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Test Report

Applicant	Bear River Holdings, LLC
Address	5000 Eldorado Pkwy, Suite 150, Frisco, Texas 75033, United States
FCC ID Number	FCC ID: ZEZB1005R24G
Brand Name(s)	None
Model Number(s)/ Item Number(s)	B1005
Product Description	2.4GHz Wireless RC Vehicle - TX Portion
Operating Frequency	2410.00-2475.00 MHz
Rules/Standards	Part 15.249 of the FCC Rules
Received Date	6th March, 2017
Tested Date	6th March, 2017
Tested by	Terry Su (Engineer of Shenzhen SEM.Test Technology Co., Ltd.)
Reviewed by	Silin Chen (EMC Manager of Shenzhen SEM.Test Technology Co., Ltd.)
Signed by	Jandy So (Manager of Shenzhen SEM.Test Technology Co., Ltd.)
Approved by	Gilbert Lui (Marketing Manager of Gakkiku Compliance Company Limited)
Report Number	GCCL201703060C
Test Results	☒ PASSED ☐ FAILED

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant:	Bear River Holdings, LLC
Address of applicant:	5000 Eldorado Pkwy, Suite 150, Frisco, Texas 75033, United States
Manufacturer:	Bear River Holdings, LLC
Address of manufacturer:	5000 Eldorado Pkwy, Suite 150, Frisco, Texas 75033, United States

General Description of EUT	
Product Description:	2.4GHz Wireless RC Vehicle - TX Portion
Trade Name:	None
Tested Model Number/ Item Number:	B1005
Adding Model Number(s)/ Item Number(s):	B1294 [All Adding Brand Name(s) and Model Number(s)/Item Number(s) are same electrically identical as Tested Brand Name and Model Number/Item Number]
Power Source:	DC 6.0V (4 units of DC 1.5V AAA-Size Battery)
Power Adapter Model:	/
Note: The test data is gathered from a production sample, provided by the manufacturer. The appearance of others models listed in the report is different from main-test model B1005, but the circuit and the electronic construction do not change, declared by the manufacturer.	

Technical Characteristics of EUT	
Frequency Range:	2410.00-2475.00 MHz
Max. Field Strength/ RF Output Power::	84.13dBuV/m
Type of Modulation:	GFSK
Type of Antenna:	Fixed 40mm-long (1.3mm-diameter) wire antenna
Antenna Gain:	0 dBi
Lowest Internal Frequency of EUT:	16 MHz

1.2 Test Standards

The following report is prepared on behalf of the Bear River Holdings, LLC in accordance with FCC Part 15, Subpart B, Subpart C, and section 15.107, 15.203, 15.205, 15.207, 15.209 and 15.249 of the FCC Rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and section 15.107, 15.203, 15.205, 15.207, 15.209 and 15.249 of the FCC Rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which results in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard for Testing Unlicensed Wireless Devices, and ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

1.4 Test Facility

FCC – Registration No.: 934118
Shenzhen SEM.Test Technology Co., Ltd. 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 and the Registration is 934118.

Industry Canada (IC) Registration No.: 11464A
The 3m Semi-anechoic chamber of Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

CNAS Registration No.: L4062
Shenzhen SEM.Test Technology Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, Guangdong, 518101, China.

1.5 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	Lowest Channel	2410.00 MHz
TM2	Near Middle Channel	2440.00 MHz
TM3	Highest Channel	2475.00 MHz

Special Cable List and Details			
Cable Description	Length (m)	Shielded/ Unshielded	With/ Without Ferrite
/	/	/	/

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
/	/	/	/

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
RF Output Power	Conducted	±0.42dB
Occupied Bandwidth	Conducted	±1.5%
Conducted Spurious Emission	Conducted	±2.17dB
Conducted Emissions	Conducted	±2.88dB
Transmitter Spurious Emissions	Radiated	±5.1dB

1.7 Test Equipment List and Details

No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due Date
SEMT-1072	Spectrum Analyzer	Agilent	E4407B	MY41440400	2016-06-04	2017-06-03
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2016-06-04	2017-06-03
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2016-06-04	2017-06-03
SEMT-1008	Amplifier	Agilent	8447F	3113A06717	2016-06-04	2017-06-03
SEMT-1043	Amplifier	C&D	PAP-1G18	2002	2016-06-04	2017-06-03
SEMT-1011	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2016-06-04	2017-06-03
SEMT-1042	Horn Antenna	ETS	3117	00086197	2016-06-04	2017-06-03
SEMT-1121	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170582	2016-06-04	2017-06-03
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2016-06-04	2017-06-03
SEMT-1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2016-06-04	2017-06-03
SEMT-1003	L.I.S.N	Schwarz beck	NSLK8126	8126-224	2016-06-04	2017-06-03
SEMT-1002	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2016-06-04	2017-06-03

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
Part 15.203	Antenna Requirement	Compliant
Part 15.205	Restricted Band of Operation	Compliant
Part 15.207(a)	Conducted Emission	N/A*
Part 15.209(a)(f)	Radiated Spurious Emissions	Compliant
Part 15.249(a)	Field Strength of Emissions	Compliant
Part 15.249(d)	Out of Band Emission	Compliant
Part 15.215 (c)	Emission Bandwidth	Compliant

*Remark:
The AC Line Conducted Emissions testing is exempted because it is powered solely by batteries.
Thus, the AC Line Conducted Emissions testing is not applicable.

3. Antenna Requirements

3.1 Standard Applicable

According to FCC Part 15.203, 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 shall be considered sufficient to comply with the provisions of this section.

3.2 Test Result

This product has a fixed 40mm-long (1.3mm-diameter) wire antenna, fulfill the requirement of this section.

4. Radiated Emissions

4.1 Standard Applicable

According to FCC Part 15.249(a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

