FCC Radio Test Report

FCC ID: ZDTJ3C0001

Report No.	:	TB-FCC126113
Applicant	:	Joysway Hobby (HK) Limited
Equipment Under Test (EUT)		
EUT Name	:	2.4GHz Pistol Grip Radio Control System
Model No.	:	J3C91
Serial No.	:	J3C92, J3C93, J3C94, J3C95, J3C96, J3C97, J3C98, J3C99, J2C91, J2C92, J2C93, J2C94, J2C95, J2C96, J2C97, J2C98, J2C99
Brand Name	:	Joysway
Receipt Date	:	2013-01-07
Test Date	:	2013-01-08 to 2013-02-18
Issue Date	:	2013-02-20
Standards	:	FCC Part 15, Subpart C
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 : Roy Lai

Approved& Authorized : Lucky Wong

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	:	Joysway Hobby (HK) Limited
Address	:	Flat/RM 924, 9/F, Beverley Commercial Centre, 87-105, Chatham Road, Tsimshatsui, Hongkong
Manufacturer	:	Dongguan Weihao Hobby Technology Co., Ltd
Address	:	No.141, Guang Hui Road, Wan Jiang, Dongguan city, China

1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	2.4GHz Pistol Grip Radio Control System	
Models No.	:	J3C91, J3C92, J3C93, J3C94, J3C95, J3C96, J3C97, J3C98, J3C99, J2C91, J2C92, J2C93, J2C94, J2C95, J2C96, J2C97, J2C98, J2C99	
Model Difference	:	The different models are identical in schematic, structure and critical component, the only different is the appearance.	
Product Description	:	Operation Frequency:2405~2450 MHz	
		Number of Channels:	20 channels
		Out Power:	95.73 dBuV/m@3m Peak 81.48 dBuV/m@3m Avg
		Antenna Gain:	2.50 dBi
		Modulation Type:	GFSK
Power Supply	:	DC Voltage supplied by AA battery.	
Power Rating	:	DC 6.0V (4*AA battery).	
Connecting I/O Port(S)	:	Please refer to the User's Manual	

Note:

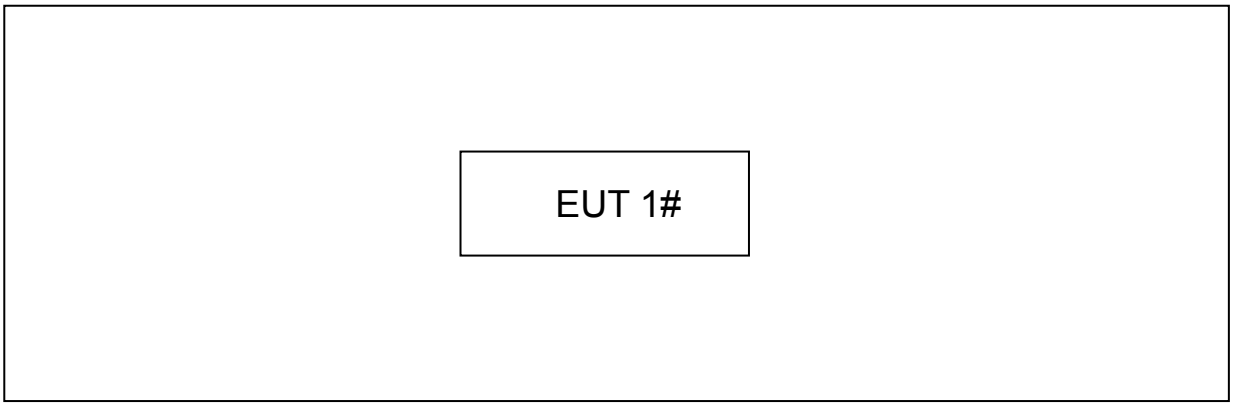
(1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

(2) Channel List:

Channel List		
Low Channel (MHz)	MID Channel (MHz)	HIGH Channel (MHz)
2405	2425	2450

1.3 Block Diagram Showing the Configuration of System Tested

Mode 1: TX Mode



1.4 Description of Support Units

The EUT has been tested as an independent unit.

Name	Model	S/N	Manufacturer	Used "√"
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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

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 a portable unit; 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 tests were performed at:

Shenzhen Anbotek Compliance Laboratory Limited.
1/F, 1 /Building, SEC Industrial Park, No.4 Qianhai Road, Nanshan District,
Shenzhen, 518054, China

At the time of testing, the Laboratory is accredited. It is listed in the United States of American Federal Communications Commission (FCC), and the registration number is 752021.

The test report was fulfilled by Shenzhen Toby Technology Co., Ltd. Shenzhen Toby Technology Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements results.

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	N/A	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

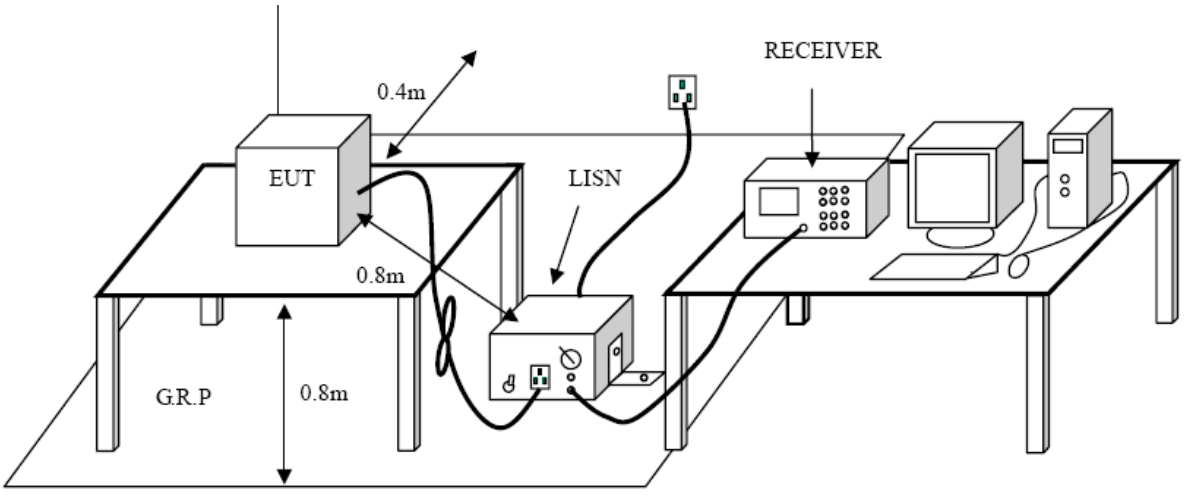
Notes:

(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. Date
EMI Test Receiver	ROHDE& SCHWARZ	ESCI	100627	2012-11-12	2013-11-11
50ΩCoaxial Switch	Anritsu	MP59B	X10321	2011-08-11	2012-08-11
L.I.S.N	EMCO	3624/1	00063417	2011-08-11	2012-08-11
L.I.S.N	EMCO	3624/1	00063417	2011-08-11	2012-08-11

3.5 EUT Operating Mode

Please refer to the description of test mode.

3.6 Test Data

The EUT is powered by battery, so no requirement for this test item.

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:

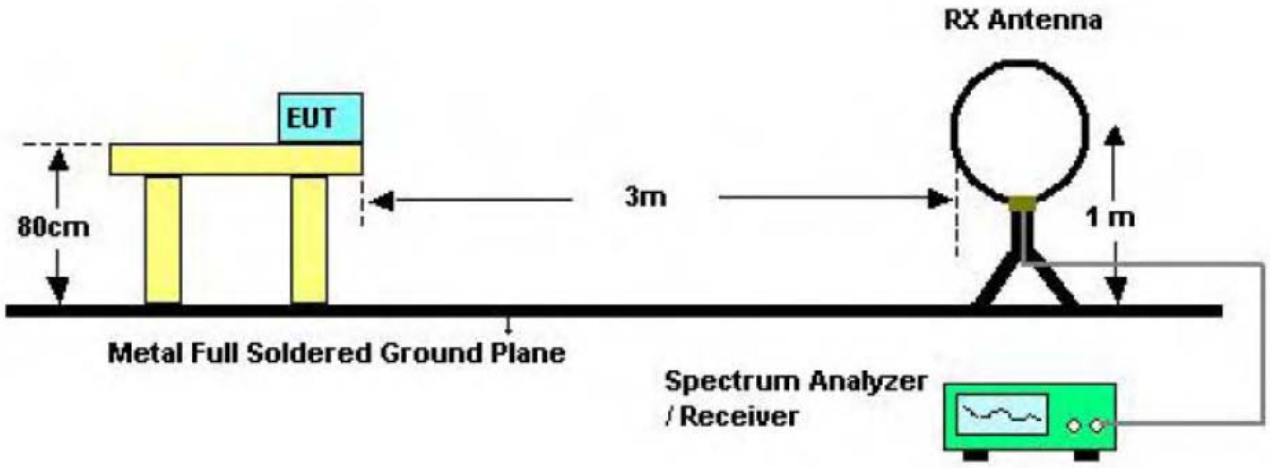
(1) The tighter limit applies at the band edges.

