FCC Radio Test Report

FCC ID: 2ABLR-SYMRX

Report No.	:	TB-FCC139317
Applicant	:	GamePop, Inc.
Equipment Under Test (EUT)		
EUT Name	:	USB Dongle
Model No.	:	SYM13015
Serial No.	:	N/A
Brand Name	:	GAMEPOP
Receipt Date	:	2014-08-25
Test Date	:	2014-08-26 to 2014-09-10
Issue Date	:	2014-09-11
Standards	:	FCC Part 15, Subpart C (15.249: 2013)
Test Method	:	ANSI C63.4:2003
Conclusions	:	**PASS**

In the configuration tested, the EUT complied with the standards specified above,
The EUT technically complies with the FCC requirements

Test/Witness Engineer : Wan Su

Approved& Authorized :

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in the report.

1A/F., Bldg.6, Yusheng Industrial Zone, The National Road No.107 Xixiang Section 467, Xixiang, Bao'an, Shenzhen, China
Tel: +86 75526509301 Fax: +86 75526509195

Contents

1. General Information About EUT

1.1 Client Information

Applicant	:	GamePop, Inc.
Address	:	2105S.Bascom Ave. #380, Campbell, CA 95008, United States
Manufacturer	:	GamePop, Inc.
Address	:	2105S.Bascom Ave. #380, Campbell, CA 95008, United States

1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	USB Dongle	
Models No.	:	SYM13015	
Model Difference	:	N/A	
Product Description	:	Operation Frequency:2402~2480 MHz	
		Number of Channels:	79 channels
		Out Power:	97.01 dBuV/m@3m Peak 76.91 dBuV/m@3m Avg
		Antenna Gain:	0 dBi
		Modulation Type:	GFSK
Power Supply	:	DC power from PC system.	
Power Rating	:	DC 5.0V by USB port.	
Connecting I/O Port(S)	:	Please refer to the User's Manual	

Note:

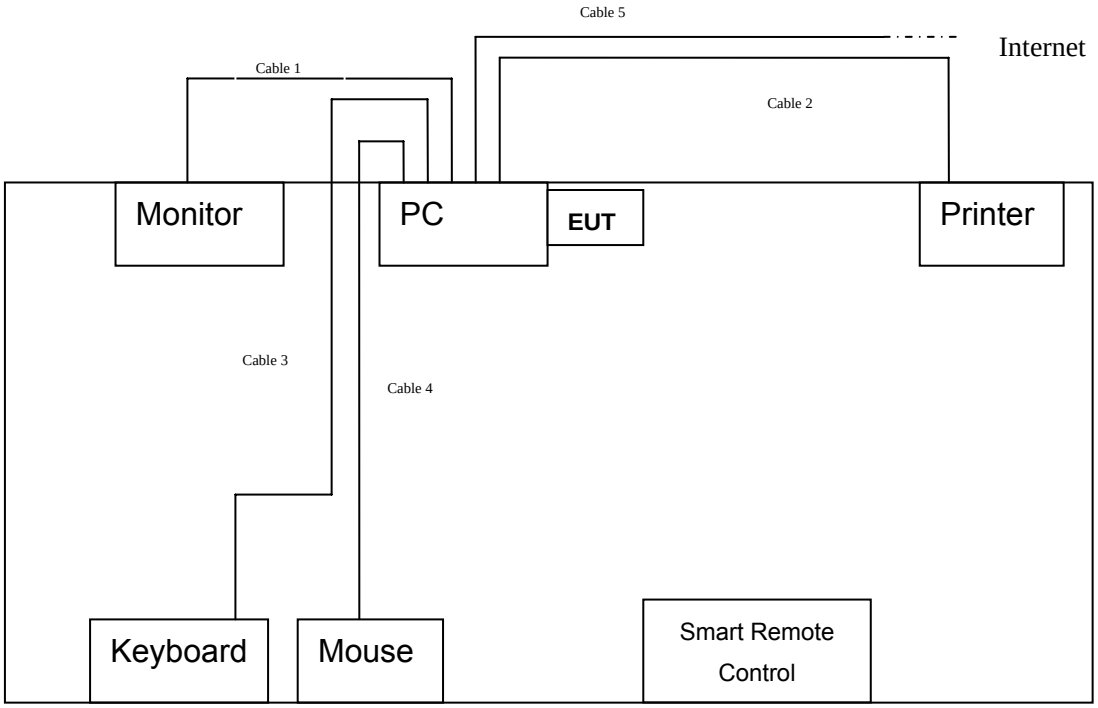
(1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

(2) Channel List:

Channel List		
Low Channel (MHz)	MID Channel (MHz)	HIGH Channel (MHz)
2402	2441	2480

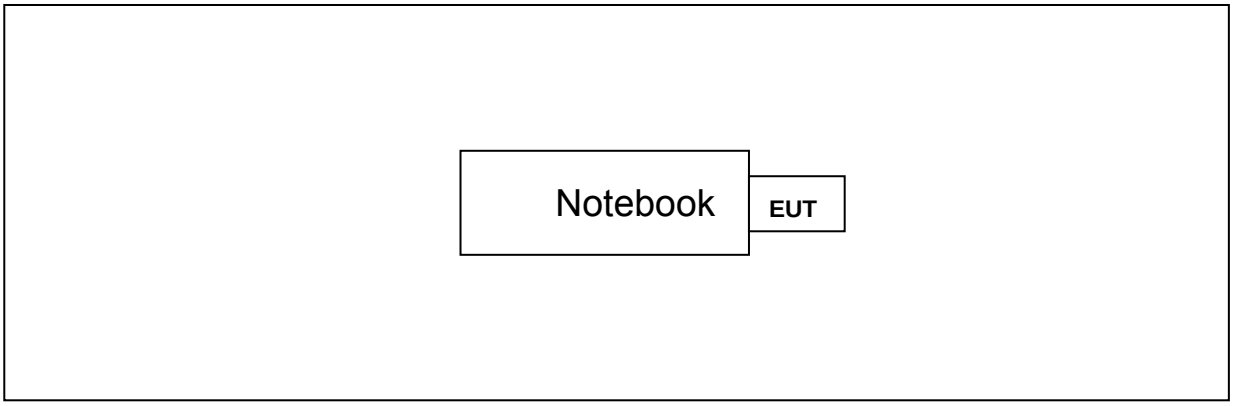
1.3 Block Diagram Showing the Configuration of System Tested

Mode 1: Normal Link



Note: During Testing the EUT was in receiving mode.

Mode 2: TX Mode



1.4 Description of Support Units

Equipment Information				
Name	Model	S/N	Manufacturer	Used " √ "
Printer	HP1505n	VNF3G06957	HP	√
LCD Monitor	E170Sc	----	DELL	√
PC	OPTIPLEX380	----	DELL	√

Keyboard	L100	U01C	DELL	√
Mouse	M-UARDEL7	----	DELL	√
TF Card	1GB	----	Kingston	
U Disk	1GB	----	SSK	
TV	LC24F566DC	----	KONKA	
Notebook	M490sA	----	Lenovo	√
Smart Remote Control	iM-LM-036	FCC ID: 2ABGP-SYMTX	Symstar Technology (Shenzhen) Co., Ltd.	Provide by applicant.
Cable Information				
Number	Shielded Type	Ferrite Core	Length	Note
Cable 1	YES	YES(2)	1.8M	
Cable 2	YES	YES(1)	2.0M	
Cable 3	YES	NO	1.5M	
Cable 4	YES	NO	1.5M	
Cable 5	YES	NO	10M	

1.5 Description of Test Mode

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned follow was evaluated respectively.

For Conducted Test	
Final Test Mode	Description
Mode 1	TX Mode

For Radiated Test	
Final Test Mode	Description
Mode 1	TX Mode
Mode 2	TX Mode

Note:

For all test, we have verified the construction and function in typical operation. And all the test modes were carried out with the EUT in transmitting operation in maximum power with all kinds of data rate.

(1)According to ANSI C63.4 standards, the measurements are performed at the highest,

middle, lowest available channels.

(2)During the testing procedure, the continuously transmitting with the maximum power mode was programmed by the customer.

(3) The EUT is considered as mobile equipment; it was pre-tested on the positioned of each 3 axis, X-plane, Y-plane and Z-plane. The worst case was found positioned on X-plane. Therefore only the test data of this X-plane was used for radiated emission measurement test.

1.6 Description of Test Software Setting

During testing channel & Power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of RF mode.

1.7 Test Facility

The testing was performed by the Shenzhen Toby Technology Co., Ltd., in their facilities located at:

1A/F., Bldg.6, Yusheng Industrial Zone, The National Road No.107 Xixiang Section 467, Xixiang, Bao'an, Shenzhen, Guangdong, China.

At the time of testing, the following bodies accredited the Laboratory:

CNAS (L5813)

The Laboratory has been accredited by CNAS to ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories for the competence in the field of testing. And the Registration No.: CNAS L5813.

FCC List No.: (811562)

The Laboratory is listed in the United States of American Federal Communications Commission (FCC), and the registration number is 811562.

IC Registration No.: (11950A-1)

The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing. The site registration: Site# 11950A-1.

2. Test Summary

FCC Part 15 Subpart C(15.249)			
Standard Section	**Test Item**	**Judgment**	**Remark**
15.203	Antenna Requirement	PASS	N/A
15.205	Restricted Bands	PASS	N/A
15.207	AC Power Conducted Emission	PASS	N/A
15.249 &15.209	Radiated Spurious Emission	PASS	N/A
15.215(C)	20dB Bandwidth	PASS	N/A
Note: N/A is an abbreviation for Not Applicable.			

