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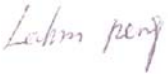
Test Report

Applicant	ViRZTEX Company Limited
Address	1505-8, Chinachem Golden Plaza, 77 Mody Road, Tsimshatsui East, Kowloon, Hong Kong
FCC ID Number	FCC ID: T886OOO2
Brand Name(s)	None
Model Number(s)/ Item Number(s)	33899
Product Description	2.425-2.478 GHz Wireless Remote Control Toy - TX
Operating Frequency	2.425-2.478 GHz
Rules/Standards	Part 15.249 of the FCC Rules
Received Date	30th March, 2015
Tested Date	30th March, 2015
Approved by	Dick Chan (Director of Gakkiku)
Tested by	 Lahm Peng (Engineer of Shenzhen SEM.Test)
Signed by	 Jandy So (Manager of Shenzhen SEM.Test)
Report Number	GKK201503300A
Test Results	☒ PASSED ☐ FAILED

GENERAL

The report is written by Gakkiku Technology Company. The tested device complies with the general approval requirements of the FCC Rules and the Industry Canada as identified in this test report.

TEST LOCATION

The tested device was tested at the test site of the Shenzhen SEM.Test Technology Co., Ltd., 1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, 518101, Guangdong, China. The FCC Recognized 2.948 Listed Test Firm Registration Number is 934118. The Industry Canada IC OATS Filing Number/Assigned Code is 11464A.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant:	ViRZTEX Company Limited
Address of applicant:	1505-8, Chinachem Golden Plaza, 77 Mody Road, Tsimshatsui East, Kowloon, Hong Kong
Manufacturer:	ViRZTEX Company Limited
Address of manufacturer:	1505-8, Chinachem Golden Plaza, 77 Mody Road, Tsimshatsui East, Kowloon, Hong Kong

General Description of EUT

Item	Description
Product Description:	2.425-2.478 GHz Wireless Remote Control Toy - TX
Brand Name(s):	None
Model Number(s)/ Item Number(s):	33899
Power Source:	DC 9V Battery X 1 unit
Output Power:	<0dBm
Frequency Range:	2.425-2.478 GHz
Number(s) of Channel(s):	3
Channel Separation:	/
Antenna Type:	Integral Antenna
Size:	/
Max. Field Strength:	79.94 dBuV/m
For more information refer to the circuit diagram form and the user's manual.	

The test data is gathered from a production sample, provided by the manufacturer.

1.2 Test Standards

The following report is prepared on behalf of the ViRZTEX Company Limited in accordance with Part 15 Subpart B and Subpart C of the FCC Rules, and Part 15.249, 15.107, 15.203, 15.205, 15.207 and 15.209 of the FCC Rules.

The objective is to determine compliance with Part 15 Subpart C of the FCC Rules, and Part 15.249, 15.107, 15.203, 15.205, 15.207 and 15.209 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 Standard C63.4-2014, American National Standard Institute 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 Recognized 2.948 Listed Test Firm Registration Number: 934118

EMC Laboratory of the Shenzhen SEM.Test Technology Co., Ltd. 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 FCC Recognized 2.948 Listed Test Firm Registration Number is 934118.

Industry Canada IC OATS Filing Number/Assigned Code: 11464A

The 3 Meter Semi-Anechoic Chamber of the Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Industry Canada IC OATS Filing Number/Assigned Code (11464A).

CNAS Registration Number: 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, 518101, Guangdong, 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	2425 MHz
TM2	Near Middle Channel	2450 MHz
TM3	Highest Channel	2478 MHz

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/ Unshielded	With Core/ Without Core
/	/	/	/

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

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

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 15.107(a)/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

3. Antenna Requirements

3.1 Standard Applicable

According to Part 15.203 of the FCC Rules, 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 Measurement Uncertainty

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is ±5.10 dB.

4.2 Standard Applicable

According to Part 15.249(a) of the FCC Rules, 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

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.

4.3 Test Equipment List and Details

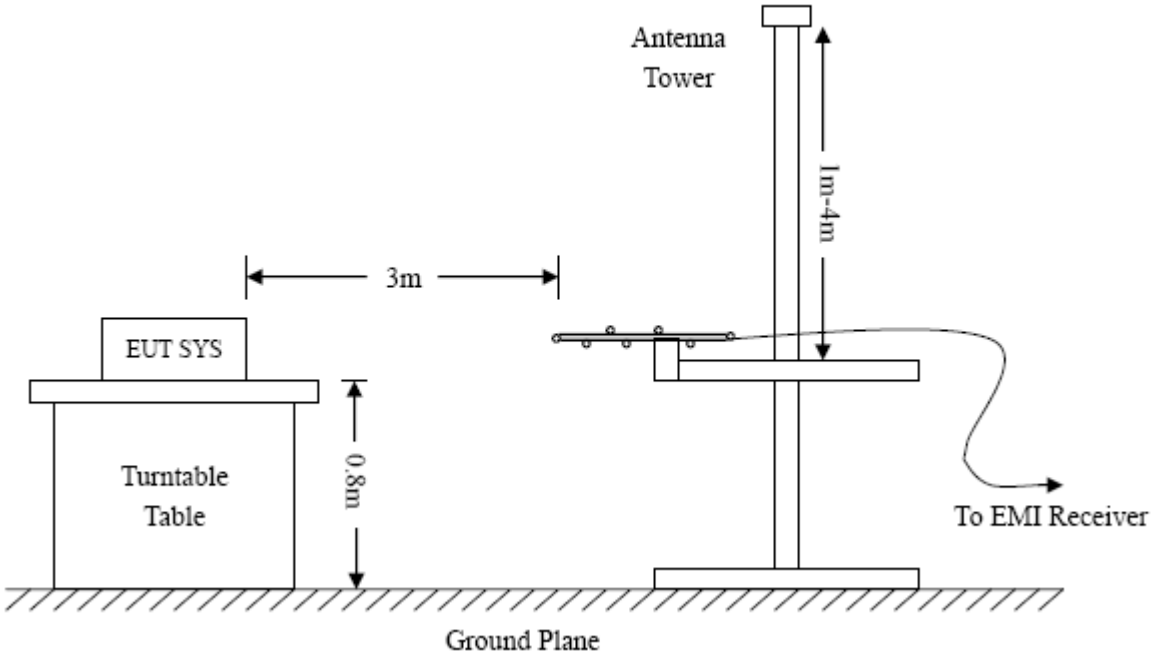
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2014-05-28	2015-05-27
EMI Test Receiver	R&S	ESVB	825471/005	2014-05-28	2015-05-27
Pre-amplifier	Agilent	8447F	3113A06717	2014-05-28	2015-05-27
Pre-amplifier	Compliance Direction	PAP-0118	24002	2014-05-28	2015-05-27
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2014-05-24	2015-05-23
Horn Antenna	ETS	3117	00086197	2014-05-24	2015-05-23
Horn Antenna	ETS	3116B	00088203	2014-05-24	2015-05-23
Loop Antenna	SCHWARZECK	HFRA 5165	9365	2014-05-24	2015-05-23