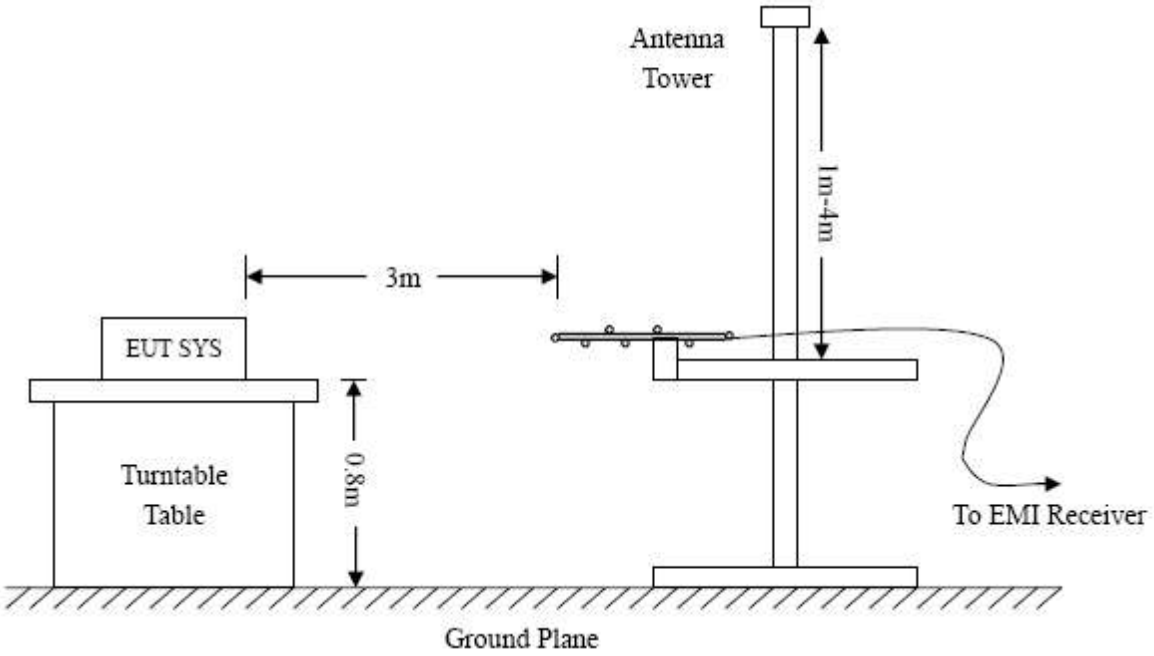
Fundamental Frequency	Field strength of fundamental (milli-volts/meter)	Field strength of Harmonics (micro-volts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

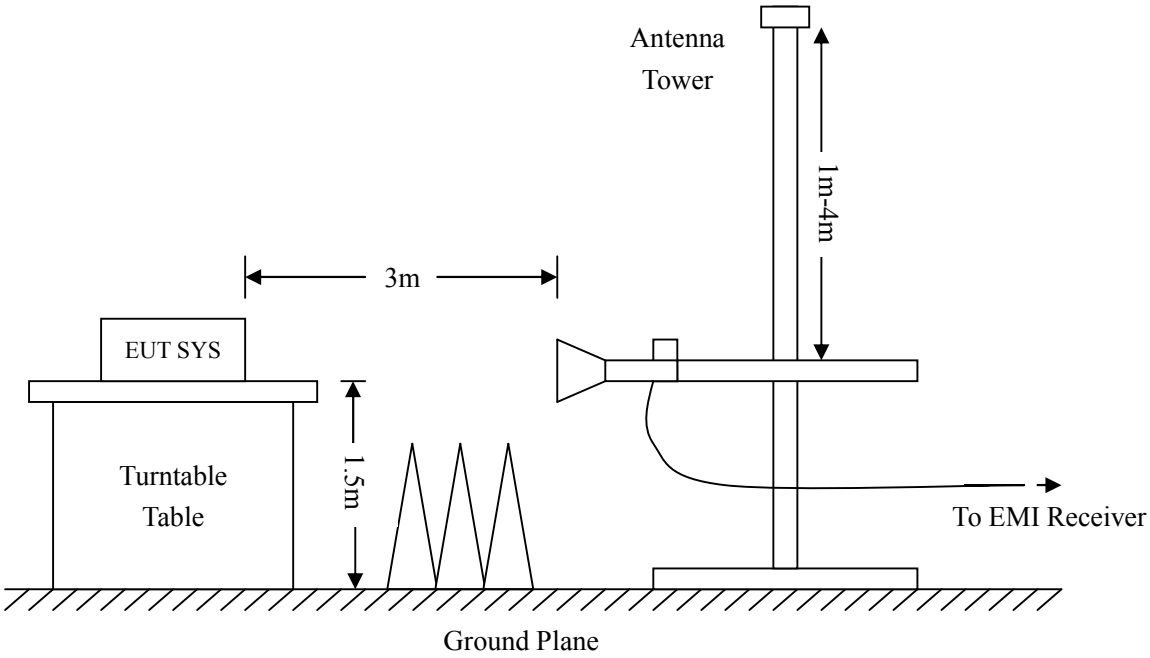
(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

4.2 Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.205 15.249(a) and FCC Part 15.209 Limit.
The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.
The spacing between the peripherals was 10 cm.





Frequency :9kHz-30MHz	Frequency :30MHz-1GHz	Frequency :Above 1GHz
RBW=10KHz,	RBW=120KHz,	RBW=1MHz,
VBW =30KHz	VBW=300KHz	VBW=3MHz(Peak), 10Hz(AV)
Sweep time= Auto	Sweep time= Auto	Sweep time= Auto
Trace = max hold	Trace = max hold	Trace = max hold
Detector function = peak	Detector function = peak, QP	Detector function = peak, AV

4.3 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Ant. Factor + Cable Loss – Ampl. Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dBμV means the emission is 6dBμV below the maximum limit. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – FCC Part 15C Limit

4.4 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	60 %
ATM Pressure:	1012 mbar

4.5 Summary of Test Results/Plots

According to the data below, the FCC Part 15.205, 15.209 and 15.249 standards, and had the worst margin of:

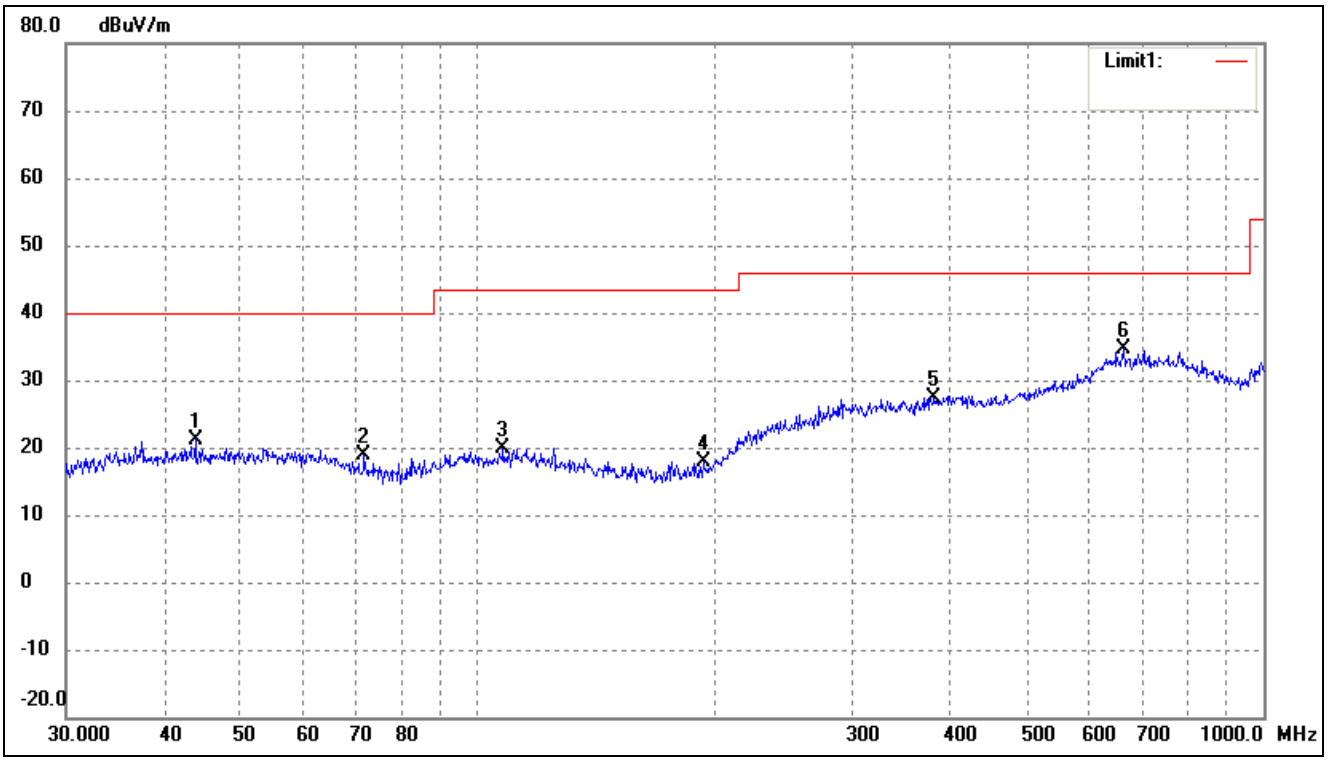
-11.29 dB at **699.3046 MHz** in the **Horizontal** polarization, **Near Middle Channel, 9 kHz to 25 GHz, 3Meters**

Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

Plot of Radiated Emissions Test Data (30MHz to 1GHz)

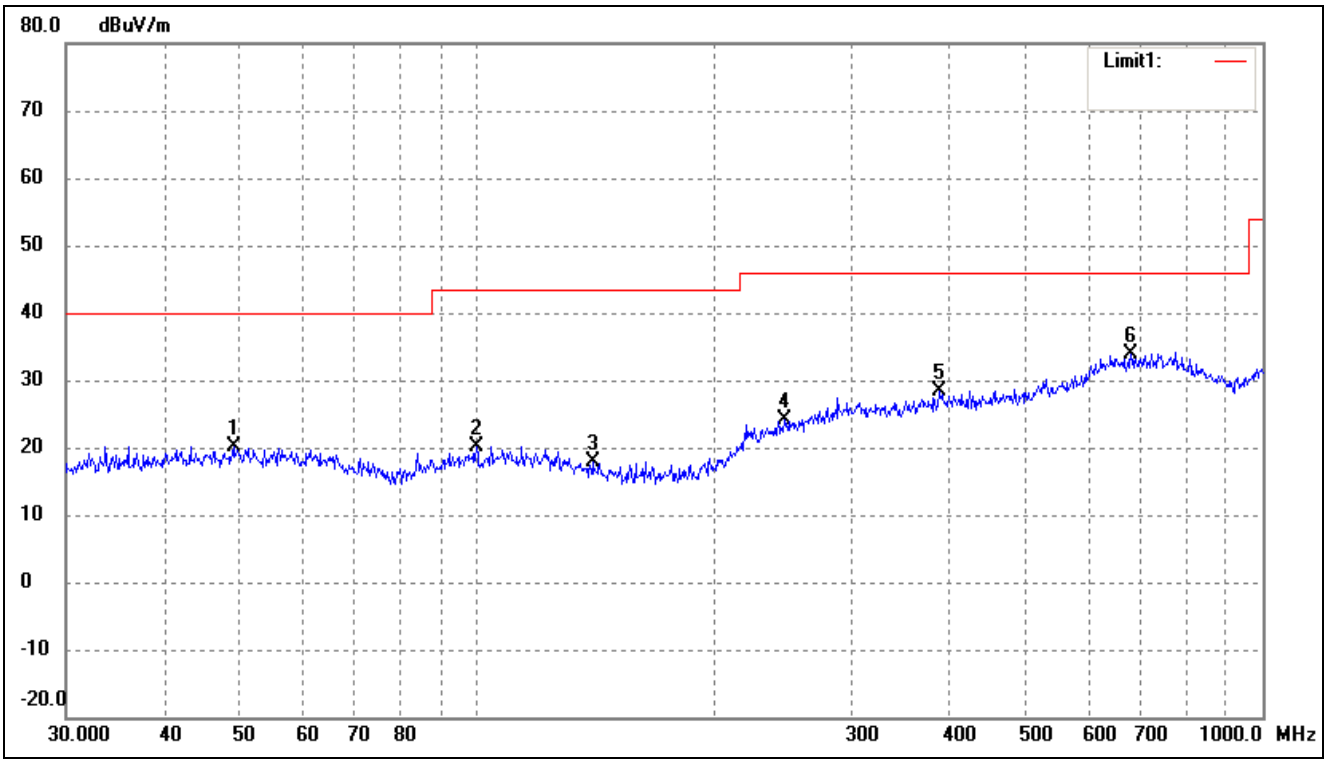
Product Description: *2.4GHz Wireless RC Vehicle - TX Portion*
Tested Model Number/ Item Number: *B1005*
Operating Condition: *Transmitting Lowest Channel (2410.00 MHz)*
Power Source: *DC 6.0V (4 units of DC 1.5V AAA-Size Battery)*

Test Specification: *Horizontal*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(·)	(cm)	
1	43.8119	16.30	4.95	21.25	40.00	-18.75	145	230	peak
2	71.8320	16.34	2.65	18.99	40.00	-21.01	111	241	peak
3	107.8877	15.03	4.88	19.91	43.50	-23.59	120	150	peak
4	193.7728	14.81	3.07	17.88	43.50	-25.62	145	320	peak
5	381.2487	15.55	11.85	27.40	46.00	-18.60	135	187	peak
6	663.4729	16.81	17.76	34.57	46.00	-11.43	187	115	peak