3. Conducted Emission Test

3.1 Test Standard and Limit

3.1.1Test Standard

FCC Part 15.207

3.1.2 Test Limit

Conducted Emission Test Limit

Frequency	Maximum RF Line Voltage (dBμV)	
	Quasi-peak Level	Average Level
150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
500kHz~5MHz	56	46
5MHz~30MHz	60	50

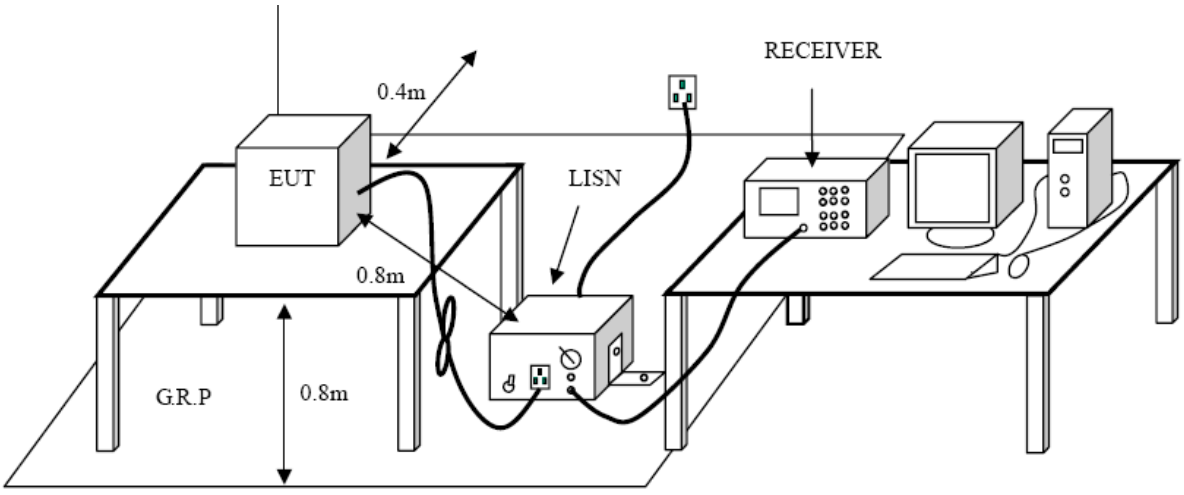
Notes:

(1) *Decreasing linearly with logarithm of the frequency.

(2) The lower limit shall apply at the transition frequencies.

(3) The limit decrease in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

3.2 Test Setup



3.3 Test Procedure

The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

LISN is at least 80 cm from nearest part of EUT chassis.

The bandwidth of EMI test receiver is set at 9kHz, and the test frequency band is from 0.15MHz to 30MHz.

3.4 Test Equipment Used

Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test Receiver	ROHDE& SCHWARZ	ESCI	100321	Aug. 08, 2014	Aug. 07, 2015
50ΩCoaxial Switch	Anritsu	MP59B	X10321	Aug. 08, 2014	Aug. 07, 2015
L.I.S.N	Rohde & Schwarz	ENV216	101131	Aug. 08, 2014	Aug. 07, 2015
L.I.S.N	SCHWARZBECK	NNBL 8226-2	8226-2/164	Aug. 08, 2014	Aug. 07, 2015

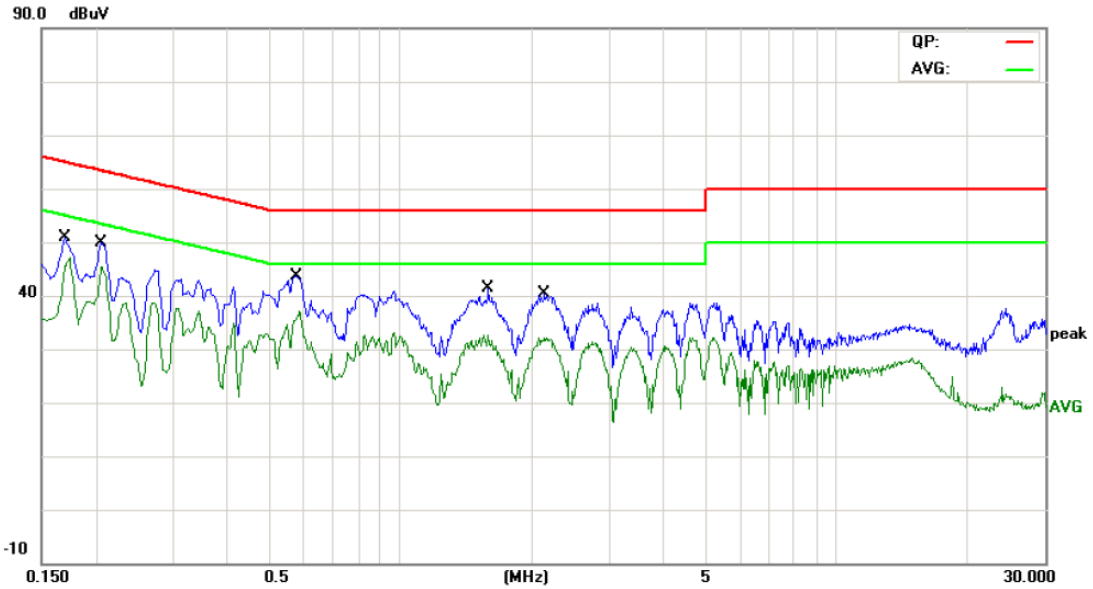
3.5 EUT Operating Mode

Please refer to the description of test mode.

3.6 Test Data

Please refer following page.

EUT:	USB Dongle	Model Name :	SYM13015
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Terminal:	Line		
Test Mode:	USB Charging with TX Mode		
Remark:	Only worse case is reported		

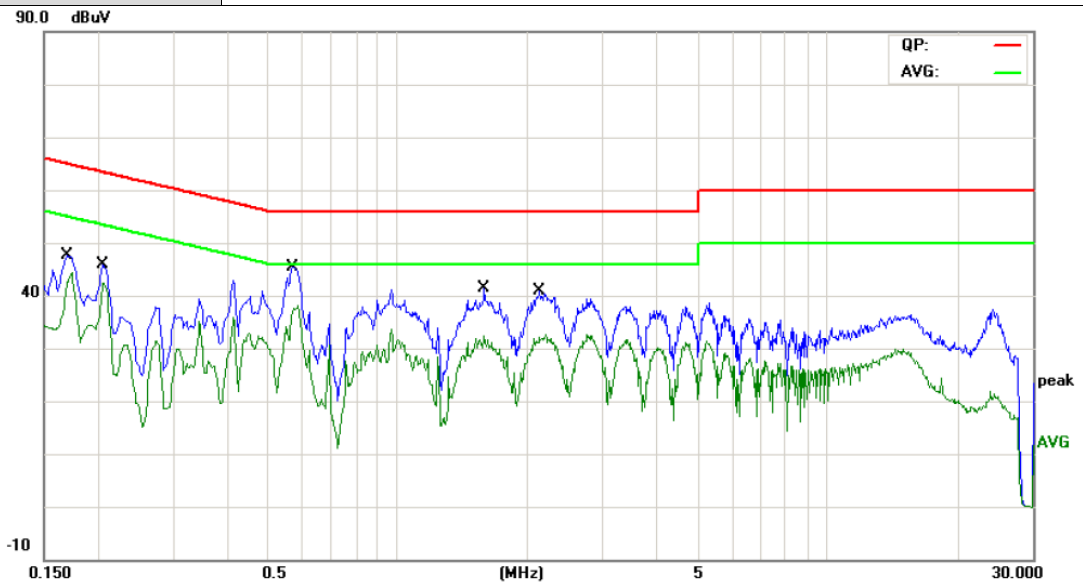


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1700	38.84	9.96	48.80	64.96	-16.16	QP	
2		0.1700	36.38	9.96	46.34	54.96	-8.62	AVG	
3		0.2060	38.34	10.02	48.36	63.36	-15.00	QP	
4	*	0.2060	35.37	10.02	45.39	53.36	-7.97	AVG	
5		0.5780	32.88	10.06	42.94	56.00	-13.06	QP	
6		0.5780	25.65	10.06	35.71	46.00	-10.29	AVG	
7		1.5859	27.33	10.06	37.39	56.00	-18.61	QP	
8		1.5859	22.28	10.06	32.34	46.00	-13.66	AVG	
9		2.1380	26.59	10.06	36.65	56.00	-19.35	QP	
10		2.1380	21.65	10.06	31.71	46.00	-14.29	AVG	

*:Maximum data x:Over limit !:over margin

Emission Level= Read Level+ Correct Factor

EUT:	USB Dongle	Model Name :	SYM13015
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Terminal:	Neutral		
Test Mode:	USB Charging with TX Mode		
Remark:	Only worse case is reported		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1700	36.22	9.96	46.18	64.96	-18.78	QP	
2		0.1700	33.50	9.96	43.46	54.96	-11.50	AVG	
3		0.2060	34.91	10.02	44.93	63.36	-18.43	QP	
4		0.2060	32.72	10.02	42.74	53.36	-10.62	AVG	
5		0.5700	34.73	10.05	44.78	56.00	-11.22	QP	
6	*	0.5700	27.14	10.05	37.19	46.00	-8.81	AVG	
7		1.5859	27.55	10.06	37.61	56.00	-18.39	QP	
8		1.5859	22.44	10.06	32.50	46.00	-13.50	AVG	
9		2.1420	26.85	10.06	36.91	56.00	-19.09	QP	
10		2.1420	21.99	10.06	32.05	46.00	-13.95	AVG	

*:Maximum data x:Over limit !:over margin

Emission Level= Read Level+ Correct Factor

4. Radiated Emission Test

4.1 Test Standard and Limit

4.1.1 Test Standard

FCC Part 15.209

4.1.2 Test Limit

Radiated Emission Limit (9kHz~1000MHz)

Frequency (MHz	Field Strength (microvolt/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Radiated Emission Limit (Above 1000MHz)

Frequency (MHz)	Class A (dBuV/m)(at 3 M)		Class B (dBuV/m)(at 3 M)	
	Peak	Average	Peak	Average
Above 1000	80	60	74	54

Note:

(1) The tighter limit applies at the band edges.

