

FCC Radio Test Report

FCC ID: 2ACZQ-40377RX

Original Grant

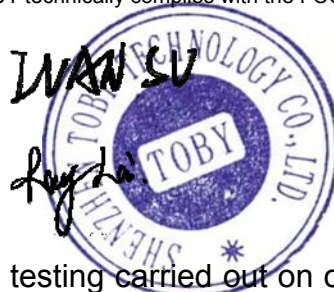
Report No. : TB-FCC141731
Applicant : Pitsco Education
Equipment Under Test (EUT)
EUT Name : 2.4 GHZ 4 CHANNEL WIRELESS JOYSTICK GAMEPAD
Model No. : 40377
Series Model No. : N/A
Brand Name : Tetrix
Receipt Date : 2014-08-15
Test Date : 2014-08-15 to 2014-08-20
Issue Date : 2014-08-22
Standards : FCC Part 15, Subpart C (15.247:2012)
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 and IC requirements

Test/Witness Engineer :

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.

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1. General Information about EUT

1.1 Client Information

Applicant : Pitsco Education

Address : 1003 E. Adams ,Pittsburg, KS 66762, USA

Manufacturer : GRAND WING SYSTEM CHINA, INC.

Address : 2nd Fl., Mingkai Factory, No. 4 Yintain Rd., Yinhu Industrial Park, Xiegang Town, Dongguan City, Guangdong Province, China

1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	2.4 GHZ 4 CHANNEL WIRELESS JOYSTICK GAMEPAD	
Models No.	:	40377	
Model Difference	:	N/A	
Product Description	:	Operation Frequency: 2404MHz~2474MHz	
		Number of Channel:	71 channels see note(3)
		RF Output Power:	2.902 dBm Conducted Power
		Antenna Gain:	0 dBi PCB Antenna
		Modulation Type:	GFSK
		Bit Rate of Transmitter:	1Mbps(GFSK)
Power Supply	:	DC power supplied by Battery.	
Power Rating	:	DC 6.0V power supplied by Battery.	
Connecting I/O Port(S)	:	Please refer to the User's Manual	

Note:

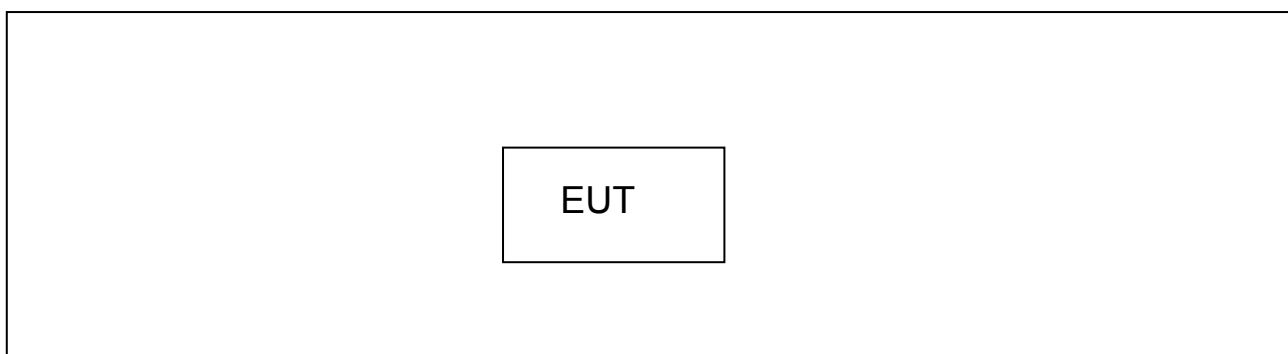
- (1) Test procedure follows the FCC KDB 558074 D01 DTS Meas Guidance v03r02.
- (2) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
- (3) Antenna information provided by the applicant.
- (4) Channel List:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2404	24	2428	48	2452
01	2405	25	2429	49	2453
02	2406	26	2430	50	2454

03	2407	27	2431	51	2455
04	2408	28	2432	52	2456
05	2409	29	2433	53	2457
06	2410	30	2434	54	2458
07	2411	31	2435	55	2459
08	2412	32	2436	56	2460
09	2413	33	2437	57	2461
10	2414	34	2438	58	2462
11	2415	35	2439	59	2463
12	2416	36	2440	60	2464
13	2417	37	2441	61	2465
14	2418	38	2442	62	2466
15	2419	39	2443	63	2467
16	2420	40	2444	64	2468
17	2421	41	2445	65	2469
18	2422	42	2446	66	2470
19	2423	43	2447	67	2471
20	2424	44	2448	68	2472
21	2425	45	2449	69	2473
22	2426	46	2450	70	2474
23	2427	47	2451		

1.3 Block Diagram Showing the Configuration of System Tested

TX Mode



1.4 Description of Support Units

Equipment Information				
Name	Model	S/N	Manufacturer	Used “√”

/	/	/	/	/
Cable Information				
Number	Shielded Type	Ferrite Core	Length	Note
/	/	/	/	/
/	/	/	/	/

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
N/A	N/A

For Radiated Test	
Final Test Mode	Description
Mode 1	TX Mode
Mode 2	TX Mode (2404MHz/2439MHz/2474MHz)

Note:

- (1) 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.

According to ANSI C63.4 standards, the measurements are performed at the highest, middle, lowest available channels, and the worst case data rate as follows:

TX Mode: GFSK Modulation Transmitting mode.

- (2) During the testing procedure, the continuously transmitting with the maximum power mode was programmed by the customer.
- (3) The EUT is considered a mobile unit; in normal use it was positioned on X-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.
- (4) During testing, the EUT is powered by new battery.

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 setting.

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(15.247)/RSS-210: 2010				
Standard Section		Test Item	Judgment	Remark
FCC	IC			
15.203	/	Antenna Requirement	PASS	N/A
15.207	RSS-GEN 7.2.4	Conducted Emission	PASS	N/A
15.205	RSS-GEN 7.2.2	Restricted Bands	PASS	N/A
15.247(a)(2)	RSS-210 A.8.2(a)	6dB Bandwidth	PASS	N/A
15.247(b)	RSS-210 A.8.4(4)	Peak Output Power	PASS	N/A
15.247(e)	RSS-210 A.8.2(b)	Power Spectral Density	PASS	N/A
15.247(d)	RSS-210 Annex 8 (A8.5)	Transmitter Radiated Spurious Emission	PASS	N/A
Note: "/" for no requirement for this test item. N/A is an abbreviation for Not Applicable.				

3. Conducted Emission Test

3.1 Test Standard and Limit

3.1.1 Test Standard

FCC Part 15.207

3.1.2 Test Limit

Conducted Emission Test Limit

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

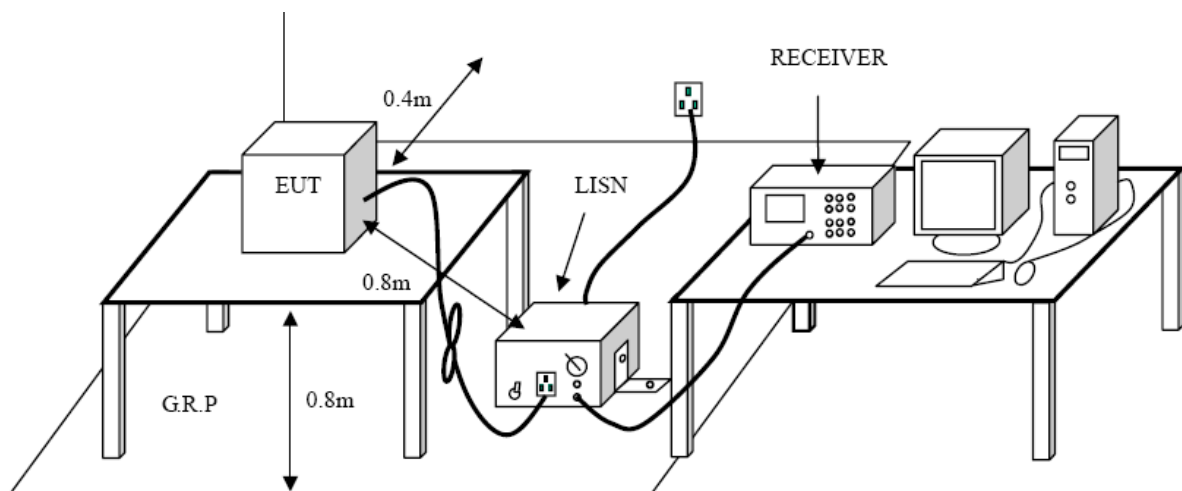
Notes:

(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 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. Due Date
EMI Test Receiver	ROHDE& SCHWARZ	ESCI	100321	Aug. 07, 2015
50ΩCoaxial Switch	Anritsu	MP59B	X10321	Aug. 07, 2015
L.I.S.N	Rohde & Schwarz	ENV216	101131	Aug. 07, 2015
L.I.S.N	SCHWARZBECK	NNBL 8226-2	8226-2/164	Aug. 07, 2015

3.5 EUT Operating Mode

Please refer to the description of test mode.

3.6 Test Data

The EUT is powered by DC power, and no requirement for this test.