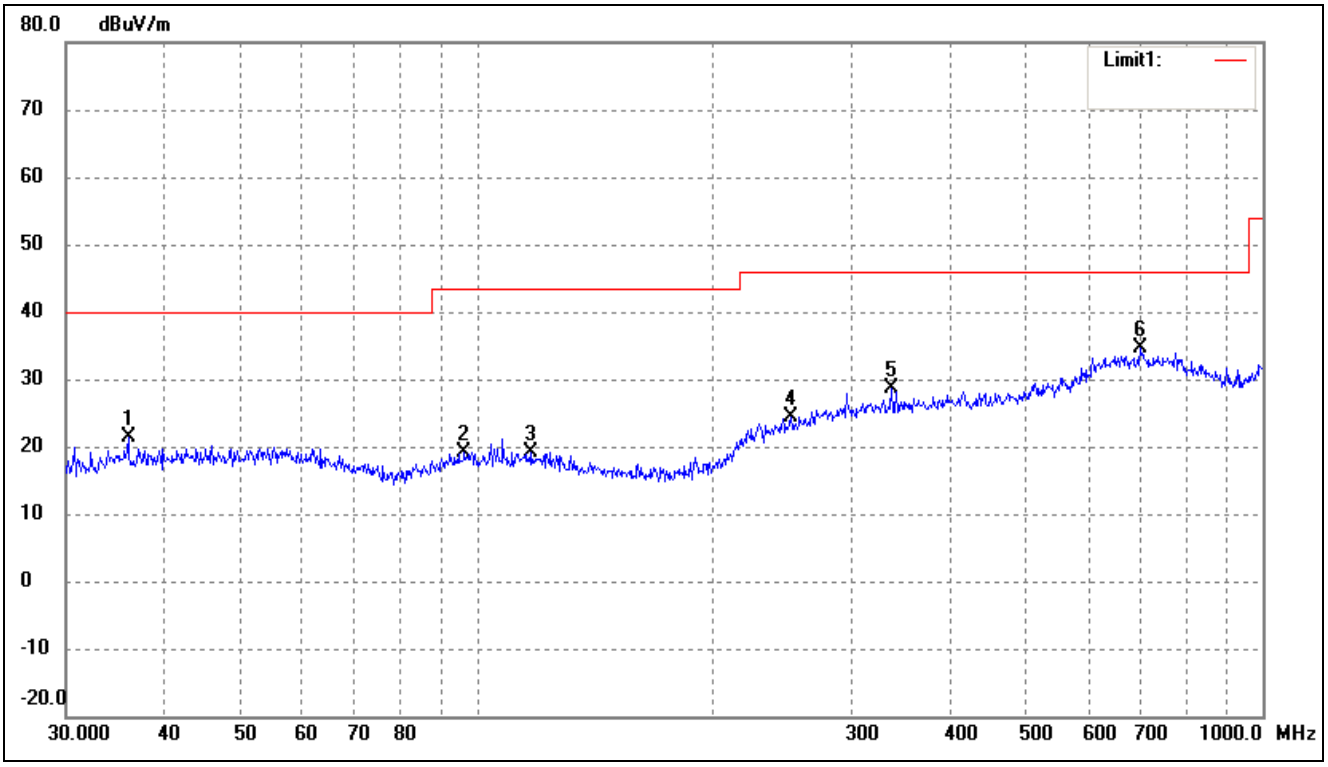
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(·)	(cm)	
1	49.0145	15.11	4.97	20.08	40.00	-19.92	254	123	peak
2	99.8777	15.22	4.91	20.13	43.50	-23.37	153	240	peak
3	140.3421	14.84	3.14	17.98	43.50	-25.52	135	254	peak
4	245.9509	15.01	9.16	24.17	46.00	-21.83	154	165	peak
5	387.9920	16.25	12.14	28.39	46.00	-17.61	169	278	peak
6	679.9600	15.29	18.68	33.97	46.00	-12.03	177	156	peak

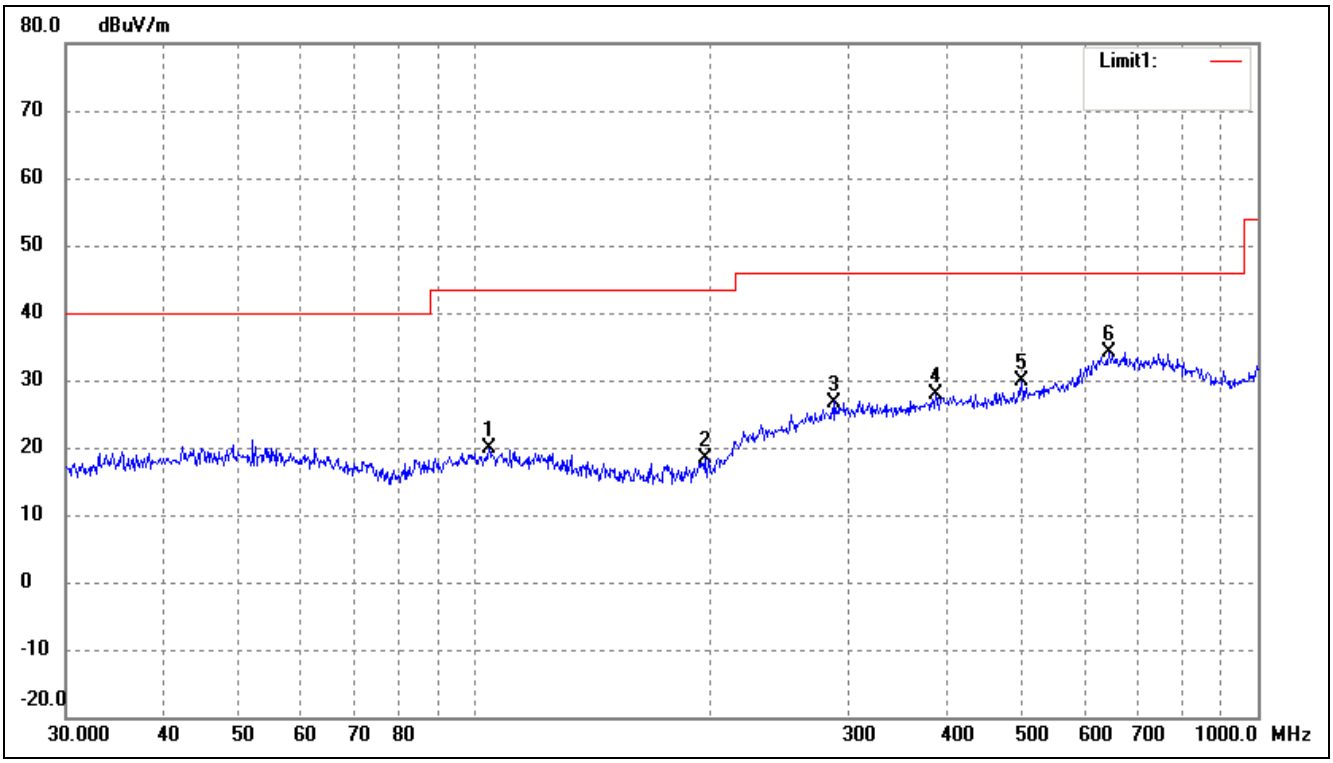
Operating Condition: *Transmitting Near Middle Channel (2440.00 MHz)*
Power Source: *DC 6.0V (4 units of DC 1.5V AAA-Size Battery)*

Test Specification: *Horizontal*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(·)	(cm)	
1	36.0007	16.93	4.33	21.26	40.00	-18.74	241	154	peak
2	96.4362	14.72	4.41	19.13	43.50	-24.37	214	100	peak
3	117.3603	14.28	4.83	19.11	43.50	-24.39	156	120	peak
4	251.1804	15.07	9.36	24.43	46.00	-21.57	185	154	peak
5	337.2155	17.21	11.45	28.66	46.00	-17.34	153	210	peak
6	699.3046	17.48	17.23	34.71	46.00	-11.29	245	123	peak

