FCC Part 15C
Measurement and Test Report

For

Acrox Technologie Co., Ltd.

4F., No.89 Minshan St., Neihu Dist., Taipei City 114, Taiwan, R.O.C

FCC ID: PRDKB33

FCC Rule(s):	FCC Part 15.249
Product Description:	AmazonBasics Wireless Keyboard
Tested Model:	KS1-US
Report No.:	STR17128226I
Sample Receipt Date:	2017-12-21
Tested Date:	2017-12-22 to 2018-01-29
Issued Date:	2018-01-31
Tested By:	Bin Mei / Engineer
Reviewed By:	Silin Chen / EMC Manager
Approved & Authorized By:	Jandy So / PSQ Manager

Prepared By:

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant:	Acrox Technologie Co., Ltd.
Address of applicant:	4F., No.89 Minshan St., Neihu Dist., Taipei City 114, Taiwan, R.O.C
Manufacturer:	Acrox Technologie Co., Ltd.
Address of manufacturer:	Hsinmin Industria, Changan Town, Dongguan City, Guangdong, China

General Description of EUT	
Product Name:	AmazonBasics Wireless Keyboard, AmazonBasics Wireless Keyboard and Mouse Combo
Trade Name:	AmazonBasics
Model No.:	KS1-US
Adding Model(s):	KS1GMD-US
Rated Voltage:	DC3.0V
Power Adapter Model:	/
Note: 1. *The test data is gathered from a production sample, provided by the manufacturer;* 2. *The appearance of others models and product name listed in the report is different from main-test model KS-US1, but the circuit and the electronic construction do not change, declared by the manufacturer.*	

Technical Characteristics of EUT	
Frequency Range:	2408MHz-2474MHz
Max. Field Strength:	94.12dBuV/m
Modulation:	GFSK
Quantity of Channels:	34
Channel Separation:	2MHz
Antenna Type:	PCB Antenna
Antenna Gain:	0dBi

1.2 Test Standards

The following report is prepared on behalf of the Acrox Technologie Co., Ltd. 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 Federal Communication Commissions 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 Federal Communication Commissions 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.: 125990

Shenzhen SEM Test Technology Co., Ltd. Laboratory has been recognized to perform compliance testing on equipment subject to the Commissions Declaration Of Conformity (DOC). The Designation Number is CN5010, and Test Firm Registration Number is 125990.

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.

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	Low Channel	2408MHz
TM2	Middle Channel	2440MHz
TM3	High Channel	2474MHz

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	9-150kHz ±3.74dB
		0.15-30MHz ±3.34dB
Transmitter Spurious Emissions	Radiated	30-200MHz ±4.52dB
		0.2-1GHz ±5.56dB
		1-6GHz ±3.84dB
		6-18GHz ±3.92dB

1.7 Test Equipment List and Details

No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due Date
SEMT-1072	Spectrum Analyzer	Agilent	E4407B	MY41440400	2017-06-12	2018-06-11
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2017-06-12	2018-06-11
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2017-06-12	2018-06-11
SEMT-1008	Amplifier	Agilent	8447F	3113A06717	2017-06-12	2018-06-11
SEMT-1043	Amplifier	C&D	PAP-1G18	2002	2017-06-12	2018-06-11
SEMT-1011	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2017-06-08	2018-06-07
SEMT-1042	Horn Antenna	ETS	3117	00086197	2017-06-08	2018-06-07
SEMT-1121	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170582	2017-06-08	2018-06-07
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2017-06-08	2018-06-07
SEMT-1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2017-06-12	2018-06-11
SEMT-1003	L.I.S.N	Schwarz beck	NSLK8126	8126-224	2017-06-12	2018-06-11
SEMT-1002	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2017-06-12	2018-06-11
SEMT-1168	Pre-amplifier	Direction Systems Inc.	PAP-0126	14141-12838	2017-08-15	2018-08-14
SEMT-1169	Pre-amplifier	Direction Systems Inc.	PAP-2640	14145-14153	2017-08-15	2018-08-14
SEMT-1163	Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2017-06-12	2018-06-11
SEMT-1170	DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2017-03-09	2018-03-08

2. SUMMARY OF TEST RESULTS

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

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 an integral antenna, fulfill the requirement of this section.

