

FCC Radio Test Report

FCC ID: 2AECXRRF-S2

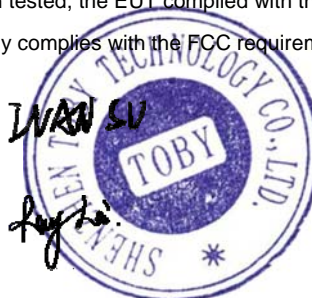
Original Grant

Report No. : TB-FCC143407
Applicant : Shenzhen Fourier Technology Co., LTD.
Equipment Under Test (EUT)
EUT Name : Runrunfast Smart Exercise Bike
Model No. : RRF-S2
Brand Name : runrunfast
Receipt Date : 2015-03-06
Test Date : 2015-03-06 to 2015-03-10
Issue Date : 2015-03-11
Standards : FCC Part 15: 2014, Subpart C(15.247)
Test Method : ANSI C63.4:2009
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 :



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 : Shenzhen Fourier Technology Co., LTD.
Address : 1068 Xueyuan avenue, Shenzhen, China
Manufacturer : Shanghai Meilide Fitness Equipment Co., LTD
Address : Great Wall economic development zone, Yongkang, Zhejiang, China

1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	Runrunfast Smart Exercise Bike	
Brand Name	:	runrunfast	
Model No.	:	RRF-S2	
Product Description	:	Operation Frequency: Bluetooth:2402~2480MHz	
		Number of Channel:	Bluetooth:79 Channels see note (2)
		Max Peak Output Power:	GFSK: -0.715dBm (Conducted Power)
		Antenna Gain:	0 dBi PCB Antenna
		Modulation Type:	GFSK 1Mbps(1 Mbps)
Power Supply	:	DC power by Power Bank	
Power Rating	:	Input: DC 5V Output: DC 5V	
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) This Test Report is FCC Part 15.247 for Bluetooth, and test procedure in accordance with Public Notice: DA 00-705.
- (3) Channel List:

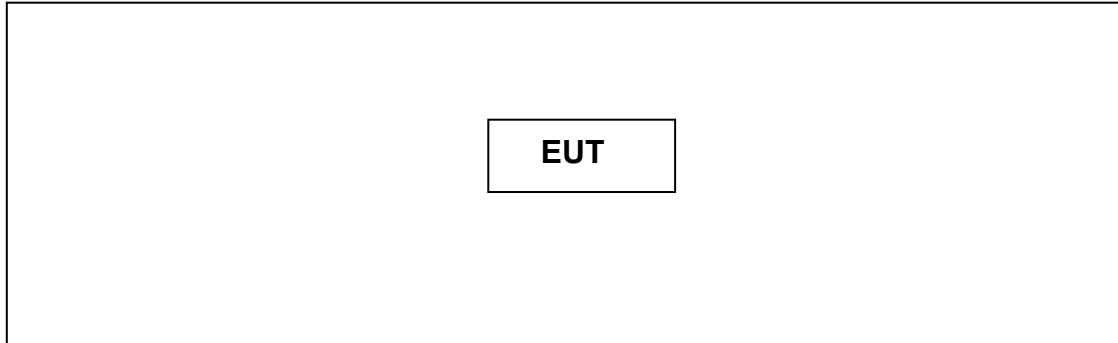
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462

07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		

(4) The Antenna information about the equipment is provided by the applicant.

1.3 Block Diagram Showing the Configuration of System Tested

TX Mode



1.4 Description of Support Units

Equipment Information				
Name	Model	FCC ID/DOC	Manufacturer	Used “√”

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 GFSK Mode

For Radiated Test	
Final Test Mode	Description
Mode 1	TX GFSK Mode
Mode 2	TX Mode(GFSK) Channel 00/39/78
Mode 5	Hopping Mode(GFSK)

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. We have pretested all the test mode above.

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 (1 Mbps)

TX Mode: 8-DPSK (3 Mbps)

- (2) 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 as the normal use. 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 Bluetooth mode.

Test Software Version	Broadcom BlueTool		
Frequency	2402 MHz	2441MHz	2480 MHz
GFSK	DEF	DEF	DEF

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)			
Standard Section	Test Item	Judgment	Remark
15.203	Antenna Requirement	PASS	N/A
15.207	Conducted Emission	N/A	N/A
15.205	Restricted Bands	PASS	N/A
15.247(a)(1)	Hopping Channel Separation	PASS	N/A
15.247(a)(1)	Dwell Time	PASS	N/A
15.247(b)(1)	Peak Output Power	PASS	N/A
15.247(b)(1)	Number of Hopping Frequency	PASS	N/A
15.247(c)	Radiated Spurious Emission	PASS	N/A
15.247(c)	Antenna Conducted Spurious Emission	PASS	N/A
15.247(a)	20dB Bandwidth	PASS	N/A
Note: N/A is an abbreviation for Not Applicable.			

3. Radiated Emission Test

3.1 Test Standard and Limit

3.1.1 Test Standard

FCC Part 15.209

3.1.2 Test Limit

Radiated Emission Limit (9 kHz~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)

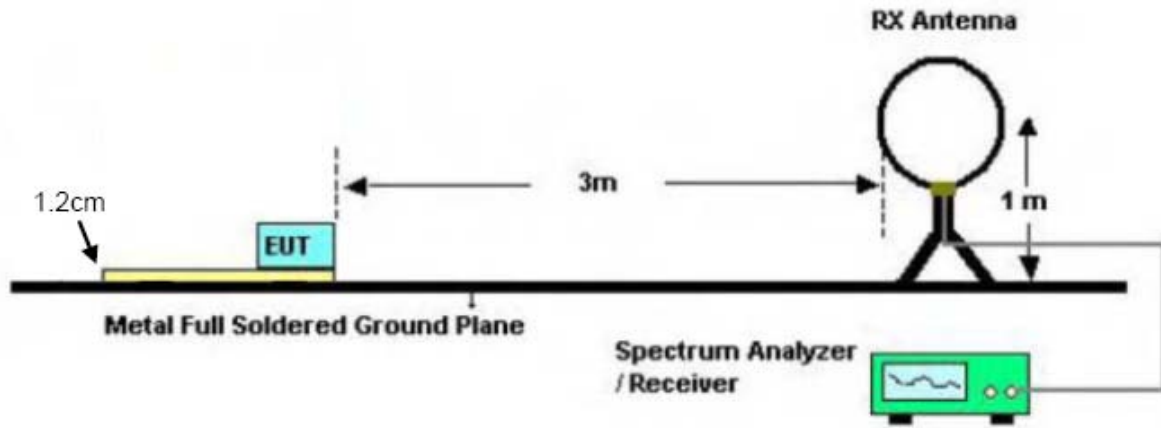
Frequency (MHz)	Class B (dBuV/m)(at 3m)	
	Peak	Average
Above 1000	74	54

Note:

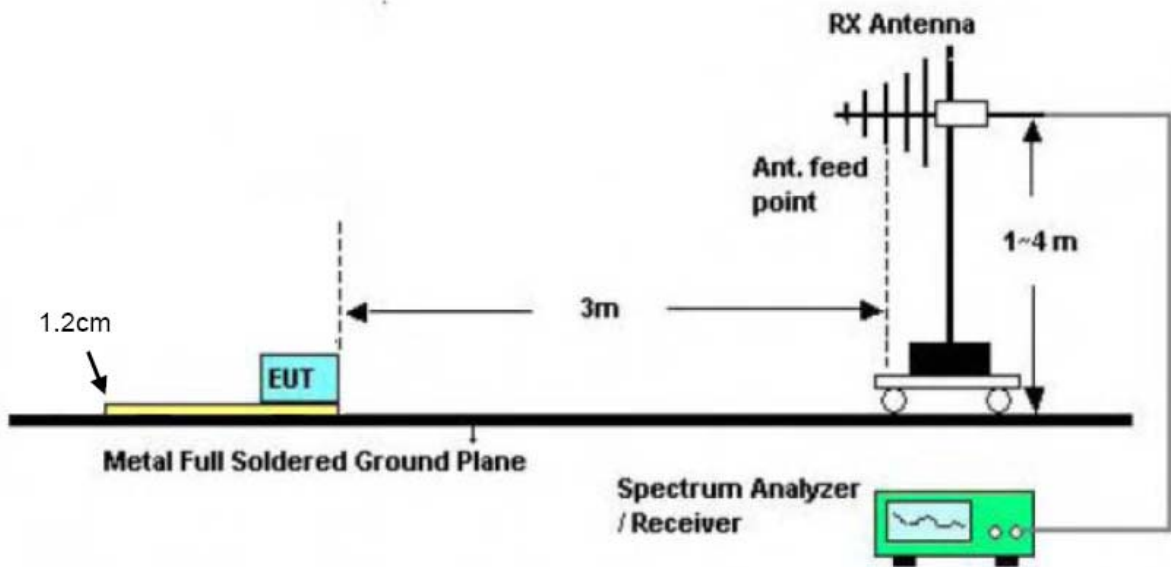
(1) The tighter limit applies at the band edges.

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

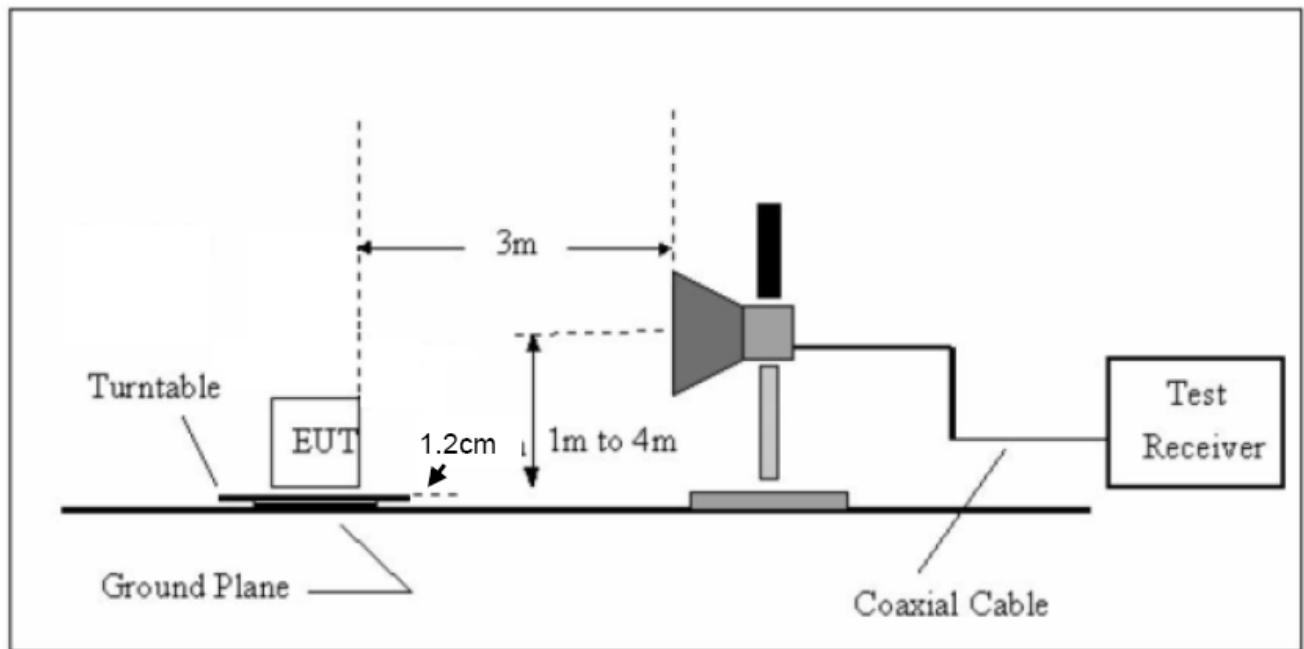
3.2 Test Setup



Bellow 30MHz Test Setup



Bellow 1000MHz Test Setup



Above 1GHz Test Setup

3.3 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 12mm 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.