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 Limits (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

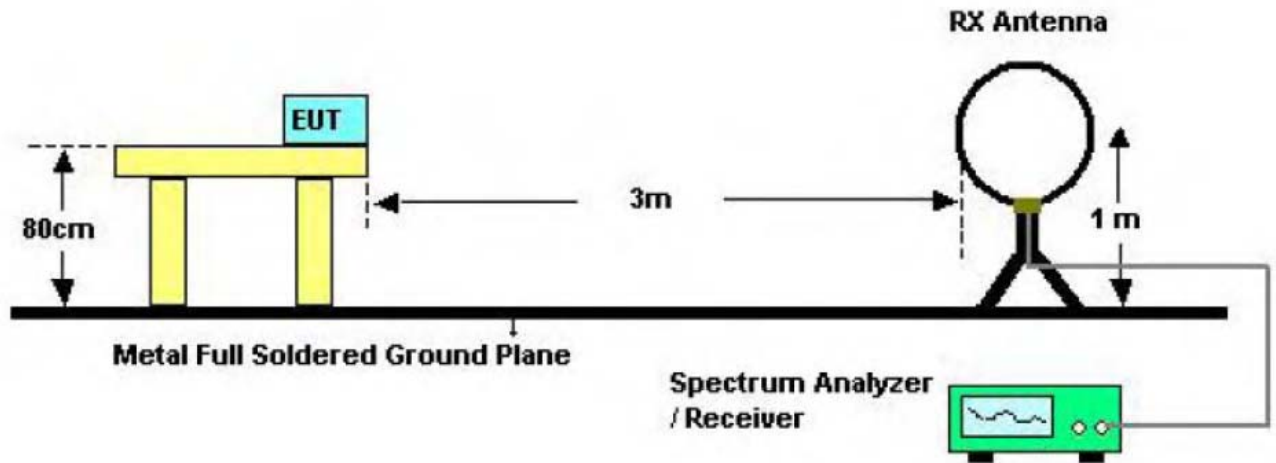
Radiated Emission Limit (Above 1000MHz)

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

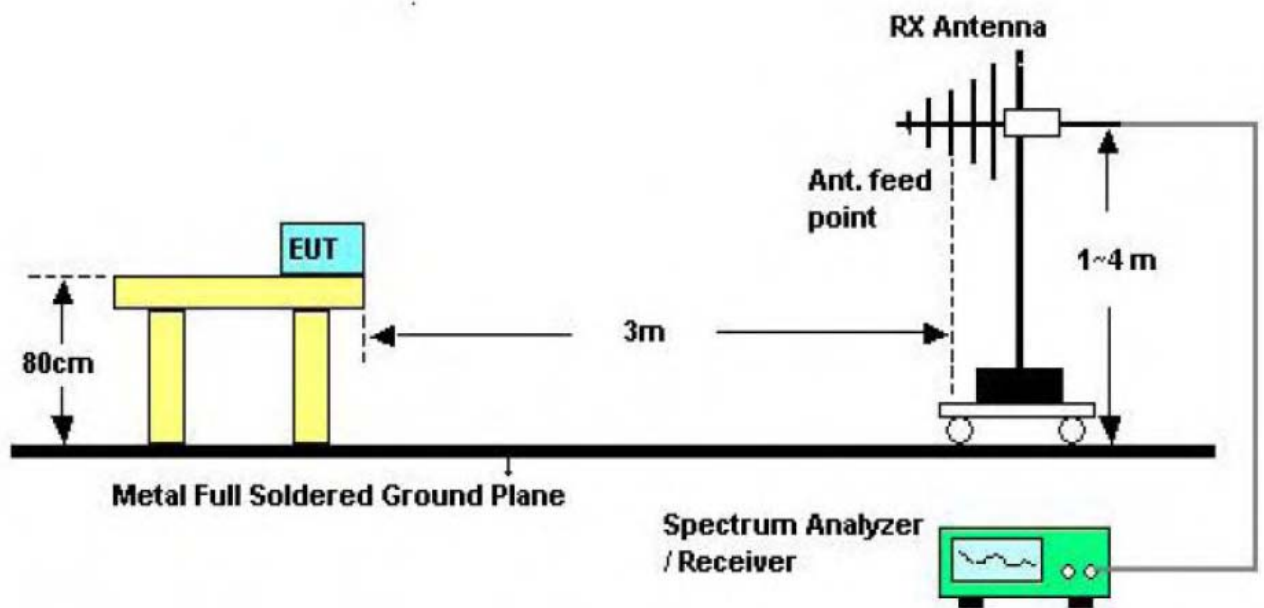
Note:

- (1) The tighter limit applies at the band edges.
- (2) Emission Level(dBuV/m)=20log Emission Level(uV/m)

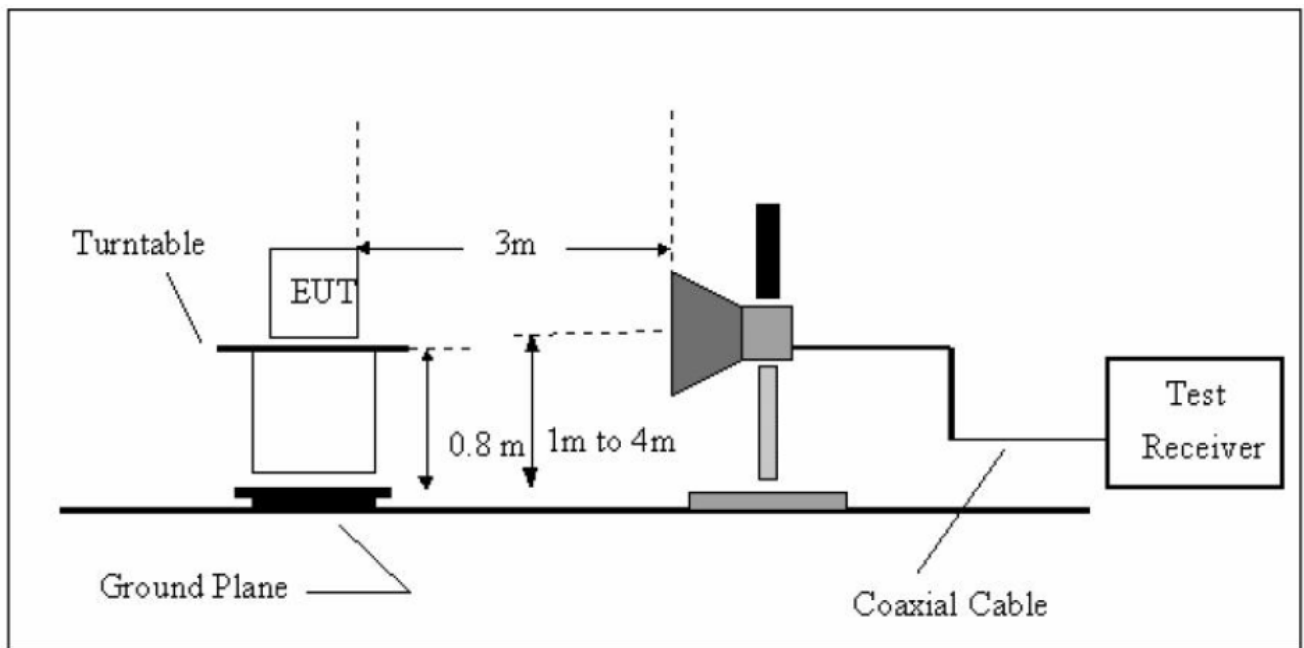
4.2 Test Setup



Below 30MHz Test Setup



Below 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 the 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 Equipment Under Test was set to Continual Transmitting in maximum power.

4.5 Test Equipment

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

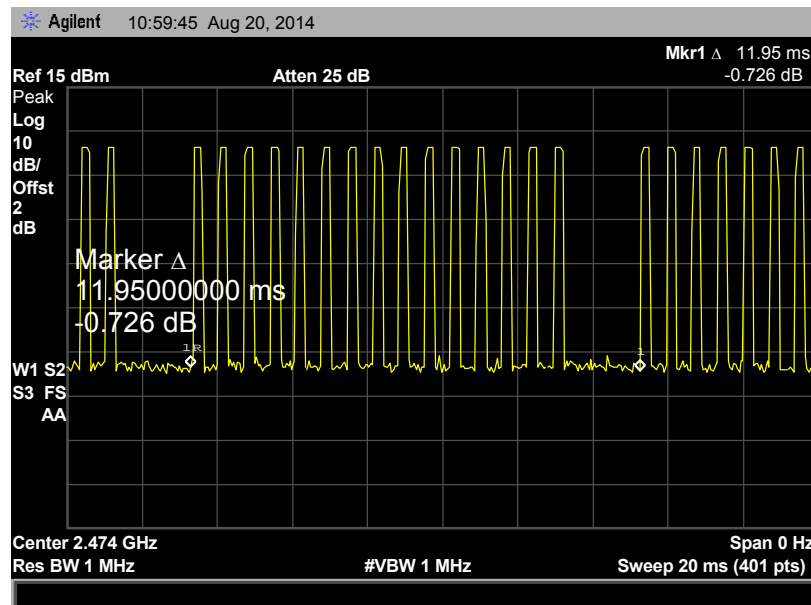
4.6 Test Data

Remark: During testing above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, Average Values is calibrate by Peak Values with duty cycle factor.

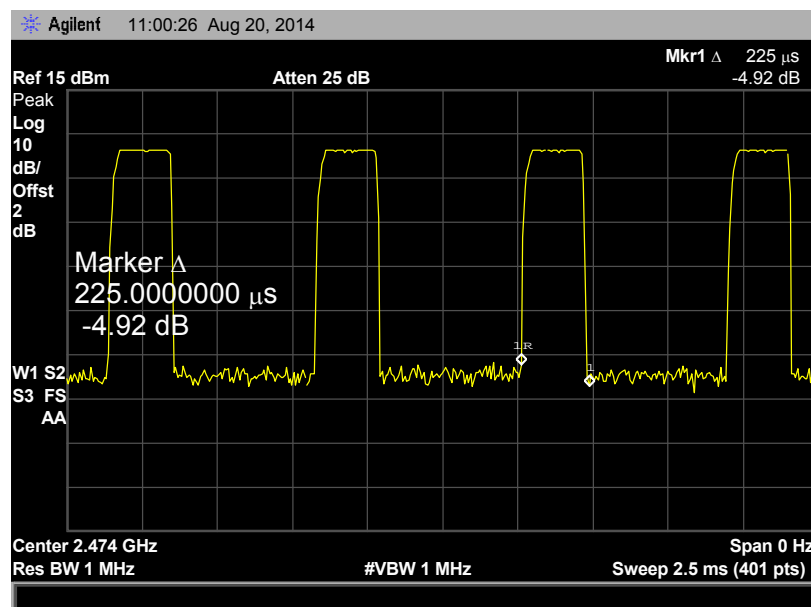
Test data please refer the following pages.