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

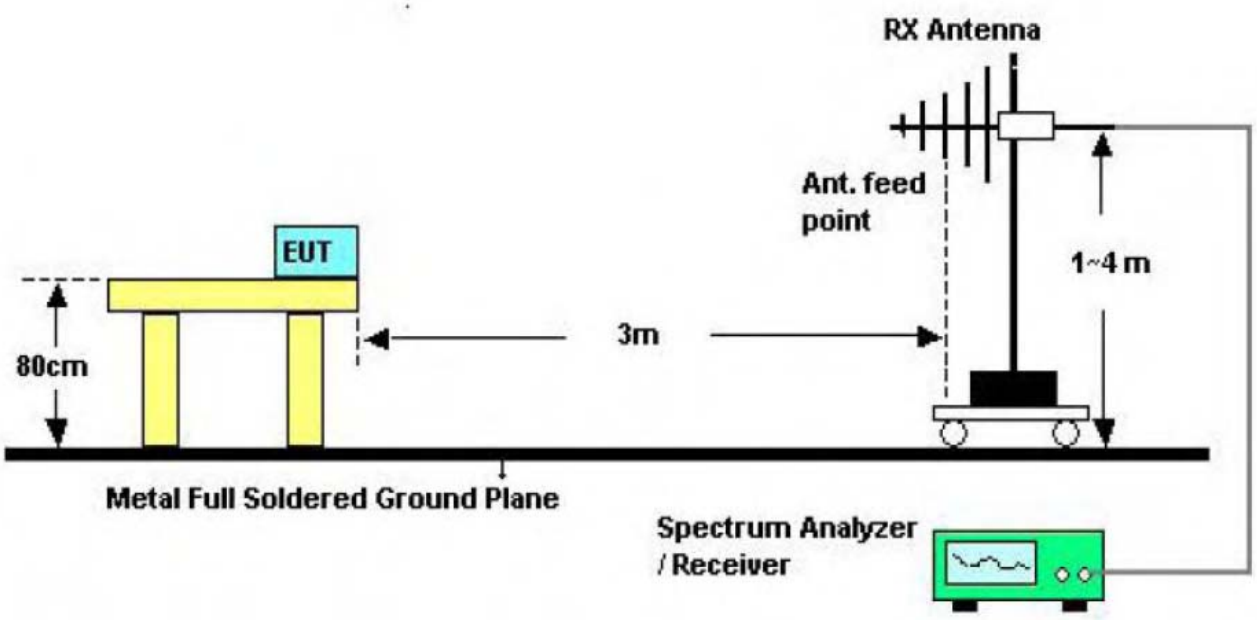
Limits of radiated emission measurement (15.249)

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

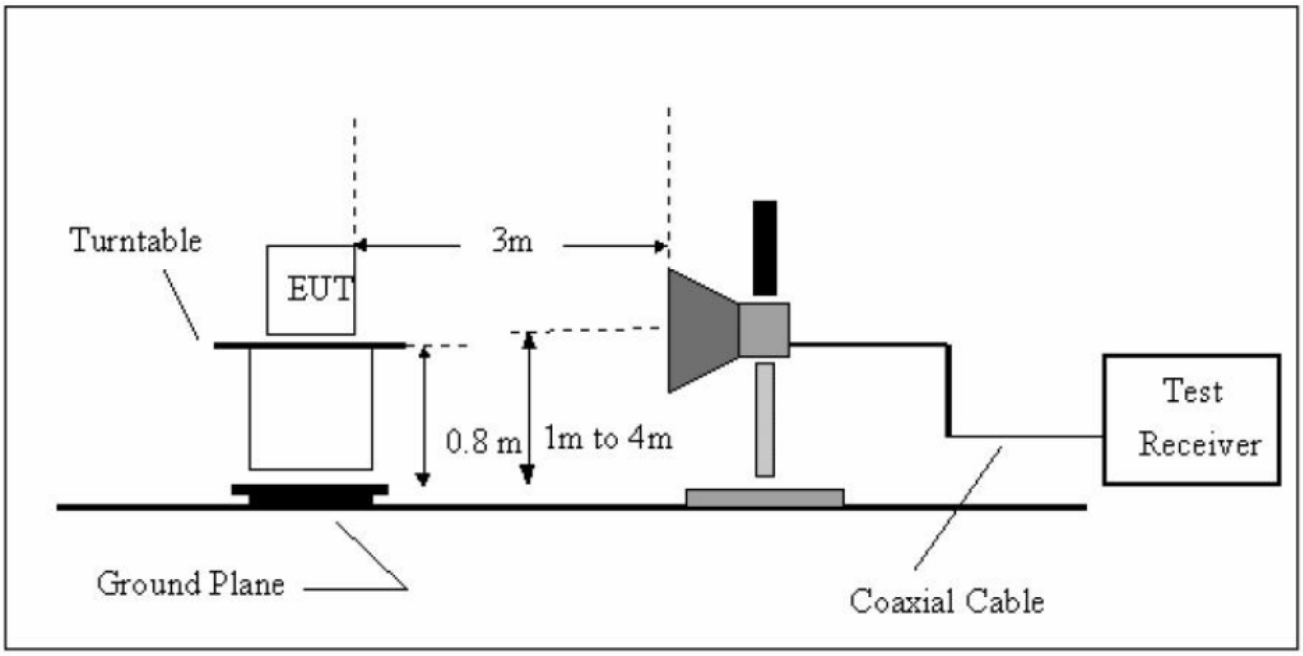
4.2 Test Setup



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) 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, and new batteries are used during testing.

4.5 Test Equipment

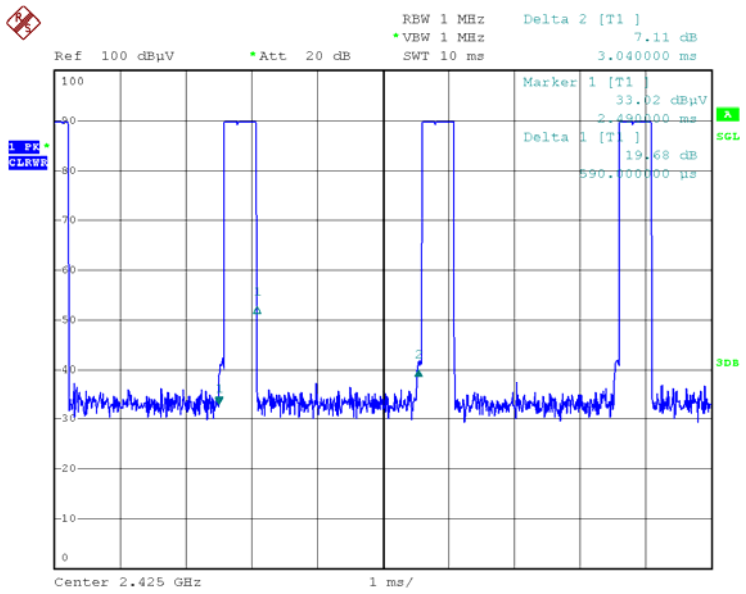
Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Date
EMI Test Receiver	ROHDE& SCHWARZ	ESCI	100627	2012-11-12	2013-11-11
Spectrum Analyzer	Agilent	E4407B	US39390582	2012-07-03	2013-07-02
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2012-07-21	2013-07-20
Horn Antenna	SCHWARZBECK	VULB9163	VULB 9163-289	2012-05-17	2013-05-16
RF Switch	EM	EMSW18	SW060023	2012-08-07	2013-08-06
Amplifier	Agilent	8447F	3113A06717	2012-08-07	2013-08-06
Coaxial Cable	SCHWARZBECK	AK9513	9513-10	2012-08-07	2013-08-06

4.6 Test Data

Please see the next page.

4.6.1 Duty Cycle

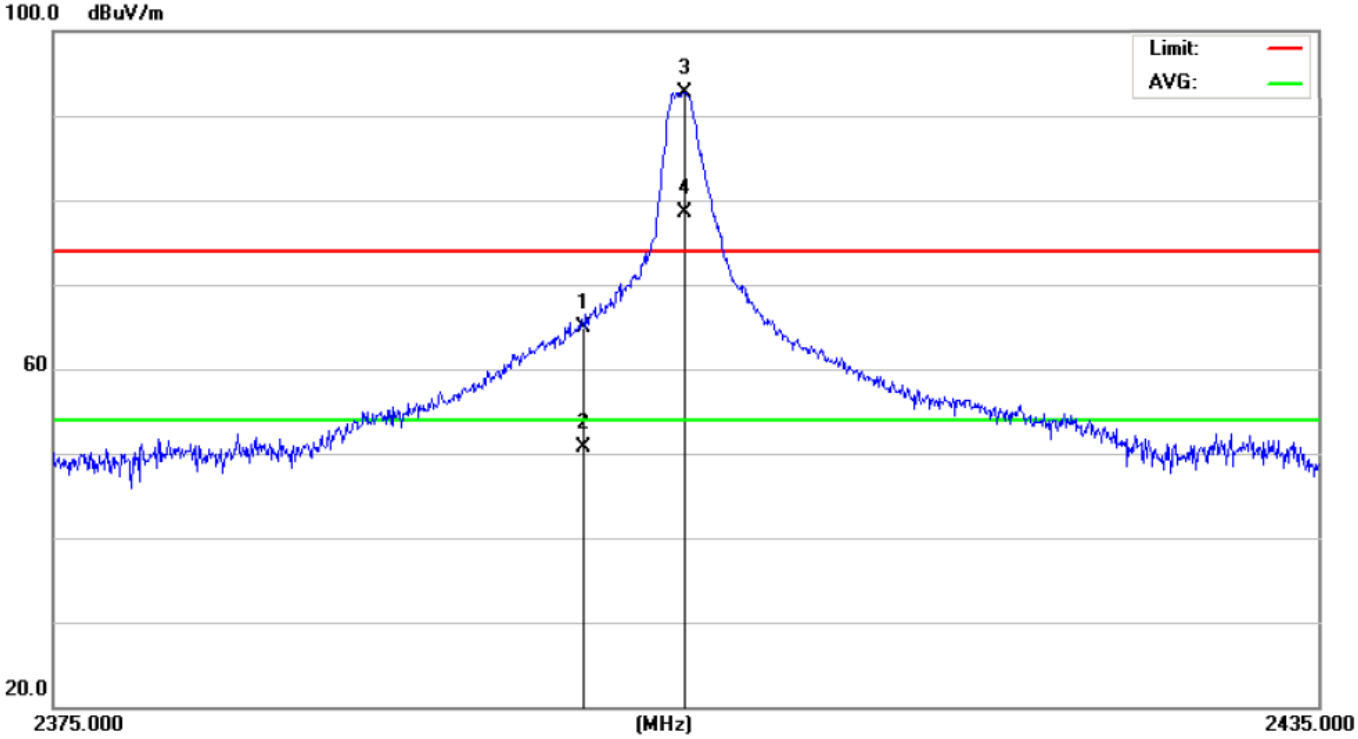
(1) During transmitting mode:



(2)Transmitting on Time (TX on)=0.59 ms
One cycle time=3.04 ms
(3)Duty Cycle=0.59/3.04=19.40%
(4)Avg=Peak+20log(Duty Cycle)=Peak-14.25

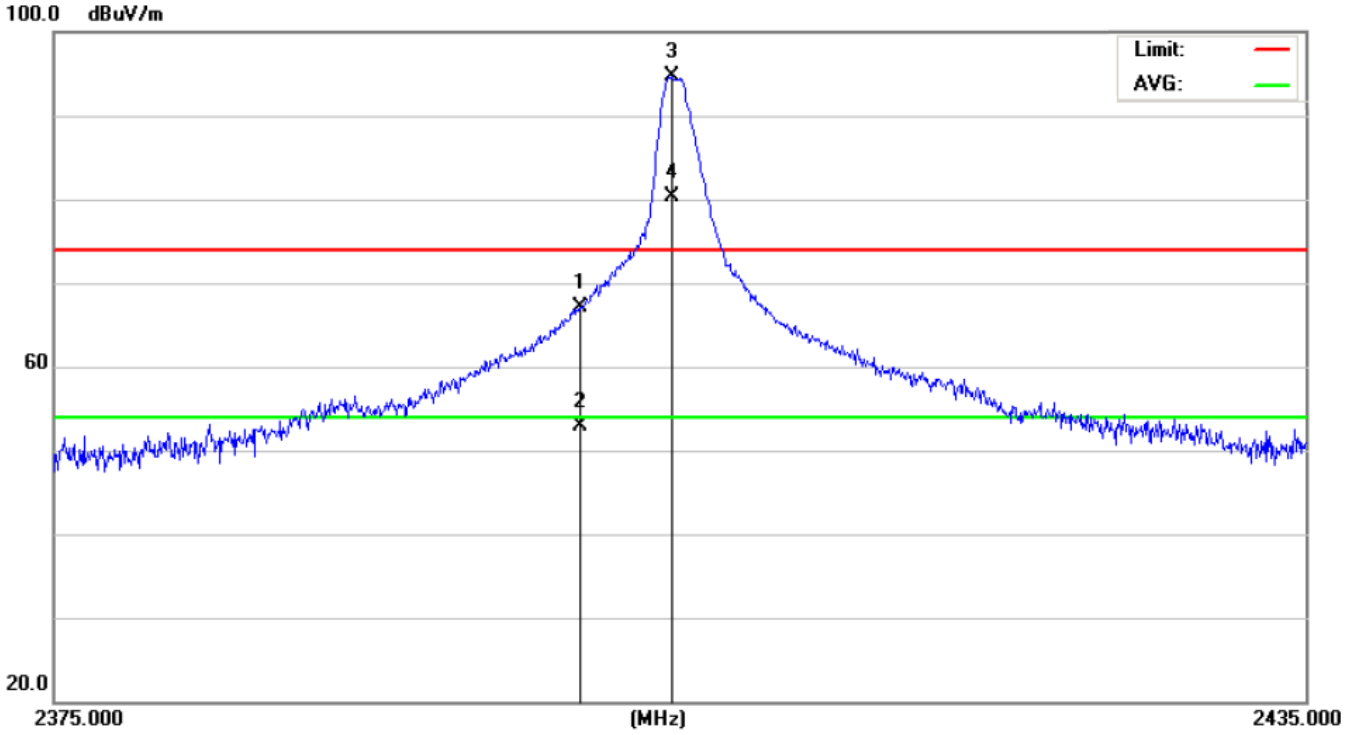
4.6.2 Field Strength of the Fundamental

E.U.T :	2.4GHz Pistol Grip Radio Control System	Model Name :	J3C91
Temperature :	23°C	Relative Humidity :	51 %
Polarization	Horizontal		
Test Voltage :	DC 6V		
Test Mode :	TX 2405		



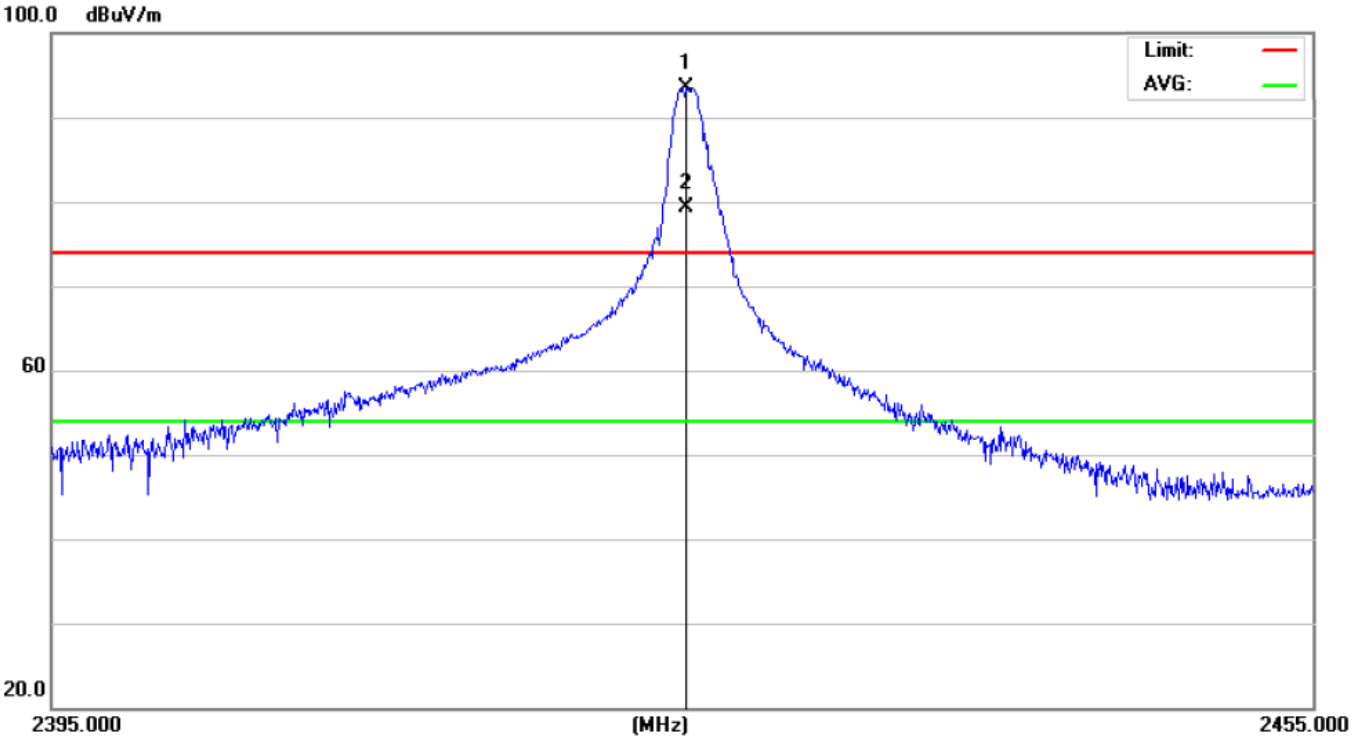
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2400.000	46.04	18.86	64.90	74.00	-9.10	peak	
2		2400.000	31.79	18.86	50.65	54.00	-3.35	AVG	
3	X	2404.760	73.88	18.86	92.74	114.00	-21.26	peak	Fundamental
4	*	2404.760	59.63	18.86	78.49	94.00	-15.51	AVG	Fundamental

E.U.T :	2.4GHz Pistol Grip Radio Control System	Model Name :	J3C91
Temperature :	23°C	Relative Humidity :	51 %
Polarization	Vertical		
Test Voltage :	DC 6V		
Test Mode :	TX 2405		