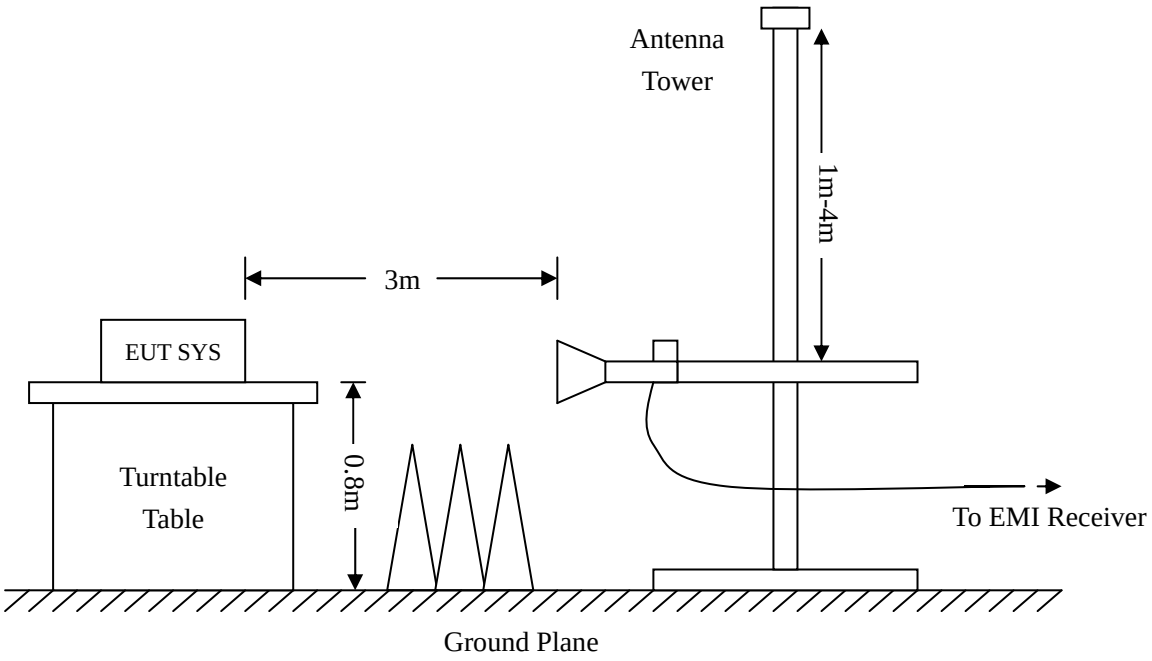
4.4 Test Procedure

The setup of EUT is according with per ANSI Standard C63.4-2014 measurement procedure. The specification used was with the limits of Part 15.249(a), 15.205 and 15.209 of the FCC Rules. The radiated emissions were investigated by rotating the EUT through the three (3) orthogonal planes as mandated in ANSI Standard C63.4-2014.

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(Average)
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, Average

4.5 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 for Part 15 of the FCC Rules. The equation for margin calculation is as follows:

Margin = Corr. Ampl. - Limit of Part 15 of the FCC Rules

4.6 Environmental Conditions

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

4.7 Summary of Test Results/Plots

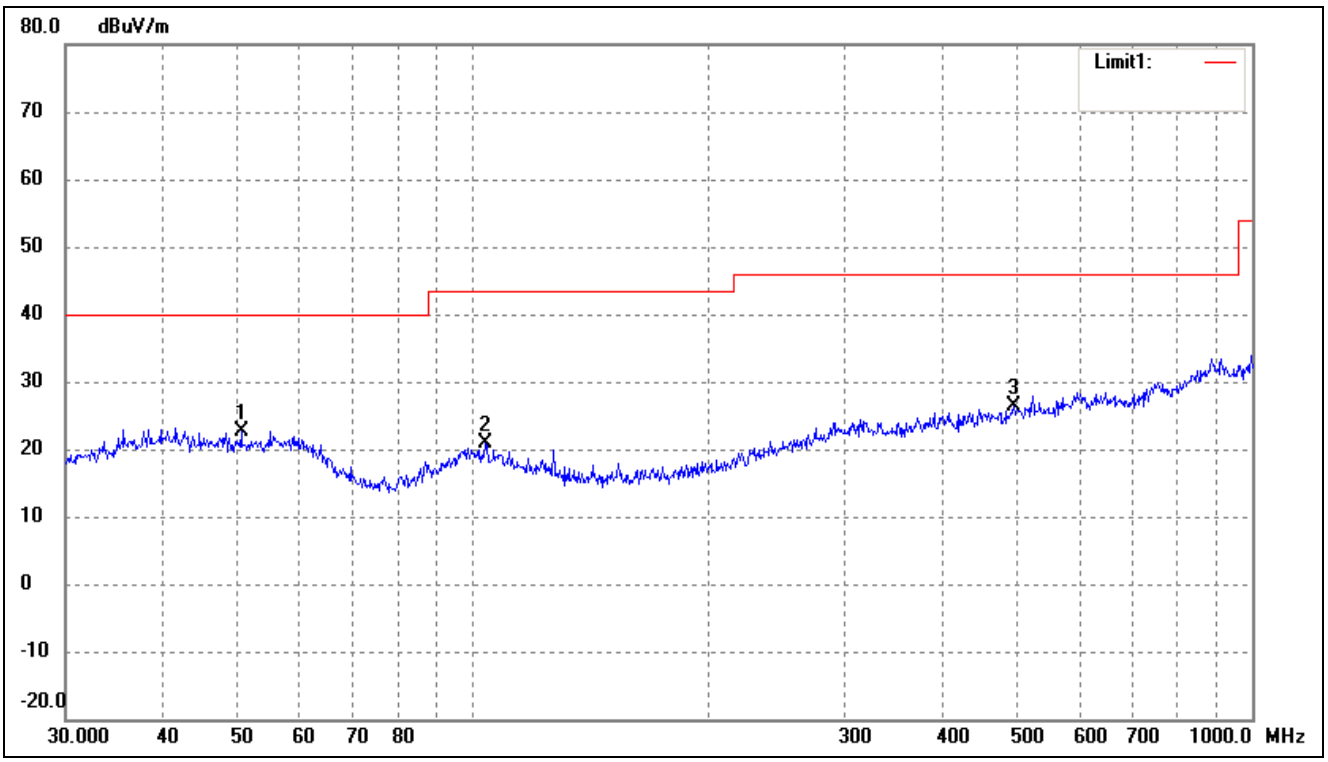
According to the data below, the standards of Part 15.249, 15.205 and 15.209 of the FCC Rules, and had the worst margin of:

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: *2.425-2.478 GHz Wireless Remote Control Toy - TX*
Model Number(s)/ Item Number(s): *33899*
Operating Condition: *Transmitting Lowest Channel (2425 MHz)*
Comment:

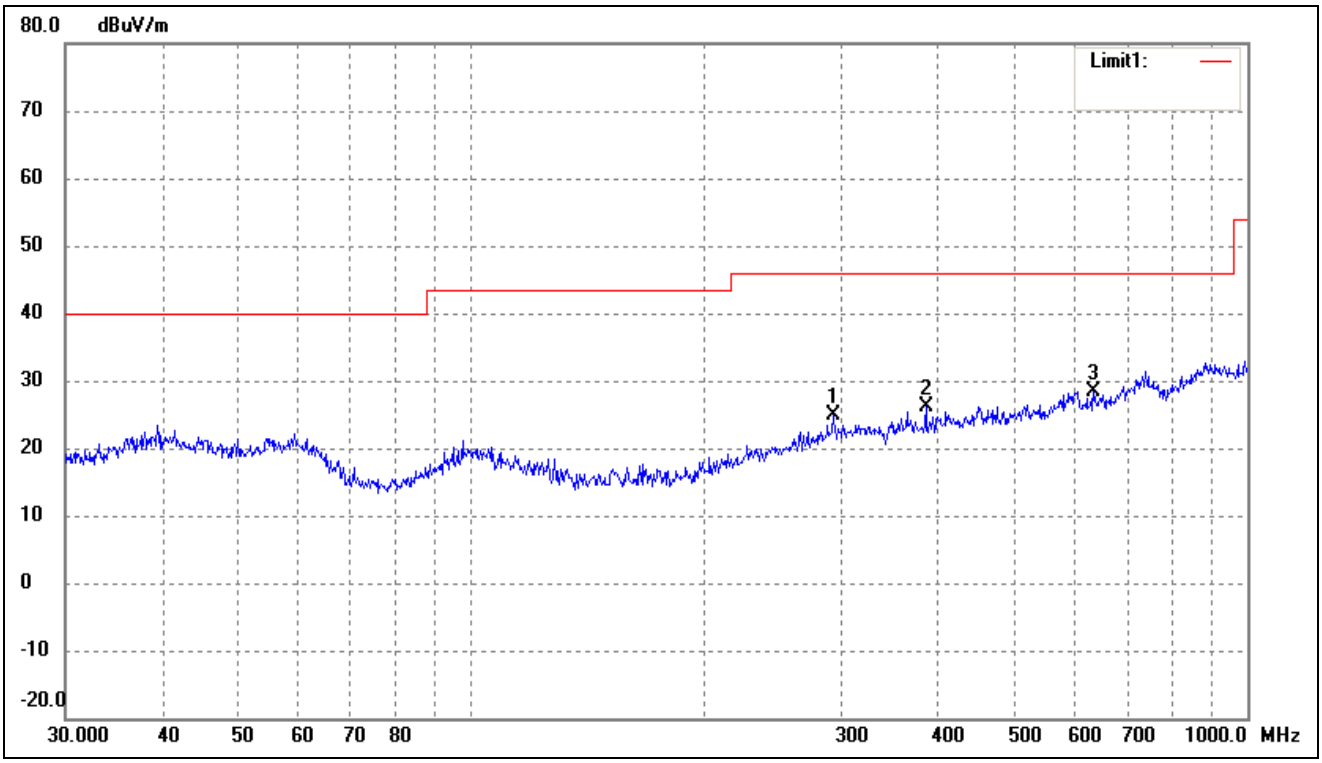
Test Specification: *Horizontal*



No.	Frequency	Reading	Correction Factor	Result	Limit	Margin	Degree	Height	Remark
	MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	·	cm	
1	50.4089	15.42	7.26	22.68	40.00	-17.32	264	100	Peak
2	103.8055	15.16	5.73	20.89	43.50	-22.61	113	200	Peak
3	494.1984	15.68	10.64	26.32	46.00	-19.68	287	100	Peak

Note: Emissions attenuated more than 20 dB below the permissible value are not reported.