(1) Duty Cycle Factor

Plots 1



Plots 2



(1) From plots 1, one cycle time=11.95ms, one cycle with 15 pulses.

(2) From plots 2, one pulse time=225 us.

(3) Duty Cycle=15*0.225/11.95*100%=28.24%

(4) Avg=Peak+20log(Duty Cycle)=Peak-10.98

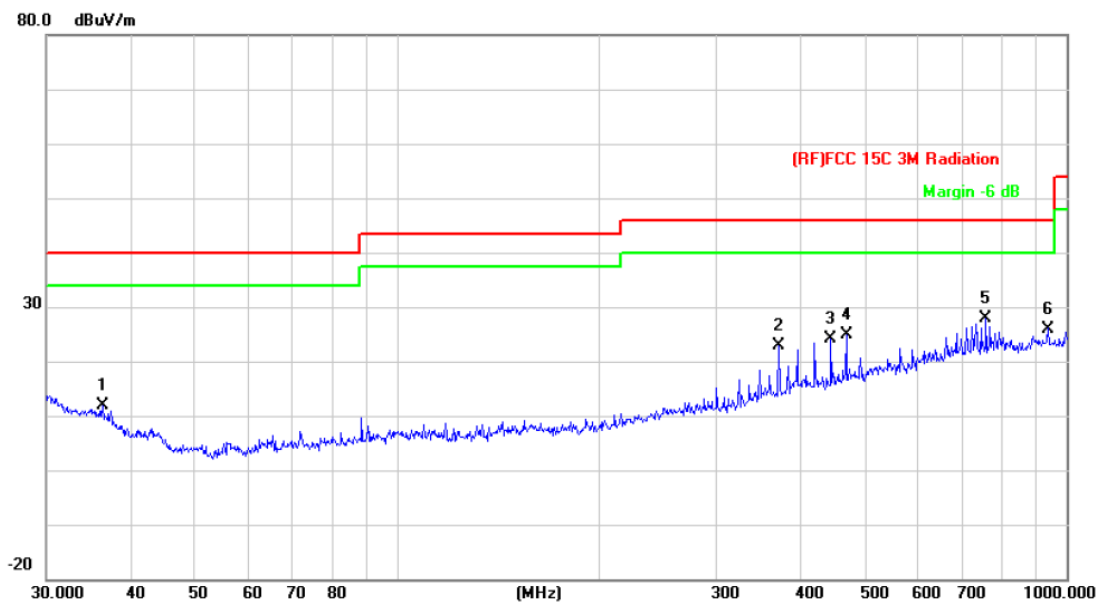
Remark: During testing above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values.

Average Values=Peak-10.98

Test data please refer the following pages.

(2) Radiation Data

EUT:	2.4 GHZ 4 CHANNEL WIRELESS JOYSTICK GAMEPAD	Model:	40377
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 6V		
Ant. Pol.	Horizontal		
Test Mode:	TX 2404MHz		
Remark:	Only worse case is reported		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		36.3813	29.75	-17.91	11.84	40.00	-28.16	peak
2		372.0045	37.38	-14.48	22.90	46.00	-23.10	peak
3		444.8514	36.61	-12.55	24.06	46.00	-21.94	peak
4		468.8761	36.60	-11.81	24.79	46.00	-21.21	peak
5	*	758.0407	34.91	-6.96	27.95	46.00	-18.05	peak
6		938.8325	30.82	-4.82	26.00	46.00	-20.00	peak

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

Emission Level= Read Level+ Correct Factor

EUT:	2.4 GHZ 4 CHANNEL WIRELESS JOYSTICK GAMEPAD	Model:	40377
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 6V		
Ant. Pol.	Vertical		
Test Mode:	TX 2404MHz		
Remark:	Only worse case is reported		

80.0 dBuV/m

(RF)FCC 15C 3M Radiation
Margin -6 dB

30

-20

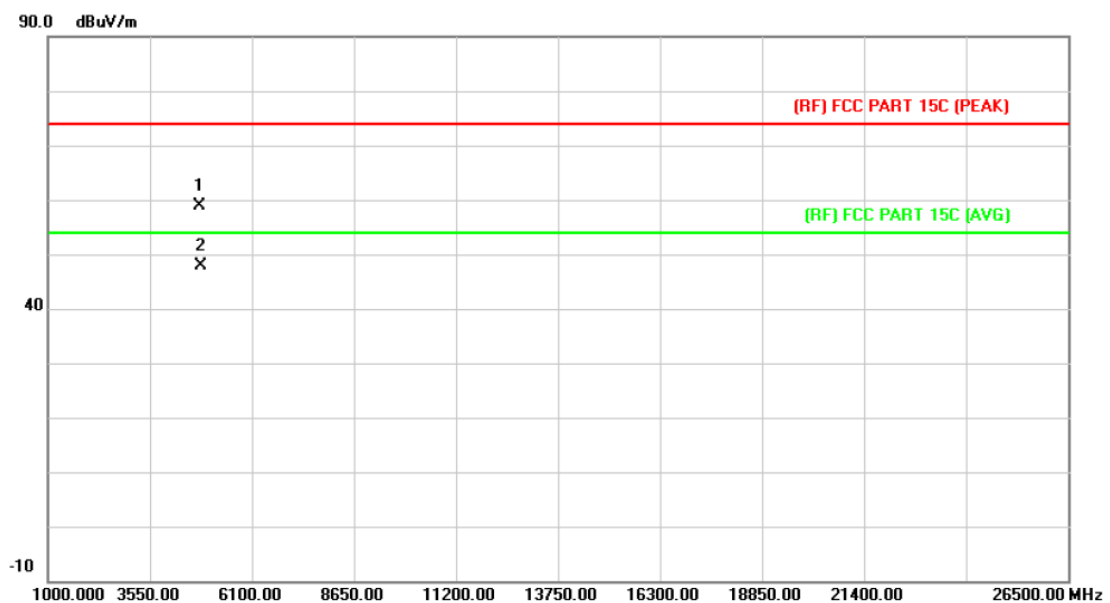
30.000 40 50 60 70 80 (MHz) 300 400 500 600 700 1000.000

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		51.3004	29.05	-24.41	4.64	40.00	-35.36	peak
2		88.6524	32.51	-22.77	9.74	43.50	-33.76	peak
3		134.0882	30.38	-22.09	8.29	43.50	-35.21	peak
4		273.2341	30.07	-17.61	12.46	46.00	-33.54	peak
5		463.9696	31.28	-11.97	19.31	46.00	-26.69	peak
6	*	758.0407	33.91	-6.96	26.95	46.00	-19.05	peak

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

Emission Level= Read Level+ Correct Factor

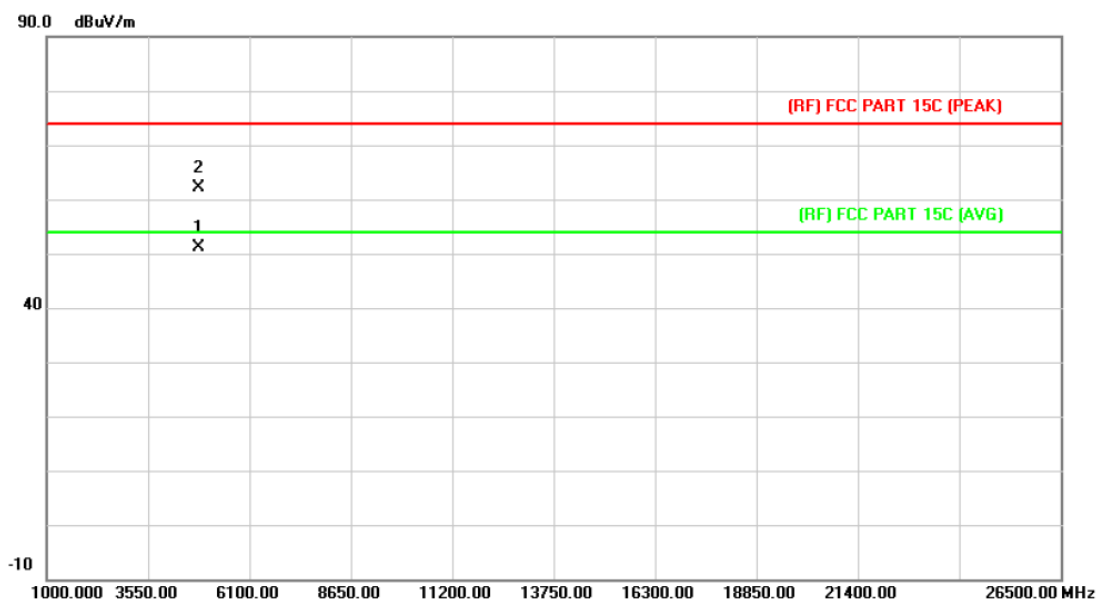
EUT:	2.4 GHZ 4 CHANNEL WIRELESS JOYSTICK GAMEPAD	Model:	40377
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 6V		
Ant. Pol.	Horizontal		
Test Mode:	TX 2404 MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4807.559	45.32	13.47	58.79	74.00	-15.21	peak
2	*	4808.030			47.81	54.00	-6.19	AVG