(2) Emission Level(dBuV/m)=20log Emission Level(Uv/m)

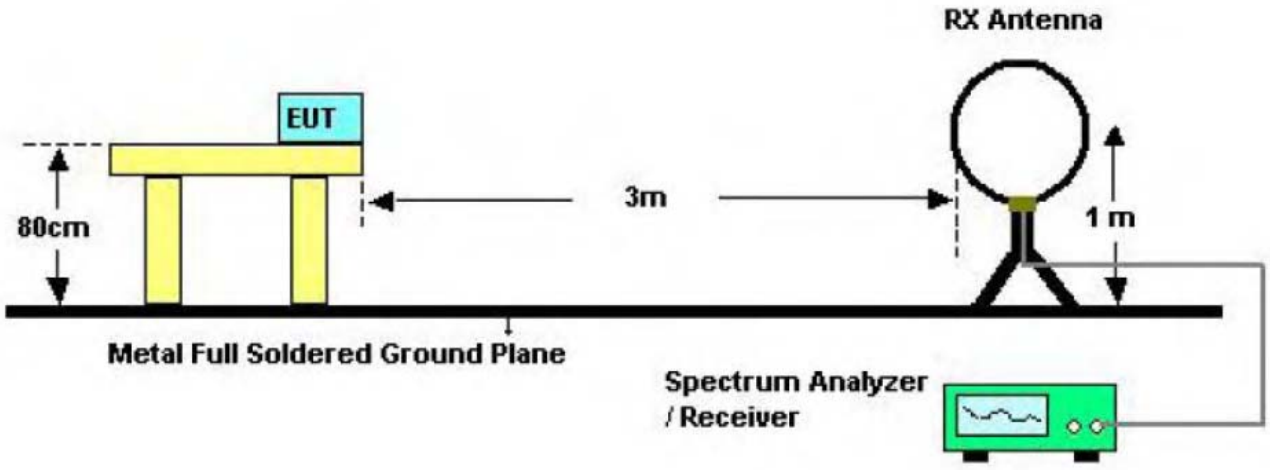
Limits of radiated emission measurement (15.249)

FCC Part 15 (15.249), Subpart C	
Limit	**Frequency Range (MHz)**
Field strength of fundamental 50000 μV/m (94 dBμV/m) @ 3 m	2400~2483.5
Field strength of fundamental 500 μV/m (94 dBμV/m) @ 3 m	Above 2483.5

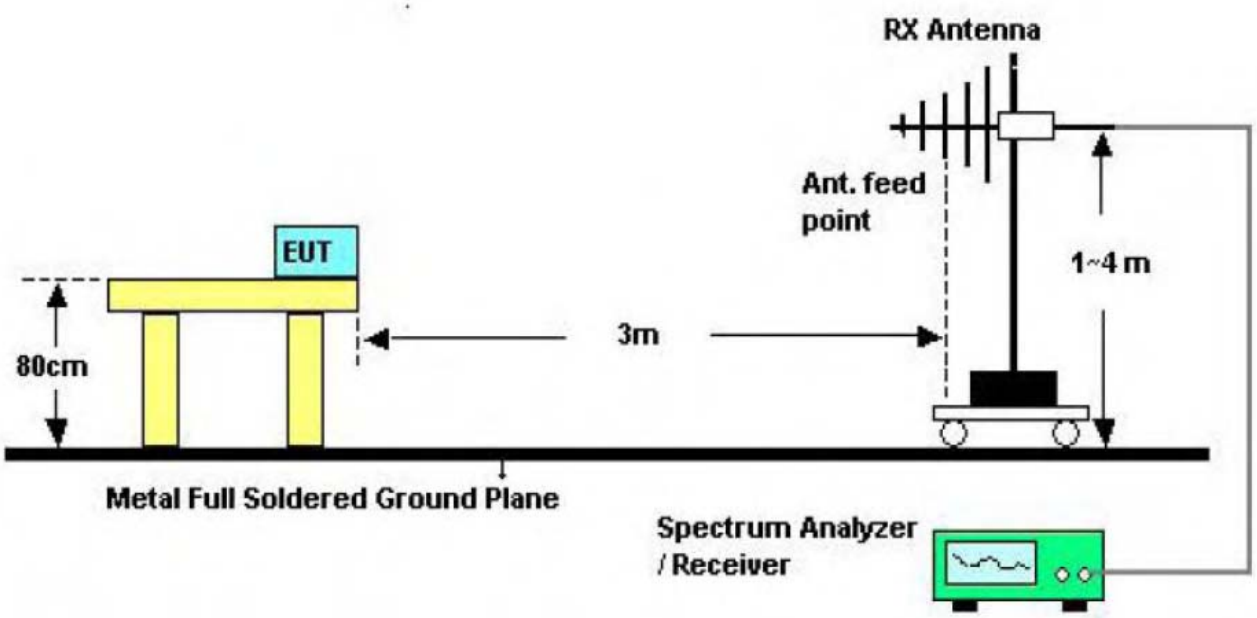
Restricted bands requirement for equipment operating in 2400MHz to 2483.5 MHz (15.249)

Restricted Frequency Band (MHz)	(dBuV/m)(at 3 M)
2310~2390	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
2483.5~2500	

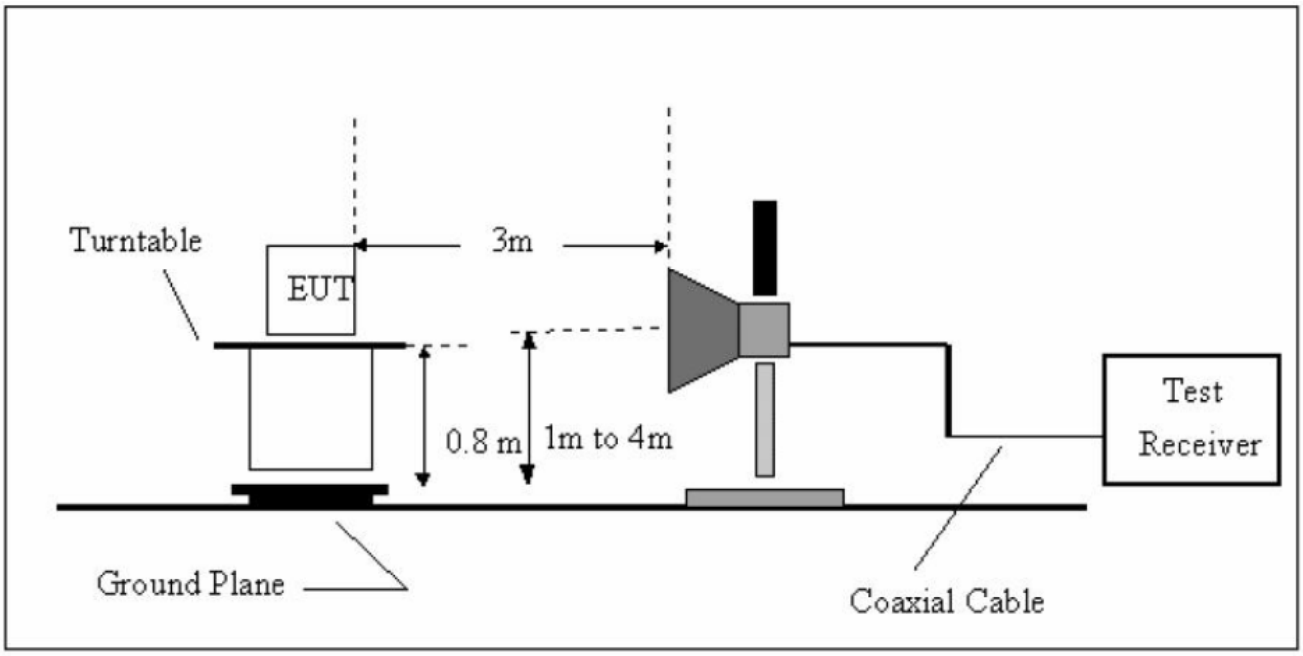
4.2 Test Setup



Bellow 30MHz Test Setup



Bellow 1000MHz Test Setup



Above 1GHz Test Setup

4.3 Test Procedure

(1) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1 GHz. The EUT was placed on a rotating 0.8m high above ground, the table was rotated 360 degrees to determine the position of the highest radiation.
(2) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
(3) The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
(4) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit Bellow 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.
(5) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
(6) Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.
(7) For the actual test configuration, please see the test setup photo.

4.4 EUT Operating Condition

The EUT was set to Continual Transmitting in maximum power, and new batteries are used during testing.