4. Radiated Emissions

4.1 Standard Applicable

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

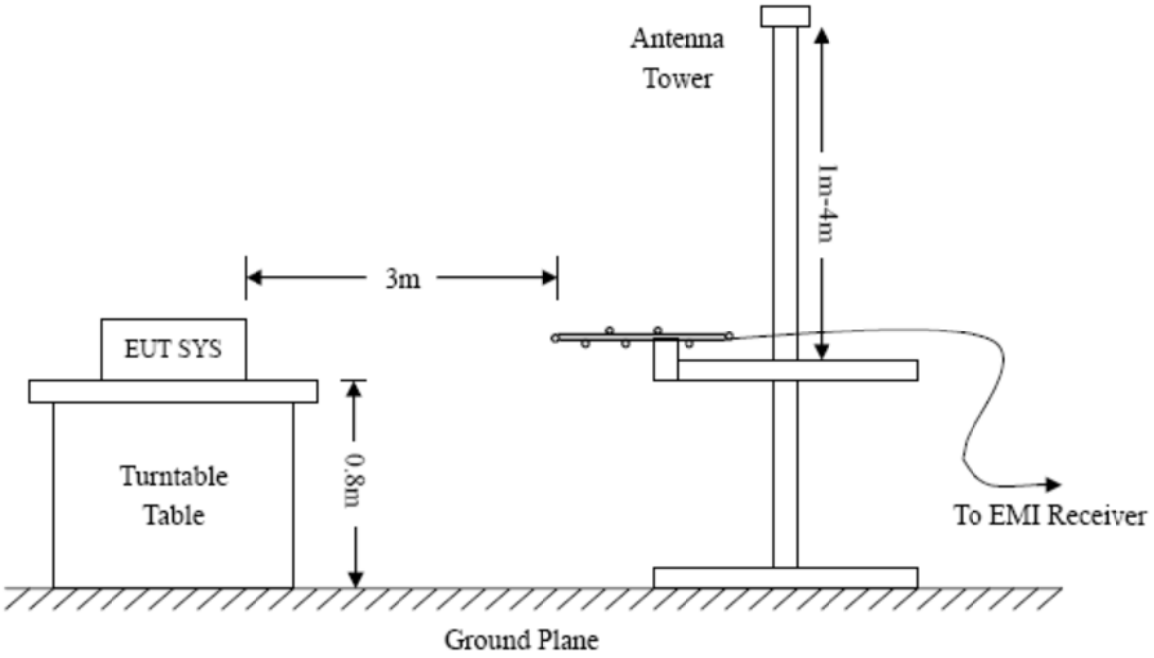
Fundamental Frequency	Field strength of fundamental (milli-volts/meter)	Field strength of Harmonics (micro-volts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

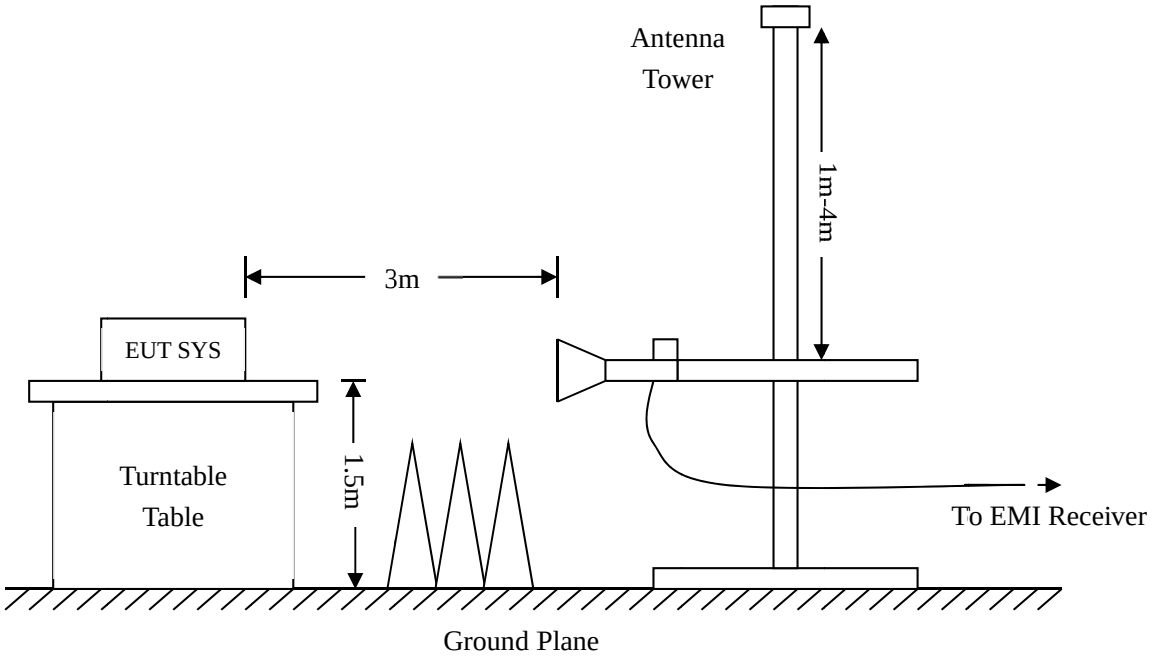
(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

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:

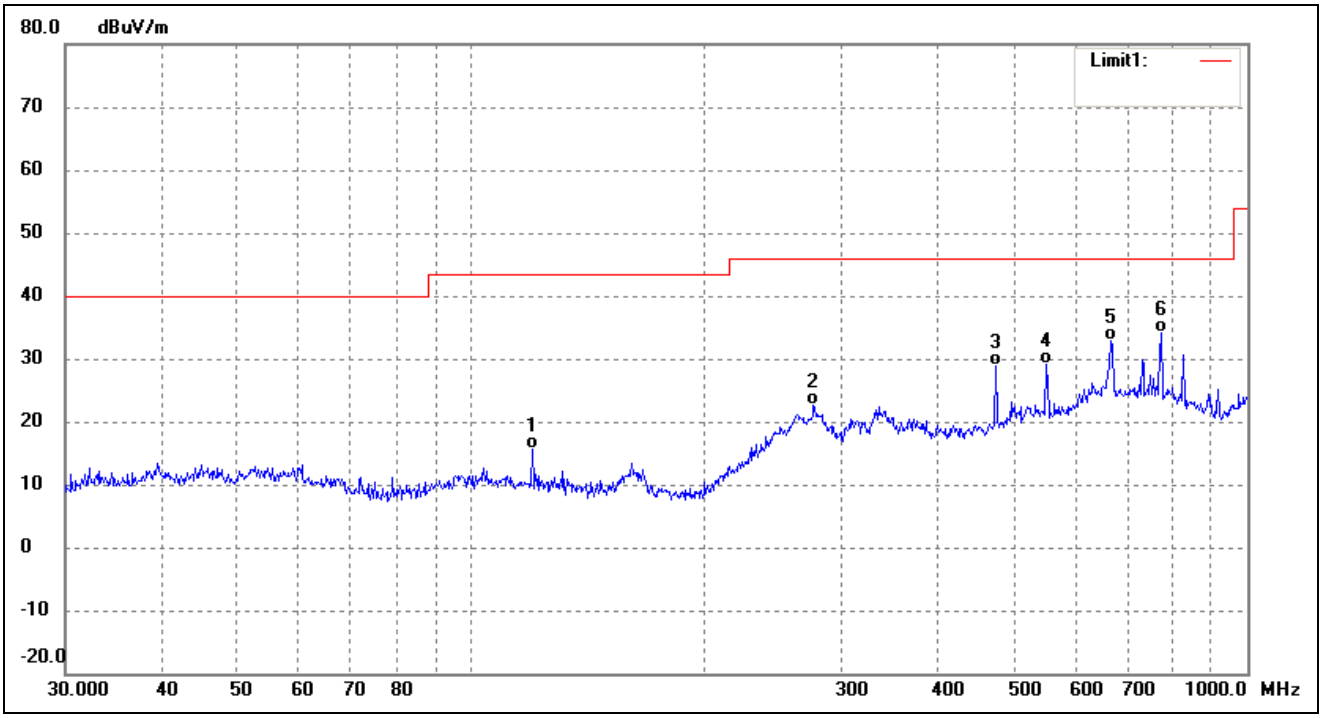
-11.80 dB at **774.1584 MHz** in the **Horizontal** polarization, **Low Channel of Antenna 1, 9 kHz to 25 GHz, 3Meters**

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)

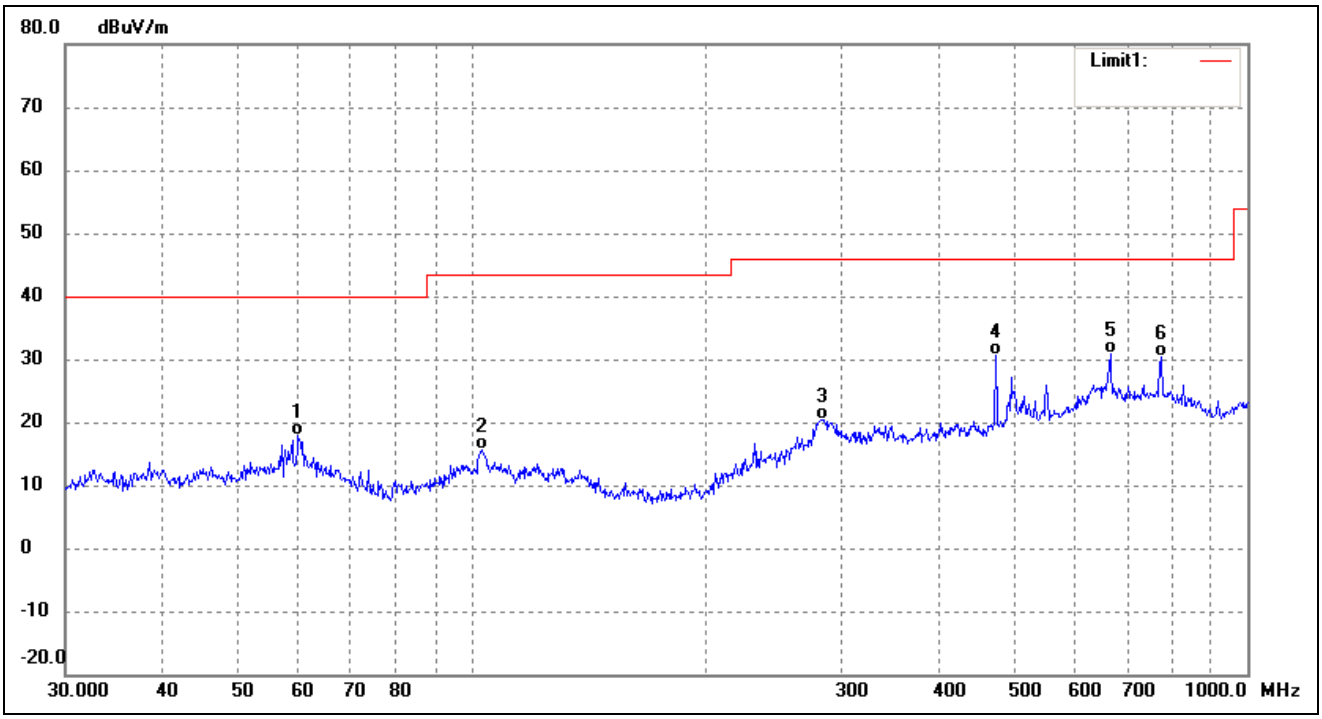
EUT: *AmazonBasics Wireless Keyboard*
Tested Model: *KS1-US*
Operating Condition: *Transmitting Low Channel (2408MHz)*
Comment: *DC3.0V by Battery*