Emission Level= Read Level+ Correct Factor

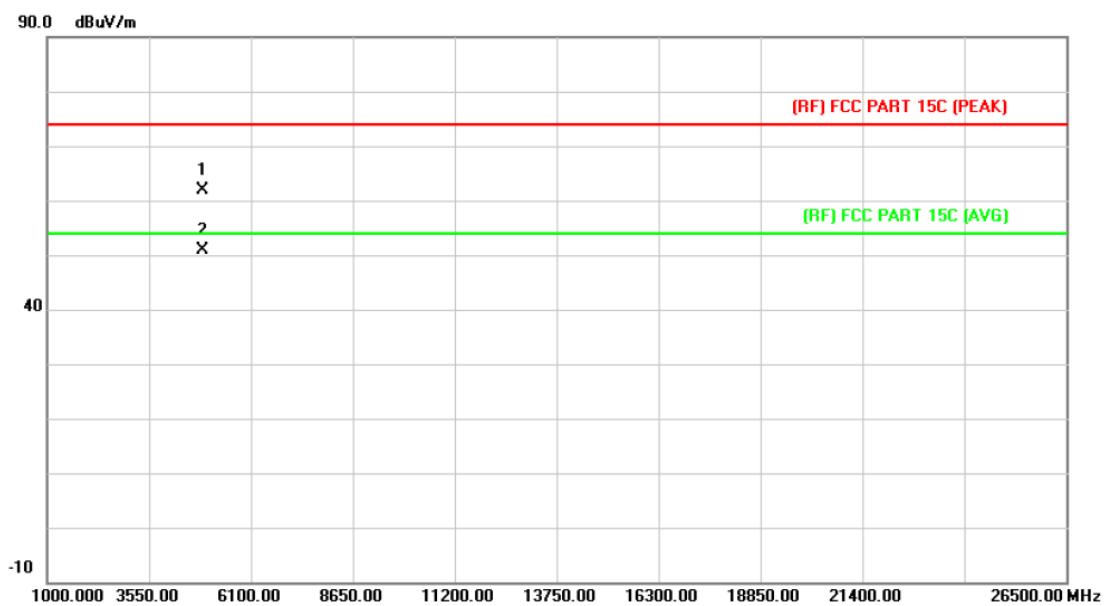
EUT:	2.4 GHZ 4 CHANNEL WIRELESS JOYSTICK GAMEPAD	Model:	40377
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 6V		
Ant. Pol.	Vertical		
Test Mode:	TX 2404 MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	*	4808.108			51.04	54.00	-2.96	AVG
2		4808.417	48.55	13.47	62.02	74.00	-11.98	peak

Emission Level= Read Level+ Correct Factor

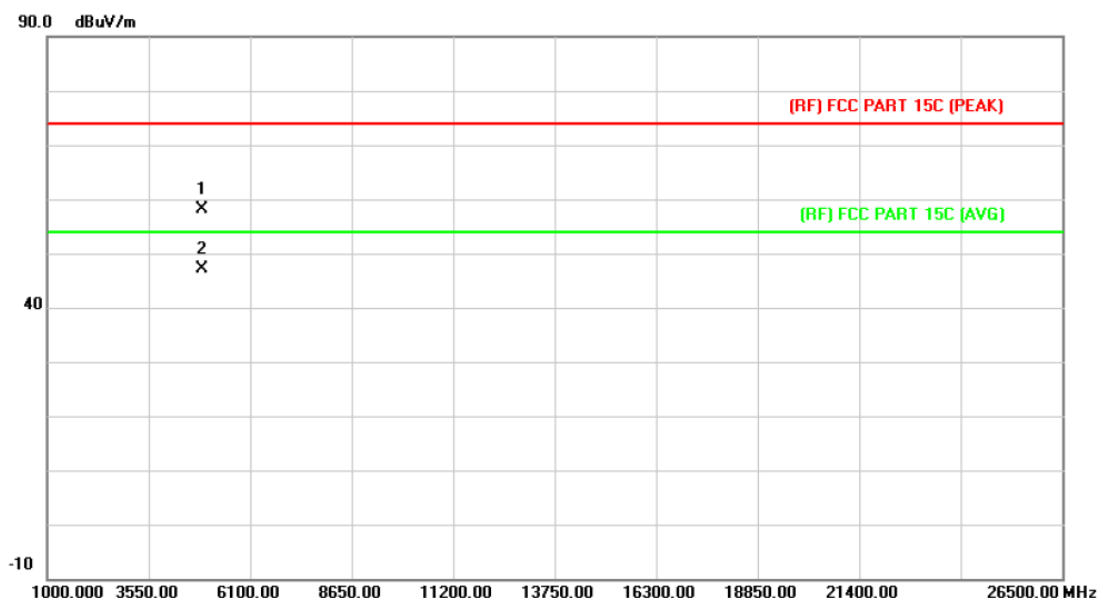
EUT:	2.4 GHZ 4 CHANNEL WIRELESS JOYSTICK GAMEPAD	Model:	40377
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 6V		
Ant. Pol.	Horizontal		
Test Mode:	TX 2439 MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4876.860	48.02	13.87	61.89	74.00	-12.11	peak
2	*	4877.910			50.91	54.00	-3.09	AVG

Emission Level= Read Level+ Correct Factor

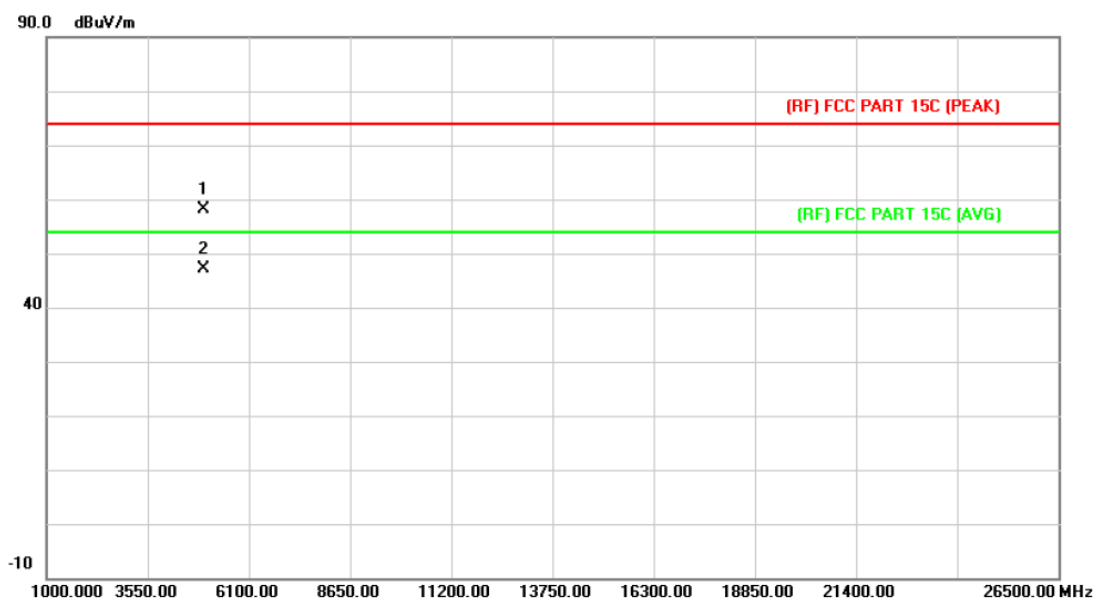
EUT:	2.4 GHZ 4 CHANNEL WIRELESS JOYSTICK GAMEPAD	Model:	40377
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 6V		
Ant. Pol.	Vertical		
Test Mode:	TX 2439 MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4876.647	44.18	13.87	58.05	74.00	-15.95	peak
2	*	4877.871			47.07	54.00	-6.93	AVG

Emission Level= Read Level+ Correct Factor

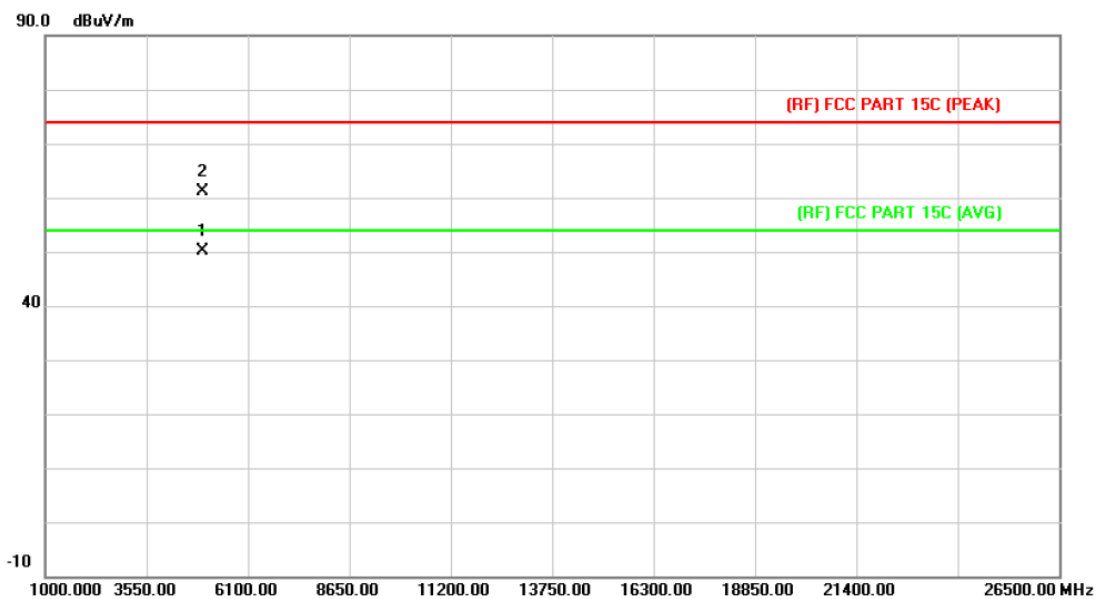
EUT:	2.4 GHZ 4 CHANNEL WIRELESS JOYSTICK GAMEPAD	Model:	40377
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 6V		
Ant. Pol.	Horizontal		
Test Mode:	TX 2474 MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB Detector
1		4947.637	43.83	14.29	58.12	74.00	-15.88 peak
2	*	4947.931			47.14	54.00	-6.86 AVG