3.4 EUT Operating Condition

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

3.5 Test Equipment

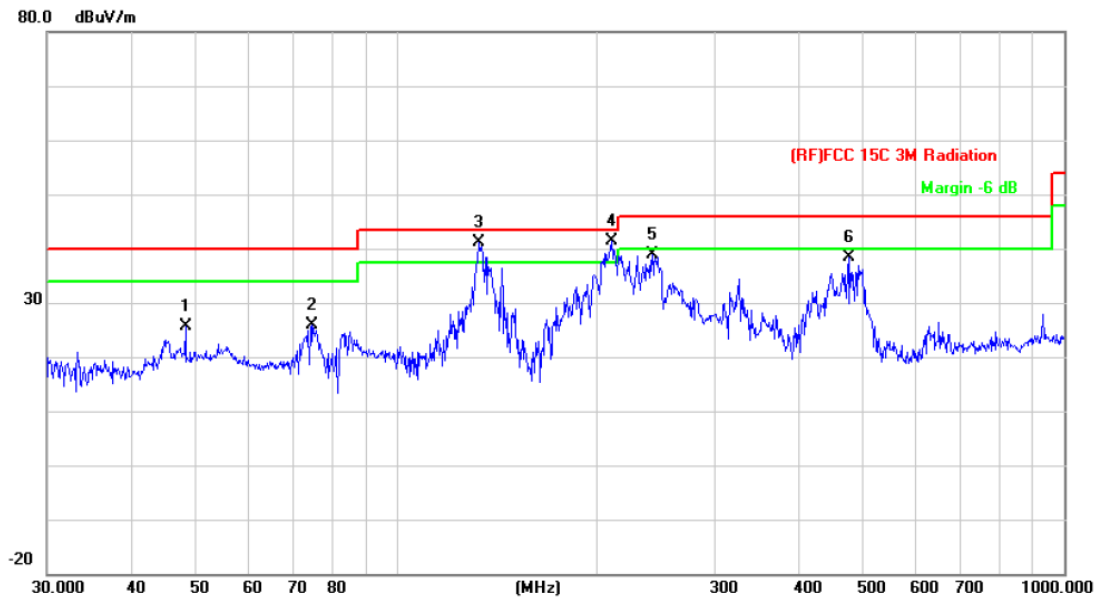
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Aug. 08, 2014	Aug.07, 2015
Spectrum Analyzer	Rohde & Schwarz	FSP30	DE25181	Aug. 08, 2014	Aug.07, 2015
EMI Test Receiver	Rohde & Schwarz	ESCI	101165	Aug. 08, 2014	Aug.07, 2015
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar. 06, 2015	Mar.05, 2016
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar. 06, 2015	Mar.05, 2016
Pre-amplifier	HP	11909A	185903	Mar. 06, 2015	Mar.05, 2016
Pre-amplifier	HP	8447B	3008A00849	Mar. 06, 2015	Mar.05, 2016
Cable	HUBER+SUHNER	100	SUCOFLEX	Mar. 06, 2015	Mar.05, 2016
Signal Generator	Rohde & Schwarz	SML03	IKW682-054	Feb. 10, 2015	Feb.09, 2016
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A

3.6 Test Data

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

Test data please refer the following pages.

EUT:	Runrunfast Smart Exercise Bike	Model Name :	RRF-S2
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 5V		
Ant. Pol.	Horizontal		
Test Mode:	TX GFSK Mode 2402MHz		
Remark:	Only worse case is reported		

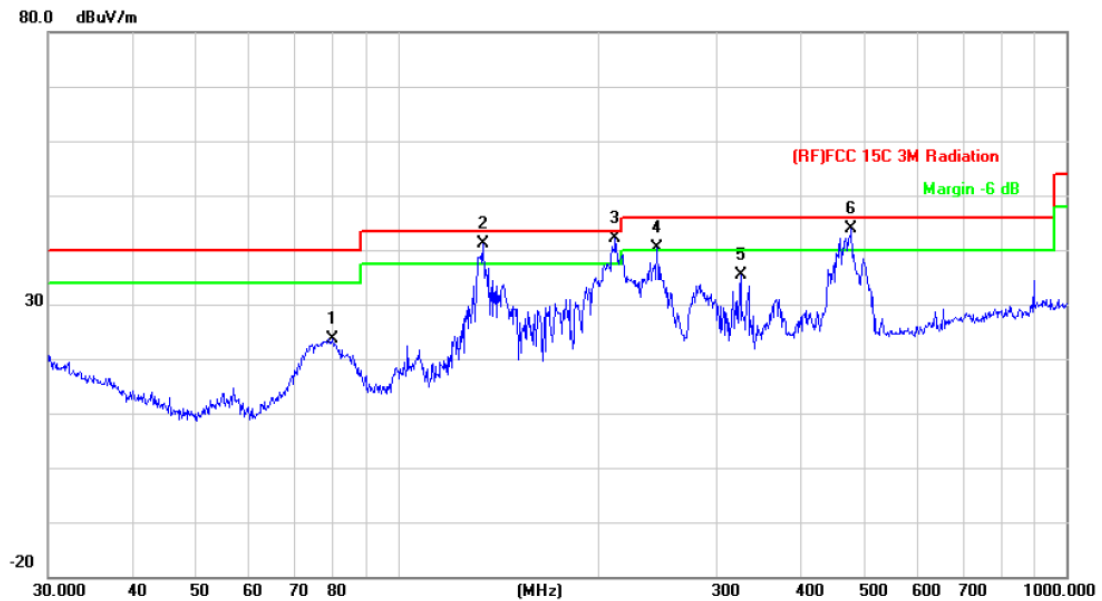


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		48.3318	49.42	-23.69	25.73	40.00	-14.27	peak
2		74.6568	49.28	-23.46	25.82	40.00	-14.18	peak
3	!	133.1511	63.17	-22.12	41.05	43.50	-2.45	peak
4	*	210.0482	61.46	-19.96	41.50	43.50	-2.00	peak
5		241.6761	57.43	-18.52	38.91	46.00	-7.09	peak
6		475.4990	50.01	-11.60	38.41	46.00	-7.59	peak

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

Emission Level= Read Level+ Correct Factor

EUT:	Runrunfast Smart Exercise Bike	Model Name :	RRF-S2
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 5V		
Ant. Pol.	Vertical		
Test Mode:	TX GFSK Mode 2402MHz		
Remark:	Only worse case is reported		

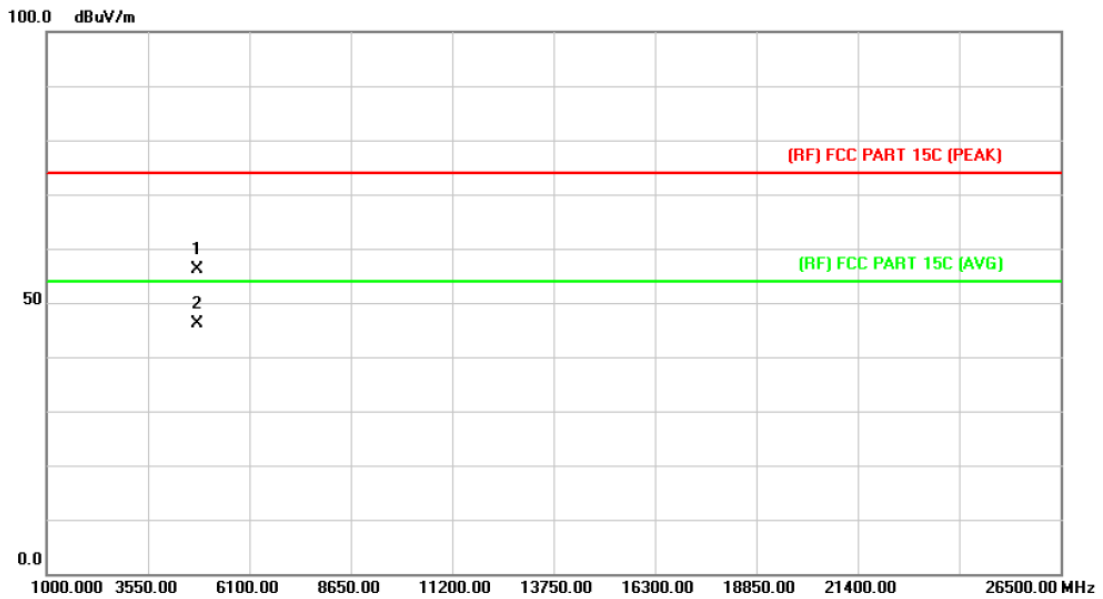


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		79.8002	46.87	-23.28	23.59	40.00	-16.41	peak
2	!	134.0882	63.12	-22.09	41.03	43.50	-2.47	peak
3	*	211.5263	61.98	-19.89	42.09	43.50	-1.41	peak
4	!	244.2321	58.67	-18.40	40.27	46.00	-5.73	peak
5		325.5957	51.44	-16.11	35.33	46.00	-10.67	peak
6	!	477.1693	55.37	-11.61	43.76	46.00	-2.24	peak

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

Emission Level= Read Level+ Correct Factor

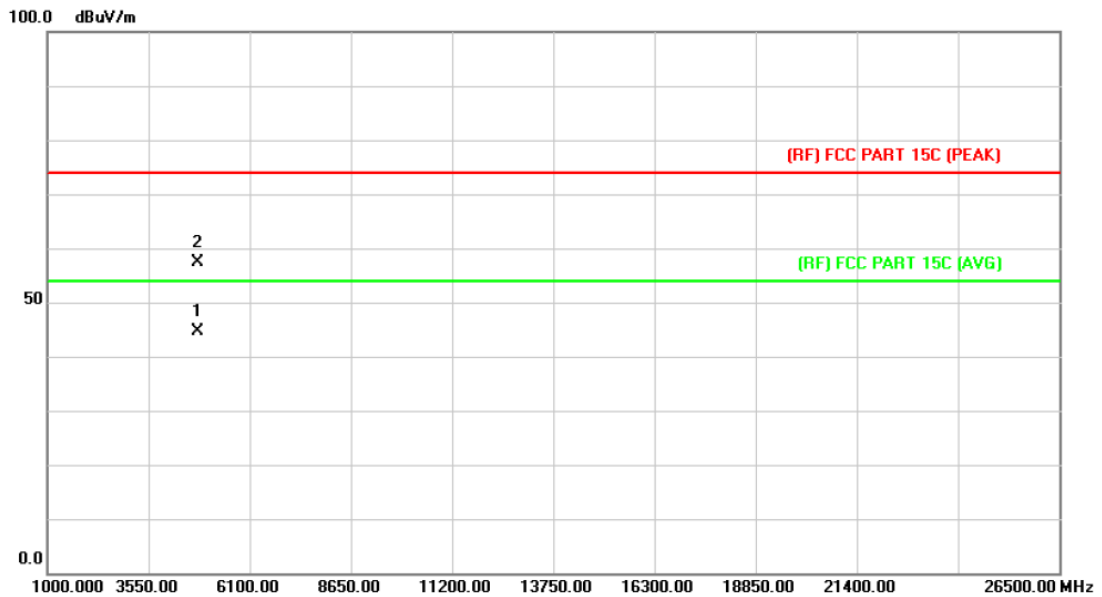
EUT:	Runrunfast Smart Exercise Bike	Model Name :	RRF-S2
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 5V		
Ant. Pol.	Horizontal		
Test Mode:	TX GFSK Mode 2402MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4803.908	42.74	13.44	56.18	74.00	-17.82	peak
2	*	4803.921	32.76	13.44	46.20	54.00	-7.80	AVG

Emission Level= Read Level+ Correct Factor

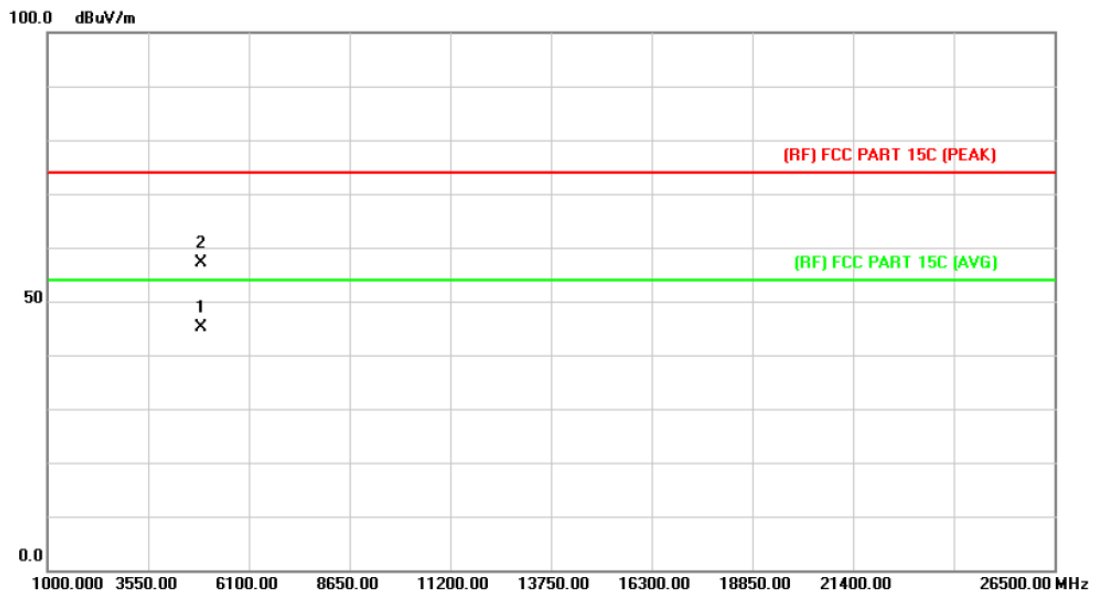
EUT:	Runrunfast Smart Exercise Bike	Model Name :	RRF-S2
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 5V		
Ant. Pol.	Vertical		
Test Mode:	TX GFSK Mode 2402MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4803.991	31.22	13.44	44.66	54.00	-9.34	AVG
2		4804.071	43.83	13.44	57.27	74.00	-16.73	peak