4.5 Test Equipment

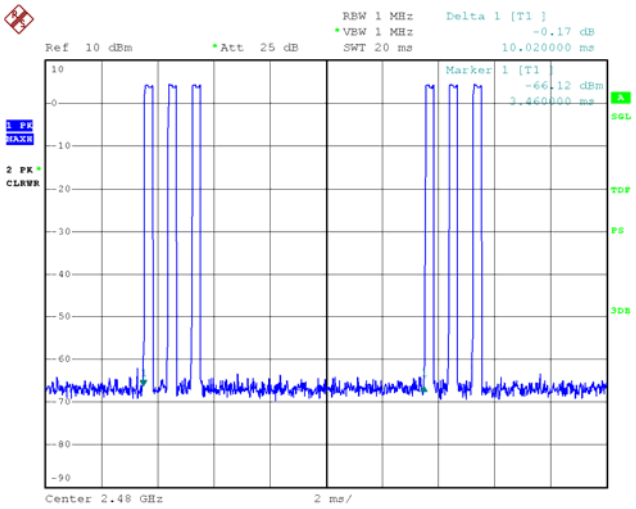
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Mar. 20, 2014	Mar. 19, 2015
Spectrum Analyzer	Rohde & Schwarz	FSP30	DE25181	Aug. 08, 2014	Aug. 07, 2015
EMI Test Receiver	Rohde & Schwarz	ESCI	101165	Aug. 08, 2014	Aug. 07, 2015
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar. 07, 2014	Mar.06, 2015
Bilog Antenna	ETS-LINDGREN	3142E	00117542	Mar. 07, 2014	Mar.06, 2015
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar. 07, 2014	Mar.06, 2015
Horn Antenna	ETS-LINDGREN	3117	00143209	Mar. 07, 2014	Mar.06, 2015
Pre-amplifier	HP	11909A	185903	Mar. 07, 2014	Mar.06, 2015
Pre-amplifier	HP	8447B	3008A00849	Mar. 07, 2014	Mar.06, 2015
Cable	HUBER+SUHNER	100	SUCOFLEX	Mar. 07, 2014	Mar.06, 2015
Signal Generator	Rohde & Schwarz	SML03	IKW682-054	Feb. 11, 2014	Feb.10, 2015
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A

4.6 Test Data

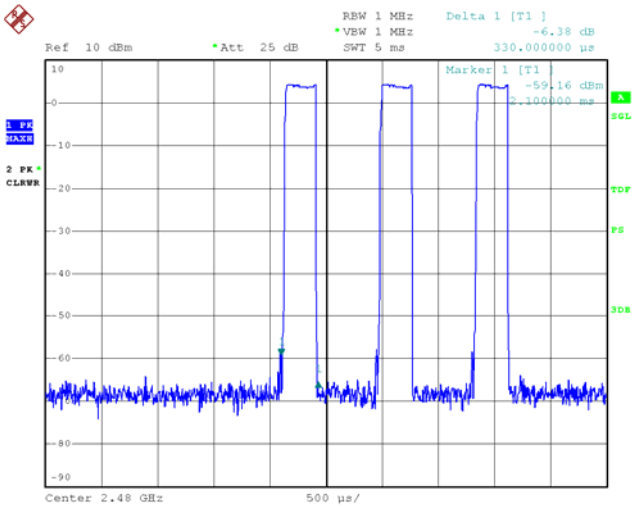
Please see the next page.

4.6.1 Duty Cycle

(1) During transmitting mode, one cycle time T1=10.02ms



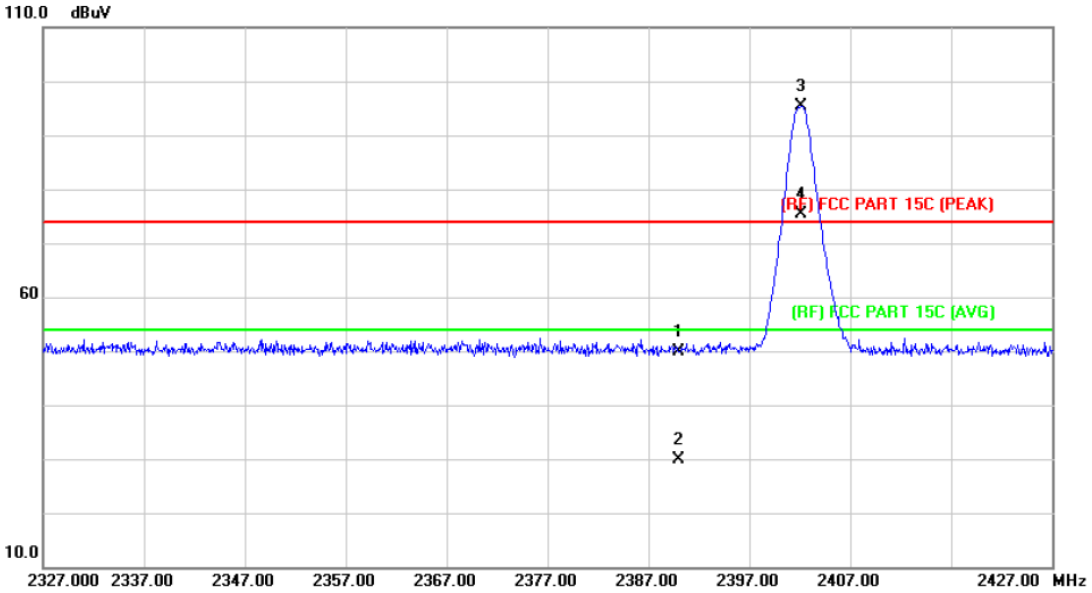
(2)One pulse time T2= 0.33 ms



(3) Duty Cycle= T2*3/T1*100%= 9.88%
(4)Avg=Peak+20log(Duty Cycle)=Peak-20.10

4.6.2 Field Strength of the Fundamental and Restricted Band

EUT:	USB Dongle	Model Name :	SYM13015
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 5V		
Ant. Pol.	Horizontal		
Test Mode:	TX 2402MHz		
Remark:			

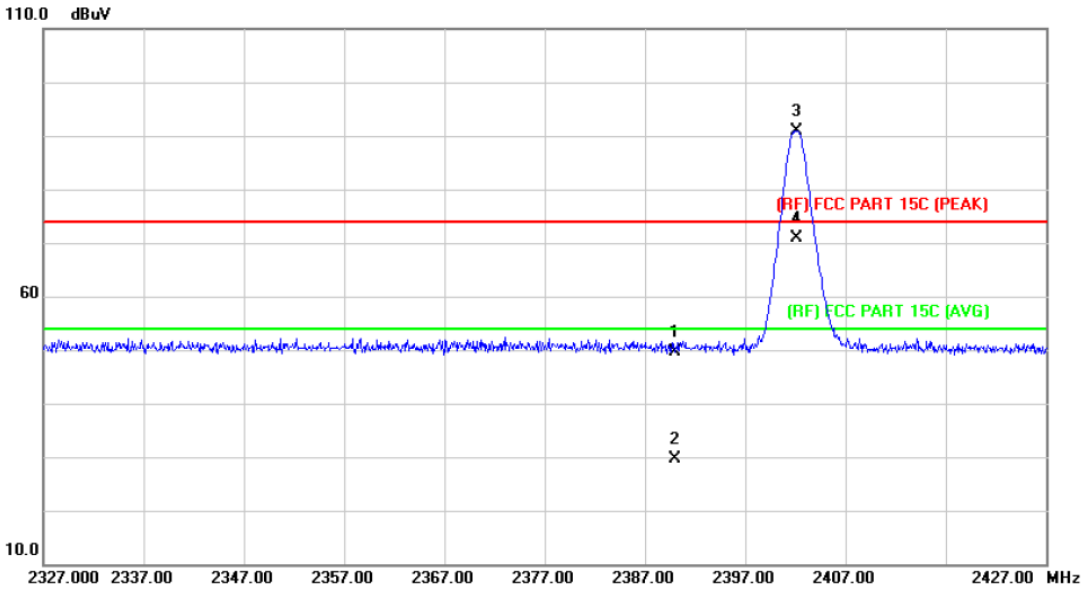


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		2390.000	46.59	3.40	49.99	74.00	-24.01	peak
2		2390.000	26.49	3.40	29.89	54.00	-24.11	AVG
3	*	2402.200	91.95	3.41	95.36	**114.00**	**-18.64**	peak
4	X	2402.200	71.85	3.41	75.26	**94.00**	**-18.74**	AVG

Emission Level= Read Level+ Correct Factor

Note: Avg=Peak-20.10

EUT:	USB Dongle	Model Name :	SYM13015
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Vertical		
Test Mode:	TX 2402MHz		
Remark:			