Emission Level= Read Level+ Correct Factor

EUT:	2.4 GHZ 4 CHANNEL WIRELESS JOYSTICK GAMEPAD	Model:	40377
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 6V		
Ant. Pol.	Vertical		
Test Mode:	TX 2474 MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	*	4947.910			50.12	54.00	-3.88	AVG
2		4949.167	46.80	14.30	61.10	74.00	-12.90	peak

Emission Level= Read Level+ Correct Factor

5. Restricted Bands Requirement

5.1 Test Standard and Limit

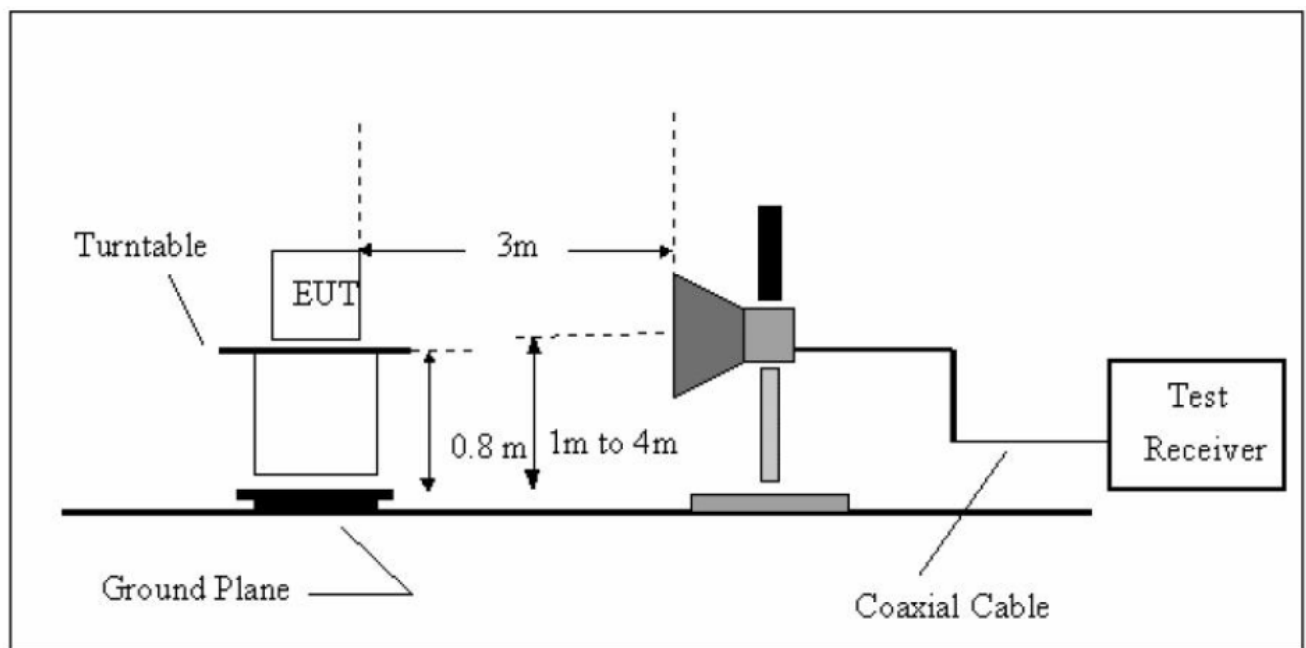
5.1.1 Test Standard

FCC Part 15.209 FCC Part 15.205

5.1.2 Test Limit

Restricted Frequency Band (MHz)	Class B (dBuV/m)(at 3 M)	
	Peak	Average
2310 ~2390	74	54
2483.5 ~2500	74	54

5.2 Test Setup



5.3 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.

5.4 EUT Operating Condition

The Equipment Under Test was set to Continual Transmitting in maximum power.

5.5 Test Equipment

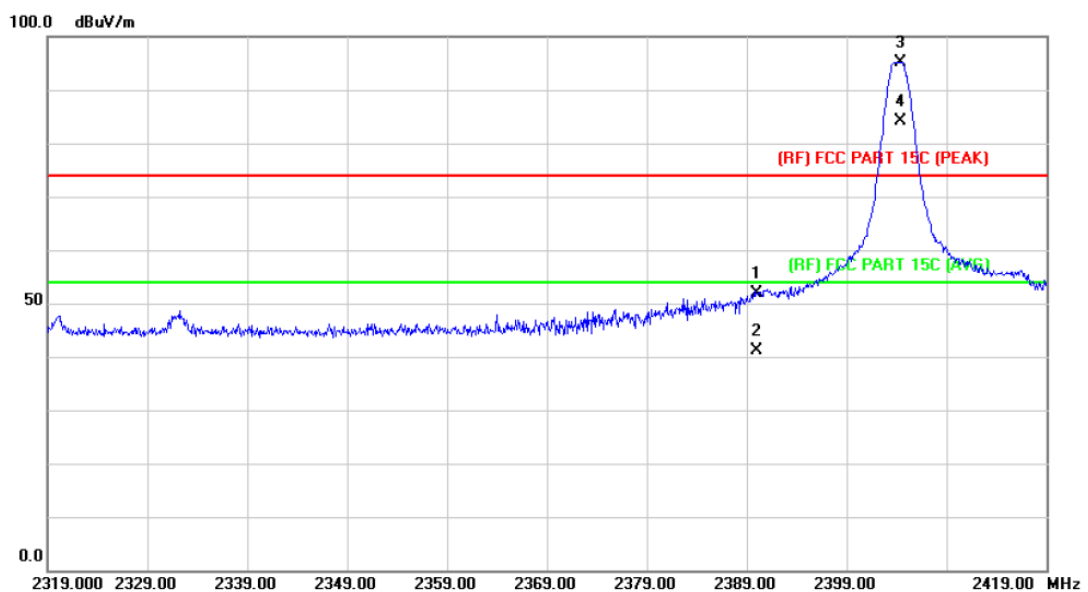
Equipment	Manufacturer	Model No.	Serial No.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Mar. 19, 2015
Spectrum Analyzer	Rohde & Schwarz	FSP30	DE25181	Aug. 07, 2015
EMI Test Receiver	Rohde & Schwarz	ESCI	101165	Aug. 07, 2015
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar.06, 2015
Bilog Antenna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

5.6 Test Data

Please see the next page.

(1) Radiation Test

EUT:	2.4 GHZ 4 CHANNEL WIRELESS JOYSTICK GAMEPAD	Model:	40377
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 6V		
Ant. Pol.	Horizontal		
Test Mode:	TX 2404 MHz		
Remark:	N/A		

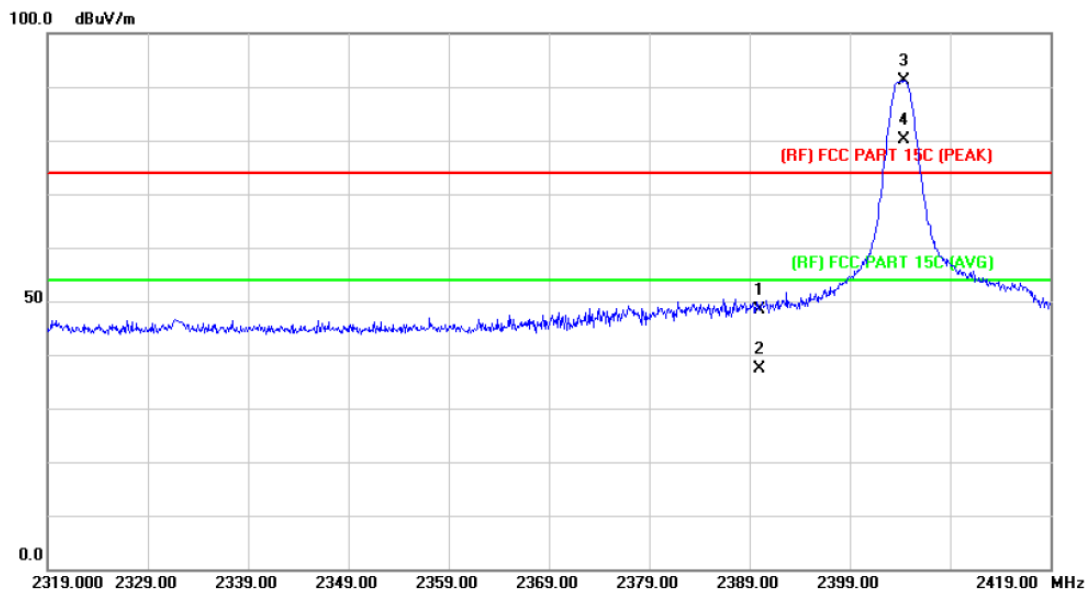


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		2390.000	51.23	0.77	52.00	74.00	-22.00	peak
2		2390.000			41.02	54.00	-12.98	AVG
3	X	2404.400	94.37	0.83	95.20	Fundamental Frequency		peak
4	*	2404.400			84.22	Fundamental Frequency		AVG

Emission Level= Read Level+ Correct Factor

Average Values=Peak-10.98

EUT:	2.4 GHZ 4 CHANNEL WIRELESS JOYSTICK GAMEPAD	Model:	40377
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 6V		
Ant. Pol.	Vertical		
Test Mode:	TX 2404 MHz		
Remark:	N/A		