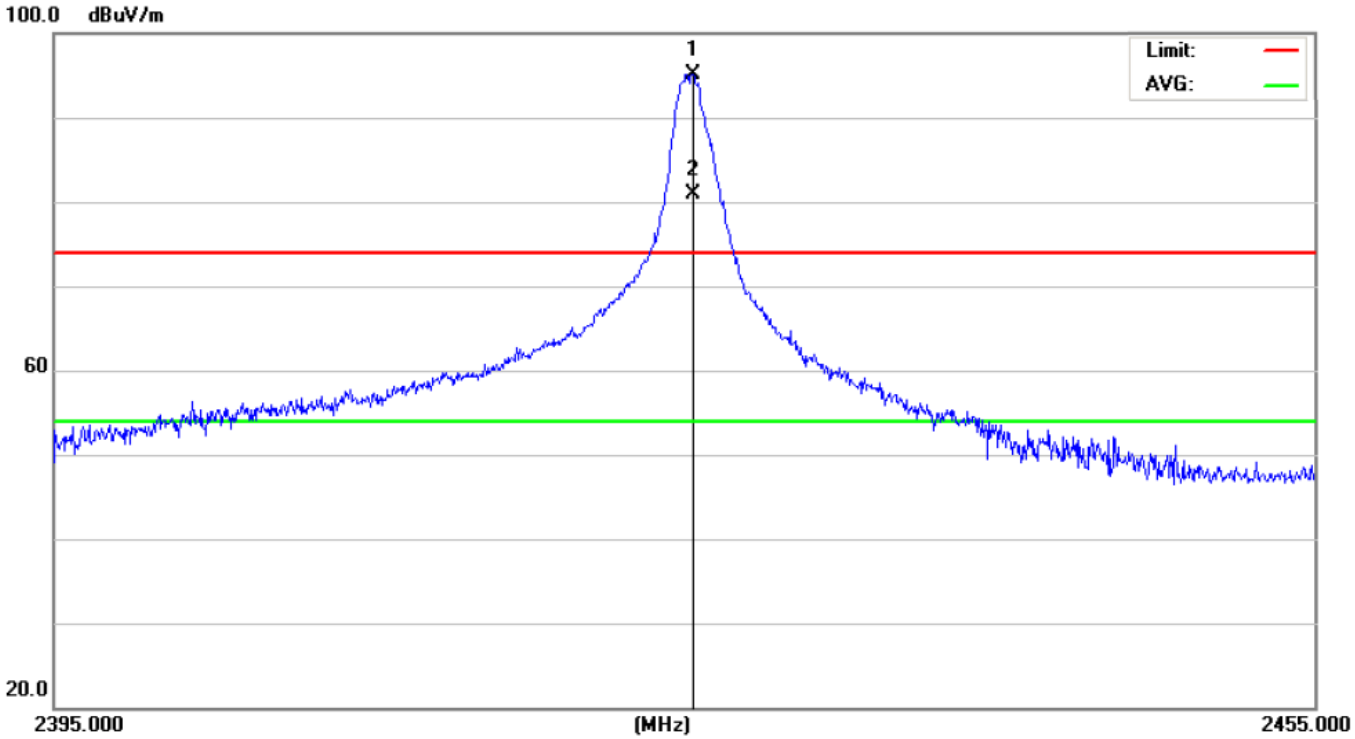
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2400.000	48.25	18.86	67.11	74.00	-6.89	peak	
2		2400.000	34.00	18.86	52.86	54.00	-1.14	AVG	
3	X	2404.460	75.78	18.86	94.64	114.00	-19.36	peak	Fundamental
4	*	2404.460	61.53	18.86	80.39	94.00	-13.61	AVG	Fundamental

E.U.T :	2.4GHz Pistol Grip Radio Control System	Model Name :	J3C91
Temperature :	23°C	Relative Humidity :	51 %
Polarization	Horizontal		
Test Voltage :	DC 6V		
Test Mode :	TX 2425		



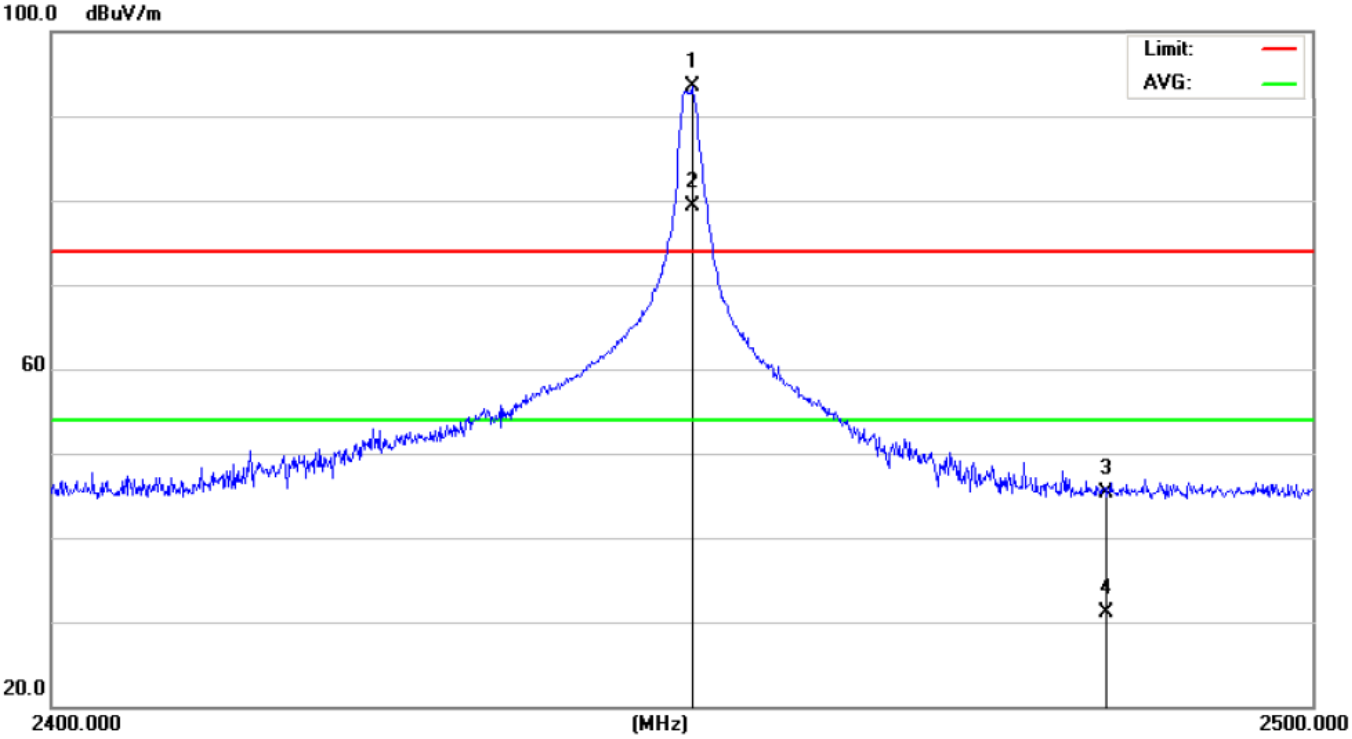
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2425.000	74.71	18.85	93.56	114.00	-20.44	peak	Fundamental
2	*	2425.000	60.46	18.85	79.31	94.00	-14.69	AVG	Fundamental

E.U.T :	2.4GHz Pistol Grip Radio Control System	Model Name :	J3C91
Temperature :	23°C	Relative Humidity :	51 %
Polarization	Vertical		
Test Voltage :	DC 6V		
Test Mode :	TX 2425		



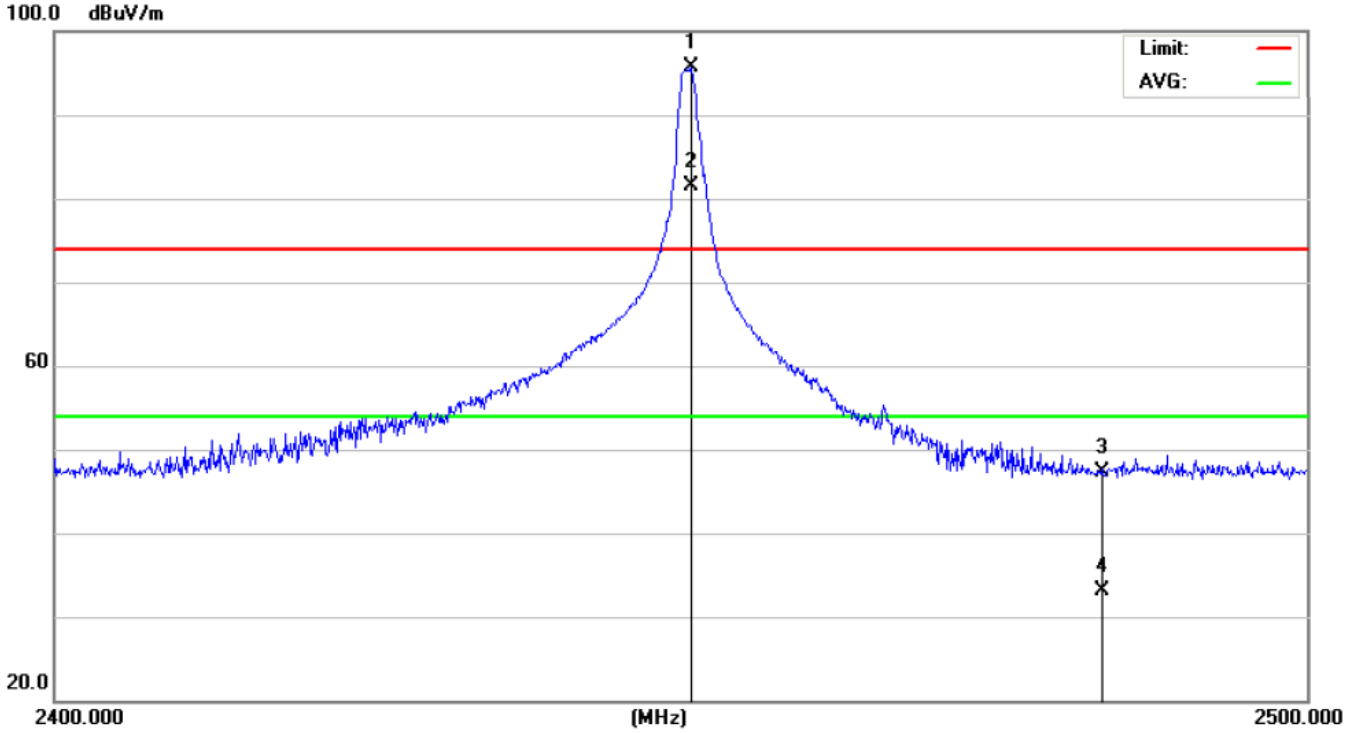
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2425.240	76.25	18.85	95.10	114.00	-18.90	peak	Fundamental
2	*	2425.240	62.00	18.85	80.85	94.00	-13.15	AVG	Fundamental