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	119.8556	32.42	-16.67	15.75	43.50	-27.75	332	100	QP
2	276.1236	33.16	-10.63	22.53	46.00	-23.47	99	100	QP
3	473.8347	35.78	-6.82	28.96	46.00	-17.04	187	100	QP
4	550.9480	34.31	-5.06	29.25	46.00	-16.75	106	100	QP
5	665.8035	33.93	-1.17	32.76	46.00	-13.24	332	100	QP
6	774.1584	35.67	-1.47	34.20	46.00	-11.80	99	100	QP

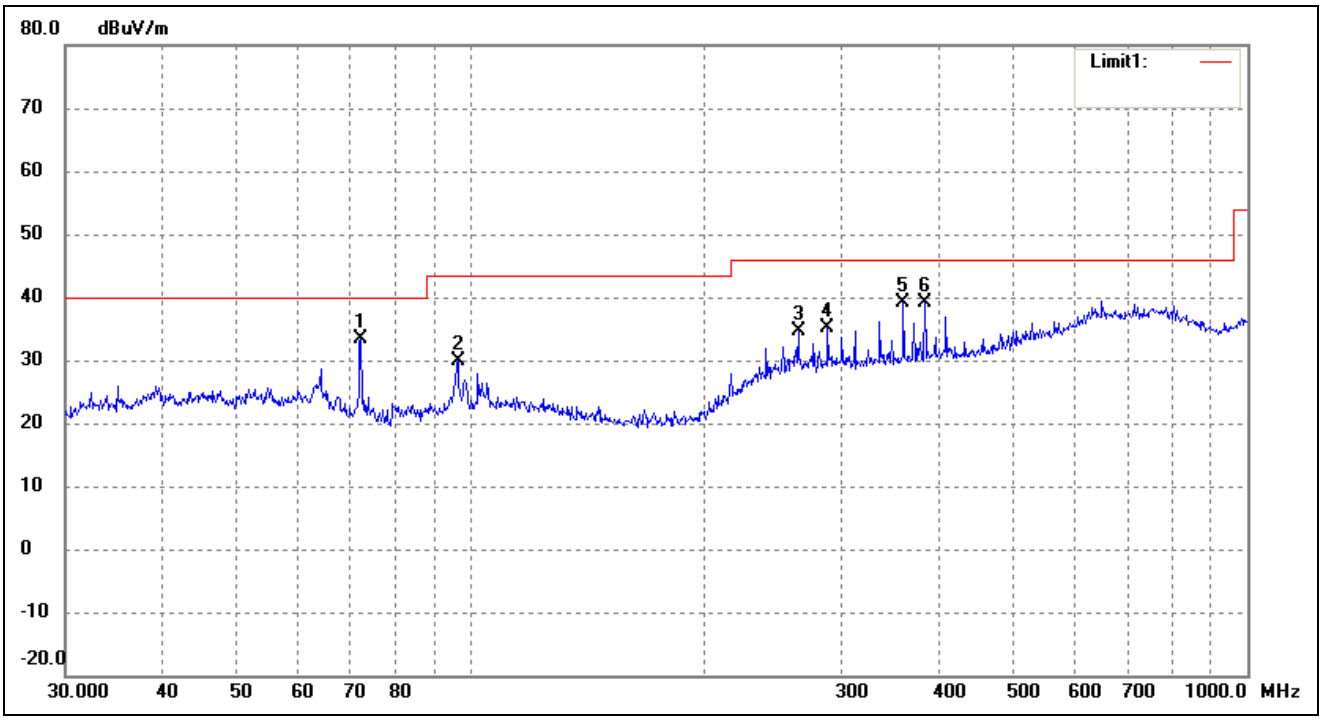
Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	59.8588	34.38	-16.51	17.87	40.00	-22.13	83	100	QP
2	103.0800	32.21	-16.59	15.62	43.50	-27.88	122	100	QP
3	282.9852	30.74	-10.25	20.49	46.00	-25.51	59	100	QP
4	473.8347	37.55	-6.82	30.73	46.00	-15.27	223	100	QP
5	665.8035	31.95	-1.17	30.78	46.00	-15.22	262	100	QP
6	774.1584	31.90	-1.47	30.43	46.00	-15.57	315	100	QP