Test Specification: Vertical

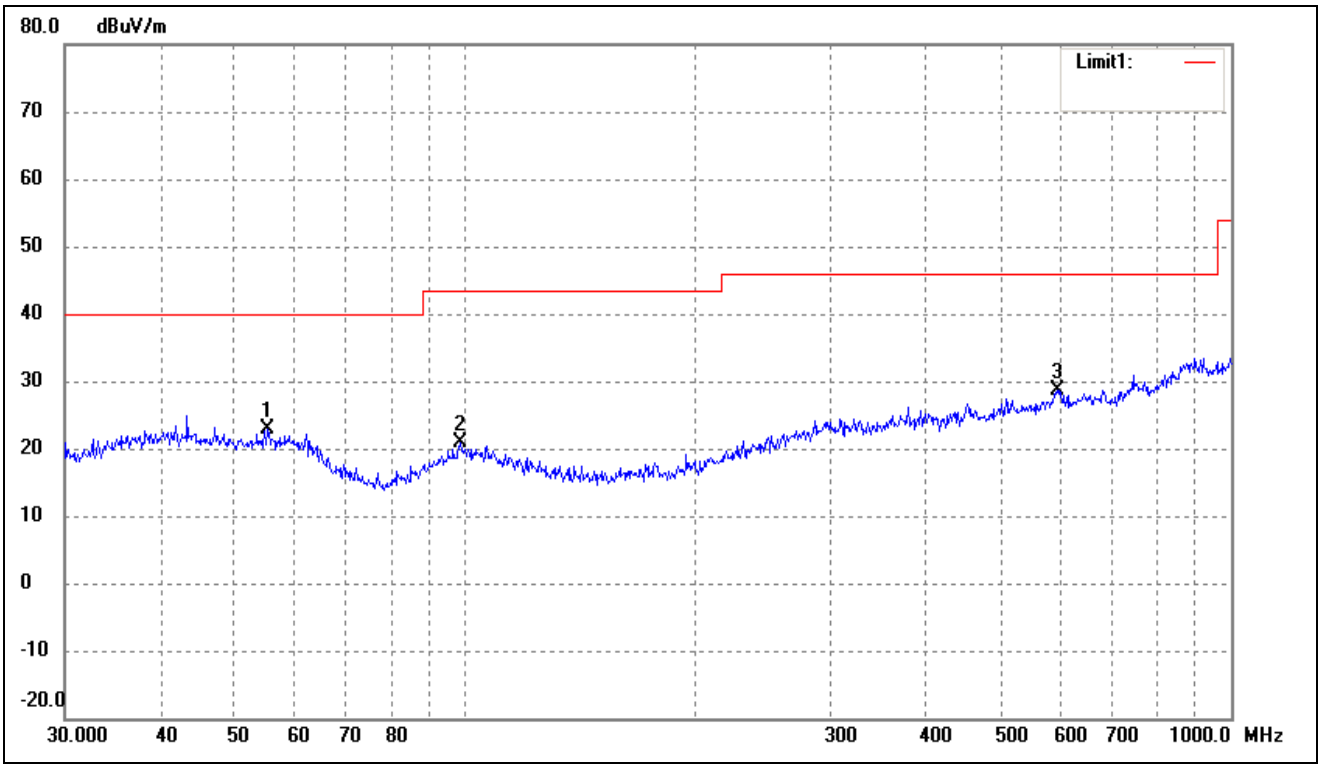


No.	Frequency	Reading	Correction Factor	Result	Limit	Margin	Degree	Height	Remark
	MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	·	cm	
1	293.0842	15.94	8.90	24.84	46.00	-21.16	234	100	Peak
2	385.2805	16.59	9.44	26.03	46.00	-19.97	118	100	Peak
3	633.9073	15.98	12.41	28.39	46.00	-17.61	164	100	Peak

Note: Emissions attenuated more than 20 dB below the permissible value are not reported.

Operating Condition: Transmitting Near Middle Channel (2450 MHz)
Comment:

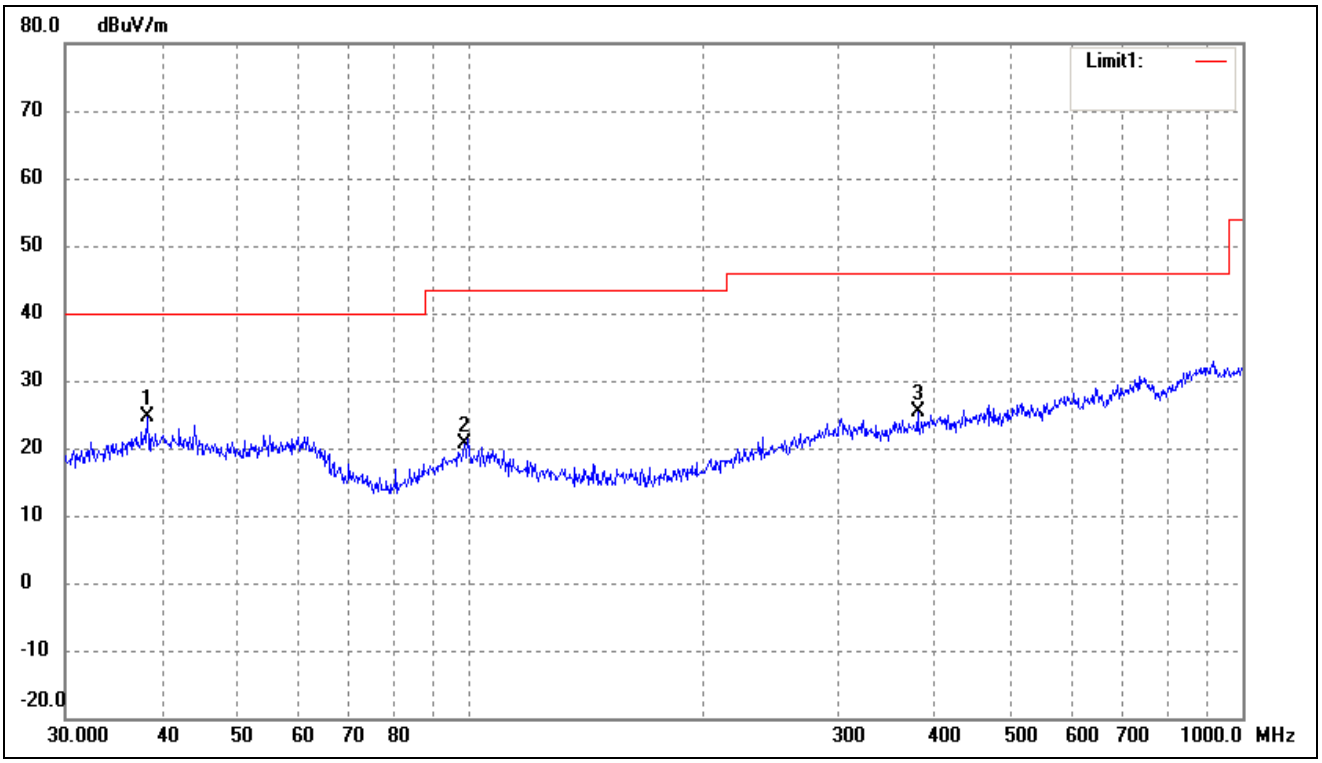
Test Specification: Horizontal



No.	Frequency	Reading	Correction Factor	Result	Limit	Margin	Degree	Height	Remark
	MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	·	cm	
1	55.2207	15.50	7.32	22.82	40.00	-17.18	162	100	Peak
2	98.4866	15.04	5.75	20.79	43.50	-22.71	200	100	Peak
3	593.0497	15.66	13.06	28.72	46.00	-17.28	156	100	Peak

Note: Emissions attenuated more than 20 dB below the permissible value are not reported.