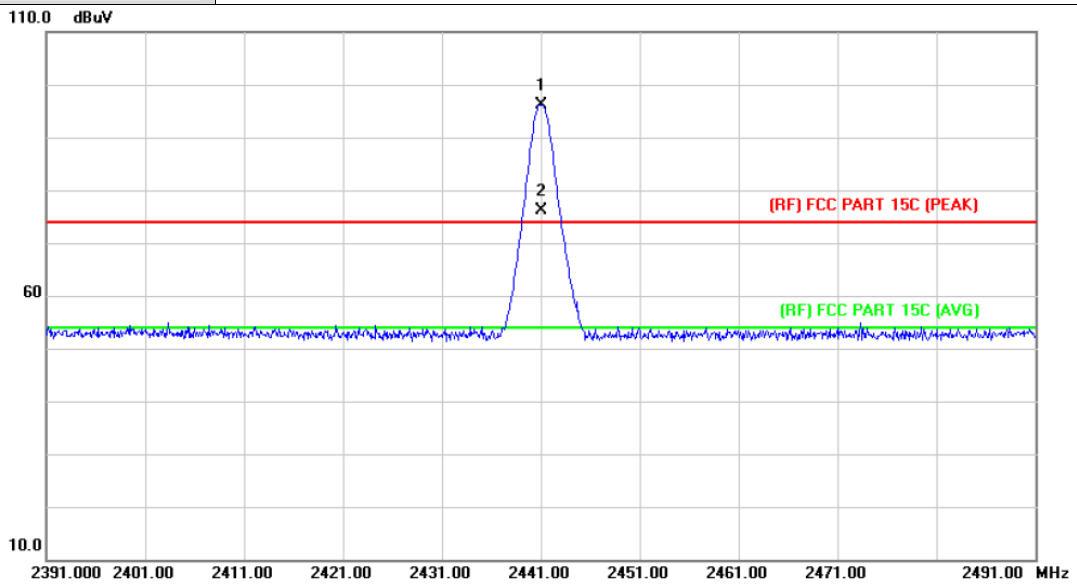


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		2390.000	46.33	3.40	49.73	74.00	-24.27	peak
2		2390.000	26.23	3.40	29.63	54.00	-24.37	AVG
3	*	2402.200	87.56	3.41	90.97	**114.00**	**-23.03**	peak
4	X	2402.200	67.46	3.41	70.87	**94.00**	**-23.13**	AVG

Emission Level= Read Level+ Correct Factor

Note: Avg=Peak-20.10

EUT:	USB Dongle	Model Name :	SYM13015
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 5V		
Ant. Pol.	Horizontal		
Test Mode:	TX 2441MHz		
Remark:			

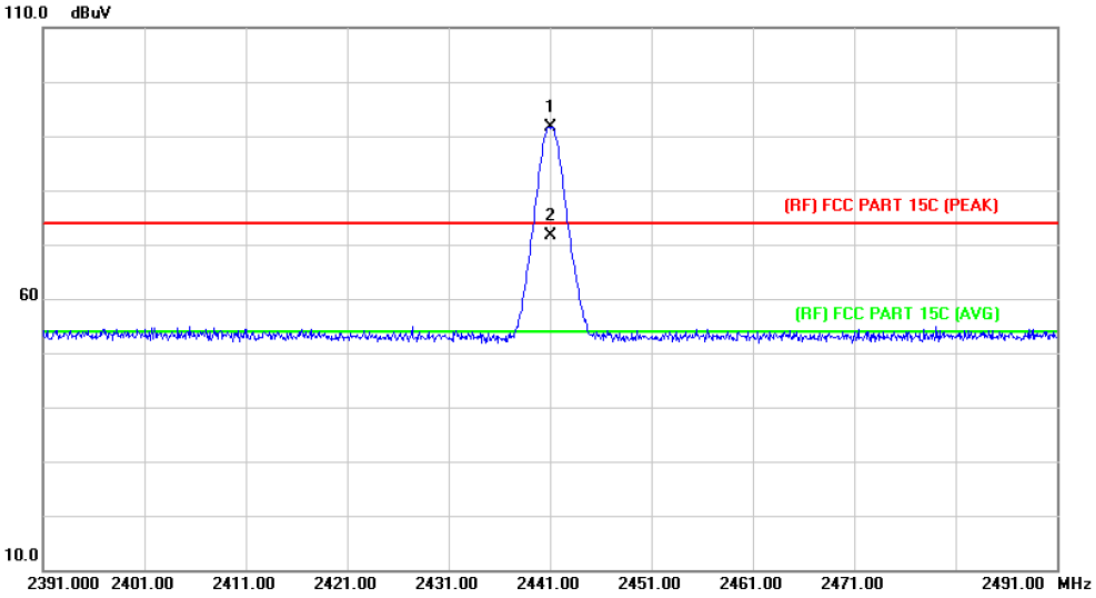


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	*	2441.100	92.66	3.46	96.12	**114.00**	**-17.88**	peak
2	X	2441.100	72.56	3.46	76.02	**94.00**	**-17.98**	AVG

Emission Level= Read Level+ Correct Factor

Note: Avg=Peak-20.10

EUT:	USB Dongle	Model Name :	SYM13015
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Vertical		
Test Mode:	TX 2441MHz		
Remark:			

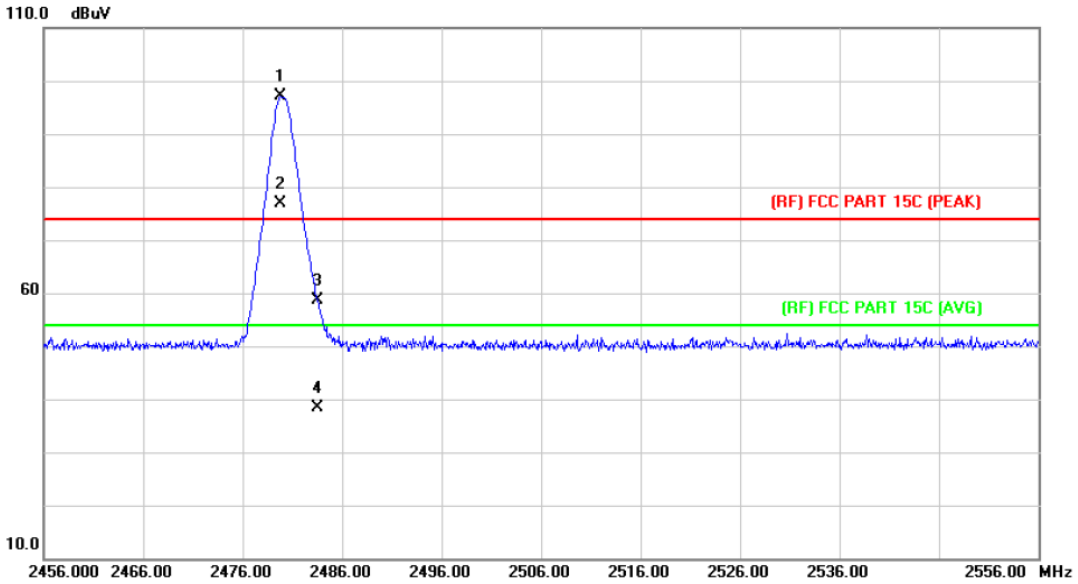


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	*	2441.100	88.17	3.46	91.63	**114.00**	**-22.37**	peak
2	X	2441.100	68.07	3.46	71.53	**94.00**	**-22.47**	AVG

Emission Level= Read Level+ Correct Factor

Note: Avg=Peak-20.10

EUT:	USB Dongle	Model Name :	SYM13015
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 5V		
Ant. Pol.	Horizontal		
Test Mode:	TX 2480MHz		
Remark:			

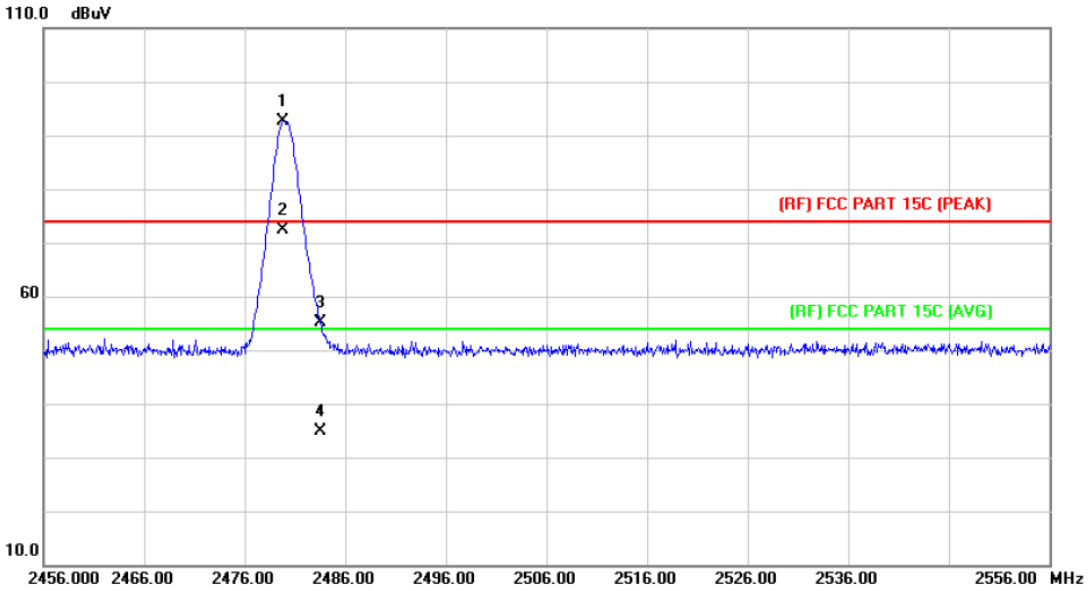


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	*	2479.800	93.51	3.50	97.01	**114.00**	**-16.99**	peak
2	X	2479.800	73.41	3.50	76.91	**94.00**	**-17.09**	AVG
3		2483.500	55.06	3.51	58.57	74.00	-15.43	peak
4		2483.500	34.96	3.51	38.47	54.00	-15.53	AVG

Emission Level= Read Level+ Correct Factor

Note: Avg=Peak-20.10

EUT:	USB Dongle	Model Name :	SYM13015
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Vertical		
Test Mode:	TX 2480MHz		
Remark:			