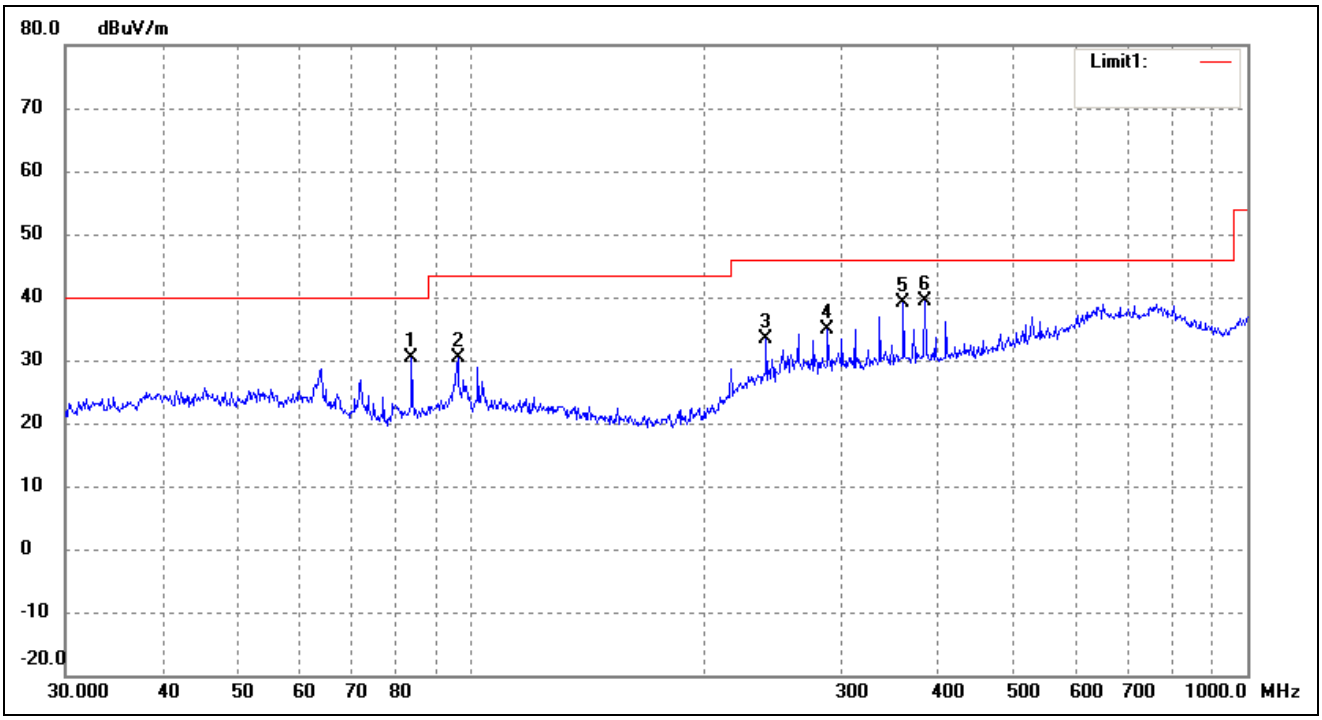
Operating Condition: *Transmitting High Channel (2474MHz)*
Comment: *DC3.0V by Battery*

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	72.0843	52.31	-18.97	33.34	40.00	-6.66	69	100	peak
2	96.0986	47.04	-17.14	29.90	43.50	-13.60	120	100	peak
3	263.8190	46.10	-11.51	34.59	46.00	-11.41	112	100	peak
4	287.9904	45.18	-10.05	35.13	46.00	-10.87	131	100	peak
5	360.4477	48.03	-8.92	39.11	46.00	-6.89	269	100	peak
6	383.9318	47.88	-8.64	39.24	46.00	-6.76	69	100	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	83.8156	49.64	-19.16	30.48	40.00	-9.52	148	100	peak
2	96.0986	47.56	-17.14	30.42	43.50	-13.08	187	100	peak
3	239.9874	45.94	-12.54	33.40	46.00	-12.60	100	100	peak
4	287.9904	44.86	-10.05	34.81	46.00	-11.19	94	100	peak
5	360.4477	48.03	-8.92	39.11	46.00	-6.89	217	100	peak
6	383.9318	48.01	-8.64	39.37	46.00	-6.63	148	100	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
Low Channel-2408MHz							
2408	101.54	-7.42	94.12	114	-19.88	H	PK
2408	98.57	-7.42	91.15	94	-2.85	H	AV
4816	58.36	-3.59	54.77	74	-19.23	H	PK
4816	45.62	-3.59	42.03	54	-11.97	H	AV
7224	42.68	-0.52	42.16	74	-31.84	H	PK
7224	38.96	-0.52	38.44	54	-15.56	H	AV
2408	99.63	-7.42	92.21	114	-21.79	V	PK
2408	95.89	-7.42	88.47	94	-5.53	V	AV
4816	58.63	-3.59	55.04	74	-18.96	V	PK
4816	45.97	-3.59	42.38	54	-11.62	V	AV
7224	46.22	-0.52	45.7	74	-28.3	V	PK
7224	37.95	-0.52	37.43	54	-16.57	V	AV
Middle Channel-2440MHz							
2440	99.68	-7.35	92.33	114	-21.67	H	PK
2440	97.02	-7.35	89.67	94	-4.33	H	AV
4880	57.62	-3.49	54.13	74	-19.87	H	PK
4880	46.33	-3.49	42.84	54	-11.16	H	AV
7320	43.57	-0.47	43.1	74	-30.9	H	PK
7320	39.26	-0.47	38.79	54	-15.21	H	AV
2440	97.58	-7.35	90.23	114	-23.77	V	PK
2440	95.07	-7.35	87.72	94	-6.28	V	AV
4880	58.12	-3.49	54.63	74	-19.37	V	PK
4880	45.31	-3.49	41.82	54	-12.18	V	AV
7320	46.28	-0.47	45.81	74	-28.19	V	PK
7320	38.69	-0.47	38.22	54	-15.78	V	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel-2474MHz							
2474	99.92	-7.29	92.63	114	-21.37	H	PK
2474	97.37	-7.29	90.08	94	-3.92	H	AV
4948	60.22	-3.41	56.81	74	-17.19	H	PK
4948	46.89	-3.41	43.48	54	-10.52	H	AV
7422	45.69	-0.42	45.27	74	-28.73	H	PK
7422	40.23	-0.42	39.81	54	-14.19	H	AV
2474	96.48	-7.29	89.19	114	-24.81	V	PK
2474	94.52	-7.29	87.23	94	-6.77	V	AV
4948	59.62	-3.41	56.21	74	-17.79	V	PK
4948	46.22	-3.41	42.81	54	-11.19	V	AV
7422	45.96	-0.42	45.54	74	-28.46	V	PK
7422	39.63	-0.42	39.21	54	-14.79	V	AV