Test Specification: Vertical

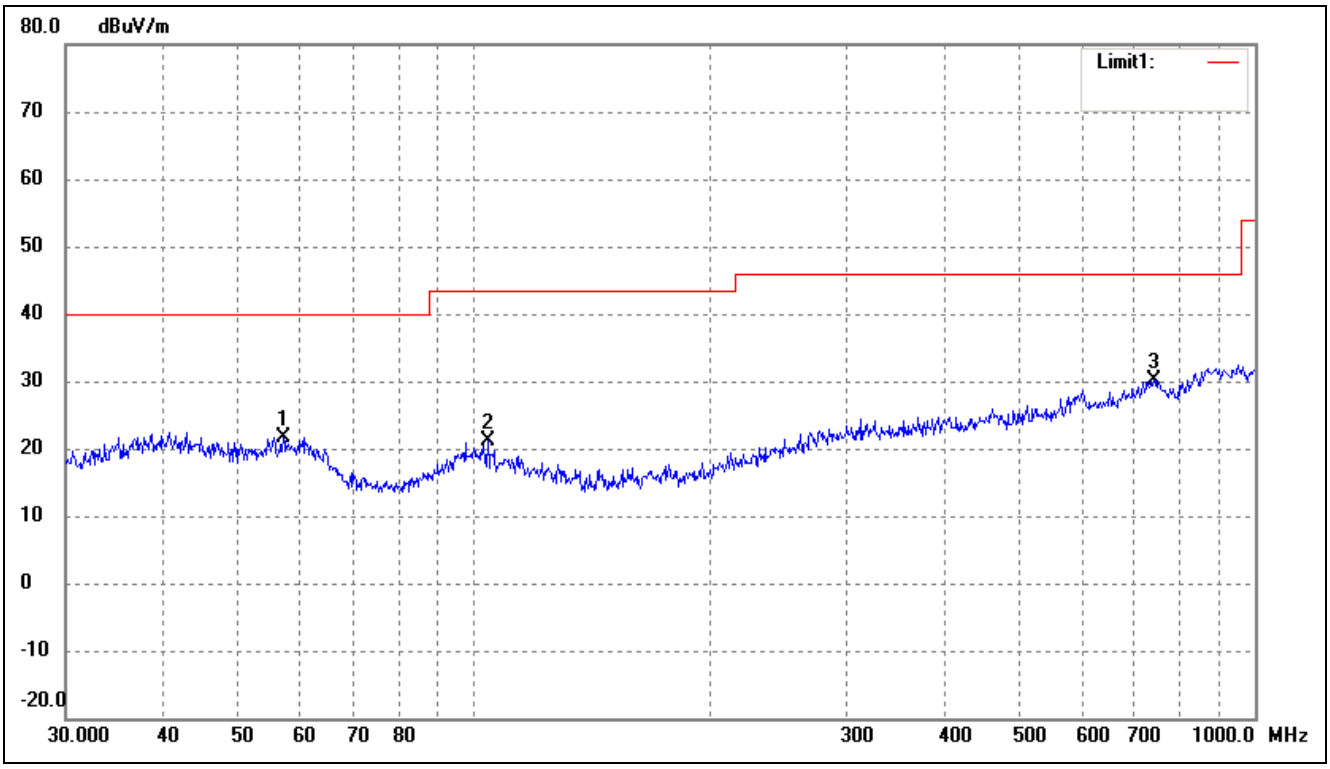


No.	Frequency	Reading	Correction Factor	Result	Limit	Margin	Degree	Height	Remark
	MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	·	cm	
1	38.3462	16.89	7.81	24.70	40.00	-15.30	240	100	Peak
2	98.4866	14.83	5.75	20.58	43.50	-22.92	187	100	Peak
3	379.9141	16.12	9.19	25.31	46.00	-20.69	220	100	Peak

Note: Emissions attenuated more than 20 dB below the permissible value are not reported.

Operating Condition: Transmitting Highest Channel (2478 MHz)
Comment:

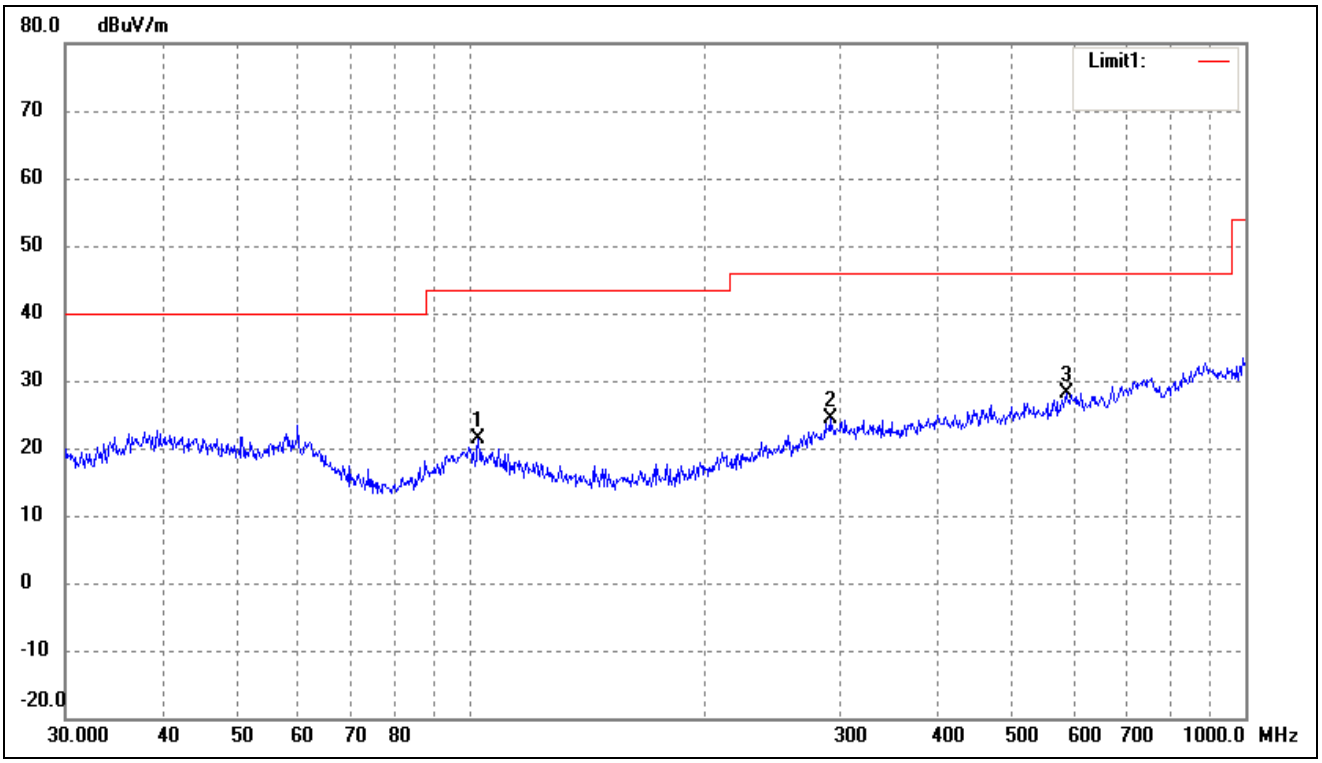
Test Specification: Horizontal



No.	Frequency	Reading	Correction Factor	Result	Limit	Margin	Degree	Height	Remark
	MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	·	cm	
1	56.9912	14.38	7.34	21.72	40.00	-18.28	162	100	Peak
2	104.1701	15.36	5.69	21.05	43.50	-22.45	200	100	Peak
3	742.2587	16.53	13.67	30.20	46.00	-15.80	360	100	Peak

Note: Emissions attenuated more than 20 dB below the permissible value are not reported.