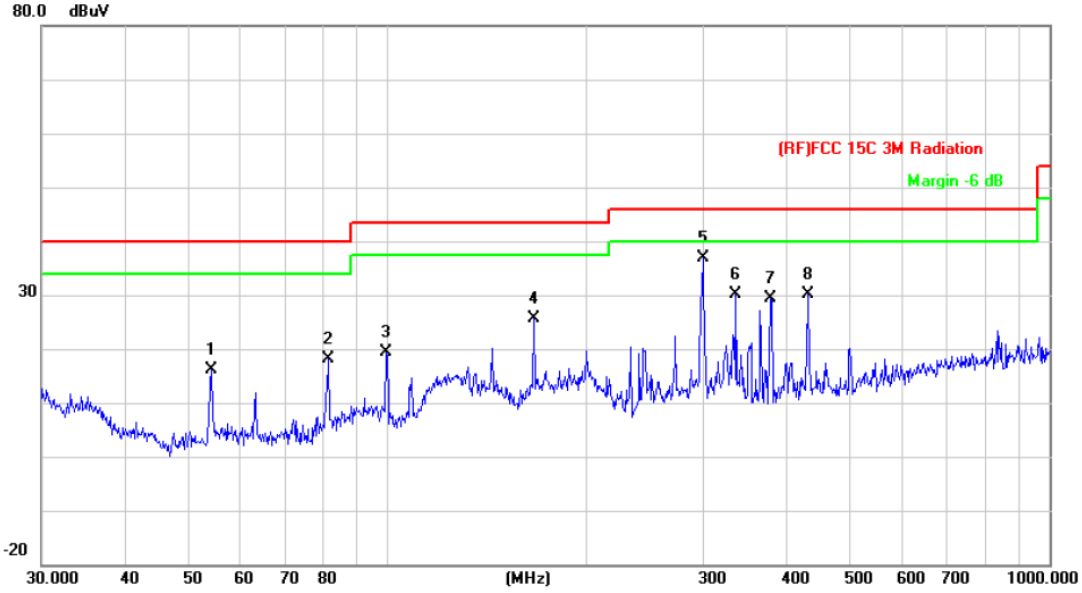
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	*	2479.800	89.09	3.50	92.59	**114.00**	**-21.41**	peak
2	X	2479.800	68.99	3.50	72.49	**94.00**	**-21.51**	AVG
3		2483.500	51.59	3.51	55.10	74.00	-18.90	peak
4		2483.500	31.49	3.51	35.00	54.00	-19.00	AVG

Emission Level= Read Level+ Correct Factor

Note: Avg=Peak-20.10

4.6.3 Radiated Spurious Emission (Below 1 GHz)

EUT:	USB Dongle	**Model Name :**	SYM13015
Temperature:	25 ℃	**Relative Humidity:**	55%
Test Voltage:	DC 5V		
Ant. Pol.	Horizontal		
Test Mode:	TX 2402MHz		
Remark:	Only worse case is reported		

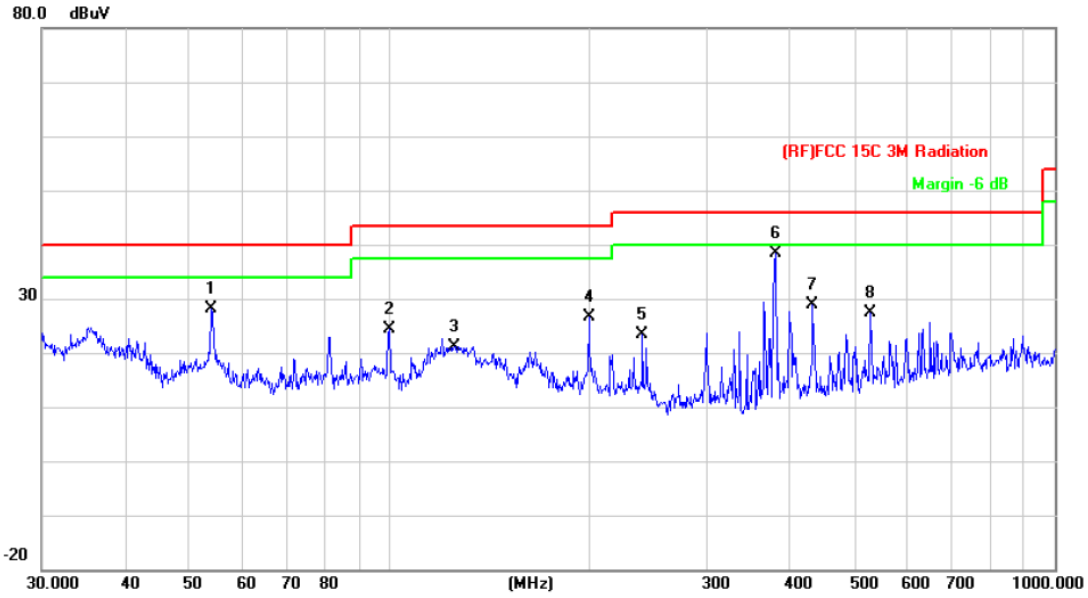


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		54.2610	40.64	-24.45	16.19	40.00	-23.81	peak
2		81.4970	41.38	-23.20	18.18	40.00	-21.82	peak
3		99.5281	41.29	-21.86	19.43	43.50	-24.07	peak
4		166.0680	46.46	-20.91	25.55	43.50	-17.95	peak
5	*	299.3158	53.86	-17.10	36.76	46.00	-9.24	peak
6		336.0352	45.55	-15.46	30.09	46.00	-15.91	peak
7		378.5843	43.54	-14.22	29.32	46.00	-16.68	peak
8		432.5457	42.89	-12.78	30.11	46.00	-15.89	peak

*:Maximum data x:Over limit !:over margin

Emission Level= Read Level+ Correct Factor

EUT:	USB Dongle	Model Name :	SYM13015
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Vertical		
Test Mode:	TX 2402MHz		
Remark:	Only worse case is reported		



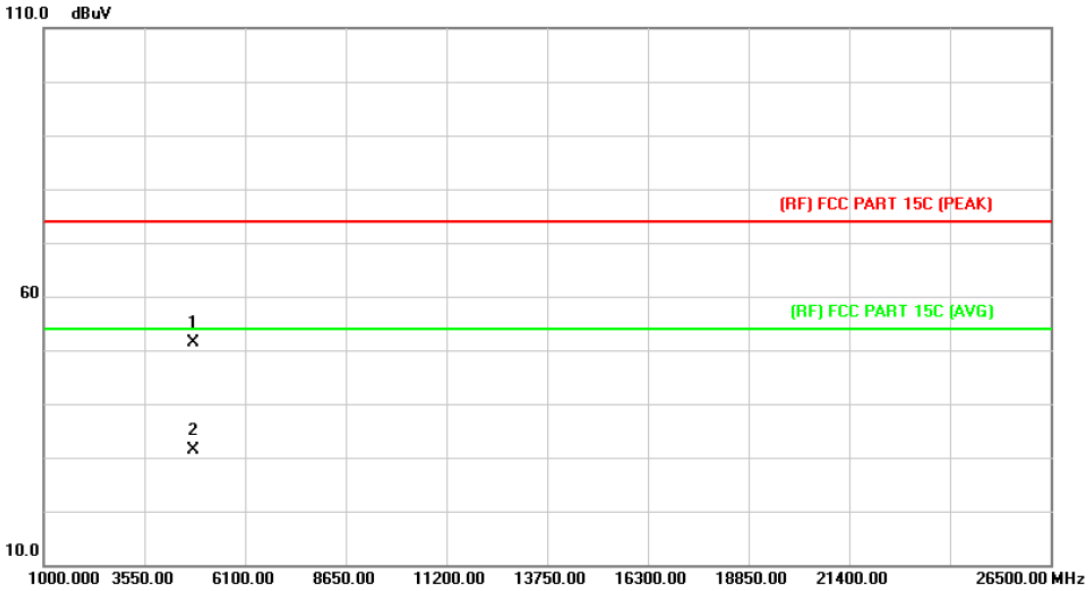
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		53.8818	52.51	-24.45	28.06	40.00	-11.94	peak
2		99.8777	46.29	-21.83	24.46	43.50	-19.04	peak
3		125.0066	43.45	-22.34	21.11	43.50	-22.39	peak
4		199.2855	47.05	-20.43	26.62	43.50	-16.88	peak
5		239.9874	41.91	-18.59	23.32	46.00	-22.68	peak
6	*	381.2487	52.32	-14.05	38.27	46.00	-7.73	peak
7		432.5457	41.56	-12.78	28.78	46.00	-17.22	peak
8		528.2458	37.53	-10.14	27.39	46.00	-18.61	peak

*:Maximum data x:Over limit !:over margin

Emission Level= Read Level+ Correct Factor

4.6.4 Radiated Spurious Emission (1 GHz~26.5 GHz)

EUT:	USB Dongle	Model Name :	SYM13015
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 5V		
Ant. Pol.	Horizontal		
Test Mode:	TX 2402MHz		
Remark:			