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, which above 5th Harmonics are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
The measurements greater than 20dB below the limit from 9kHz to 30MHz..

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

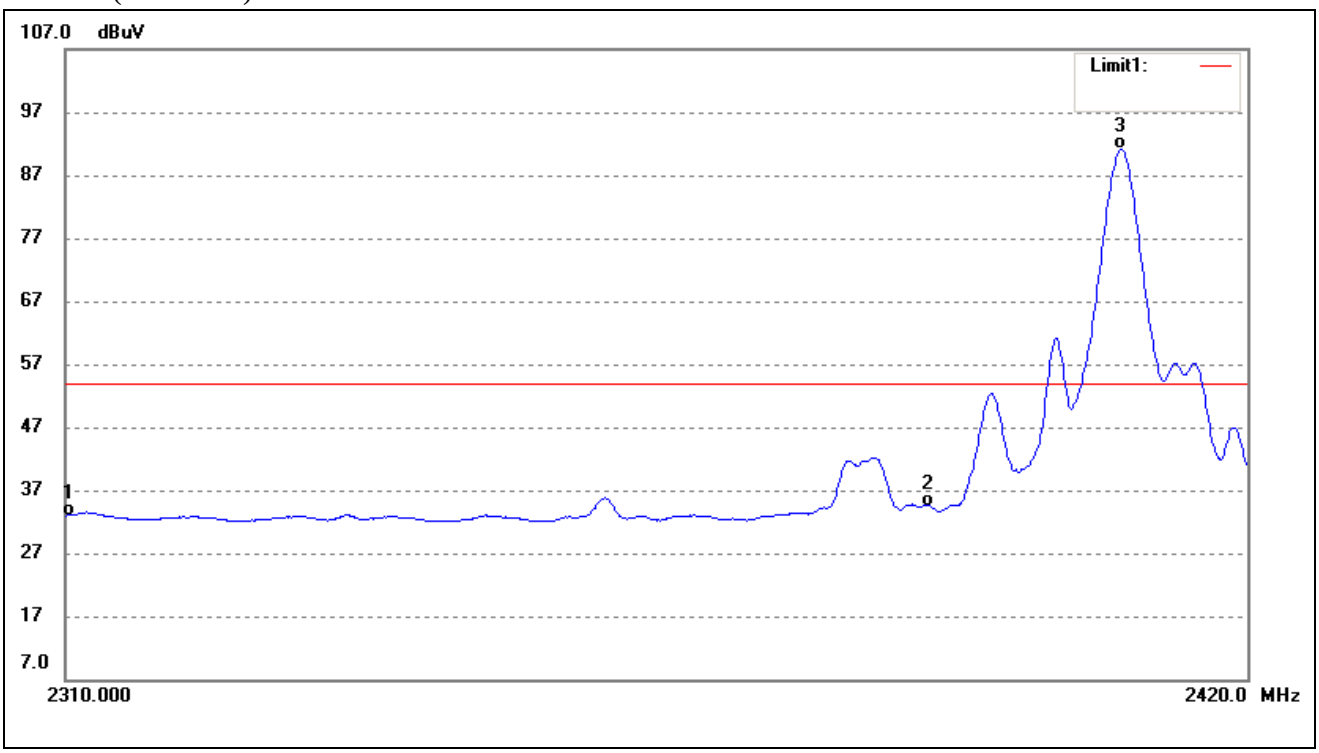
Test mode	Frequency	Limit	Result
	MHz	dBuV / dBc	
Lowest	2310.00	<54 dBuV	Pass
	2390.00	<54 dBuV	Pass
	2407.00	<54 dBuV	Pass
Highest	2483.50	<54 dBuV	Pass
	2500.00	<54 dBuV	Pass

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

Please refer to the test plots as below.