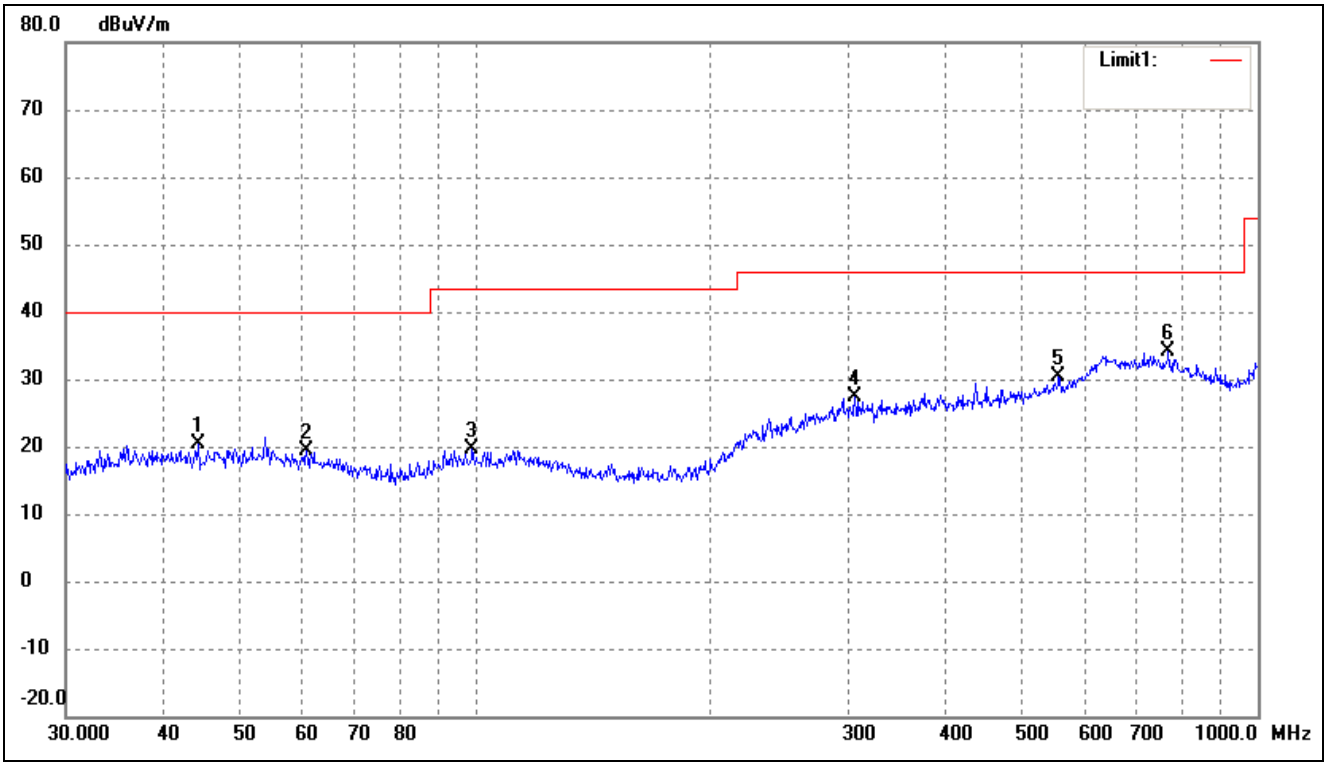
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(·)	(cm)	
1	104.1701	14.94	4.89	19.83	43.50	-23.67	152	100	peak
2	196.5098	15.25	3.20	18.45	43.50	-25.05	121	120	peak
3	287.9904	15.28	11.47	26.75	46.00	-19.25	154	145	peak
4	387.9920	15.63	12.14	27.77	46.00	-18.23	186	152	peak
5	499.4247	16.47	13.31	29.78	46.00	-16.22	153	175	peak
6	645.1195	16.12	17.94	34.06	46.00	-11.94	142	178	peak

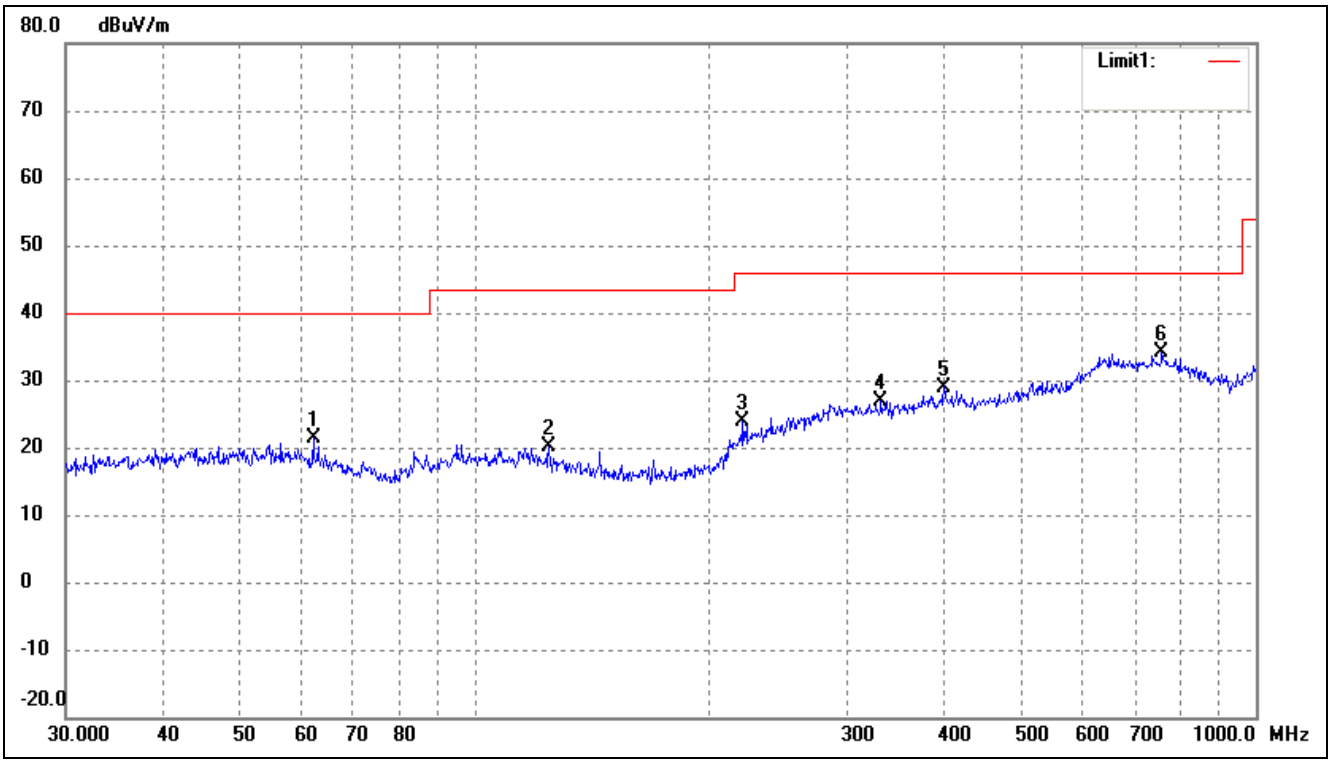
Operating Condition: *Transmitting Highest Channel (2475.00 MHz)*
Power Source: *DC 6.0V (4 units of DC 1.5V AAA-Size Battery)*