Emission Level= Read Level+ Correct Factor

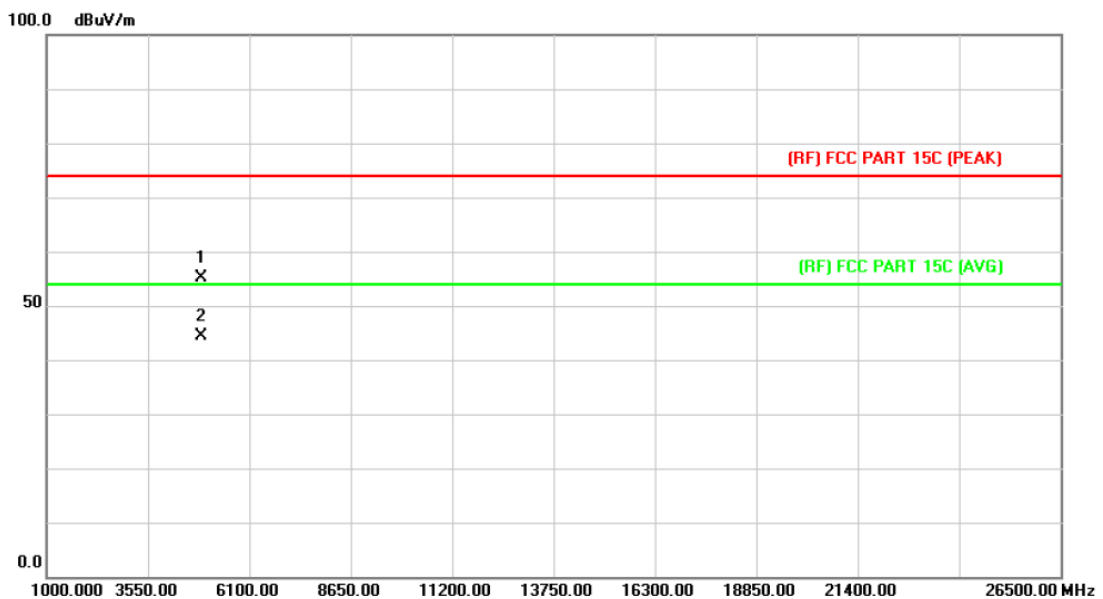
EUT:	Runrunfast Smart Exercise Bike	Model Name :	RRF-S2
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 5V		
Ant. Pol.	Horizontal		
Test Mode:	TX GFSK Mode 2441MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4882.021	31.35	13.90	45.25	54.00	-8.75	AVG
2		4882.024	43.11	13.90	57.01	74.00	-16.99	peak

Emission Level= Read Level+ Correct Factor

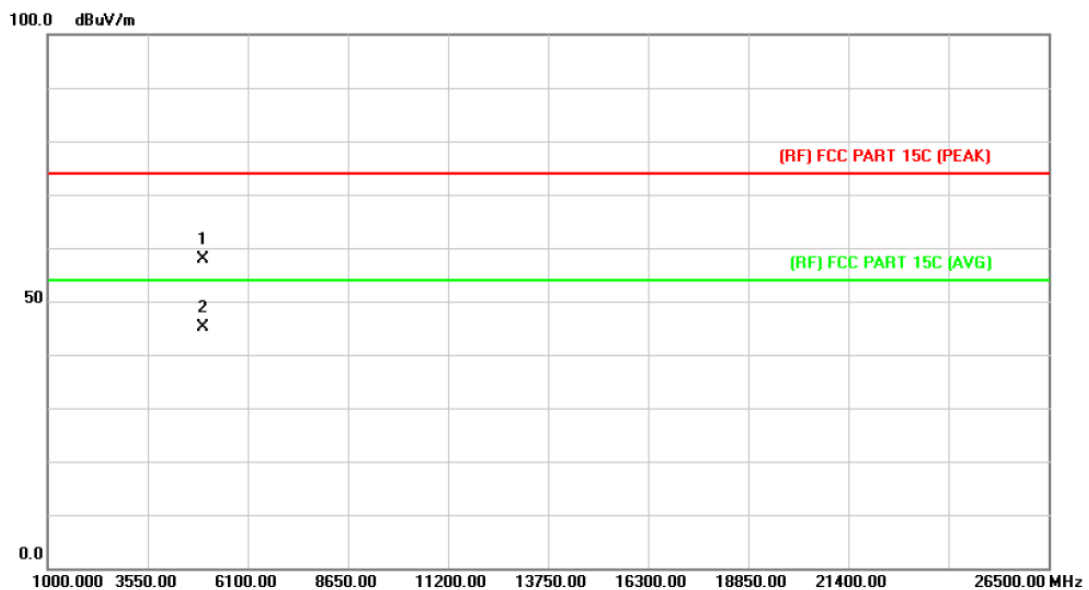
EUT:	Runrunfast Smart Exercise Bike	Model Name :	RRF-S2
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 5V		
Ant. Pol.	Vertical		
Test Mode:	TX GFSK Mode 2441MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4882.011	41.23	13.90	55.13	74.00	-18.87	peak
2	*	4882.011	30.56	13.90	44.46	54.00	-9.54	AVG

Emission Level= Read Level+ Correct Factor

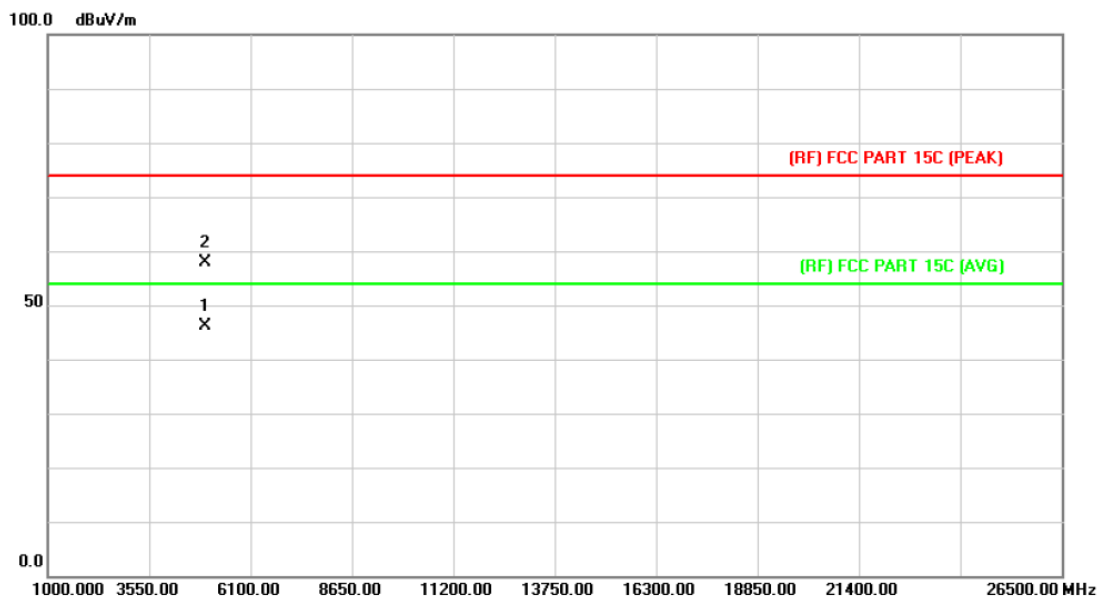
EUT:	Runrunfast Smart Exercise Bike	Model Name :	RRF-S2
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 5V		
Ant. Pol.	Horizontal		
Test Mode:	TX GFSK Mode 2480MHz		
Remark:	No report for the emission which more than 10 dB below the prescribed limit.		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4960.081	43.59	14.36	57.95	74.00	-16.05	peak
2	*	4960.117	30.89	14.36	45.25	54.00	-8.75	AVG

Emission Level= Read Level+ Correct Factor

EUT:	Runrunfast Smart Exercise Bike	Model Name :	RRF-S2
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 5V		
Ant. Pol.	Vertical		
Test Mode:	TX GFSK Mode 2480MHz		
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	*	4959.999	31.65	14.36	46.01	54.00	-7.99	AVG
2		4960.008	43.46	14.36	57.82	74.00	-16.18	peak

Emission Level= Read Level+ Correct Factor

4. Restricted Bands Requirement

4.1 Test Standard and Limit

4.1.1 Test Standard

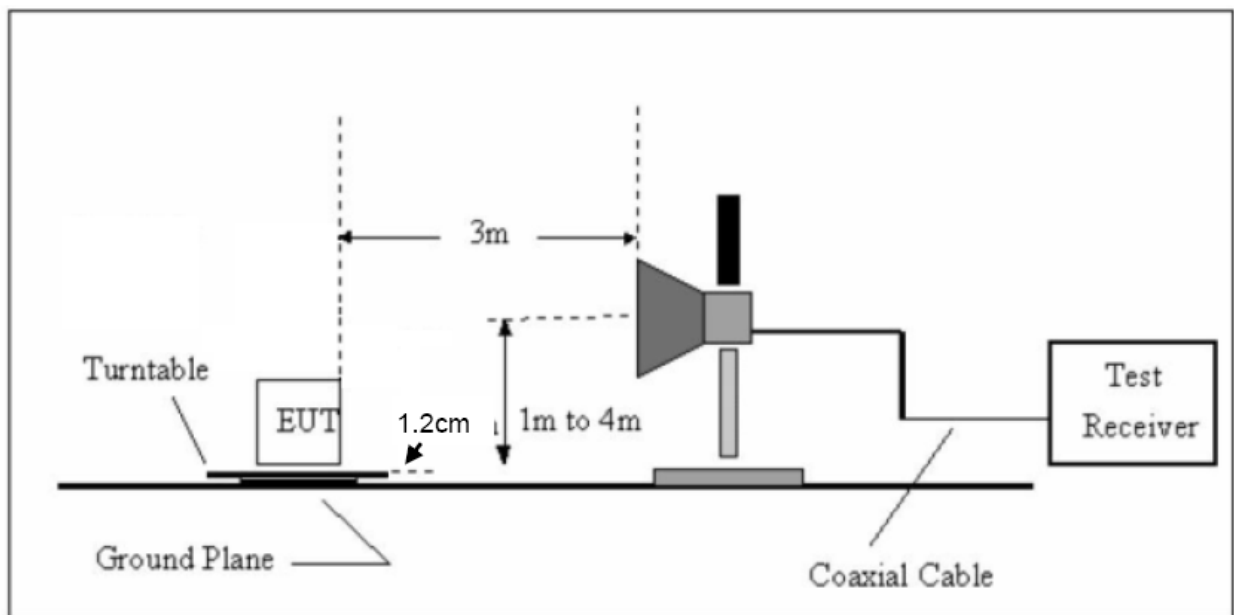
FCC Part 15.209

FCC Part 15.205

4.1.2 Test Limit

Restricted Frequency Band (MHz)	Class B (dBuV/m)(at 3m)	
	Peak	Average
2310 ~2390	74	54
2483.5 ~2500	74	54
Note: All restriction bands have been tested, only the worst case is reported.		

4.2 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 12mm 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 Equipment Under Test was set to Continual Transmitting in maximum power.