Test Specification: Vertical



No.	Frequency	Reading	Correction Factor	Result	Limit	Margin	Degree	Height	Remark
	MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	·	cm	
1	102.3597	15.50	5.88	21.38	43.50	-22.12	240	100	Peak
2	291.0360	15.47	8.83	24.30	46.00	-21.70	187	100	Peak
3	586.8437	15.19	12.83	28.02	46.00	-17.98	220	100	Peak

Note: Emissions attenuated more than 20 dB below the permissible value are not reported.

Spurious Emissions Above 1GHz

Frequency	Reading	Correction Factor	Result	Limit	Margin	Polar	Detector
MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	H/V	
Lowest Channel - 2425 MHz							
2425	83.40	-3.46	79.94	114	-34.06	H	Peak
2425	72.43	-3.46	68.97	94	-25.03	H	Average
4850	46.17	0.62	46.79	74	-27.21	H	Peak
4850	29.06	0.62	29.72	54	-24.28	H	Average
7275	30.79	3.72	34.51	74	-39.49	H	Peak
7275	20.05	3.72	23.83	54	-30.17	H	Average
2425	80.90	-3.46	77.44	114	-36.56	V	Peak
2425	70.03	-3.46	66.57	94	-27.43	V	Average
4850	42.53	0.62	43.13	74	-30.87	V	Peak
4850	29.15	0.62	29.81	54	-24.19	V	Average
7275	30.74	3.72	34.46	74	-39.54	V	Peak
7275	19.79	3.72	23.55	54	-30.45	V	Average
Near Middle Channel - 2450 MHz							
2450	79.98	-3.40	76.58	114	-37.42	H	Peak
2450	68.88	-3.40	65.48	94	-28.52	H	Average
4900	46.42	0.70	47.12	74	-26.88	H	Peak
4900	31.60	0.70	32.30	54	-21.70	H	Average
7350	32.97	3.79	36.76	74	-37.24	H	Peak
7350	20.57	3.79	24.38	54	-29.62	H	Average
2450	80.96	-3.40	77.56	114	-36.44	V	Peak
2450	69.89	-3.40	66.49	94	-27.51	V	Average
4900	41.76	0.70	42.42	74	-31.58	V	Peak
4900	29.30	0.70	30.02	54	-23.98	V	Average
7350	32.16	3.79	35.95	74	-38.05	V	Peak
7350	20.83	3.79	24.68	54	-29.32	V	Average

Frequency	Reading	Correction Factor	Result	Limit	Margin	Polar	Detector
MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	H/V	
Highest Channel - 2478 MHz							
2478	79.39	-3.33	76.06	114	-37.94	H	Peak
2478	65.73	-3.33	62.40	94	-31.60	H	Average
4956	46.57	0.77	47.34	74	-26.66	H	Peak
4956	32.59	0.77	33.36	54	-20.64	H	Average
7434	31.52	3.85	35.37	74	-38.63	H	Peak
7434	20.55	3.87	24.44	54	-29.56	H	Average
2478	79.73	-3.33	76.40	114	-37.60	V	Peak
2478	66.08	-3.33	62.75	94	-31.25	V	Average
4956	40.38	0.77	41.15	74	-32.85	V	Peak
4956	28.89	0.77	29.70	54	-24.30	V	Average
7434	32.31	3.85	36.16	74	-37.84	V	Peak
7434	20.59	3.85	24.50	54	-29.50	V	Average

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 Part 15.209 of the FCC Rules, whichever is the lesser attenuation.

5.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2014-05-28	2015-05-27
EMI Test Receiver	R&S	ESVB	825471/005	2014-05-28	2015-05-27
Pre-amplifier	Agilent	8447F	3113A06717	2014-05-28	2015-05-27
Pre-amplifier	Compliance Direction	PAP-0118	24002	2014-05-28	2015-05-27
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2014-05-24	2015-05-23
Horn Antenna	ETS	3117	00086197	2014-05-24	2015-05-23

5.3 Test Procedure

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

5.4 Environmental Conditions

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

5.5 Summary of Test Results/Plots

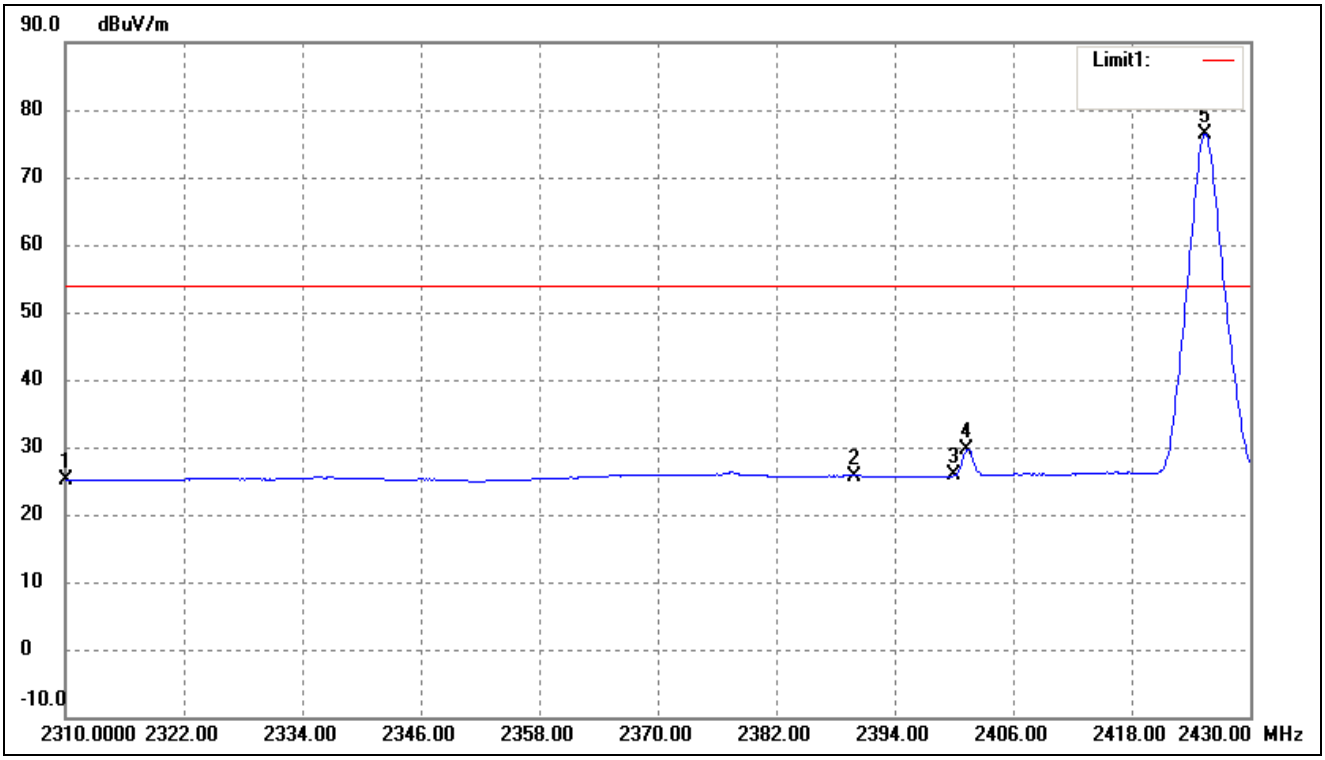
Test mode	Frequency	Limit	Result
	MHz	dBuV/dBc	
Lowest	2310.00	<54 dBuV	Pass
	2390.00	<54 dBuV	Pass
	2400.00	<54 dBuV	Pass
Highest	2483.50	<54 dBuV	Pass
	2500.00	<54 dBuV	Pass