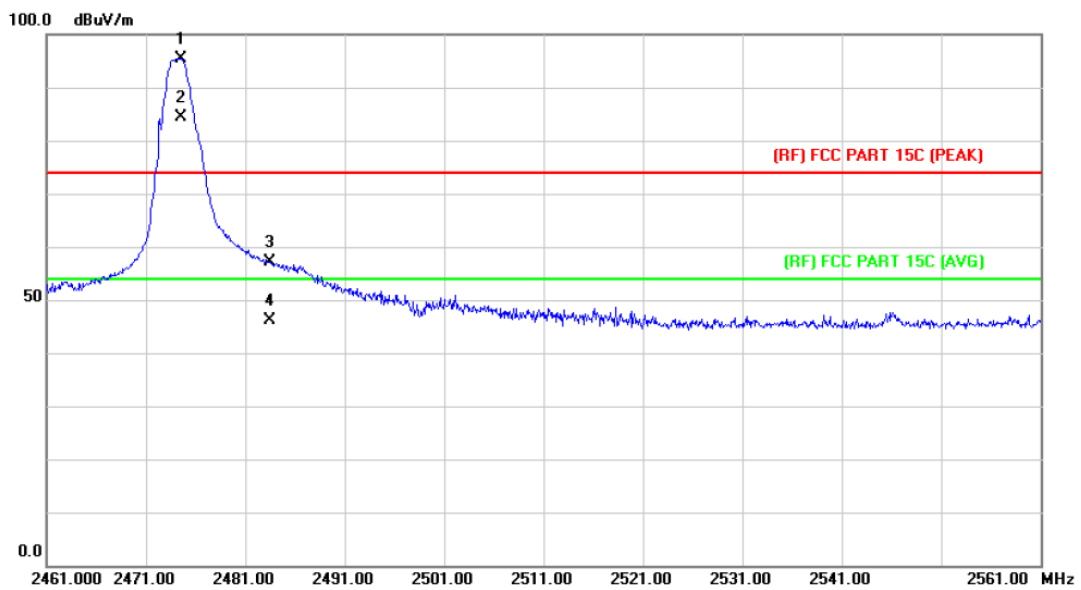


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	47.67	0.77	48.44	74.00	-25.56	peak
2		2390.000			37.46	54.00	-16.54	AVG
3	X	2404.400	90.35	0.83	91.18	Fundamental Frequency		peak
4	*	2404.400			80.20	Fundamental Frequency		AVG

Emission Level= Read Level+ Correct Factor

Average Values=Peak-10.98

EUT:	2.4 GHZ 4 CHANNEL WIRELESS JOYSTICK GAMEPAD	Model:	40377
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 6V		
Ant. Pol.	Horizontal		
Test Mode:	TX 2474 MHz		
Remark:	N/A		

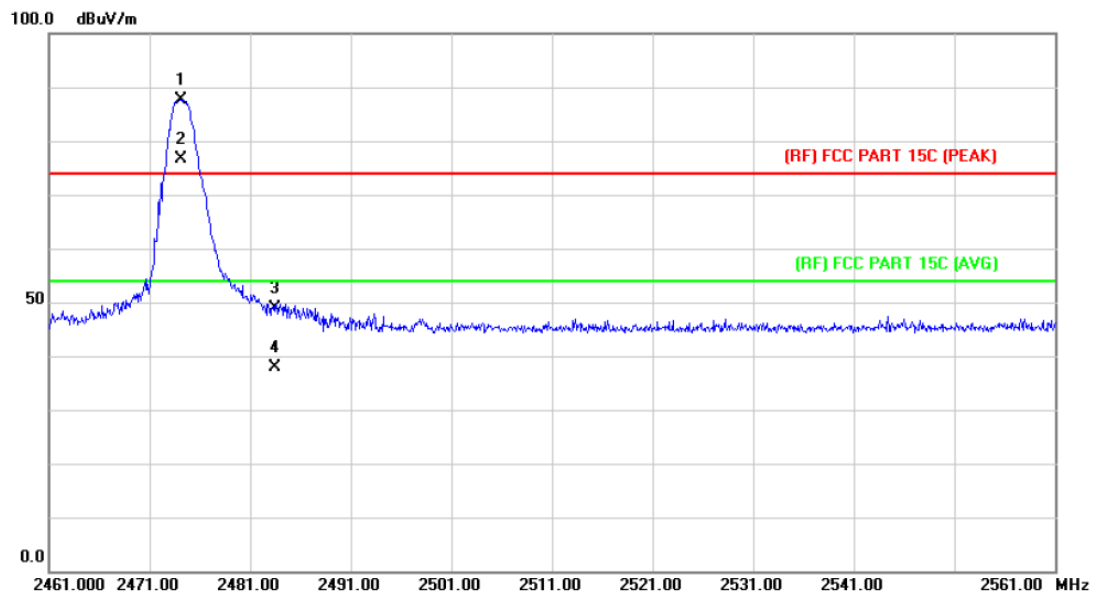


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	X	2474.500	94.23	1.13	95.36	Fundamental Frequency		peak
2	*	2474.500			84.38	Fundamental Frequency		AVG
3		2483.500	56.02	1.17	57.19	74.00	-16.81	peak
4		2483.500			46.21	54.00	-7.79	AVG

Emission Level= Read Level+ Correct Factor

Average Values=Peak-10.98

EUT:	2.4 GHZ 4 CHANNEL WIRELESS JOYSTICK GAMEPAD	Model:	40377
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 6V		
Ant. Pol.	Vertical		
Test Mode:	TX 2474 MHz		
Remark:	N/A		



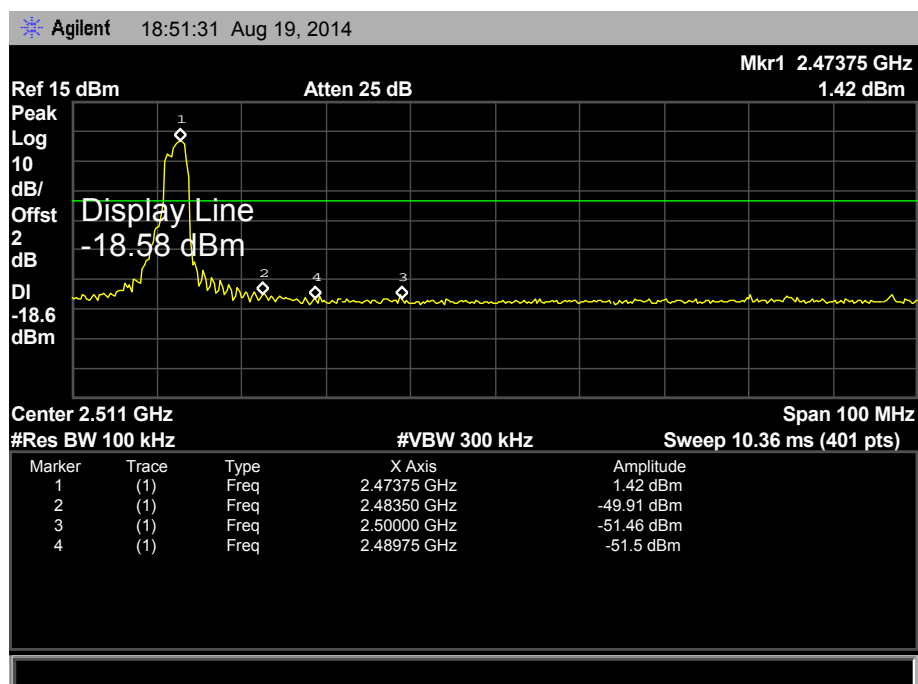
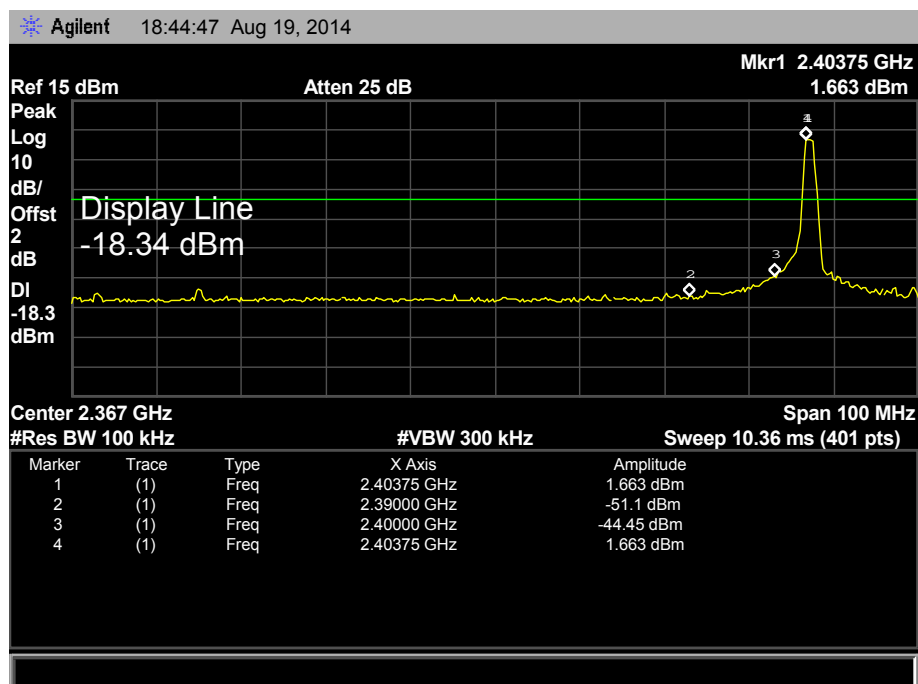
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB Detector
1	X	2474.200	86.51	1.13	87.64	Fundamental Frequency	peak
2	*	2474.200			76.66	Fundamental Frequency	AVG
3		2483.500	47.70	1.17	48.87	74.00	-25.13 peak
4		2483.500			37.89	54.00	-16.11 AVG

Emission Level= Read Level+ Correct Factor

Average Values=Peak-10.98

(2) Conducted Test

EUT:	2.4 GHZ 4 CHANNEL WIRELESS JOYSTICK GAMEPAD	Model:	40377
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 6V		
Test Mode:	TX 2404MHz / TX 2474MHz		
Remark:	The EUT is programed in continuously transmitting mode		



6. Bandwidth Test

6.1 Test Standard and Limit

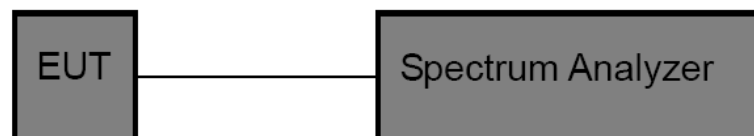
6.1.1 Test Standard

FCC Part 15.247 (a)(2)

6.1.2 Test Limit

FCC Part 15 Subpart C(15.247)/RSS-210		
Test Item	Limit	Frequency Range(MHz)
Bandwidth	≥ 500 KHz (6dB bandwidth)	2400~2483.5

6.2 Test Setup



6.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) The bandwidth is measured at an amplitude level reduced 6dB 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.
- (3) Measure the channel separation the spectrum analyzer was set to Resolution Bandwidth:100 kHz, and Video Bandwidth:300 kHz, Detector: Peak, Sweep Time set auto.