4.5 Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Aug. 08, 2014	Aug. 07, 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. 06, 2015	Mar.05, 2016
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar. 06, 2015	Mar.05, 2016
Pre-amplifier	HP	11909A	185903	Mar. 06, 2015	Mar.05, 2016
Pre-amplifier	HP	8447B	3008A00849	Mar. 06, 2015	Mar.05, 2016
Cable	HUBER+SUHNE R	100	SUCOFLEX	Mar. 06, 2015	Mar.05, 2016
Signal Generator	Rohde & Schwarz	SML03	IKW682-054	Feb. 10, 2015	Feb.09, 2016
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A

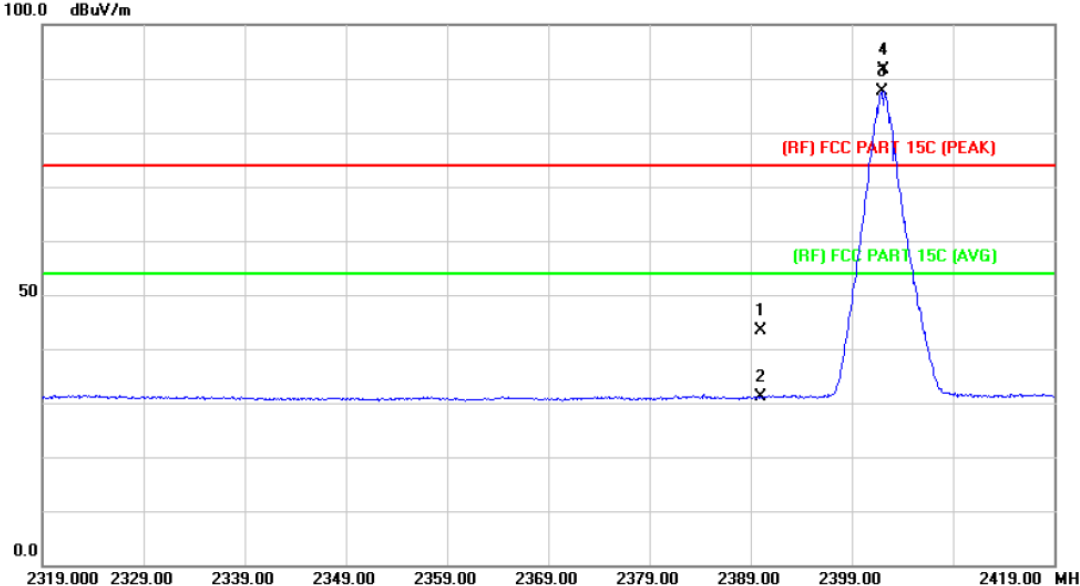
4.6 Test Data

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

All restriction bands have been tested, only the worst case is reported.

(1) Radiation Test

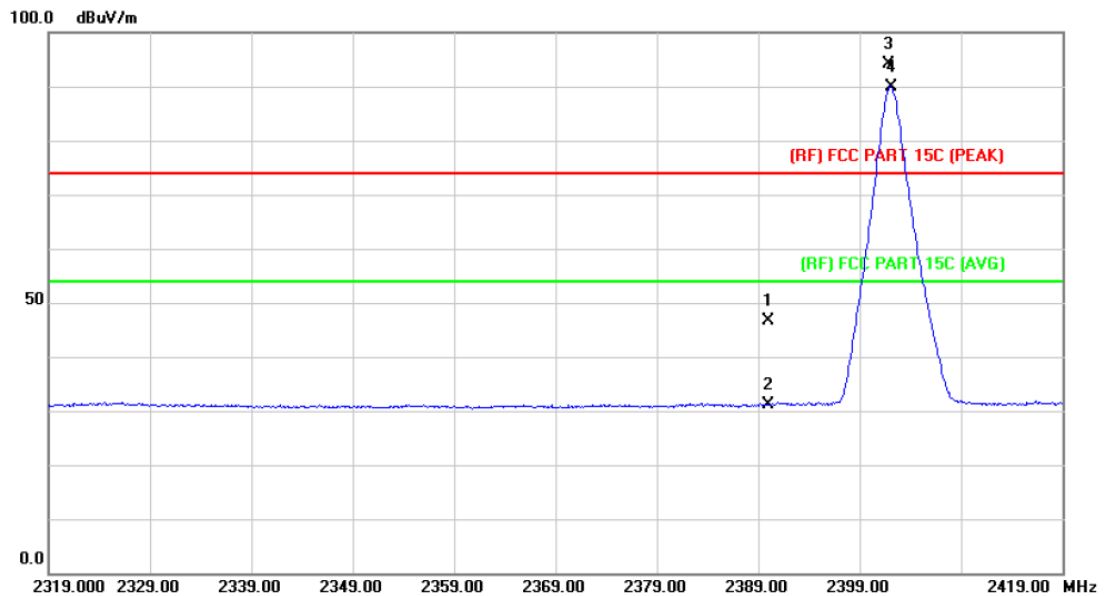
EUT:	Runrunfast Smart Exercise Bike	Model Name :	RRF-S2
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 5V		
Ant. Pol.	Horizontal		
Test Mode:	TX GFSK Mode 2402MHz		
Remark:	N/A		

100.0 dBuV/m


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB Detector
1		2390.000	42.64	0.77	43.41	74.00	-30.59 peak
2		2390.000	30.33	0.77	31.10	54.00	-22.90 AVG
3	*	2402.000	86.87	0.82	87.69	Fundamental Frequency AVG	
4	X	2402.200	90.89	0.82	91.71	Fundamental Frequency peak	

Emission Level= Read Level+ Correct Factor

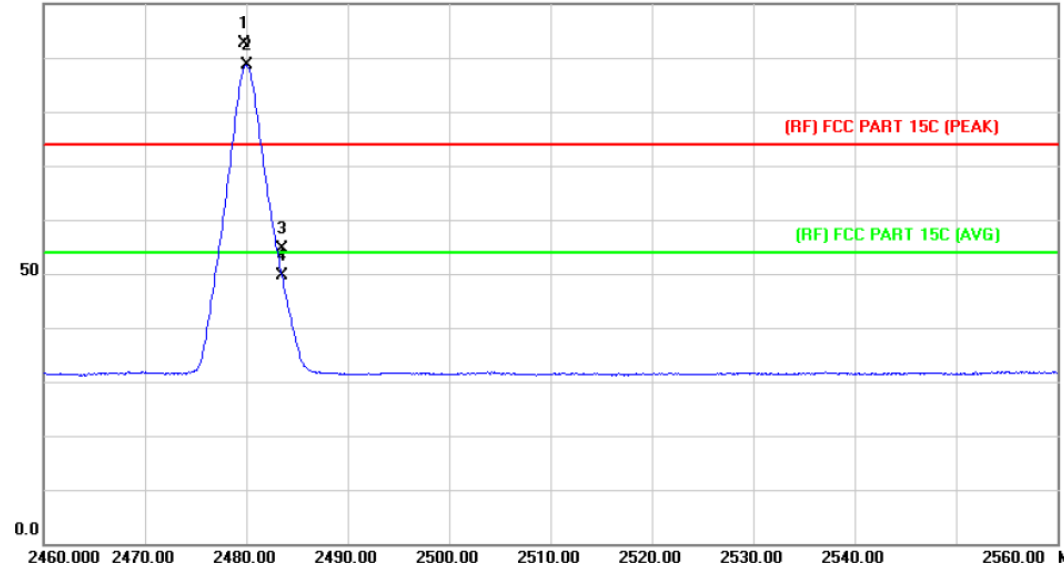
EUT:	Runrunfast Smart Exercise Bike	Model Name :	RRF-S2
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 5V		
Ant. Pol.	Vertical		
Test Mode:	TX GFSK Mode 2402MHz		
Remark:	N/A		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB Detector
1		2390.000	45.79	0.77	46.56	74.00	-27.44 peak
2		2390.000	30.46	0.77	31.23	54.00	-22.77 AVG
3	X	2401.900	93.26	0.82	94.08	Fundamental Frequency peak	
4	*	2402.100	89.13	0.82	89.95	Fundamental Frequency AVG	

Emission Level= Read Level+ Correct Factor

EUT:	Runrunfast Smart Exercise Bike	Model Name :	RRF-S2
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 5V		
Ant. Pol.	Horizontal		
Test Mode:	TX GFSK Mode 2480 MHz		
Remark:	N/A		

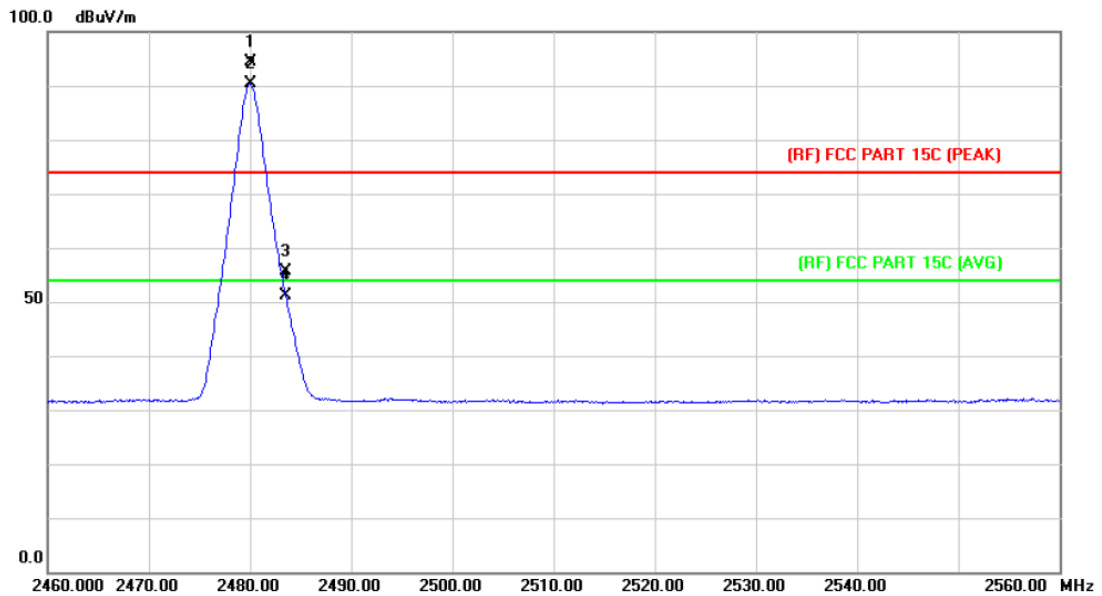
100.0 dBuV/m


0.0
2460.00 2470.00 2480.00 2490.00 2500.00 2510.00 2520.00 2530.00 2540.00 2560.00 MHz

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB Detector
1	X	2479.800	91.40	1.15	92.55	Fundamental Frequency	peak
2	*	2480.000	87.51	1.15	88.66	Fundamental Frequency	AVG
3		2483.500	53.36	1.17	54.53	74.00	-19.47 peak
4		2483.500	48.46	1.17	49.63	54.00	-4.37 AVG

Emission Level= Read Level+ Correct Factor

EUT:	Runrunfast Smart Exercise Bike	Model Name :	RRF-S2
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 5V		
Ant. Pol.	Vertical		
Test Mode:	TX GFSK Mode 2480 MHz		
Remark:	N/A		