Lowest Bandedge

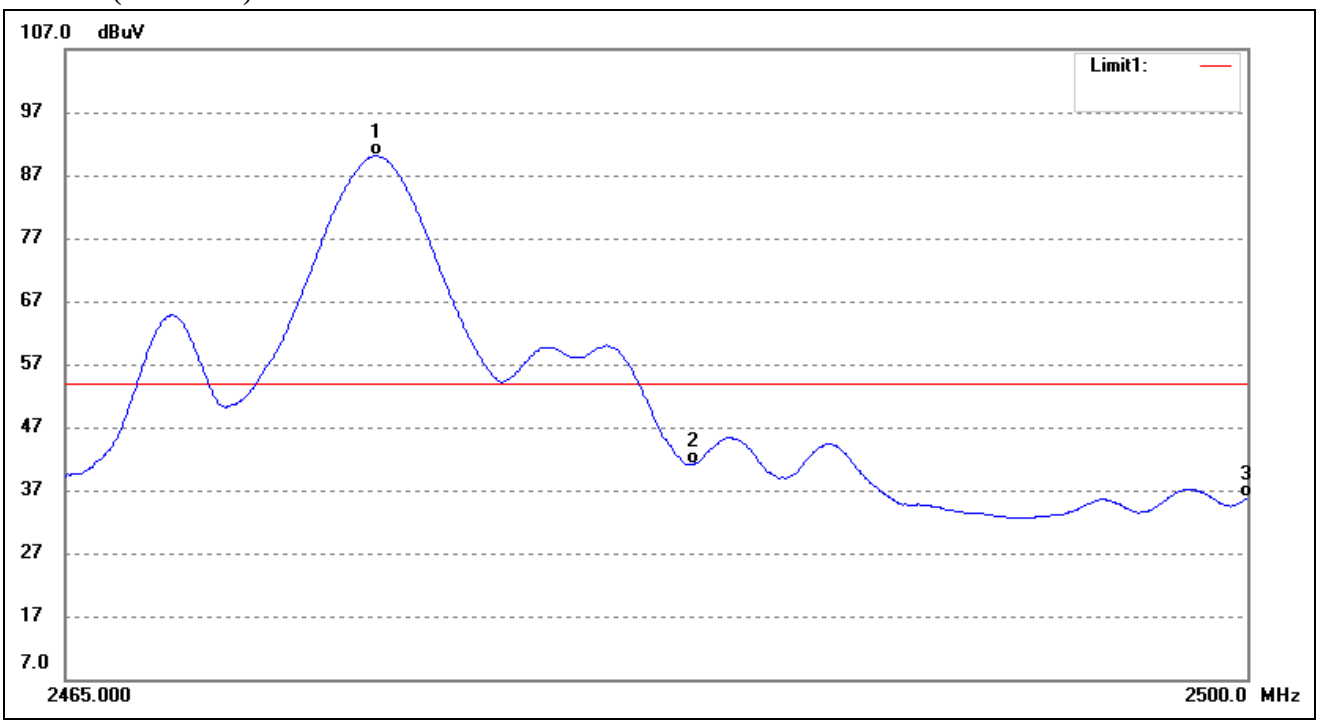
Vertical (Worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2310.000	39.32	-6.38	32.94	54.00	-21.06	Ave Detector
	2310.000	51.27	-6.38	44.89	74.00	-29.11	Peak Detector
2	2390.000	41.67	-7.26	34.41	54.00	-19.59	Ave Detector
	2390.000	53.07	-7.26	45.81	74.00	-28.19	Peak Detector
3	2407.984	98.57	-7.42	91.15	/	/	Ave Detector
	2407.424	101.54	-7.42	94.12	/	/	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	2474.157	97.37	-7.29	90.08	/	/	Ave Detector
	2473.564	99.92	-7.29	92.63	/	/	Peak Detector
2	2483.500	48.42	-7.28	41.14	54.00	-12.86	Ave Detector
	2483.500	60.16	-7.28	52.88	74.00	-21.12	Peak Detector
3	2500.000	43.12	-7.25	35.87	54.00	-18.13	Ave Detector
	2500.000	53.76	-7.25	46.51	74.00	-27.49	Peak Detector

6. Emission Bandwidth

6.1 Standard Applicable

According to 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

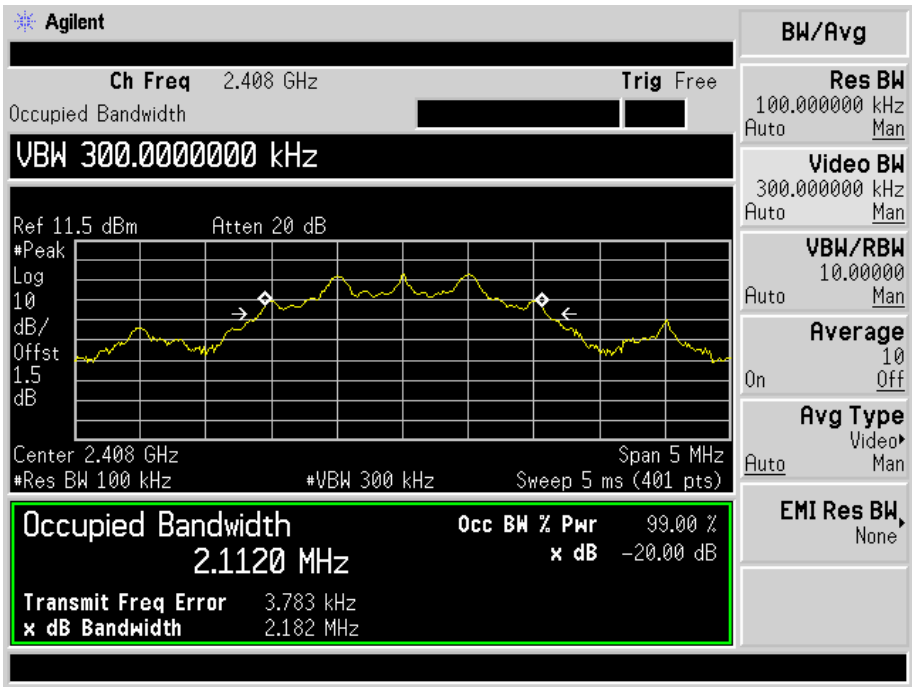
Temperature:	25 °C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