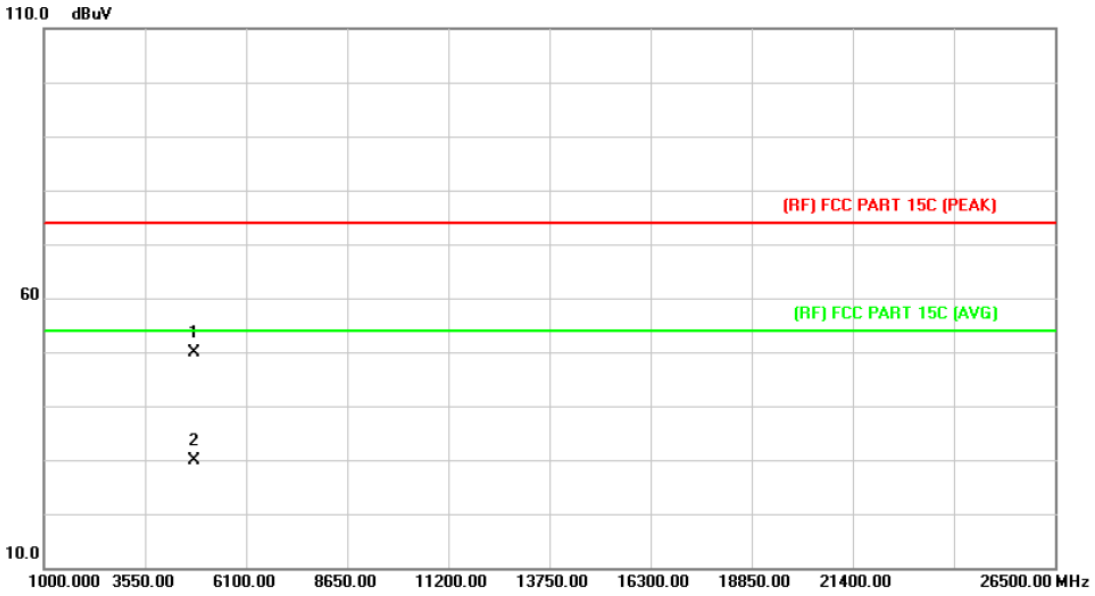


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	*	4804.420	43.27	8.18	51.45	74.00	-22.55	peak
2		4804.420	23.17	8.18	31.35	54.00	-22.65	AVG

Emission Level= Read Level+ Correct Factor

Note: Avg=Peak-20.10

EUT:	USB Dongle	Model Name :	SYM13015
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Vertical		
Test Mode:	TX 2402MHz		
Remark:			

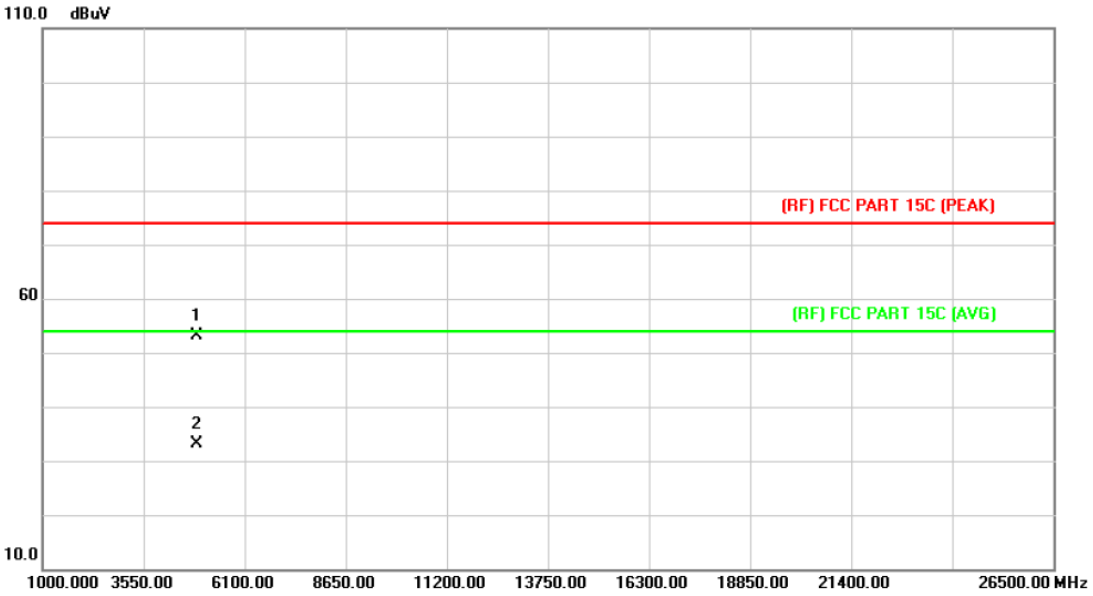


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	*	4804.420	41.68	8.18	49.86	74.00	-24.14	peak
2		4804.420	21.58	8.18	29.76	54.00	-24.24	AVG

Emission Level= Read Level+ Correct Factor

Note: Avg=Peak-20.10

EUT:	USB Dongle	Model Name :	SYM13015
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 5V		
Ant. Pol.	Horizontal		
Test Mode:	TX 2441MHz		
Remark:			

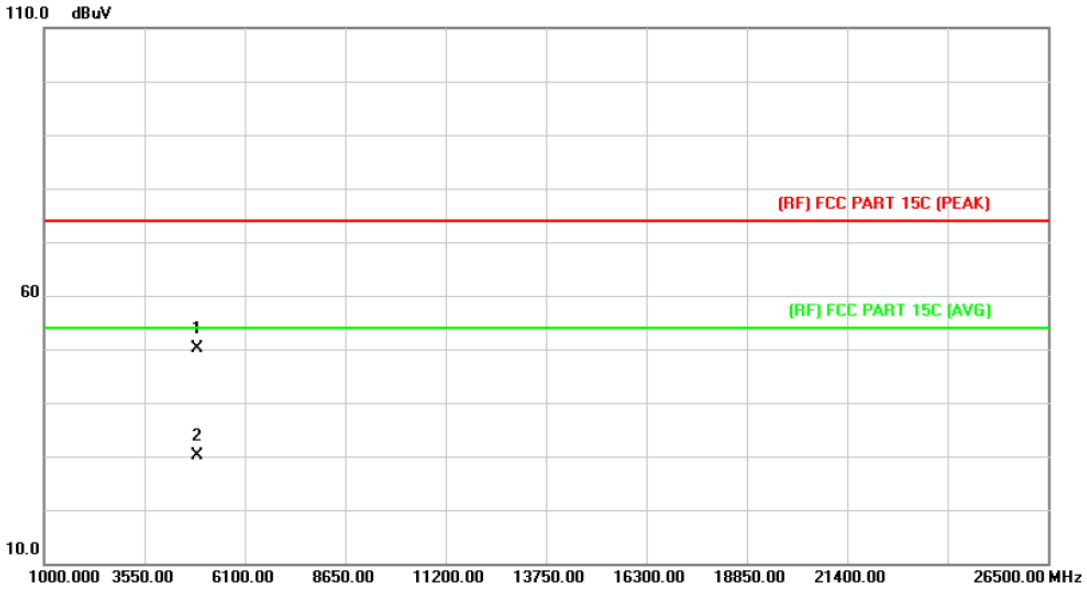


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	*	4881.160	44.93	8.21	53.14	74.00	-20.86	peak
2		4881.160	24.83	8.21	33.04	54.00	-20.96	AVG

Emission Level= Read Level+ Correct Factor

Note: Avg=Peak-20.10

EUT:	USB Dongle	Model Name :	SYM13015
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Vertical		
Test Mode:	TX 2441MHz		
Remark:			

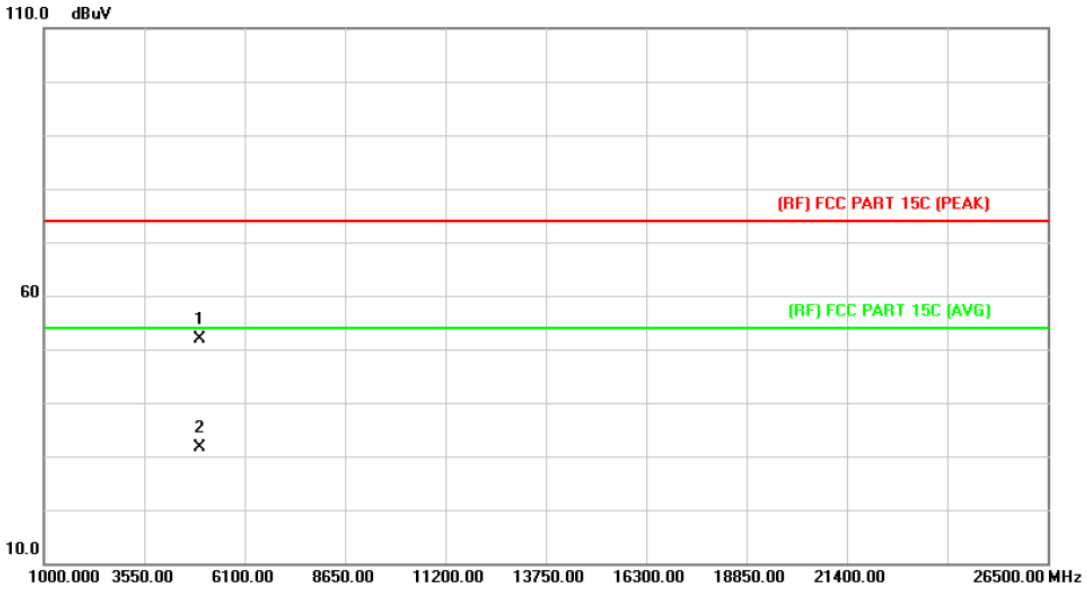


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	*	4881.160	41.93	8.21	50.14	74.00	-23.86	peak
2		4881.160	21.83	8.21	30.04	54.00	-23.96	AVG

Emission Level= Read Level+ Correct Factor

Note: Avg=Peak-20.10

EUT:	USB Dongle	Model Name :	SYM13015
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	DC 5V		
Ant. Pol.	Horizontal		
Test Mode:	TX 2480MHz		
Remark:			