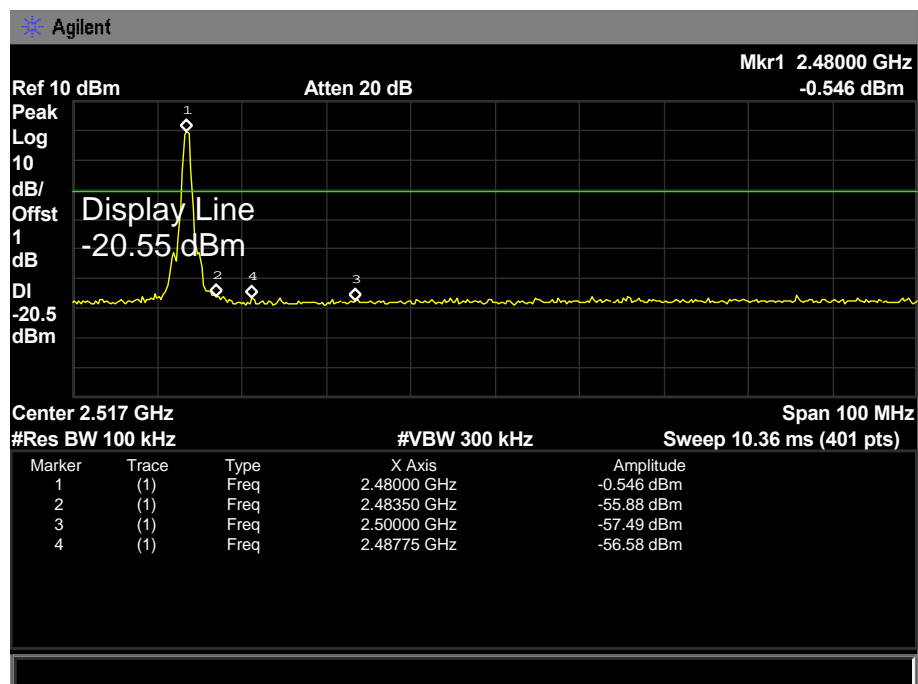
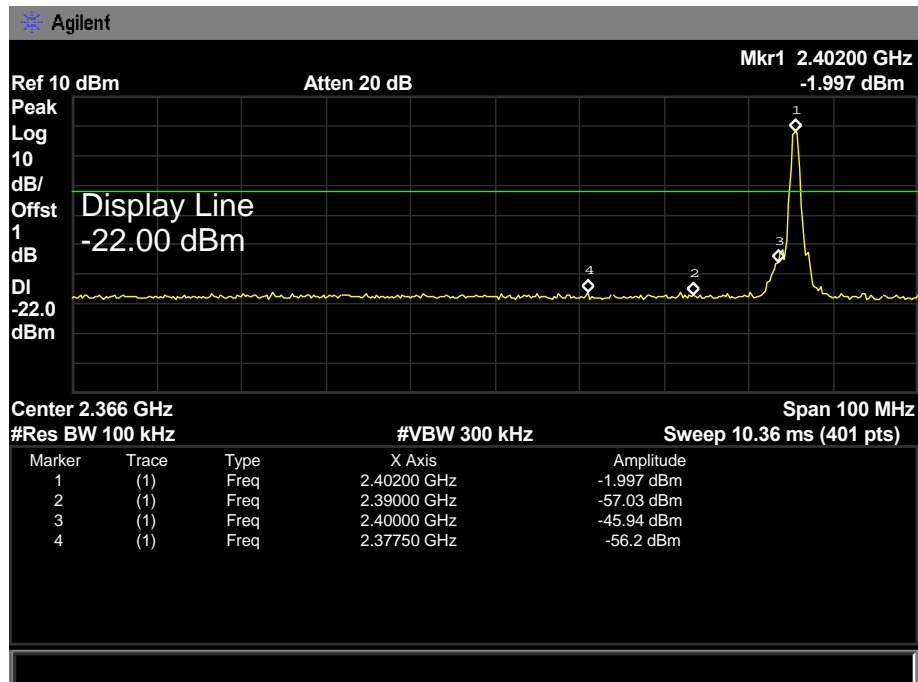


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	X	2480.000	93.12	1.15	94.27	Fundamental Frequency		peak
2	*	2480.000	89.14	1.15	90.29	Fundamental Frequency		AVG
3		2483.500	54.47	1.17	55.64	74.00	-18.36	peak
4		2483.500	49.93	1.17	51.10	54.00	-2.90	AVG

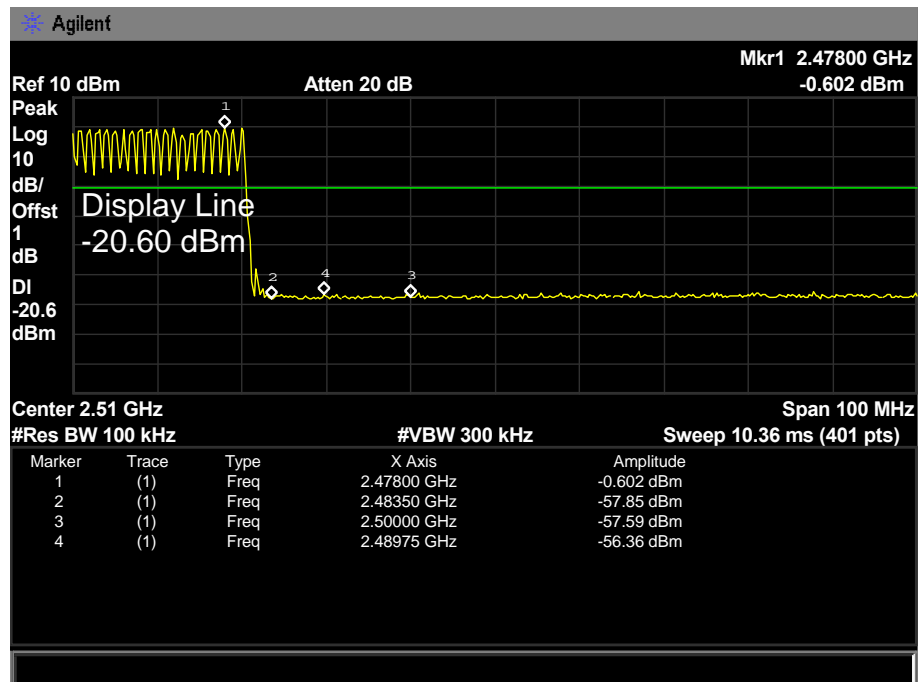
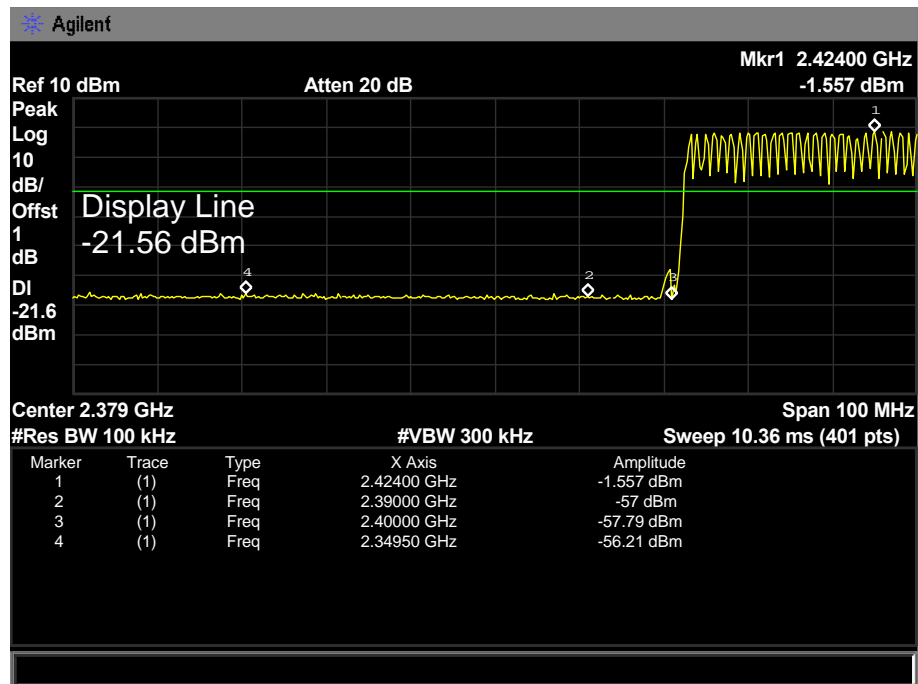
Emission Level= Read Level+ Correct Factor

(1) Conducted Test

EUT:	Runrunfast Smart Exercise Bike	Model Name :	RRF-S2
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 5V		
Test Mode:	TX GFSK Mode 2402MHz / 2480 MHz		
Remark:	N/A		



EUT:	Runrunfast Smart Exercise Bike	Model Name :	RRF-S2
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 5V		
Test Mode:	GFSK Hopping Mode		
Remark:	N/A		



5. Number of Hopping Channel

5.1 Test Standard and Limit

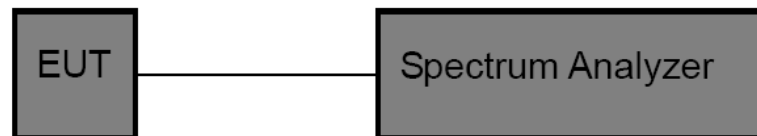
5.1.1 Test Standard

FCC Part 15.247 (a)(1)

5.1.2 Test Limit

Section	Test Item	Limit
15.247	Number of Hopping Channel	>15

5.2 Test Setup



5.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting: RBW=100 KHz, VBW=100 KHz, Sweep time= Auto.

5.4 EUT Operating Condition

The EUT was set to the Hopping Mode by the Customer.

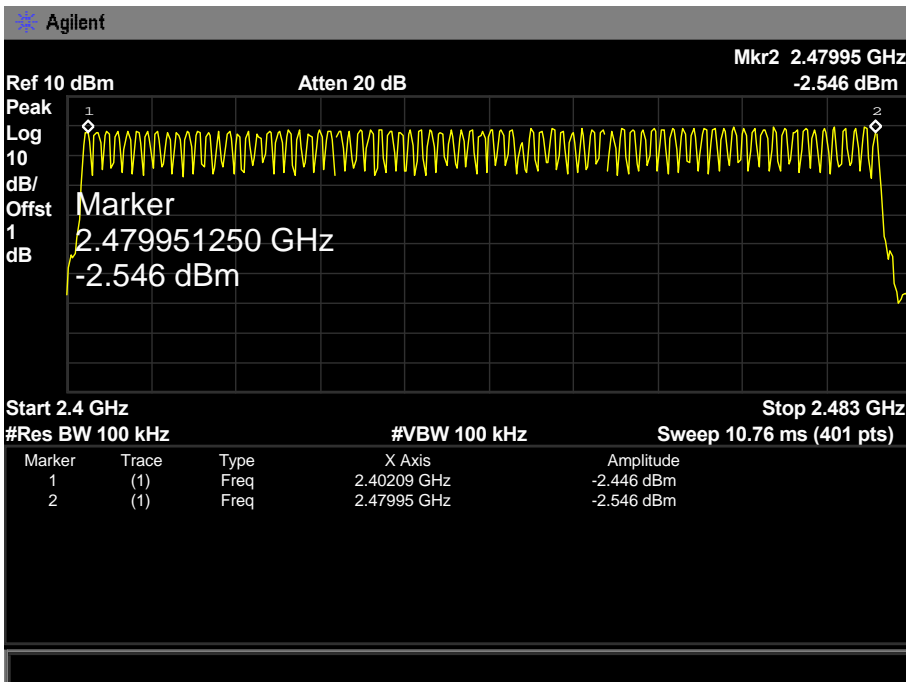
5.5 Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Aug. 08, 2014	Aug. 07, 2015

5.6 Test Data

EUT:	Runrunfast Smart Exercise Bike	Model Name :	RRF-S2
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 5V		
Test Mode:	Hopping Mode (GFSK)		
Frequency Range		Quantity of Hopping Channel	Limit
2402MHz~2480MHz		79	>15

GFSK Mode



Agilent

Ref 10 dBm Atten 20 dB Mkr2 2.47995 GHz -2.546 dBm

Peak Log 10 dB/Offst 1 dB

Marker 2.479951250 GHz -2.546 dBm

Start 2.4 GHz Stop 2.483 GHz

#Res BW 100 kHz #VBW 100 kHz Sweep 10.76 ms (401 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.40209 GHz	-2.446 dBm
2	(1)	Freq	2.47995 GHz	-2.546 dBm

6. Average Time of OcCupancy

6.1 Test Standard and Limit

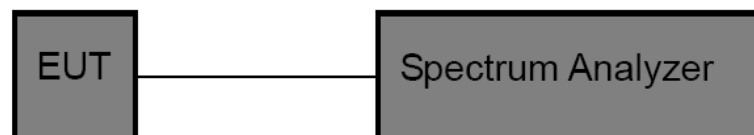
6.1.1 Test Standard

FCC Part 15.247 (a)(1)

6.1.2 Test Limit

Section	Test Item	Limit
15.247(a)(1)/ RSS-210 Annex 8(A8.1d)	Average Time of OcCupancy	0.4 sec

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) Spectrum Setting: RBW=1MHz, VBW=1MHz.
- (3) Use video trigger with the trigger level set to enable triggering only on full pulses.
- (4) Sweep Time is more than once pulse time.
- (5) Set the center frequency on any frequency would be measure and set the frequency span to zero.
- (6) Measure the maximum time duration of one single pulse.
- (7) Set the EUT for packet transmitting.
- (8) Measure the maximum time duration of one single pulse.

6.4 EUT Operating Condition

The EUT was set to the Hopping Mode by the Customer.