6.4 EUT Operating Condition

The EUT was set to continuously transmitting in each mode and low, middle and high channel for the test.

6.5 Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Mar. 20, 2014	Mar. 19, 2015

6.6 Test Data

EUT:	2.4 GHZ 4 CHANNEL WIRELESS JOYSTICK GAMEPAD	Model:	40377
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 6V		
Test Mode:	TX Mode		
Channel frequency (MHz)	6dB Bandwidth (kHz)	99% Bandwidth (kHz)	Limit (kHz)
2404	905.727	1318.50	>=500
2439	926.858	1248.80	
2474	941.850	1162.30	

TX Mode

2404 MHz

Agilent18:13:01 Aug 19, 2014

Ref 15 dBm

Atten 25 dB

#Peak

Log

10

dB/Offst

2

dB

Center 2.404000000 GHz

Center 2.404 GHz

#Res BW 100 kHz

#VBW 300 kHz

Span 5 MHz

Sweep 5 ms (401 pts)

Occupied Bandwidth

1.3185 MHz

Occ BW % Pwr

99.00 %

x dB

-6.00 dB

Transmit Freq Error

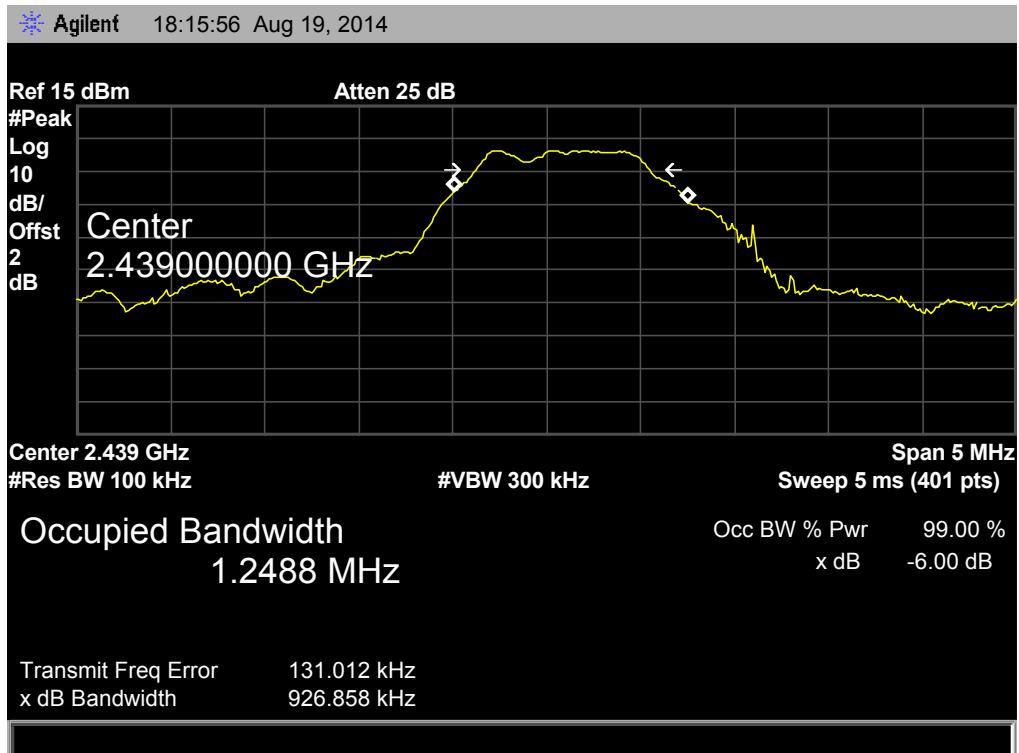
166.002 kHz

x dB Bandwidth

905.727 kHz

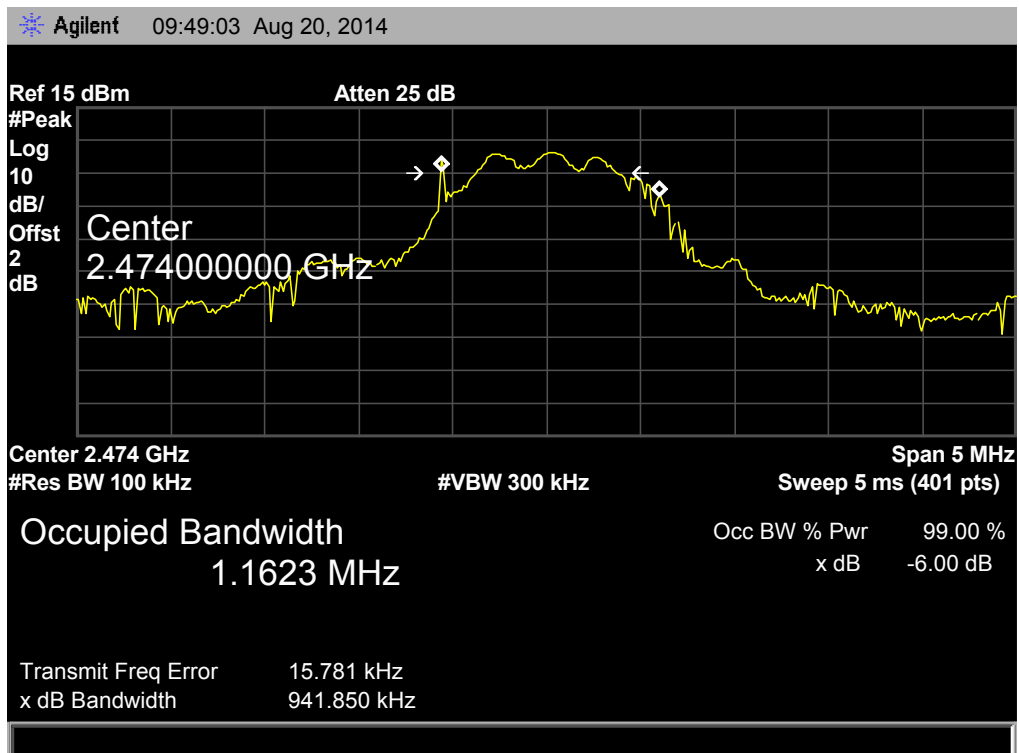
TX Mode

2439 MHz



TX Mode

2474 MHz



7. Peak Output Power Test

7.1 Test Standard and Limit

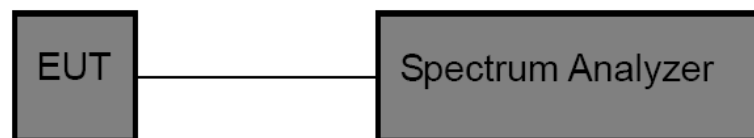
7.1.1 Test Standard

FCC Part 15.247 (b)

7.1.2 Test Limit

FCC Part 15 Subpart C(15.247)/RSS-210		
Test Item	Limit	Frequency Range(MHz)
Peak Output Power	1 Watt or 30 dBm	2400~2483.5

7.2 Test Setup



7.3 Test Procedure

The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above. The measurement is according to section 9.1.1 of KDB 558074 D01 DTS Meas Guidance v03r02.

- (1) Set the $RBW \geq DTS \text{ Bandwidth}$
- (2) Set $VBW \geq 3 * RBW$
- (3) Set $Span \geq 3 * RBW$
- (4) Sweep time=auto
- (5) Detector= peak
- (6) Trace mode= maxhold.
- (7) Allow trace to fully stabilize, and then use peak marker function to determine the peak amplitude level.

7.4 EUT Operating Condition

The EUT was set to continuously transmitting in the max power during the test.