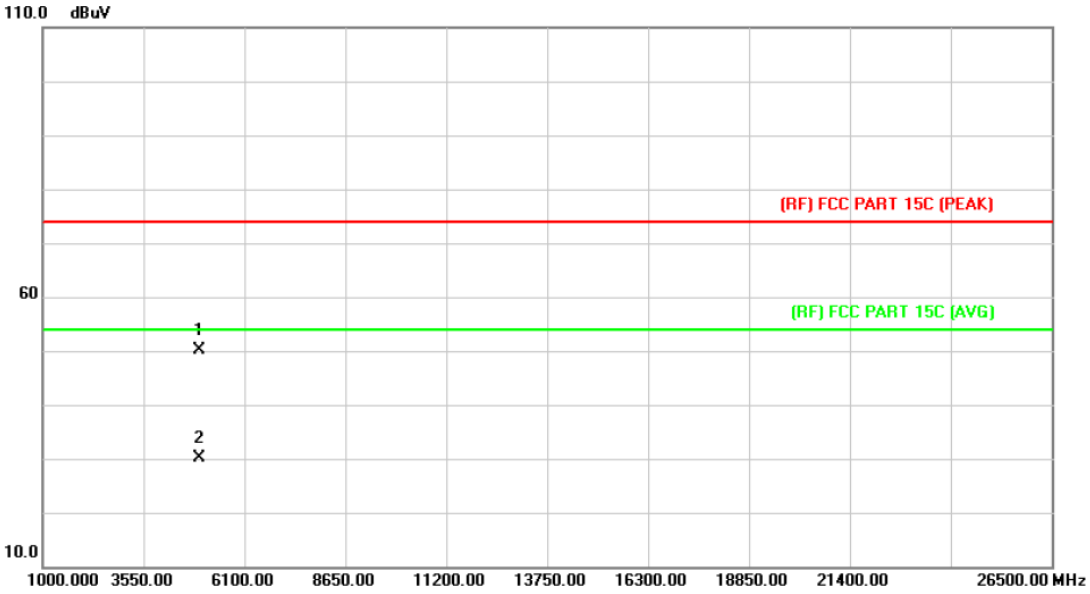


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	*	4960.270	43.62	8.23	51.85	74.00	-22.15	peak
2		4960.270	23.52	8.23	31.75	54.00	-22.25	AVG

Emission Level= Read Level+ Correct Factor

Note: Avg=Peak-20.10

EUT:	USB Dongle	Model Name :	SYM13015
Temperature:	25 ℃	Relative Humidity:	55%
Test Voltage:	AC 120V/60 Hz		
Ant. Pol.	Vertical		
Test Mode:	TX 2480MHz		
Remark:			



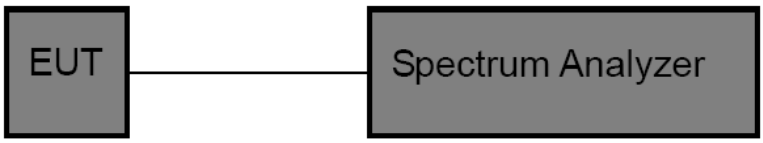
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	*	4960.270	42.01	8.23	50.24	74.00	-23.76	peak
2		4960.270	21.91	8.23	30.14	54.00	-23.86	AVG

Emission Level= Read Level+ Correct Factor

Note: Avg=Peak-20.10

5. Bandwidth Test

5.1 Test Setup



5.2 Test Procedure

(1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
(2) Spectrum Setting:
Bandwidth: RBW=100 kHz, VBW=300kHz.
(3) The bandwidth is measured at an amplitude level reduced 20dB from the reference level. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst –case (i.e the widest) bandwidth.

5.3 EUT Operating Condition

The EUT was set to continuously transmitting for the Bandwidth Test.

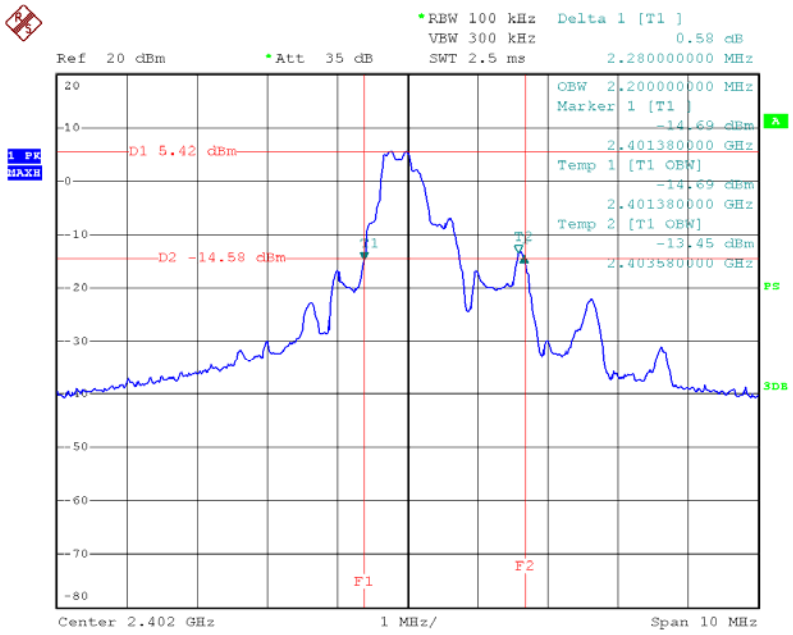
5.4 Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Rohde & Schwarz	FSP30	DE25181	Aug. 08, 2014	Aug. 07, 2015
EMI Test Receiver	Rohde & Schwarz	ESCI	101165	Aug. 08, 2014	Aug. 07, 2015

5.5 Test Data

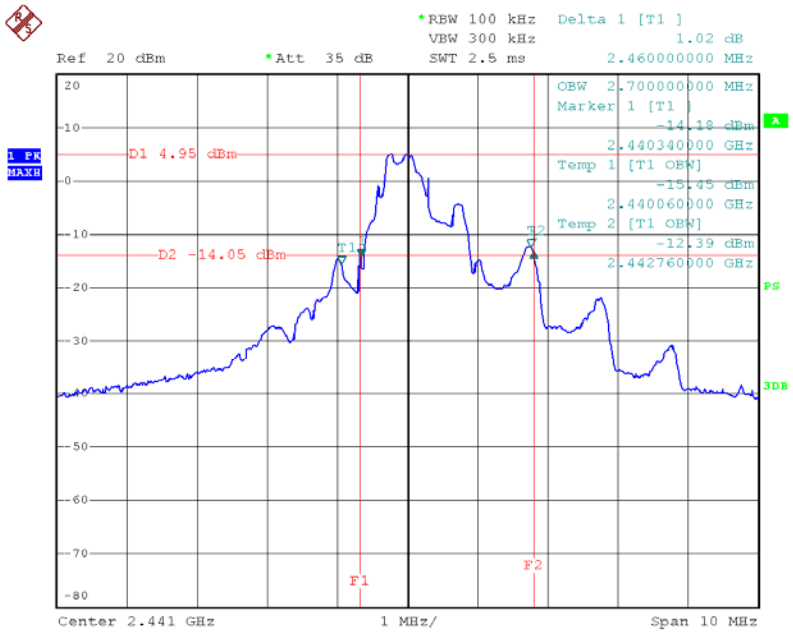
Low Channel Frequency (MHz)	20dB Bandwidth (MHz)
2402	2.280

2402 MHz



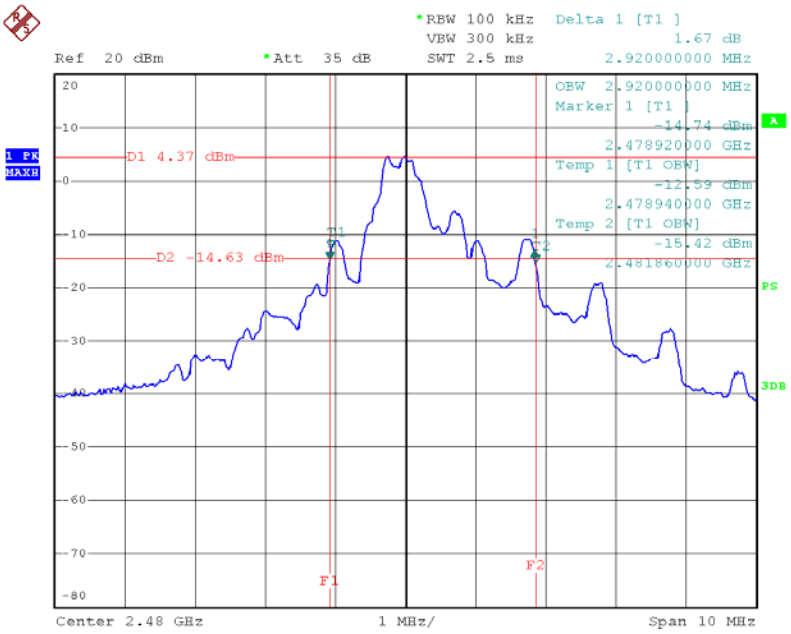
MID Channel Frequency (MHz)	20dB Bandwidth (MHz)
2441	2.460

2441 MHz



HIGH Channel Frequency (MHz)	20dB Bandwidth (MHz)
2480	2.920

2480 MHz



6. Antenna Requirement

6.1 Standard Requirement

6.1.1 Standard

FCC Part 15.203

6.1.2 Requirement

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. 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.

6.2 Antenna Connected Construction

The directional gains of the antenna used for transmitting is 0 dBi, and the antenna de-signed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

6.3 Result

The EUT antenna is a Printed Antenna. It complies with the standard requirement.