6.5 Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Aug. 08, 2014	Aug. 07, 2015

6.6 Test Data

EUT:	Runrunfast Smart Exercise Bike		Model Name :	RRF-S2	
Temperature:	25 °C		Relative Humidity:	55%	
Test Voltage:	DC 5V				
Test Mode:	Hopping Mode (GFSK DH1)				
Channel (MHz)	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
2402	0.480	153.60	31.60	400	PASS
2441	0.470	150.40			
2480	0.470	150.40			

GFSK Hopping Mode DH1

2402 MHz

Agilent

Ref 10 dBm

Atten 20 dB

Mkr1 Δ 480 μs
-1.742 dB

Peak
Log
10
dB/
Offst
1
dB

Marker Δ
480.000000 μs
-1.742 dB

W1 S2
S3 FS
AA

Center 2.402 GHz

Res BW 1 MHz

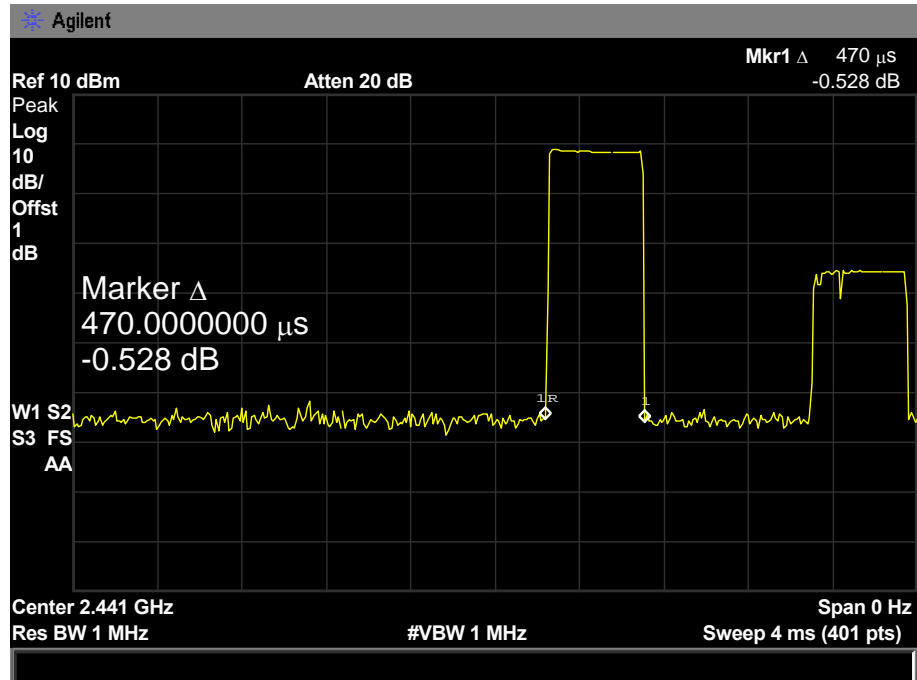
#VBW 1 MHz

Span 0 Hz

Sweep 4 ms (401 pts)

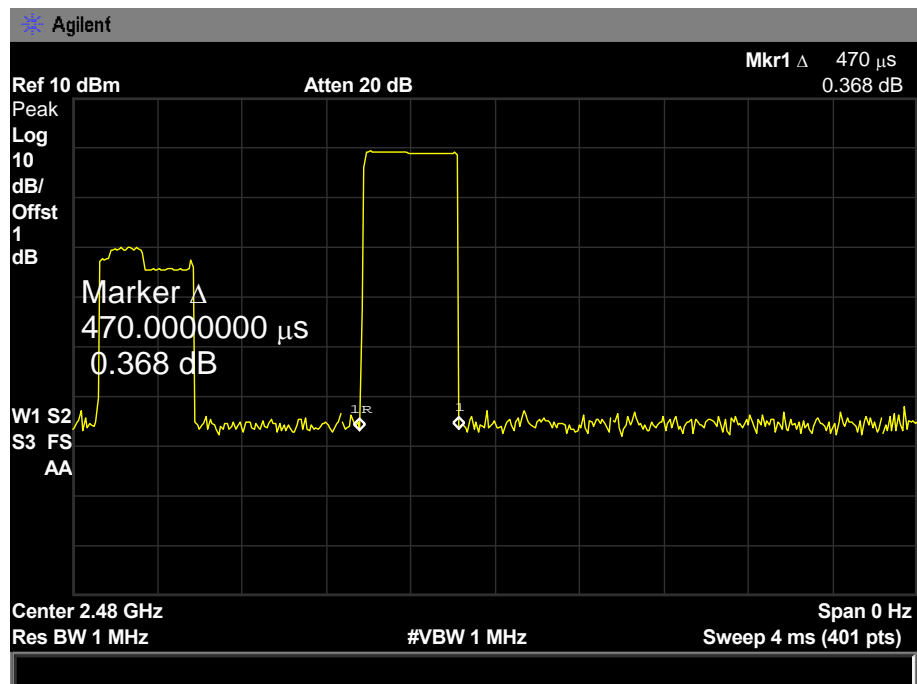
GFSK Hopping Mode DH1

2441 MHz



GFSK Hopping Mode DH1

2480 MHz



EUT:	Runrunfast Smart Exercise Bike		Model Name :	RRF-S2	
Temperature:	25 °C		Relative Humidity:	55%	
Test Voltage:	DC 5V				
Test Mode:	Hopping Mode (GFSK DH3)				
Channel (MHz)	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
2402	1.740	278.40	31.60	400	PASS
2441	1.740	278.40			
2480	1.740	278.40			

GFSK Hopping Mode DH3

2402 MHz

Agilent

Ref 10 dBm

Atten 20 dB

Mkr1 Δ 1.74 ms
-1.843 dB

Peak Log 10 dB/Offst 1 dB

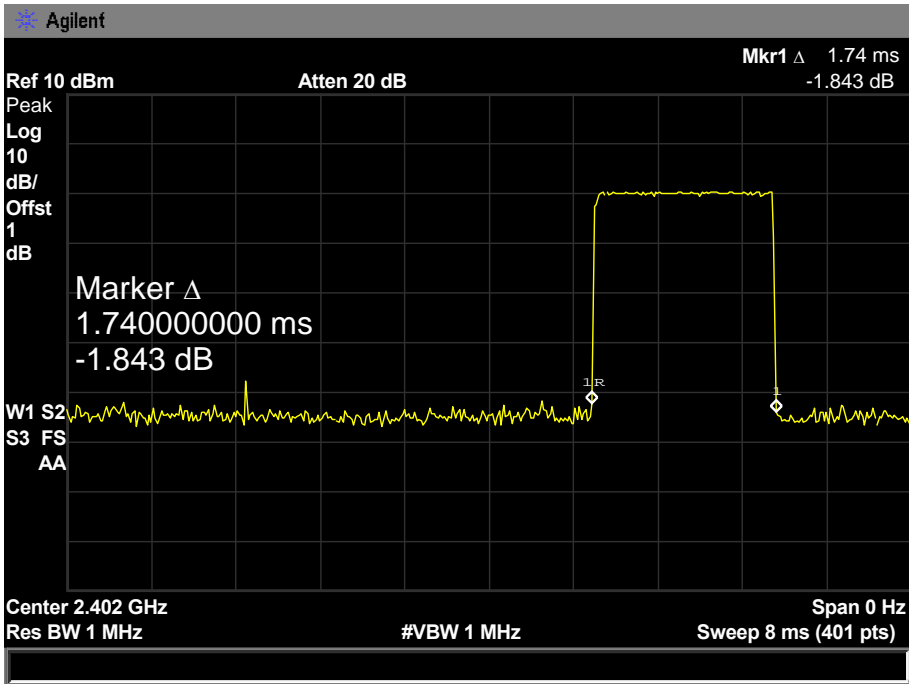
Marker Δ 1.740000000 ms
-1.843 dB

W1 S2
S3 FS
AA

Center 2.402 GHz
Res BW 1 MHz

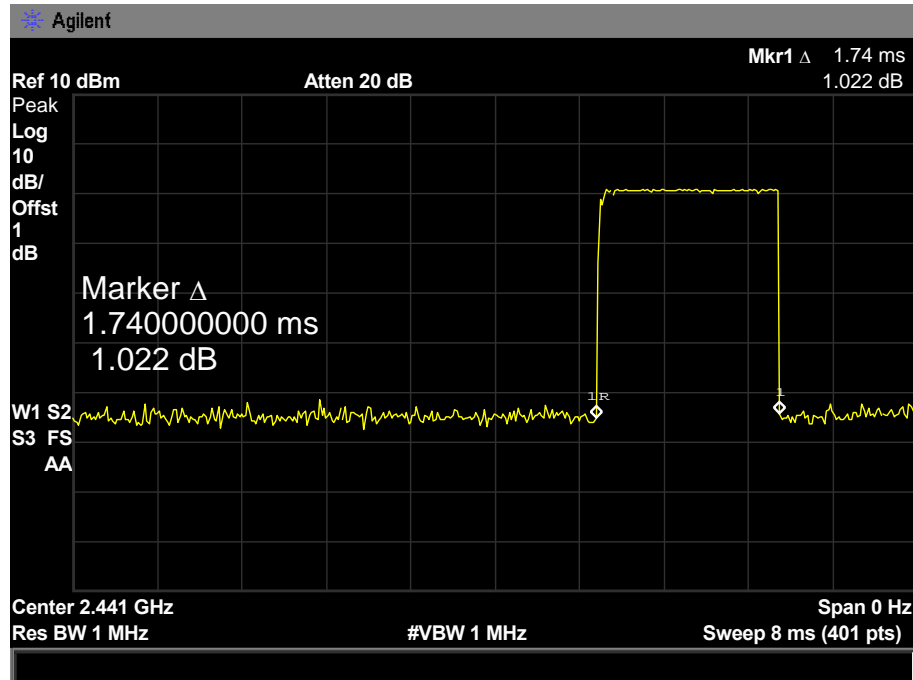
#VBW 1 MHz

Span 0 Hz
Sweep 8 ms (401 pts)



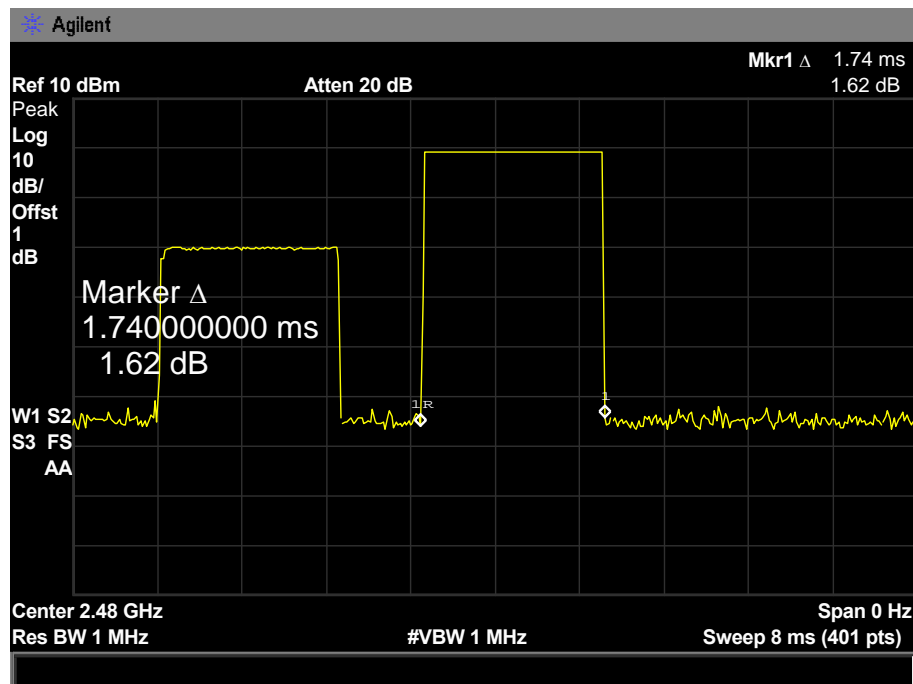
GFSK Hopping Mode DH3

2441 MHz



GFSK Hopping Mode DH3

2480 MHz



EUT:	Runrunfast Smart Exercise Bike		Model Name :	RRF-S2	
Temperature:	25 °C		Relative Humidity:	55%	
Test Voltage:	DC 5V				
Test Mode:	Hopping Mode (GFSK DH5)				
Channel (MHz)	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
2402	3.000	320.00	31.60	400	PASS
2441	3.000	320.00			
2480	3.000	320.00			