E.U.T :	2.4GHz Pistol Grip Radio Control System	Model Name :	J3C91
Temperature :	23°C	Relative Humidity :	51 %
Polarization	Horizontal		
Test Voltage :	DC 6V		
Test Mode :	TX 2450		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2450.300	74.65	18.85	93.50	114.00	-20.50	peak	Fundamental
2	*	2450.300	60.40	18.85	79.25	94.00	-14.75	AVG	Fundamental
3		2483.500	26.55	18.84	45.39	74.00	-28.61	peak	
4		2483.500	12.30	18.84	31.14	54.00	-22.86	AVG	

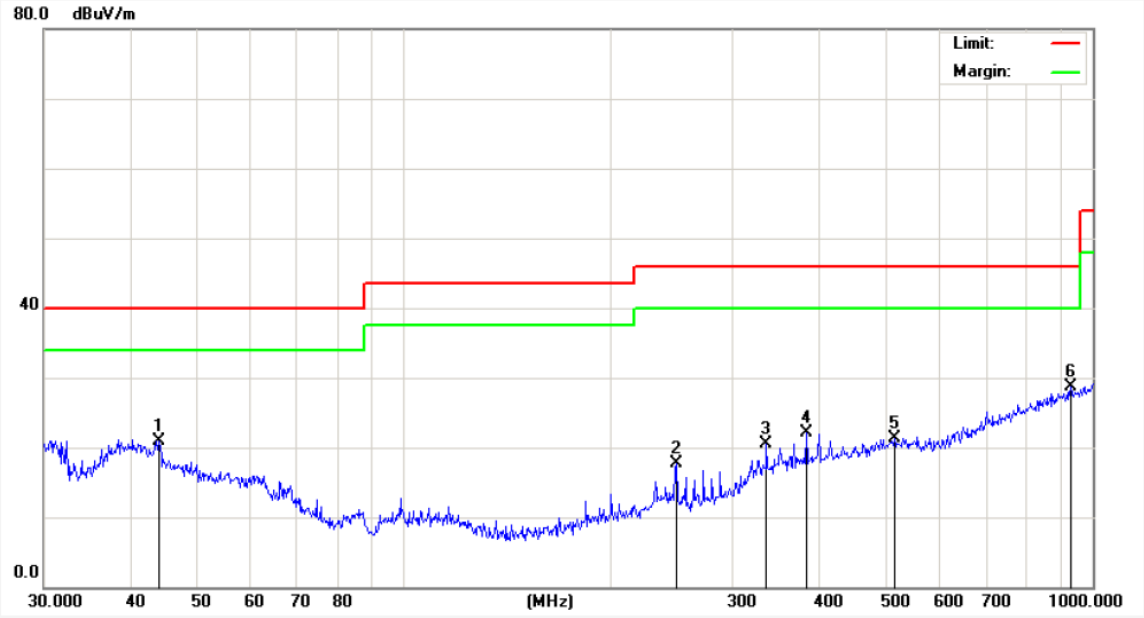
E.U.T :	2.4GHz Pistol Grip Radio Control System	Model Name :	J3C91
Temperature :	23°C	Relative Humidity :	51 %
Polarization	Vertical		
Test Voltage :	DC 6V		
Test Mode :	TX 2450		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2450.300	76.88	18.85	95.73	114.00	-18.27	peak	Fundamental
2	*	2450.300	62.63	18.85	81.48	94.00	-12.52	AVG	Fundamental
3		2483.500	28.47	18.84	47.31	74.00	-26.69	peak	
4		2483.500	14.22	18.84	33.06	54.00	-20.94	AVG	

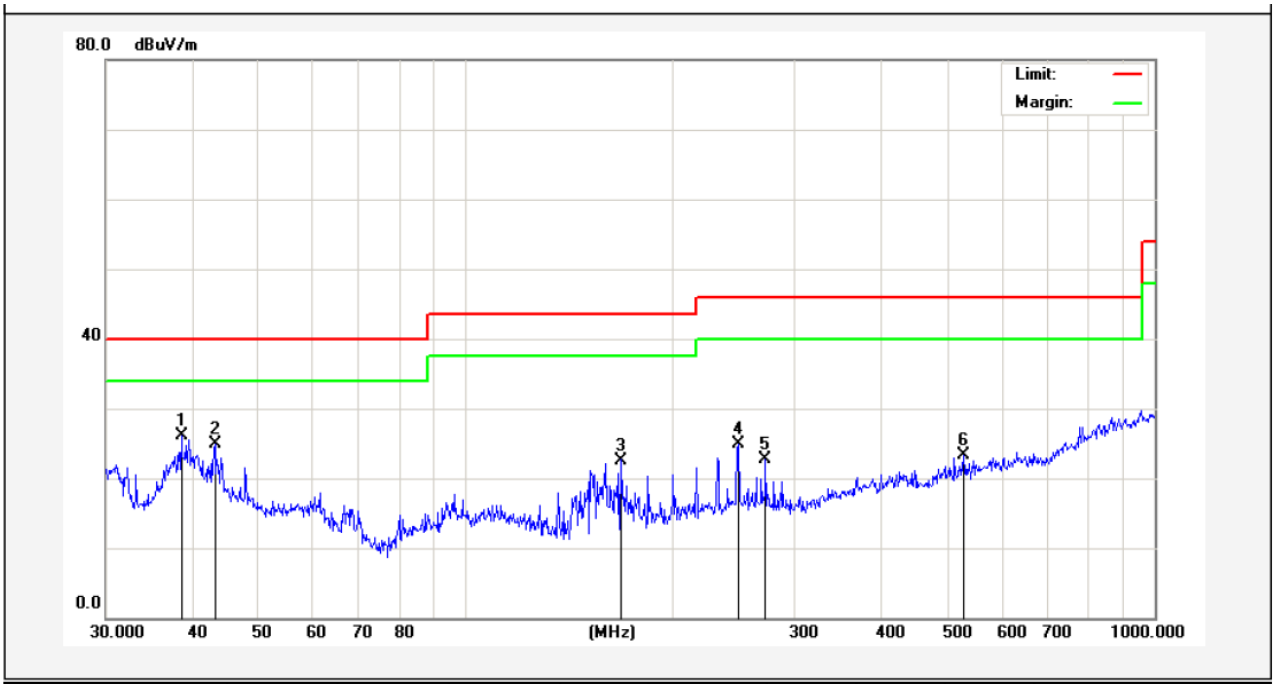
4.6.3 Spurious Emissions (Bellow 1GHz)

E.U.T :	2.4GHz Pistol Grip Radio Control System	Model Name :	J3C91
Temperature :	23°C	Relative Humidity :	51 %
Polarization	Horizontal		
Test Voltage :	DC 6V		
Test Mode :	TX 2405		



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	44.1202	32.88	-11.98	20.90	40.00	-19.10	peak			
2	248.5519	36.18	-18.48	17.70	46.00	-28.30	peak			
3	336.0352	35.02	-14.49	20.53	46.00	-25.47	peak			
4	383.9318	35.21	-13.19	22.02	46.00	-23.98	peak			
5	515.4374	32.38	-10.99	21.39	46.00	-24.61	peak			
6	929.0082	33.02	-4.30	28.72	46.00	-17.28	peak			

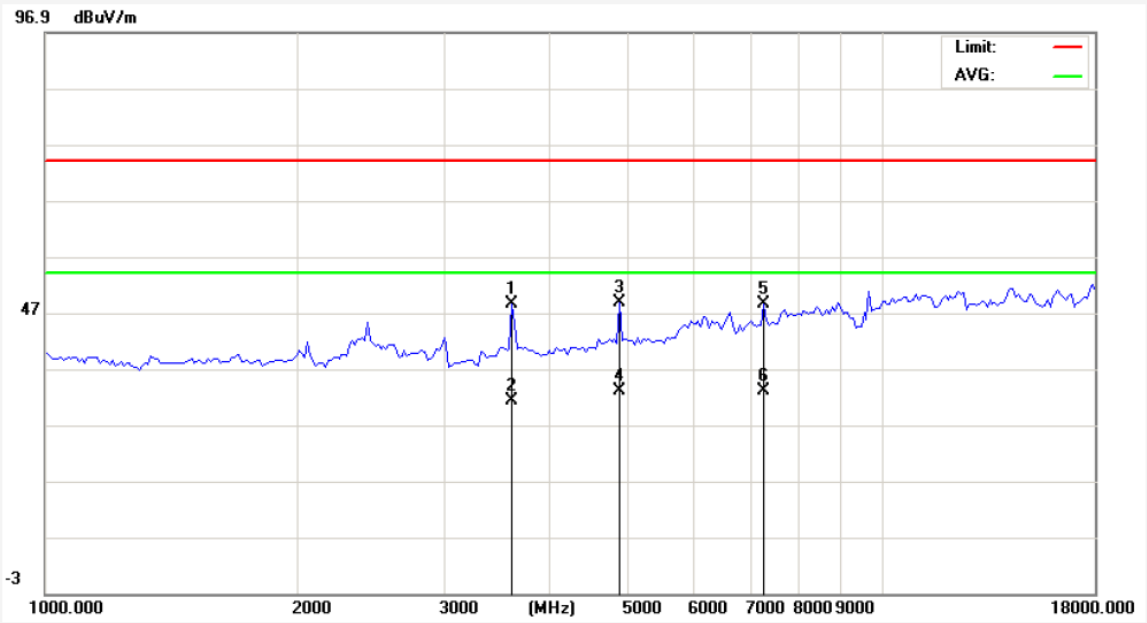
E.U.T :	2.4GHz Pistol Grip Radio Control System	Model Name :	J3C91
Temperature :	23°C	Relative Humidity :	51 %
Polarization	Vertical		
Test Voltage :	DC 6V		
Test Mode :	TX 2405		