7.5 Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum	Agilent	E4407B	MY45106456	Mar. 20, 2014	Mar. 19, 2015

Analyzer					
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7.6 Test Data

EUT:	2.4 GHZ 4 CHANNEL WIRELESS JOYSTICK GAMEPAD	Model:	40377
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 6V		
Test Mode:	TX Mode		
Channel frequency (MHz)	Test Result (dBm)	Limit (dBm)	
2404	2.803	30	
2439	2.902		
2474	1.246		

TX Mode

2404MHz

Agilent

18:33:37 Aug 19, 2014

Ref 15 dBm

Atten 25 dB

Mkr1 2.4042750 GHz

2.803 dBm

Peak

Log

10

dB/

Offst

2

dB

Marker

2.404275000 GHz

2.803 dBm

M1 S2

S3 FC

AA

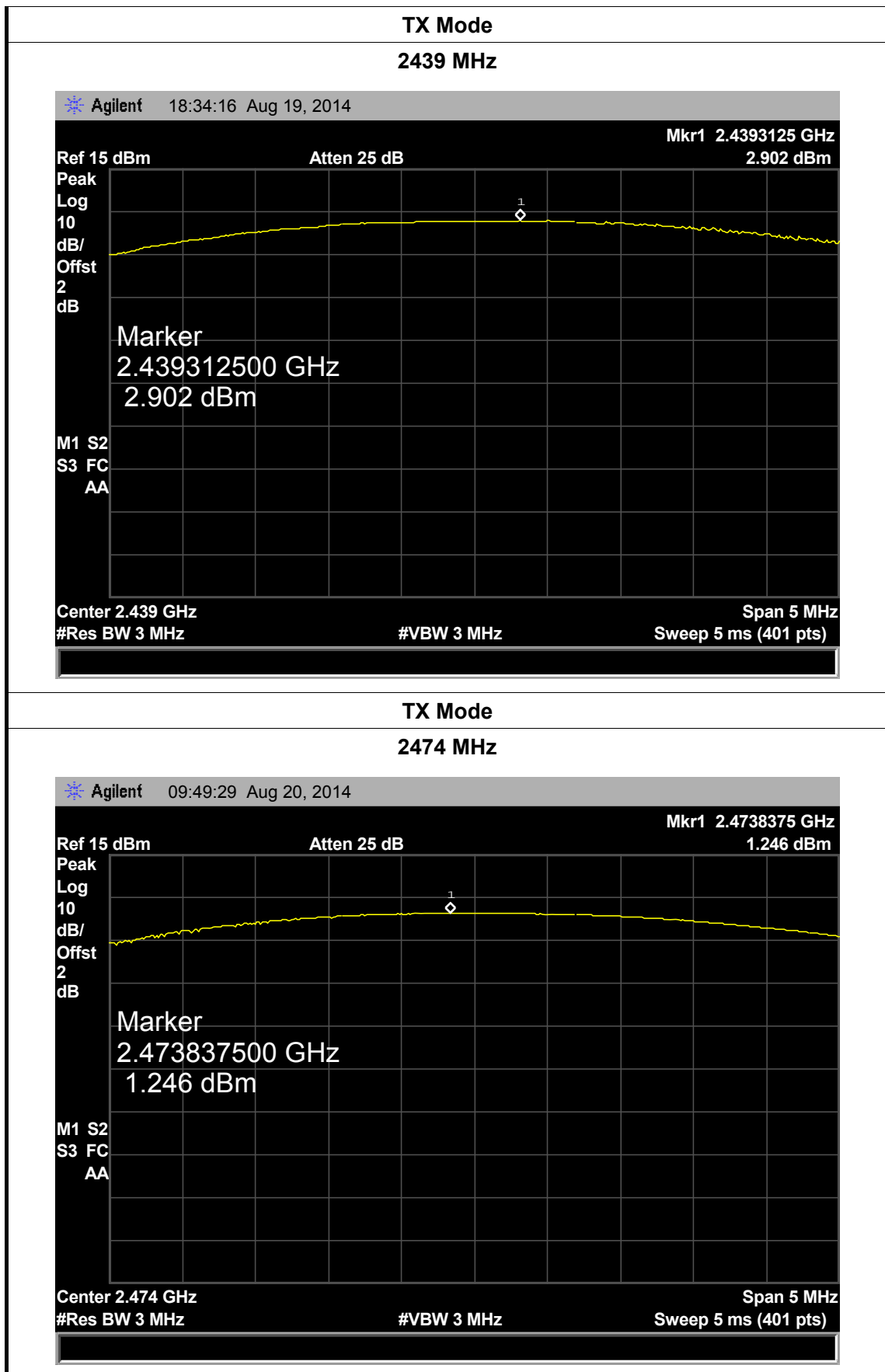
Center 2.404 GHz

#Res BW 3 MHz

#VBW 3 MHz

Span 5 MHz

Sweep 5 ms (401 pts)



8. Power Spectral Density Test

8.1 Test Standard and Limit

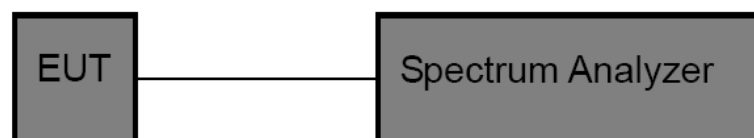
8.1.1 Test Standard

FCC Part 15.247 (e)

8.1.2 Test Limit

FCC Part 15 Subpart C(15.247)		
Test Item	Limit	Frequency Range(MHz)
Power Spectral Density	8dBm(in any 3 kHz)	2400~2483.5

8.2 Test Setup



8.3 Test Procedure

The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above. The measurement according to section 10.2 of KDB 558074 D01 DTS Meas Guidance v03r02.

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Set analyser center frequency to DTS channel center frequenyc.
- (3) Set the span to 1.5 times the DTS bandwidth.
- (4) Set the RBW to: 3 kHz
- (5) Set the VBW to: 10 kHz
- (6) Detector: peak
- (7) Sweep time: auto
- (8) Allow trace to fully stabilize. Then use the peak marker function to determine the maximum amplitude level.

8.4 EUT Operating Condition

The EUT was set to continuously transmitting in each mode and low, Midle and high channel for the test.

8.5 Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Mar. 20, 2014	Mar. 19, 2015

8.6 Test Data

EUT:	2.4 GHZ 4 CHANNEL WIRELESS JOYSTICK GAMEPAD	Model:	40377
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 6V		
Test Mode:	TX Mode		
Channel Frequency (MHz)	Power Density (3 kHz/dBm)	Limit (dBm)	
2404	-10.85	8	
2439	-10.38		
2474	-11.33		
TX Mode			
2404 MHz			

Agilent18:38:18 Aug 19, 2014

Ref 15 dBm

Atten 25 dB

Mkr1 2.40403000 GHz
-10.85 dBm

Peak

Log

10

dB/

Offst

2

dB

Marker

2.404030000 GHz

-10.85 dBm

M1 S2

S3 FC

AA

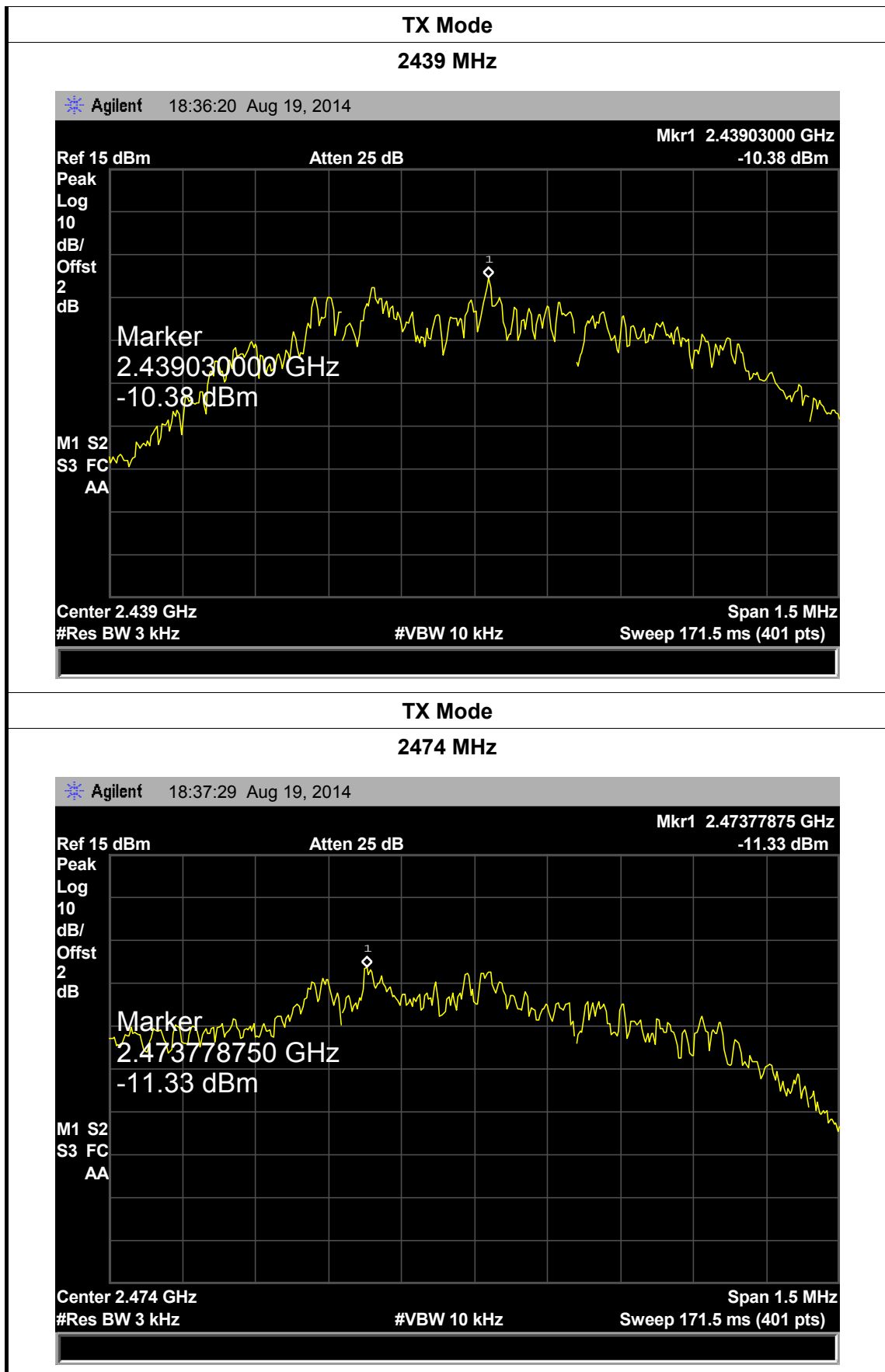
Center 2.404 GHz

#Res BW 3 kHz

#VBW 10 kHz

Sweep 171.5 ms (401 pts)

Span 1.5 MHz



9. Antenna Requirement

9.1 Standard Requirement

9.1.1 Standard

FCC Part 15.203

9.1.2 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.

9.2 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.

9.3 Result

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