Test Specification: *Horizontal*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(·)	(cm)	
1	44.2752	15.55	4.95	20.50	40.00	-19.50	142	201	peak
2	60.9176	14.54	4.85	19.39	40.00	-20.61	144	213	peak
3	99.1797	14.85	4.81	19.66	43.50	-23.84	147	147	peak
4	305.6800	15.53	11.94	27.47	46.00	-18.53	120	156	peak
5	556.7744	16.29	13.99	30.28	46.00	-15.72	156	154	peak
6	768.7482	16.56	17.60	34.16	46.00	-11.84	186	120	peak

Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(·)	(cm)	
1	62.2128	16.80	4.58	21.38	40.00	-18.62	120	201	peak
2	124.5690	15.61	4.44	20.05	43.50	-23.45	121	100	peak
3	220.6171	16.12	7.71	23.83	46.00	-22.17	100	102	peak
4	331.3547	15.35	11.60	26.95	46.00	-19.05	145	135	peak
5	399.0302	16.36	12.64	29.00	46.00	-17.00	163	147	peak
6	758.0408	15.84	18.23	34.07	46.00	-11.93	175	156	peak

Spurious Emissions Above 1GHz

Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar H/V	Detector
Lowest Channel - 2410.00 MHz							
2410	86.36	-3.49	82.87	114.00	-31.13	H	PK
2410	75.36	-3.49	71.87	94.00	-22.13	H	AV
4820	33.31	0.55	33.86	54.00	-20.14	H	PK
4820	44.64	0.55	45.19	74.00	-28.81	H	AV
7230	23.97	3.65	27.62	54.00	-26.38	H	PK
7230	36.61	3.67	40.28	74.00	-33.72	H	AV
2410	81.06	-3.49	77.57	114.00	-36.43	V	PK
2410	70.06	-3.49	66.57	94.00	-27.43	V	AV
4820	33.03	0.55	33.58	54.00	-20.42	V	PK
4820	42.80	0.55	43.35	74.00	-30.65	V	AV
7230	23.38	3.65	27.03	54.00	-26.97	V	PK
7230	35.01	3.67	38.68	74.00	-35.32	V	AV
Near Middle Channel - 2440.00 MHz							
2440	85.16	-3.41	81.75	114.00	-32.25	H	PK
2440	71.62	-3.41	68.21	94.00	-25.79	H	AV
4880	45.30	0.68	45.98	74.00	-28.02	H	PK
4880	33.28	0.68	33.96	54.00	-20.04	H	AV
7320	38.83	3.77	42.60	74.00	-31.40	H	PK
7320	26.89	3.82	30.71	54.00	-23.29	H	AV
2440	85.19	-3.41	81.78	114.00	-32.22	V	PK
2440	71.68	-3.41	68.27	94.00	-25.73	V	AV
4880	48.07	0.68	48.75	74.00	-25.25	V	PK
4880	34.77	0.68	35.45	54.00	-18.55	V	AV
7320	38.30	3.77	42.07	74.00	-31.93	V	PK
7320	38.30	3.77	42.07	74.00	-31.93	V	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Highest Channel - 2475.00 MHz							
2475	83.60	-3.33	80.27	114.00	-33.73	H	PK
2475	72.52	-3.33	69.19	94.00	-24-81	H	AV
4950	46.18	0.77	46.95	74.00	-27.05	H	PK
4950	33.24	0.77	34.01	54.00	-19.99	H	AV
7425	26.94	3.82	30.76	54.00	-23.24	H	PK
7425	38.28	3.84	42.12	74.00	-31.88	H	AV
2475	87.46	-3.33	84.13	114.00	-29.87	V	PK
2475	76.43	-3.33	73.10	94.00	-20.90	V	AV
4950	49.65	0.77	50.42	74.00	-23.58	V	PK
4950	35.28	0.77	36.05	54.00	-17.95	V	AV
7425	26.88	3.82	30.70	54.00	-23.30	V	PK
7425	37.48	3.84	41.32	74.00	-32.68	V	AV

Note: Testing is carried out with frequency rang 9 kHz to the 10th harmonic, other than listed in the table above are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
Emissions attenuated more than 20 dB below the permissible value are not reported.

5. Out of Band Emissions

5.1 Standard Applicable

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 §15.209, whichever is the lesser attenuation.

5.2 Test Procedure

As the radiation test, set the Lowest and Highest Transmitting Channel, observed the outside band of 2400MHz to 2483.5MHz, than mark the higher-level emission for comparing with the FCC Rules.

5.3 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	60 %
ATM Pressure:	1012 mbar