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	38.6160	37.63	-11.45	26.18	40.00	-13.82	peak			
2	43.2017	36.53	-11.63	24.90	40.00	-15.10	peak			
3	167.8243	40.23	-17.63	22.60	43.50	-20.90	peak			
4	248.5519	38.90	-14.06	24.84	46.00	-21.16	peak			
5	272.2776	37.53	-14.75	22.78	46.00	-23.22	peak			
6	528.2458	33.69	-10.47	23.22	46.00	-22.78	peak			

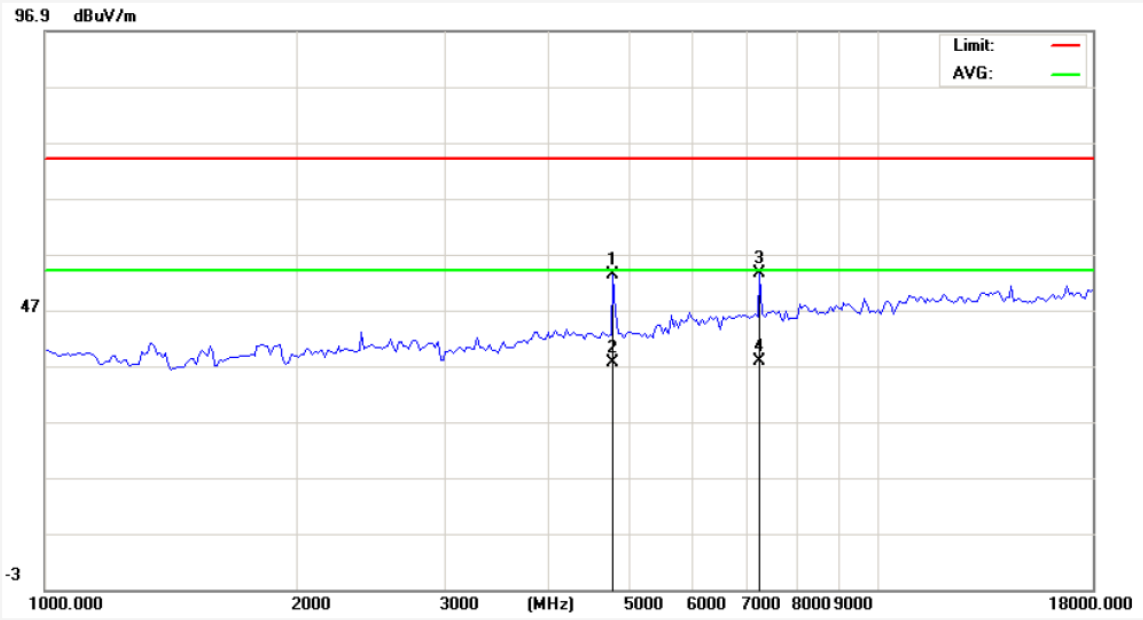
4.6.4 Spurious Emissions (Above 1GHz)

E.U.T :	2.4GHz Pistol Grip Radio Control System	Model Name :	J3C91
Temperature :	23°C	Relative Humidity :	51 %
Polarization	Horizontal		
Test Voltage :	DC 6V		
Test Mode :	TX 2405		



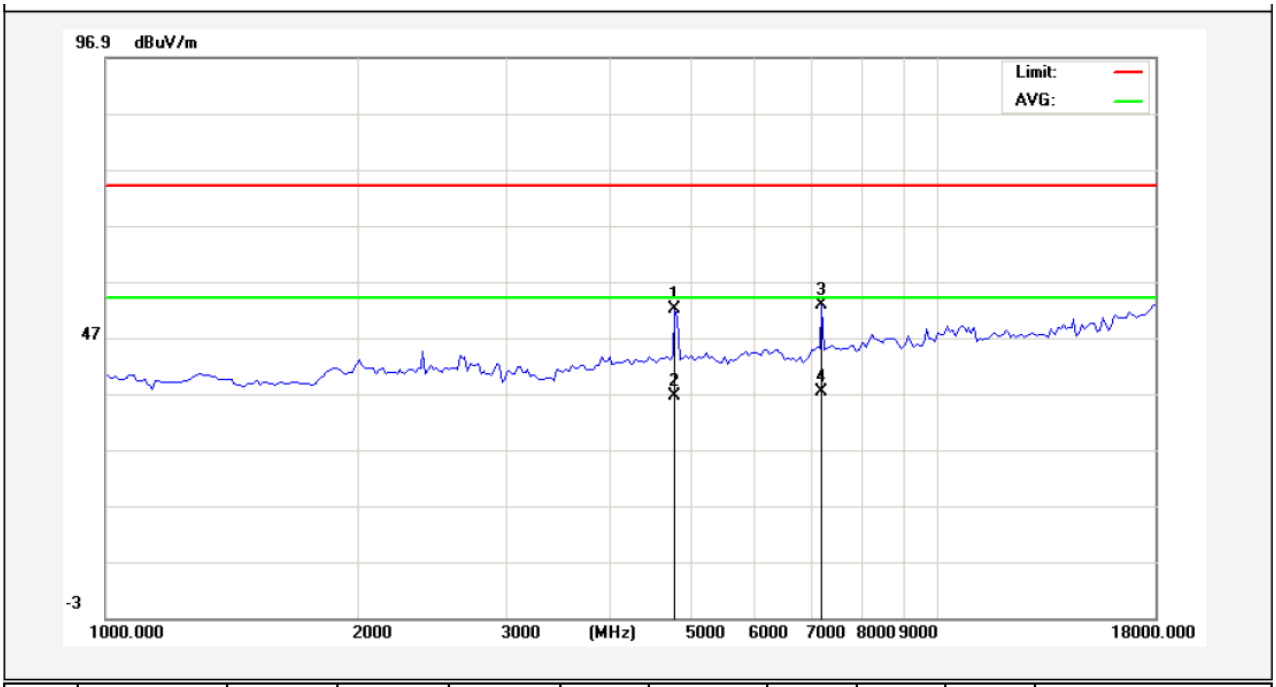
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	3635.000	47.49	1.15	48.64	74.00	-25.36	peak			
2	3635.000	30.10	1.15	31.25	54.00	-22.75	AVG			
3	4867.500	45.28	3.41	48.69	74.00	-25.31	peak			
4	4867.500	29.69	3.41	33.10	54.00	-20.90	AVG			
5	7290.000	40.12	8.53	48.65	74.00	-25.35	peak			
6	7290.000	24.53	8.53	33.06	54.00	-20.94	AVG			

E.U.T :	2.4GHz Pistol Grip Radio Control System	Model Name :	J3C91
Temperature :	23°C	Relative Humidity :	51 %
Polarization	Vertical		
Test Voltage :	DC 6V		
Test Mode :	TX 2405		



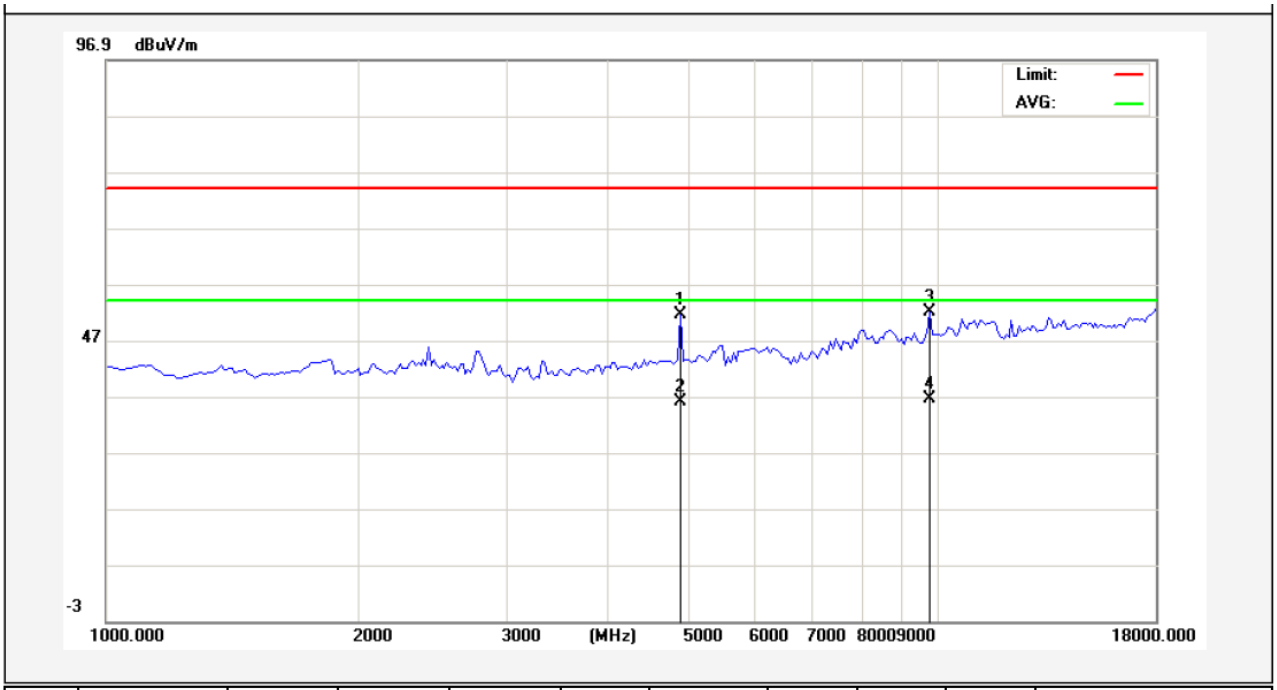
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	4825.000	49.84	3.34	53.18	74.00	-20.82	peak			
2	4825.000	34.25	3.34	37.59	54.00	-16.41	AVG			
3	7205.000	45.02	8.43	53.45	74.00	-20.55	peak			
4	7205.000	29.43	8.43	37.86	54.00	-16.14	AVG			