GFSK Hopping Mode DH5

2402 MHz

Agilent

Ref 10 dBm

Atten 20 dB

Mkr1 Δ 3 ms -0.189 dB

Peak

Log

10

dB/

Offst

1

dB

Marker Δ 3.000000000 ms -0.189 dB

W1 S2

S3 FS

AA

Center 2.402 GHz

Res BW 1 MHz

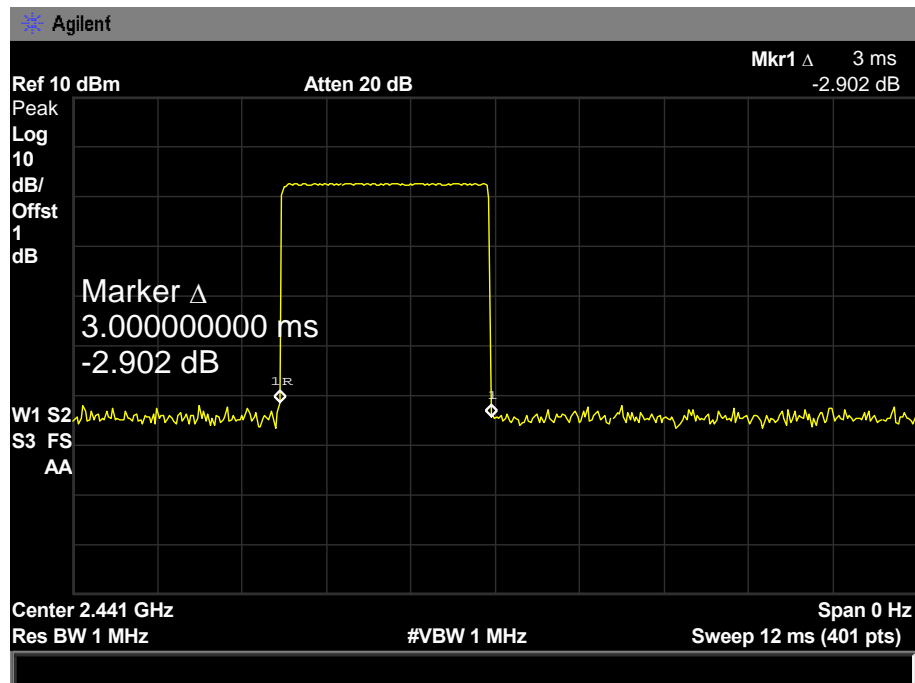
#VBW 1 MHz

Span 0 Hz

Sweep 12 ms (401 pts)

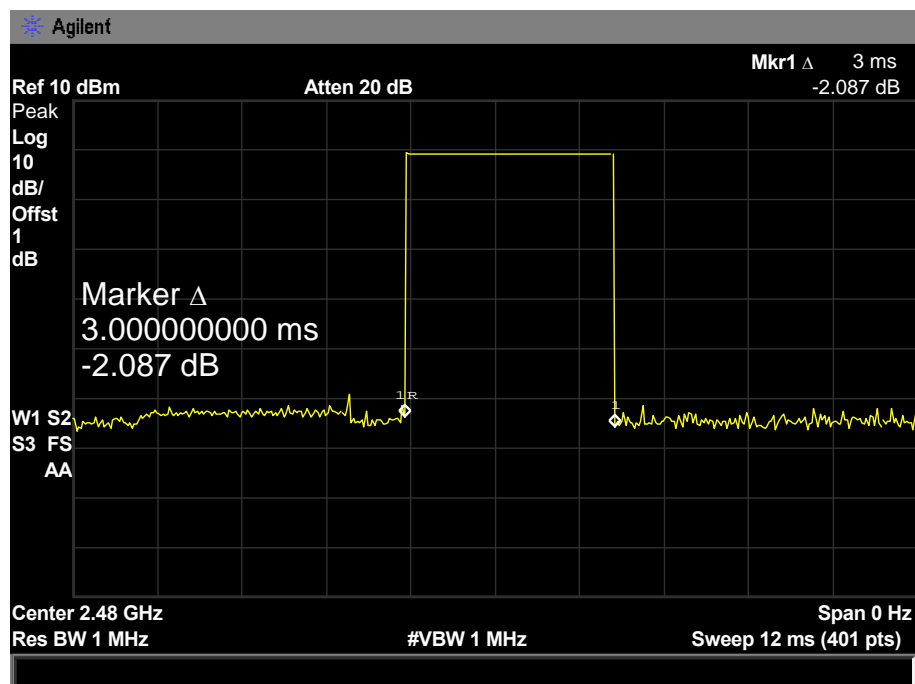
GFSK Hopping Mode DH5

2441 MHz



GFSK Hopping Mode DH5

2480 MHz



7. Channel Separation and Bandwidth Test

7.1 Test Standard and Limit

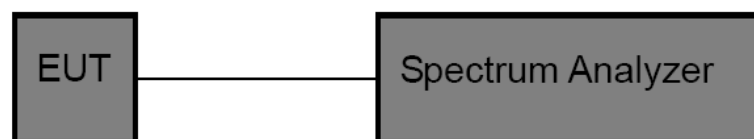
7.1.1 Test Standard

FCC Part 15.247

7.1.2 Test Limit

Test Item	Limit	Frequency Range(MHz)
Bandwidth	≤ 1 MHz (20dB bandwidth)	2400~2483.5
Channel Separation	>25 kHz or $>$ two-thirds of the 20 dB bandwidth Which is greater	2400~2483.5

7.2 Test Setup



7.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting:
Channel Separation: RBW=30 kHz, VBW=100 kHz.
Bandwidth: RBW=30 kHz, VBW=100 kHz.
- (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.
- (4) Measure the channel separation the spectrum analyzer was set to Resolution Bandwidth:30 kHz, and Video Bandwidth:100 kHz. Sweep Time set auto.

7.4 EUT Operating Condition

The EUT was set to the Hopping Mode for Channel Separation Test and continuously transmitting for the Bandwidth Test.

7.5 Test Equipment

Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Aug. 08, 2014	Aug. 07, 2015

7.6 Test Data

EUT:	Runrunfast Smart Exercise Bike	Model Name :	RRF-S2
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 5V		
Test Mode:	TX Mode (GFSK)		
Channel frequency (MHz)	99% OBW (kHz)	20dB Bandwidth (kHz)	20dB Bandwidth *2/3 (kHz)
2402	989.0899	1050.00	700.00
2441	984.5802	1047.00	698.00
2480	979.8630	1047.00	698.00

GFSK TX Mode

2402 MHz

Agilent

Ref 10 dBm

Atten 20 dB

#Peak

Log 10 dB/ Offst 1 dB

Center 2.402000000 GHz

Center 2.402 GHz

#Res BW 30 kHz

#VBW 100 kHz

Span 3 MHz

Sweep 5 ms (401 pts)