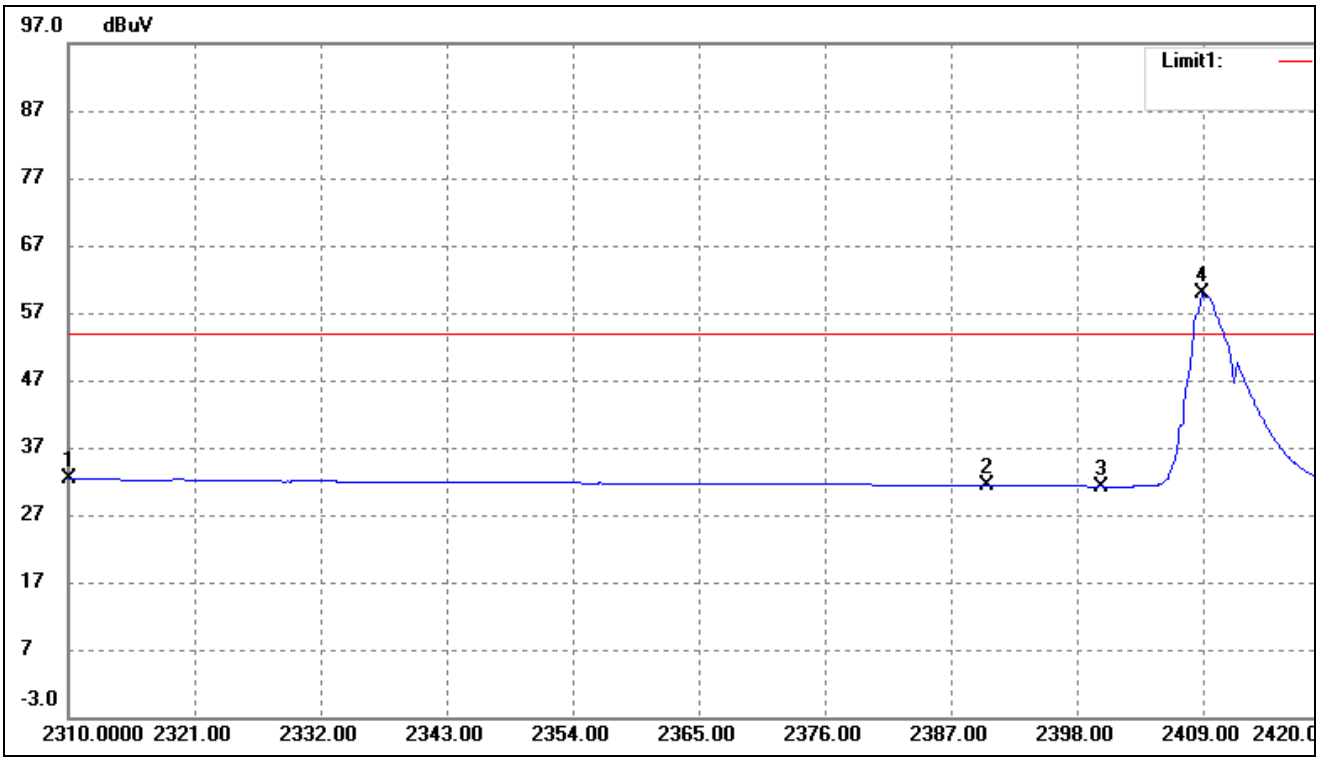
5.4 Summary of Test Results/Plots

Test mode	Frequency	Limit	Result
	MHz	dBuV / dBc	
Lowest	2310.00	<54 dBuV	Pass
	2390.00	<54 dBuV	Pass
	2400.00	<54 dBuV	Pass
Highest	2483.50	<54 dBuV	Pass
	2500.00	<54 dBuV	Pass

The edge emissions are below the FCC Part 15.209 Limits or complies with the FCC Part 15.249 requirements.

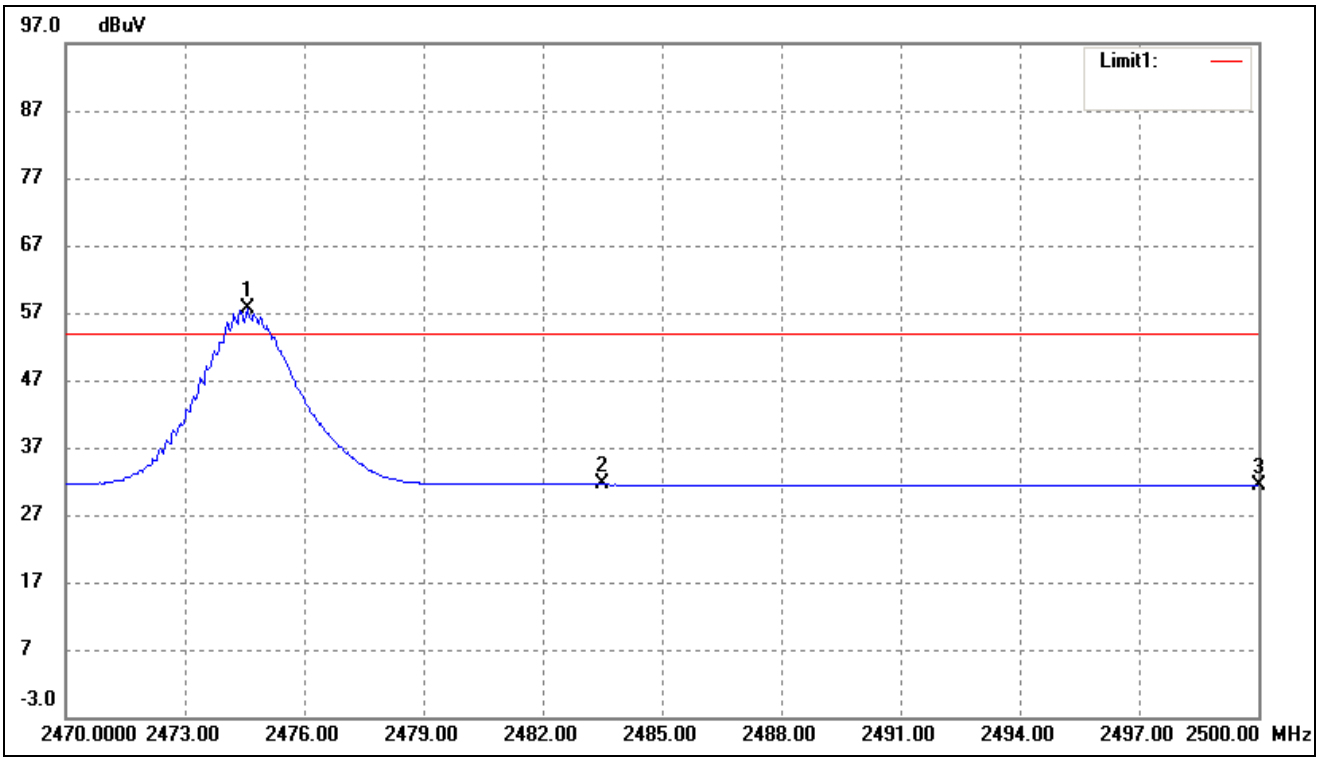
Please refer to the test plots as below.

Lowest Bandedge
Vertical (Worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2310.000	35.70	-3.35	32.35	54.00	-21.65	Ave Detector
	2310.000	47.47	-3.35	44.12	74.00	-29.88	Peak Detector
2	2390.000	35.71	-4.29	31.42	54.00	-22.58	Ave Detector
	2390.000	48.17	-4.29	43.88	74.00	-30.12	Peak Detector
3	2400.000	35.65	-4.40	31.25	54.00	-22.75	Ave Detector
	2400.000	53.76	-4.40	49.36	74.00	-24.64	Peak Detector
4	2408.890	64.24	-4.45	59.79	/	/	Ave Detector
	2409.880	84.76	-4.44	80.32	/	/	Peak Detector

Highest Bandedge
Vertical (Worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2474.560	61.95	-4.36	57.59	/	/	Ave Detector
	2473.480	80.87	-4.36	76.51	/	/	Peak Detector
2	2483.500	35.88	-4.36	31.52	54.00	-22.48	Ave Detector
	2483.500	49.42	-4.36	45.06	74.00	-28.94	Peak Detector
3	2500.000	35.71	-4.34	31.37	54.00	-22.63	Ave Detector
	2500.000	49.16	-4.34	44.82	74.00	-29.18	Peak Detector

6. Emission Bandwidth

6.1 Standard Applicable

According to FCC Part 15.215 (c), intentional radiators operating under the alternative provisions to the general emission limits, as contained in §15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

6.2 Test Procedure

According to the ANSI 63.10-2013, the emission bandwidth test method as follows:
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
Set span = 1MHz, centered on a transmitting channel
RBW ≥1% 20dB Bandwidth, VBW ≥RBW
Sweep = auto
Detector function = peak
Trace = max hold
All the trace to stabilize, use the marker-to-peak function to set the marker to the peak of the emission, use the marker-delta function to measure and record the 20dB down and 99% bandwidth of the emission.