E.U.T :	2.4GHz Pistol Grip Radio Control System	Model Name :	J3C91
Temperature :	23°C	Relative Humidity :	51 %
Polarization	Horizontal		
Test Voltage :	DC 6V		
Test Mode :	TX 2425		



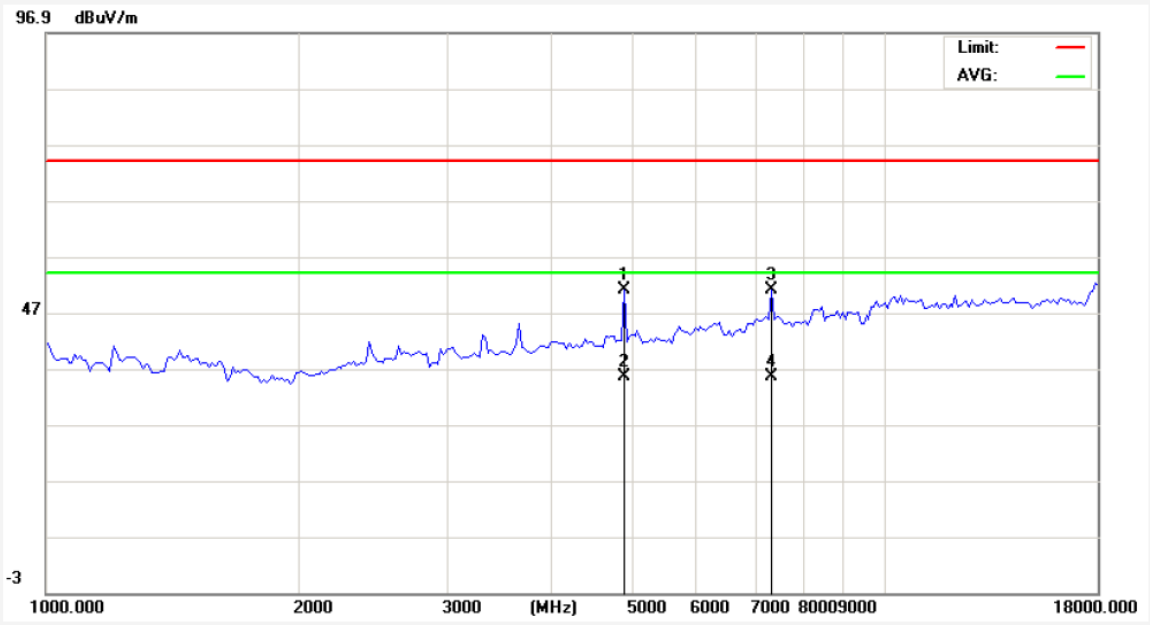
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	4825.000	48.80	3.34	52.14	74.00	-21.86	peak			
2	4825.000	33.21	3.34	36.55	54.00	-17.45	AVG			
3	7205.000	44.32	8.43	52.75	74.00	-21.25	peak			
4	7205.000	28.73	8.43	37.16	54.00	-16.84	AVG			

E.U.T :	2.4GHz Pistol Grip Radio Control System	Model Name :	J3C91
Temperature :	23°C	Relative Humidity :	51 %
Polarization	Vertical		
Test Voltage :	DC 6V		
Test Mode :	TX 2425		



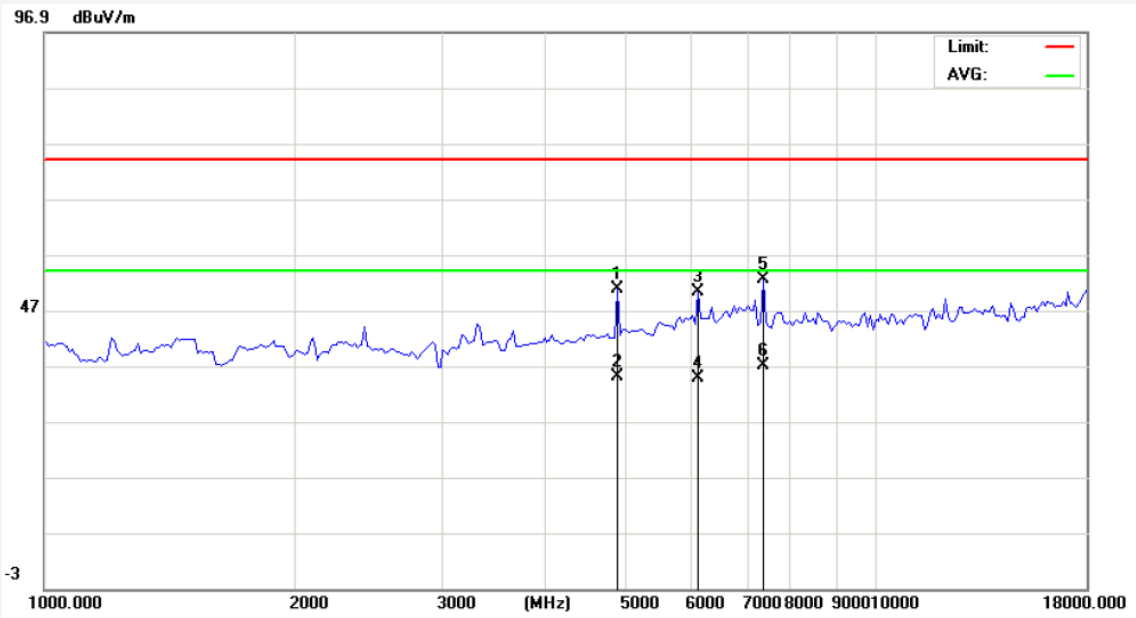
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	4867.500	48.15	3.41	51.56	74.00	-22.44	peak			
2	4867.500	32.56	3.41	35.97	54.00	-18.03	AVG			
3	9712.500	42.16	9.84	52.00	74.00	-22.00	peak			
4	9712.500	26.57	9.84	36.41	54.00	-17.59	AVG			

E.U.T :	2.4GHz Pistol Grip Radio Control System	Model Name :	J3C91
Temperature :	23°C	Relative Humidity :	51 %
Polarization	Horizontal		
Test Voltage :	DC 6V		
Test Mode :	TX 2450		



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	4910.000	47.64	3.49	51.13	74.00	-22.87	peak			
2	4910.000	32.15	3.49	35.64	54.00	-18.36	AVG			
3	7375.000	42.39	8.63	51.02	74.00	-22.98	peak			
4	7375.000	26.80	8.63	35.43	54.00	-18.57	AVG			

E.U.T :	2.4GHz Pistol Grip Radio Control System	Model Name :	J3C91
Temperature :	23°C	Relative Humidity :	51 %
Polarization	Vertical		
Test Voltage :	DC 6V		
Test Mode :	TX 2450		



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	4910.000	47.22	3.49	50.71	74.00	-23.29	peak			
2	4910.000	31.63	3.49	35.12	54.00	-18.88	AVG			
3	6142.500	43.08	7.26	50.34	74.00	-23.66	peak			
4	6142.500	27.49	7.26	34.75	54.00	-19.25	AVG			
5	7375.000	44.02	8.63	52.65	74.00	-21.35	peak			
6	7375.000	28.43	8.63	37.06	54.00	-16.94	AVG			