6.4 Summary of Test Results/Plots

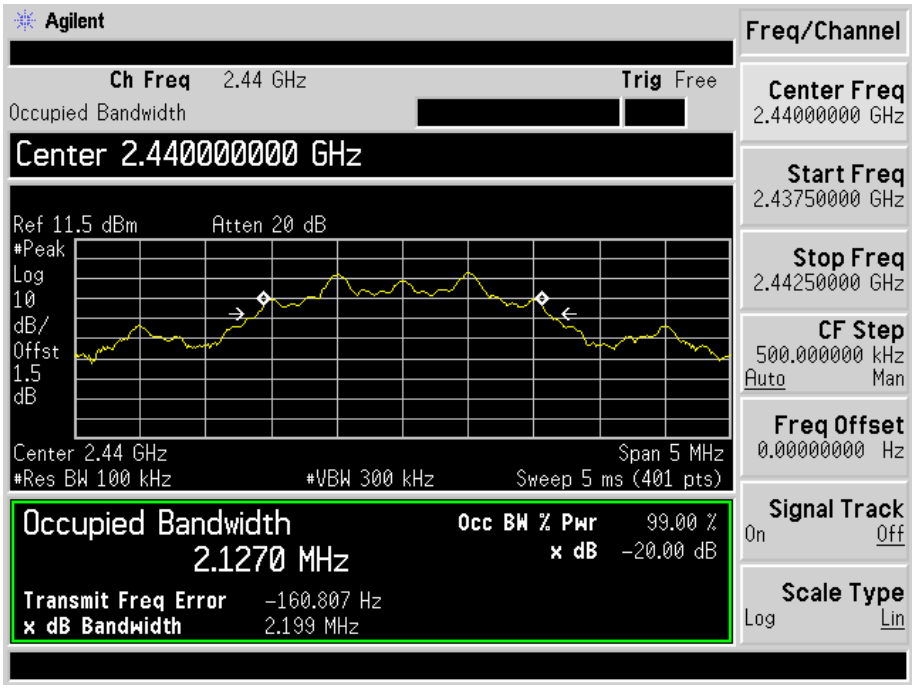
Channel	Frequency MHz	20dB Bandwidth kHz	99% Bandwidth kHz
Low Channel	2408	2182	2112
Middle Channel	2440	2199	2127
High Channel	2474	2198	2124

Please refer to the following test plots

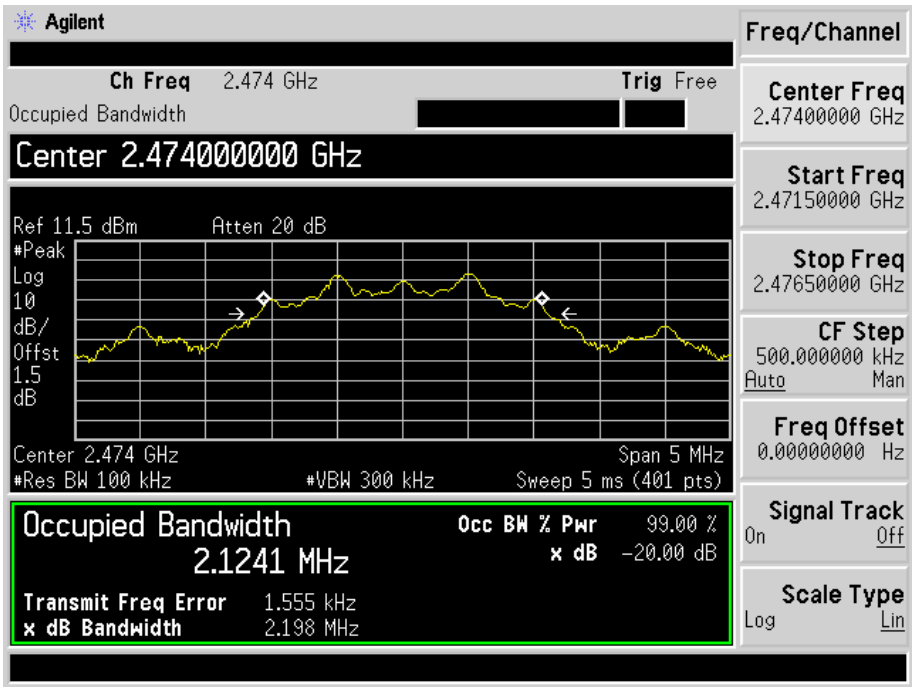
Low Channel:



Middle Channel:



High Channel:



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