6.3 Environmental Conditions

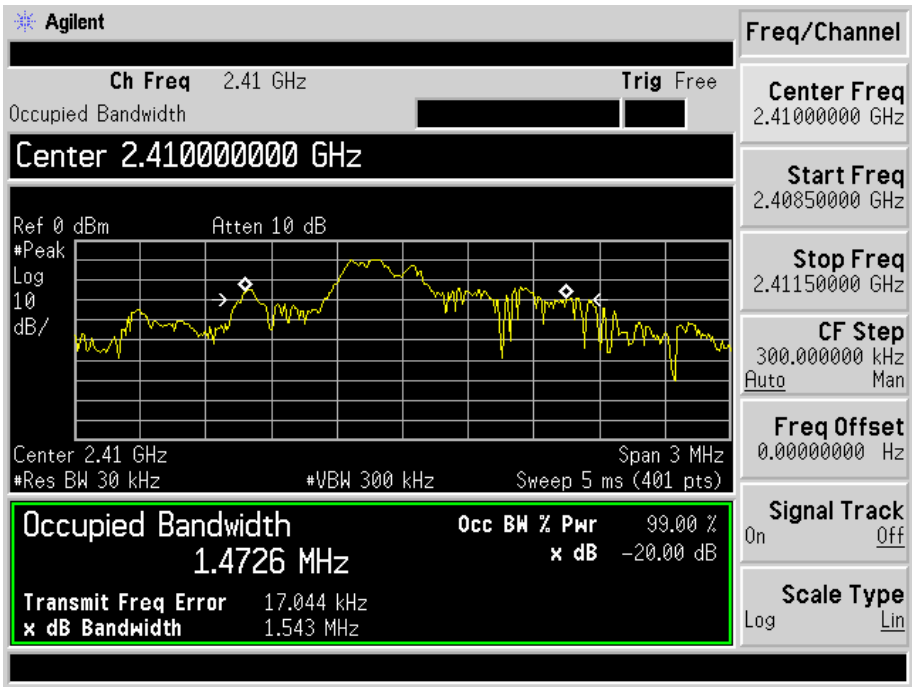
Temperature:	25 °C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

6.4 Summary of Test Results/Plots

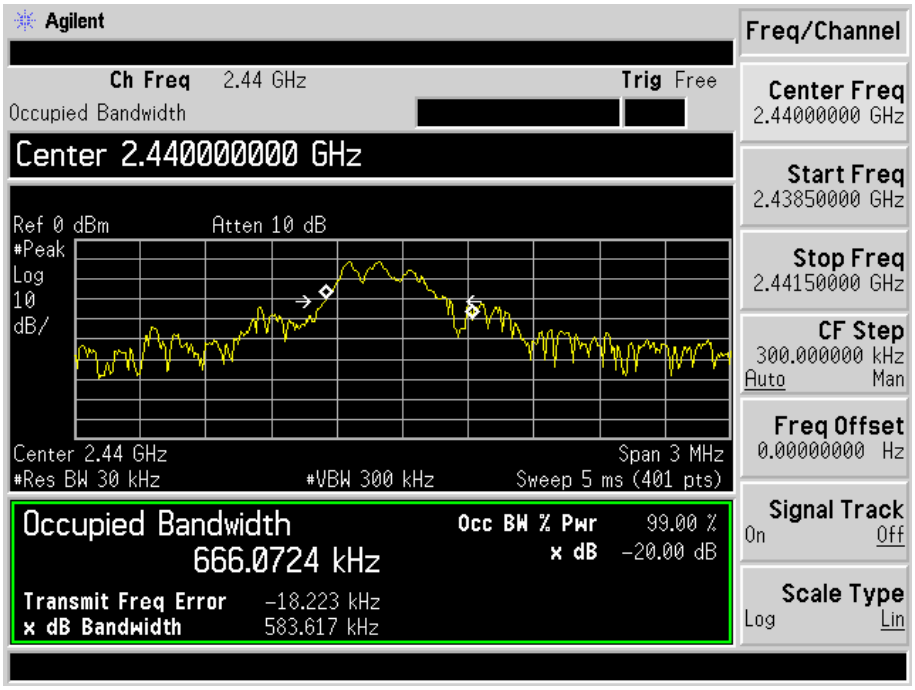
Channel	Frequency (MHz)	20dB Bandwidth (kHz)	99% Bandwidth (kHz)
Lowest Channel	2410.00	1543	1472.6
Near Middle Channel	2440.00	583.617	666.0724
Highest Channel	2475.00	1724	1643.2

Please refer to the following test plots

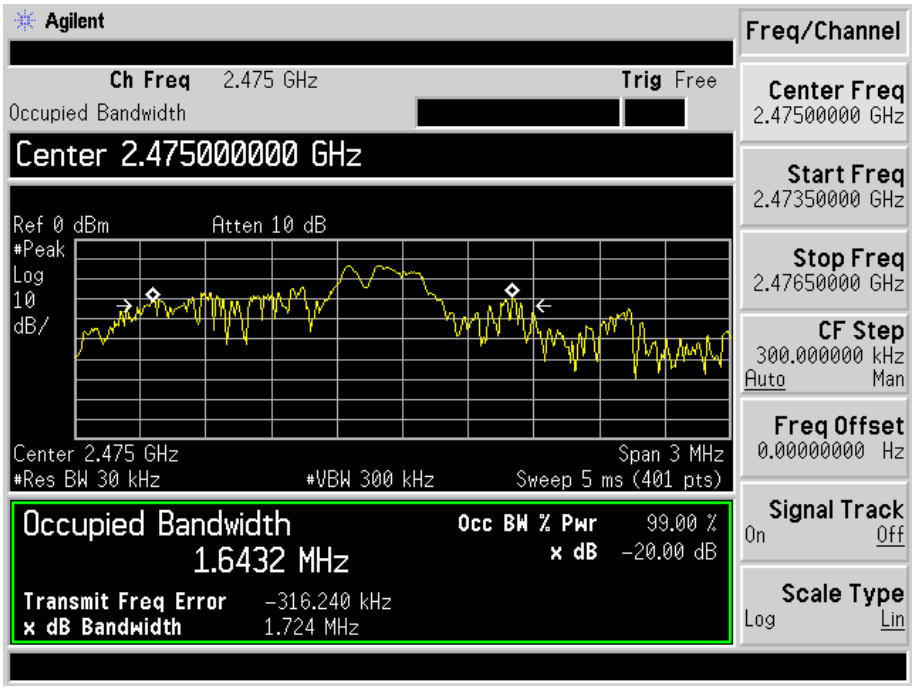
Lowest Channel:



Near Middle Channel:



Highest Channel:



******* END OF REPORT *******