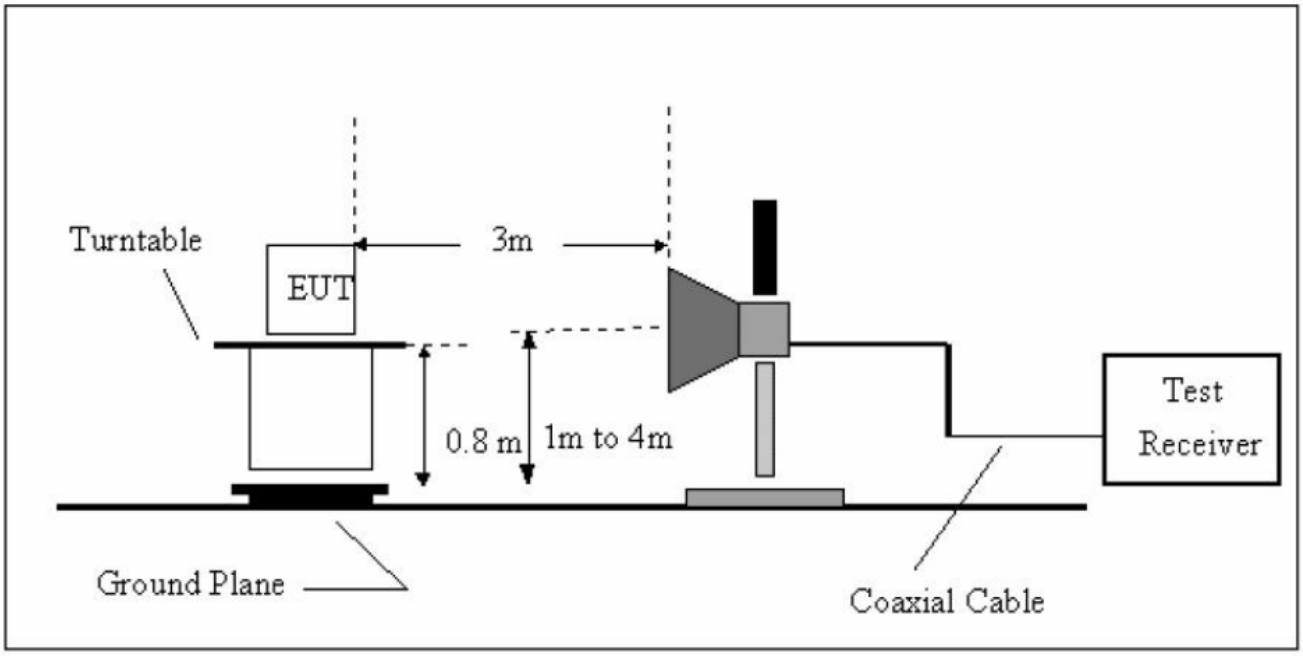
5. Restricted Bands Requirement

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)
608 ~614	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
960 ~1240	

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) 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

Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Date
EMI Test Receiver	ROHDE& SCHWARZ	ESCI	100627	2012-11-12	2013-11-11
Spectrum Analyzer	Agilent	E4407B	US39390582	2012-07-03	2013-07-02
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2012-07-21	2013-07-20
Horn Antenna	SCHWARZBECK	VULB9163	VULB 9163-289	2012-05-17	2013-05-16
RF Switch	EM	EMSW18	SW060023	2012-08-07	2013-08-06
Amplifier	Agilent	8447F	3113A06717	2012-08-07	2013-08-06
Coaxial Cable	SCHWARZBECK	AK9513	9513-10	2012-08-07	2013-08-06

5.6 Test Data

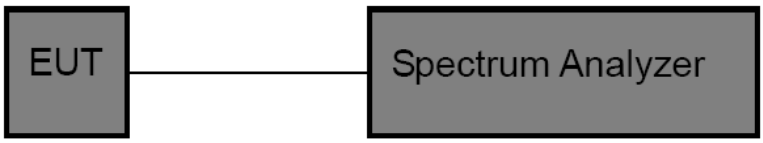
Band Edge (Radiated Emissions)

Spectrum Detector:	PK &AVG	Test Date :	April 19, 2013
Temperature :	28 ℃	Humidity :	65 %

Frequency MHz)	Antenna polarization (H/V)	Emission (dBuV/m)		Band edge Limit (dBuV/m)	
		PEAK	AV	PEAK	AV
2400.0	H	64.90	50.65	74.00	54.00
2400.0	V	67.11	52.86	74.00	54.00
2483.5	H	45.39	31.14	74.00	54.00
2483.5	V	47.31	33.06	74.00	54.00

6. Bandwidth Test

6.1 Test Setup



6.2 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=100kHz.
(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.

6.3 EUT Operating Condition

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

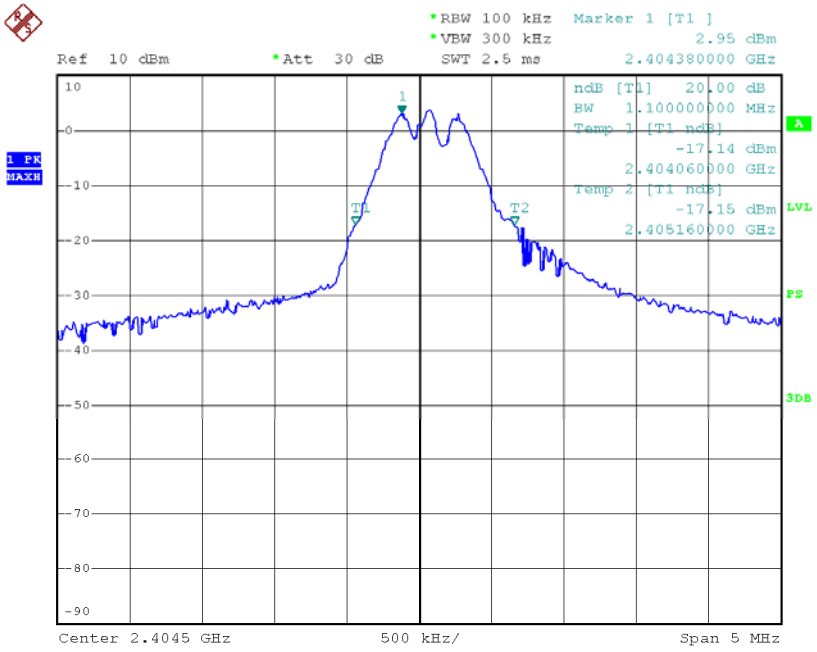
6.4 Test Equipment

Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Date
EMI Test Receiver	ROHDE& SCHWARZ	ESCI	100627	2012-11-12	2013-11-11

6.5 Test Data

Low Channel Frequency (MHz)	20dB Bandwidth (MHz)
2405	1.10

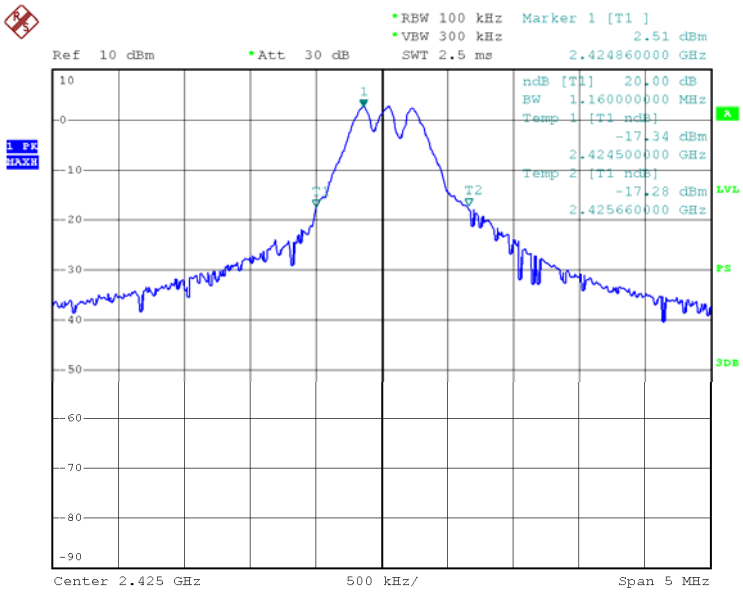
2405 MHz



Date: 29.JAN.2013 10:37:22

MID Channel Frequency (MHz)	20dB Bandwidth (MHz)
2425	1.16

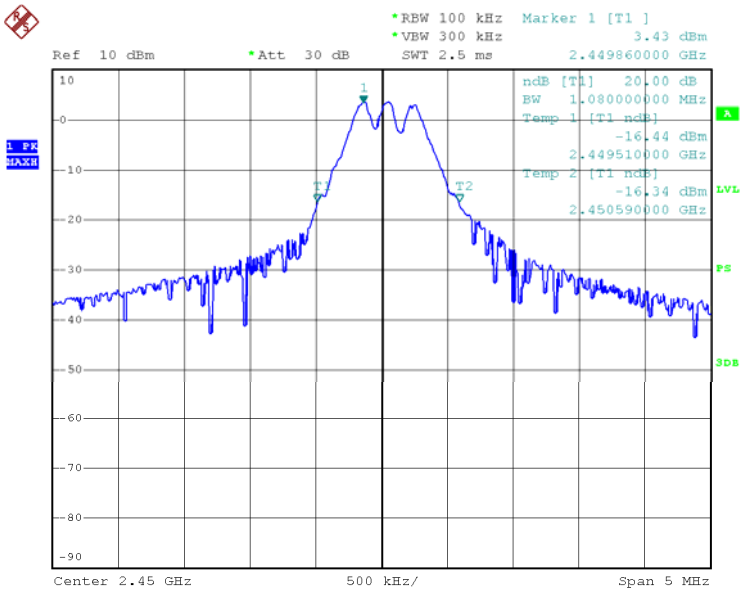
2425 MHz



Date: 29.JAN.2013 10:33:12

HIGH Channel Frequency (MHz)	20dB Bandwidth (MHz)
2450	1.08

2450 MHz



Date: 29.JAN.2013 10:29:58

7. Antenna Requirement

7.1 Standard Requirement

7.1.1 Standard

FCC Part 15.203

7.1.2 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.

7.2 Antenna Connected Construction

The directional gains of the antenna used for transmitting is 2.50 dBi, and the antenna de-signed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

7.3 Result

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