Occupied Bandwidth

989.0899 kHz

Occ BW % Pwr

x dB

99.00 %

-20.00 dB

Transmit Freq Error

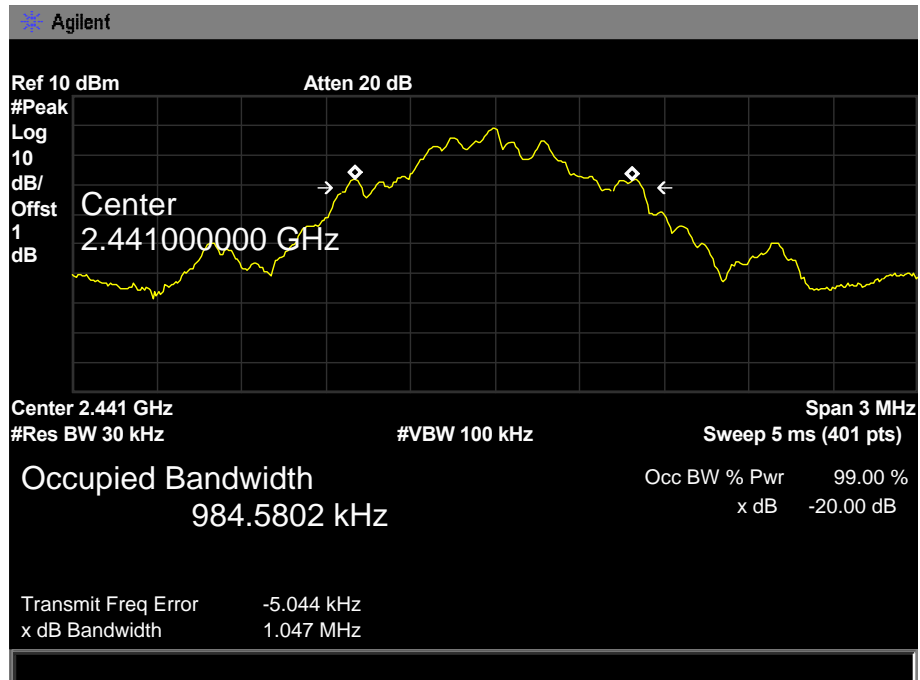
x dB Bandwidth

-6.023 kHz

1.050 MHz

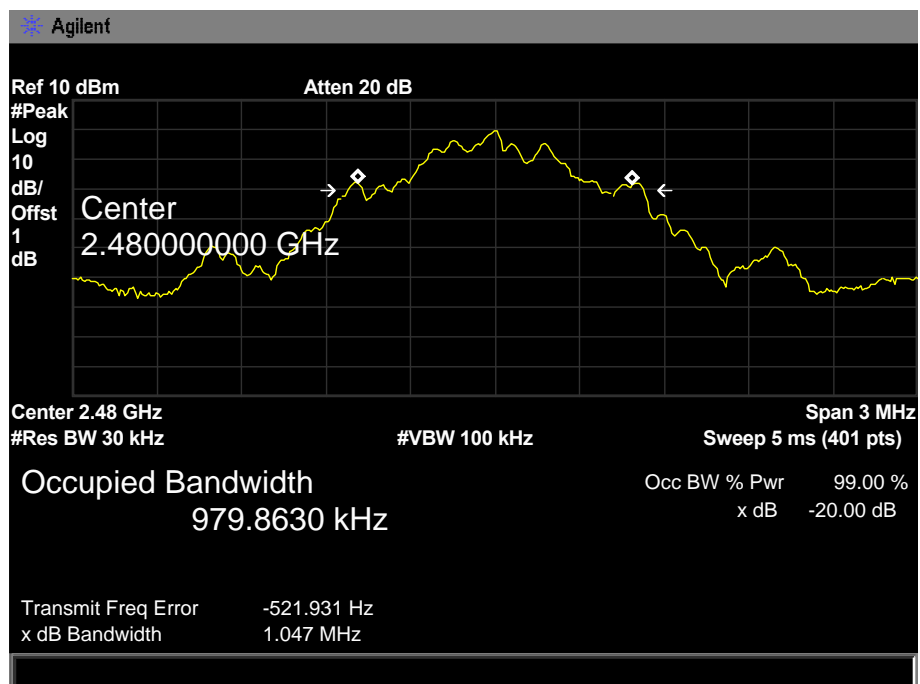
GFSK TX Mode

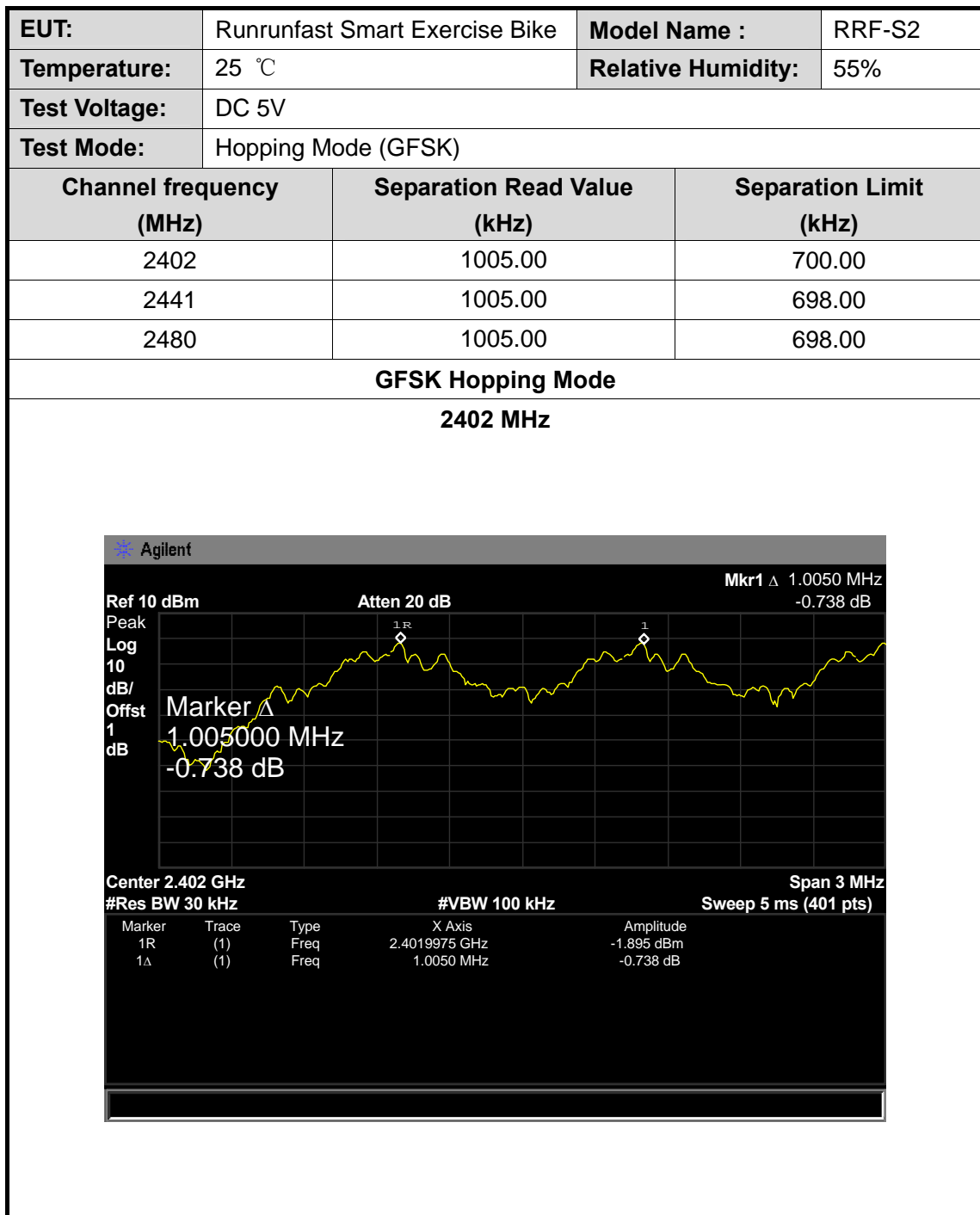
2441 MHz



GFSK TX Mode

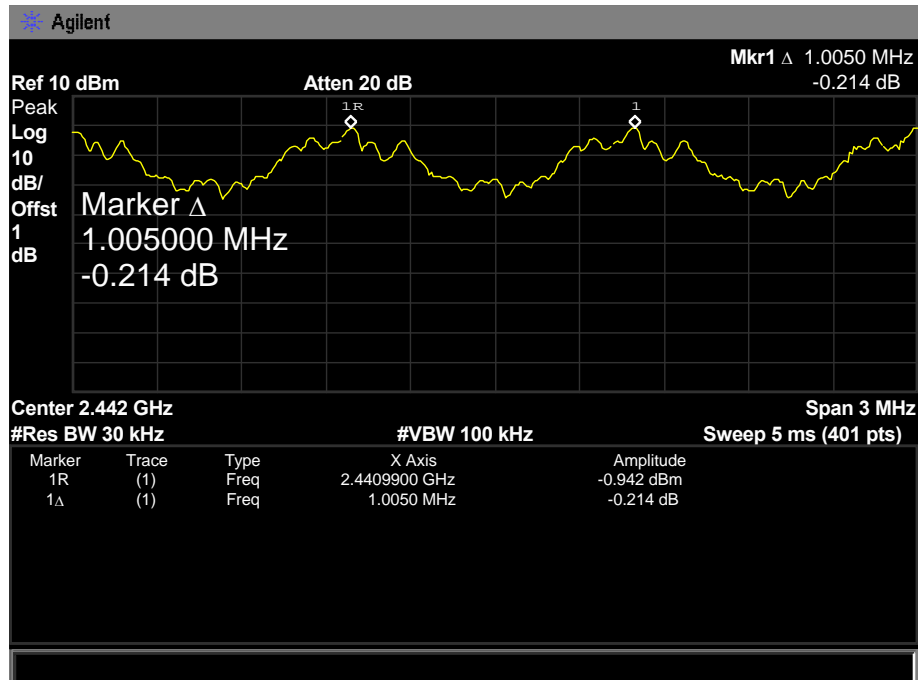
2480 MHz





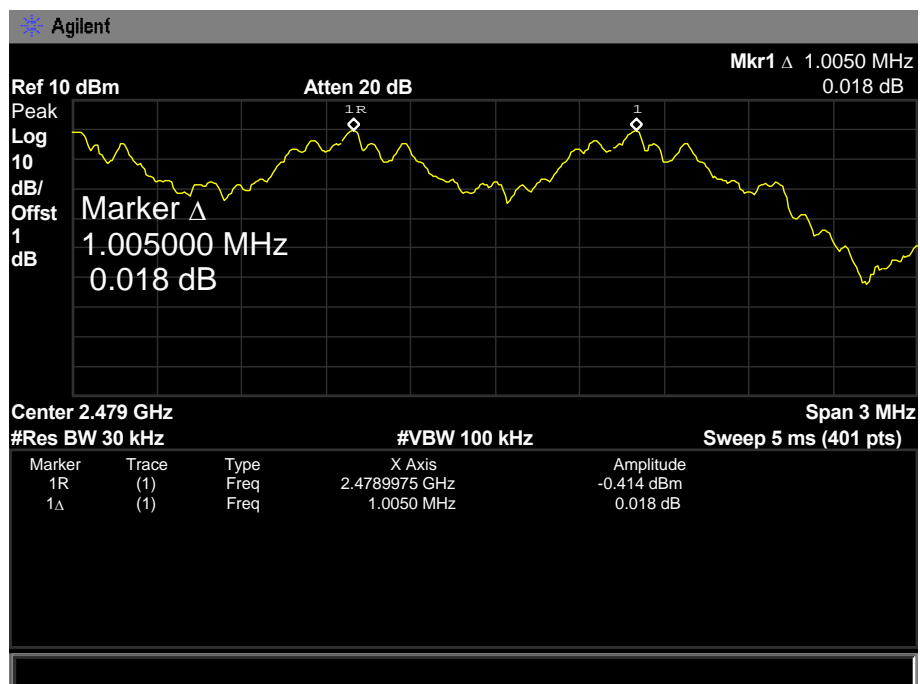
GFSK Hopping Mode

2441 MHz



GFSK Hopping Mode

2480 MHz



8. Peak Output Power Test

8.1 Test Standard and Limit

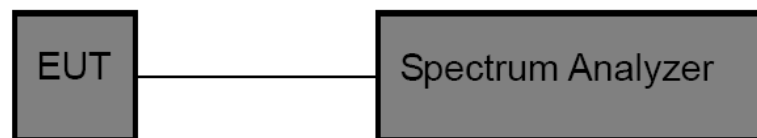
8.1.1 Test Standard

FCC Part 15.247 (b) (1)

8.1.2 Test Limit

Test Item	Limit	Frequency Range(MHz)
Peak Output Power	Hopping Channels>75 Power<1W(30dBm) Other <125 mW(21dBm)	2400~2483.5

8.2 Test Setup



8.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting:
Peak Detector: RBW=1 MHz, VBW=3 MHz for bandwidth less than 1MHz.
RBW=3 MHz, VBW=3 MHz for bandwidth more than 1MHz.

8.4 EUT Operating Condition

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

8.5 Test Equipment

Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Aug. 08, 2014	Aug. 07, 2015

8.6 Test Data

EUT:	Runrunfast Smart Exercise Bike	Model Name :	RRF-S2
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	DC 5V		
Test Mode:	TX Mode (GFSK)		
Channel frequency (MHz)	Test Result (dBm)	Limit (dBm)	
2402	-2.041	21	
2441	-1.261		
2480	-0.715		
GFSK TX Mode			
2402 MHz			

Agilent

Ref 10 dBm

Atten 20 dB

Mkr1 2.4021000 GHz
-2.041 dBm

Peak Log 10 dB/Offst 1 dB

Marker
2.402100000 GHz
-2.041 dBm

M1 S2
S3 FC
AA

Center 2.402 GHz

#Res BW 3 MHz

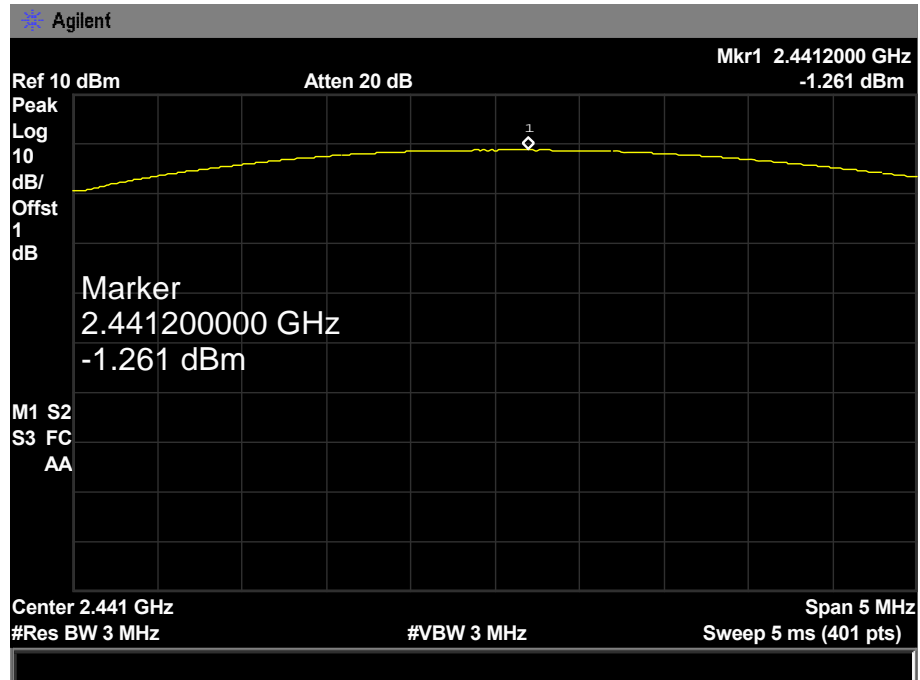
#VBW 3 MHz

Span 5 MHz

Sweep 5 ms (401 pts)

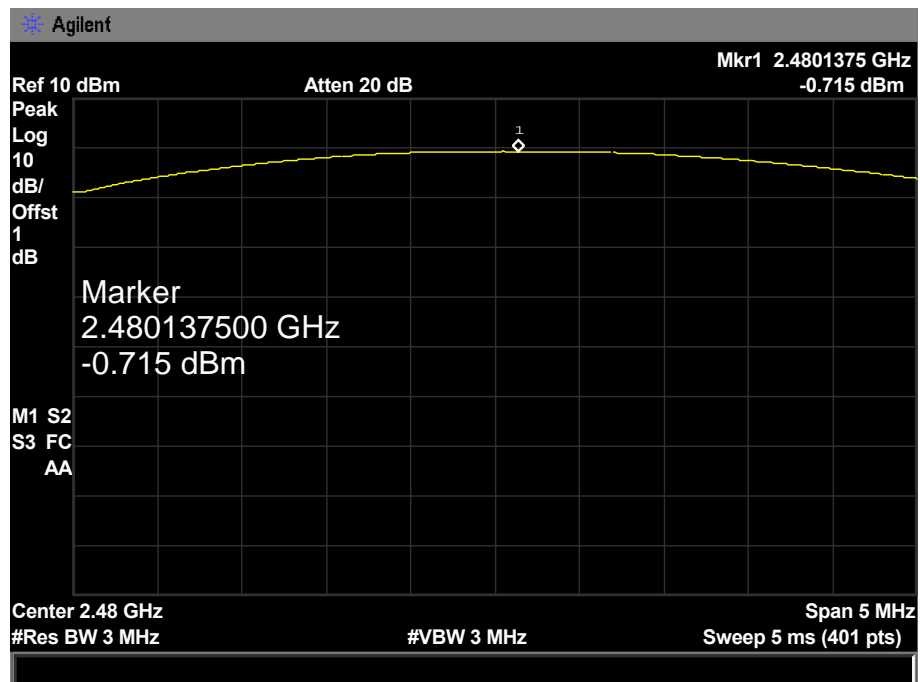
GFSK TX Mode

2441 MHz



GFSK TX Mode

2480 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 gain of the PCB antenna used for transmitting is 0 dBi. And the antenna connector is de-signed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

9.2 Result

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

Antenna Type
<input checked="" type="checkbox"/> Permanent attached antenna
<input type="checkbox"/> Unique connector antenna
<input type="checkbox"/> Professional installation antenna