The edge emissions are below limits of Part 15.209 of the FCC Rules or complies with the requirements under Part 15.249 of the FCC Rules.

Please refer to the test plots as below:

Lowest Bandedge

Horizontal (Worst case)

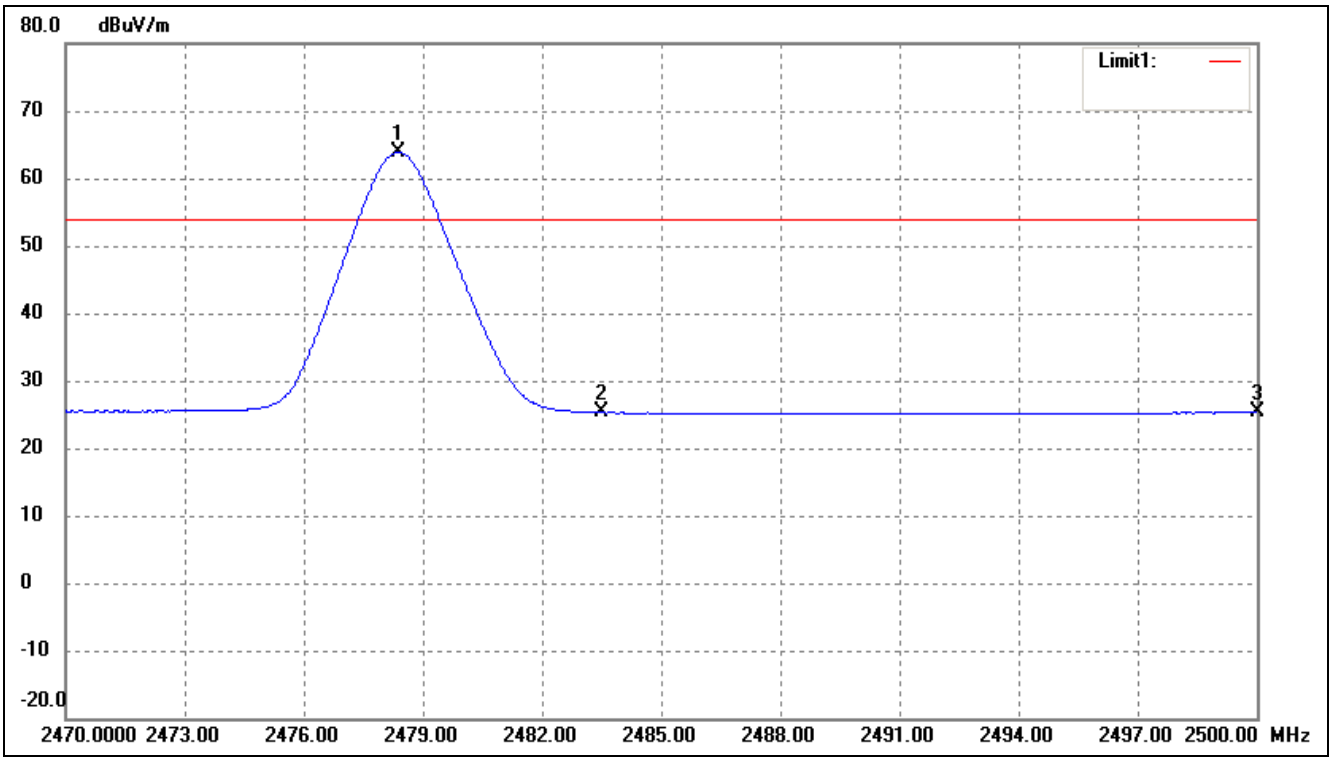


No.	Frequency	Reading	Correction Factor	Result	Limit	Margin	Remark
	MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	
1	2310.000	28.87	-3.71	25.16	54.00	-28.84	Average Detector
	2310.000	42.50	-3.71	38.79	74.00	-35.21	Peak Detector
2	2390.000	29.29	-3.54	25.75	54.00	-28.25	Average Detector
	2390.000	42.63	-3.54	39.09	74.00	-34.91	Peak Detector
3	2400.000	29.29	-3.51	25.78	54.00	-28.22	Average Detector
	2400.000	42.68	-3.51	39.17	74.00	-34.83	Peak Detector
4	2401.320	33.23	-3.51	29.72	54.00	-24.28	Average Detector
	2401.320	46.55	-3.51	43.04	74.00	-30.96	Peak Detector
5	2425.440	79.90	-3.46	76.44	/	/	Average Detector

Note: Emissions attenuated more than 20 dB below the permissible value are not reported.

Highest Bandedge

Horizontal (Worst case)



No.	Frequency	Reading	Correction Factor	Result	Limit	Margin	Remark
	MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	
1	2478.370	67.22	-3.33	63.89	/	/	Average Detector
2	2483.500	28.64	-3.33	25.31	54.00	-28.69	Average Detector
	2483.500	41.93	-3.33	38.60	74.00	-35.40	Peak Detector
3	2500.000	28.60	-3.28	25.32	54.00	-28.68	Average Detector
	2500.000	41.61	-3.28	38.33	74.00	-35.67	Peak Detector

Note: Emissions attenuated more than 20 dB below the permissible value are not reported.

6. Emission Bandwidth

6.1 Standard Applicable

According to Part 15.215 (c) of the FCC Rules, intentional radiators operating under the alternative provisions to the general emission limits, as contained in Part 15.217 through Part 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 Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	Agilent	E4402B	US41192821	2014-05-28	2015-05-27
Attenuator	ATTEN	ATS100-4-20	/	2014-05-28	2015-05-27

6.3 Test Procedure

According to the ANSI Standard C63.4-2014, 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.

