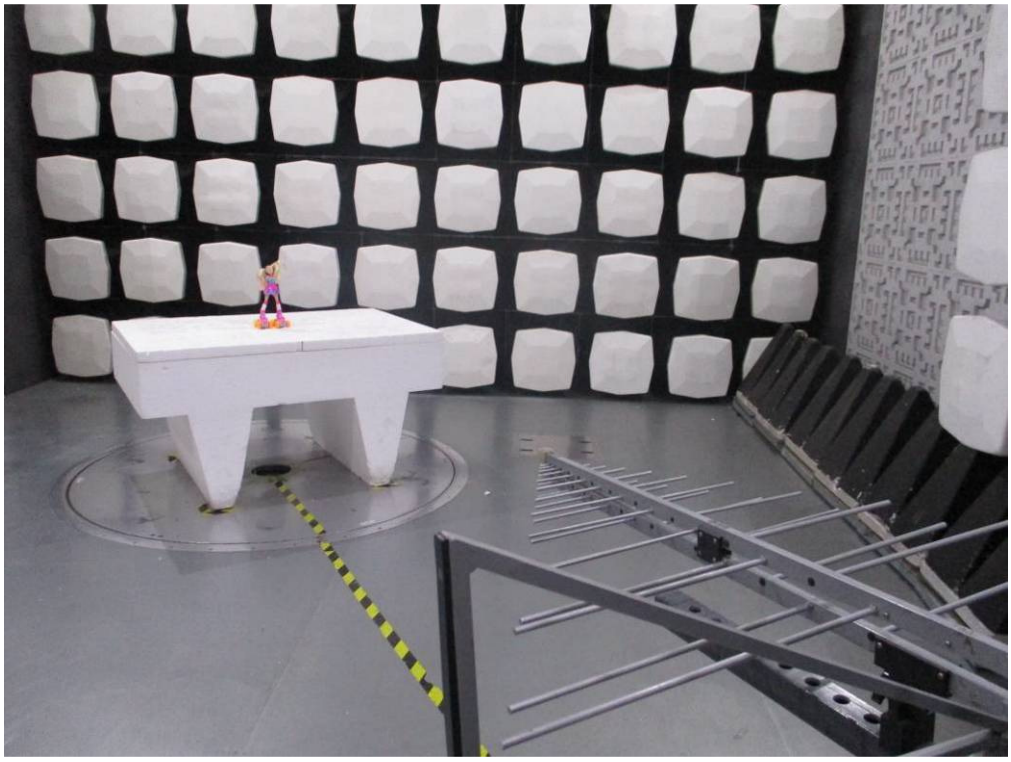


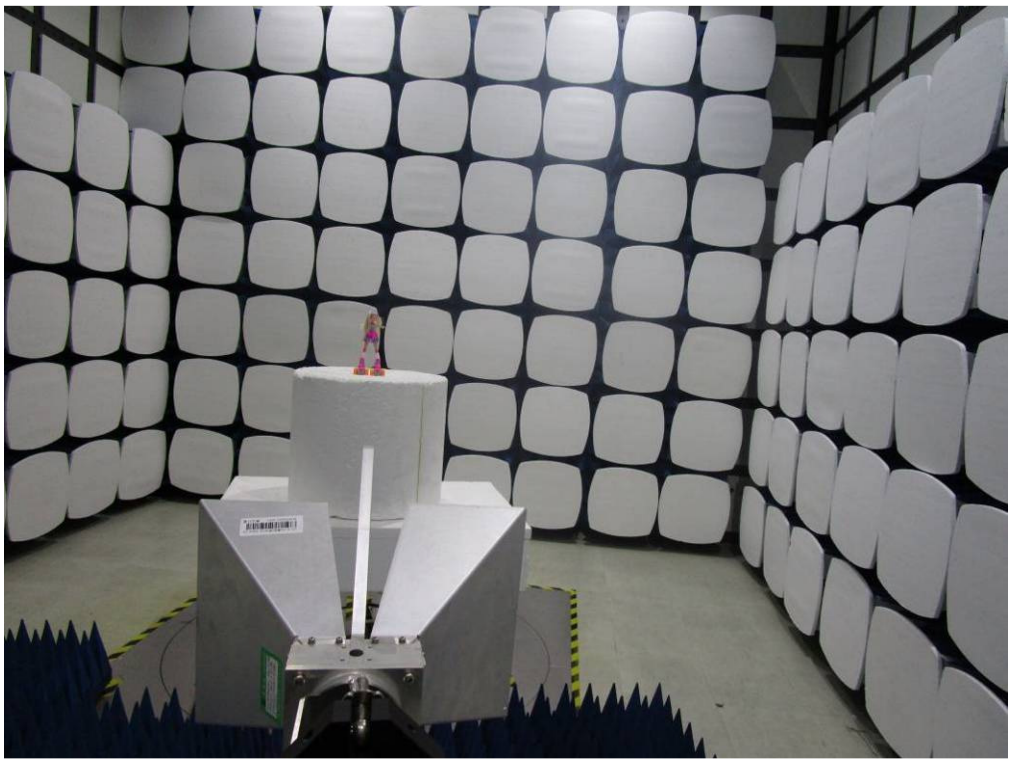
Test channel:	Highest



8 Photographs

8.1 Radiated Emissions Test Setup





8.2 EUT Constructional Details

Refer to Appendix A - Photographs of EUT Constructional Details for SZEM1702001258CR.