6.4 Environmental Conditions

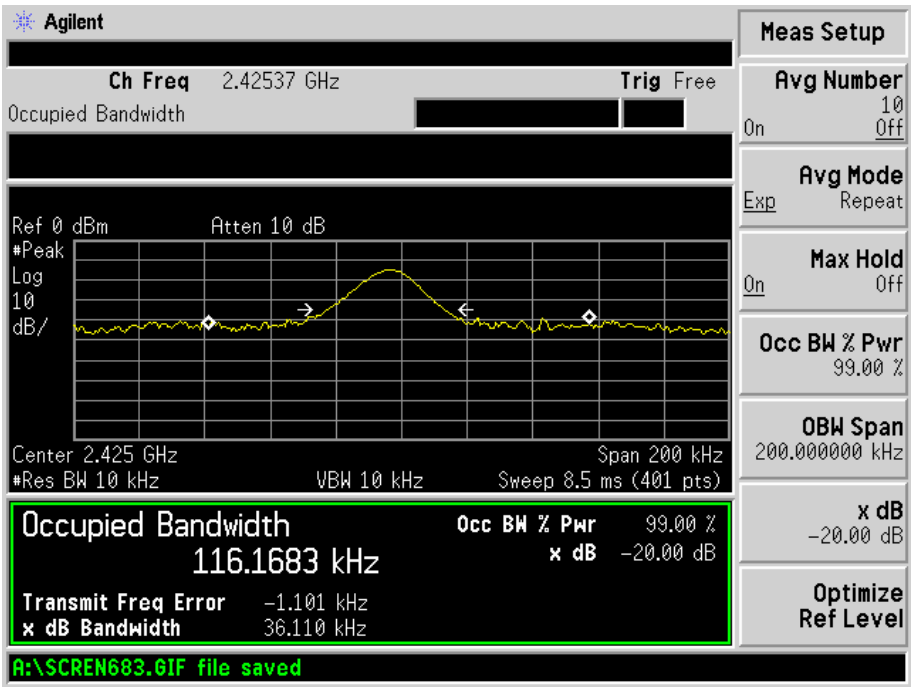
Temperature:	25 °C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

6.5 Summary of Test Results/Plots

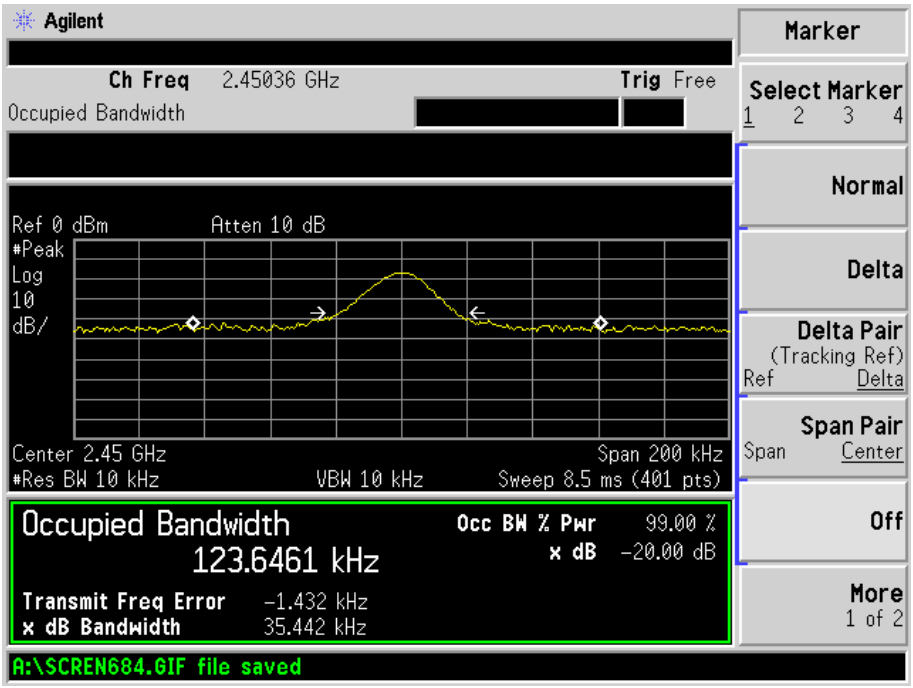
Channel	Frequency (MHz)	20dB Bandwidth (kHz)	99% Bandwidth (kHz)
Lowest Channel	2425	36.110	116.1683
Near Middle Channel	2450	35.442	123.6461
Highest Channel	2478	36.739	107.8520

Please refer to the following test plots

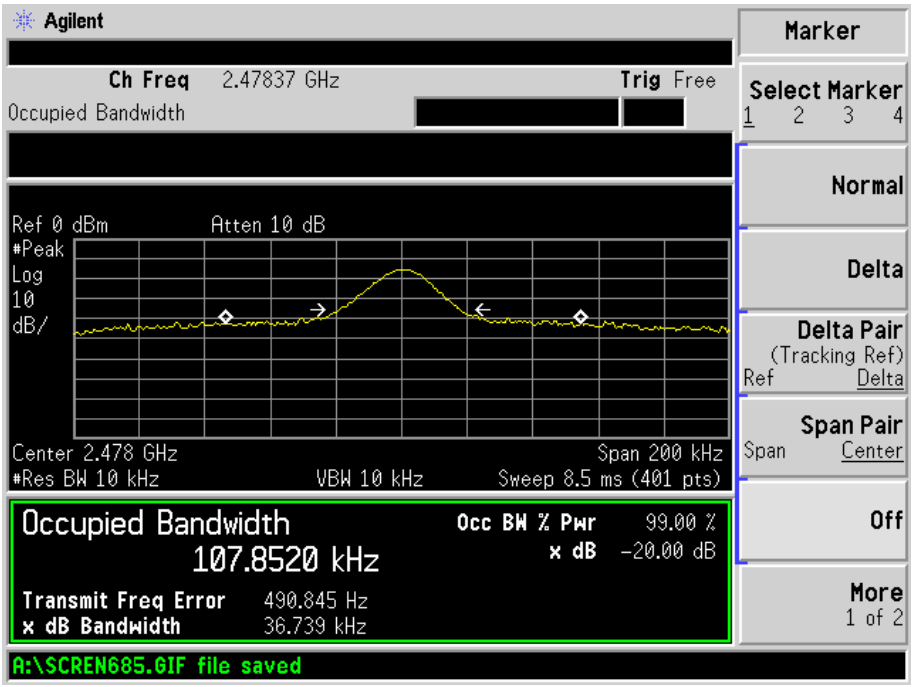
Lowest Channel:



Near Middle Channel:



Highest Channel:



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