



Product Service

FCC- TEST REPORT

Report Number : **68.760.12.284.01** Date of Issue: 25 December 2012

Model : **SZ2013 Expert**

Product Type : **Bicycle Computer**

Applicant : **Dayton Industrial Co., Ltd.**

Address : **2-12 Kwai Fat Road, 11-A Kwai Chung, New Territories,**
Hong Kong

Production Facility : **Kendy Enterprise Ltd.**

Address : **2-12 Kwai Fat Road, 11-A Kwai Chung, NT, Hong Kong**

Test Result : **Positive** **Negative**

Total pages including
Appendices : **25**

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Product Service

2 Details about the Test Laboratory

Details about the Test Laboratory

Test Site 1

Company name: Jiangsu TÜV Product Service Ltd. – Shenzhen Branch
6th Floor, H Hall,
Century Craftwork Culture Square,
No. 4001, Fuqiang Road,
Futian District 518048,
Shenzhen, P.R.C.

Telephone: 86 755 8828 6998
Fax: 86 755 8828 5299

Test Site 2

Company name: Audix Technology (shenzhen) Co., Ltd
Block Shenzhen, Science & Industry Park,
Nantou, Shenzhen,
Guangdong,
China

Telephone: 86 755 2663 9496
Fax: 86 755 2663 2877



3 Description of the Equipment Under Test

Description of the Equipment Under Test

Product: Bicycle Computer
Model no.: SZ2013 Expert
FCC ID: O4GSPPRO
Brand Name: Dayton
Options and accessories: NIL
Rating: 3.0VDC (Supplied by 1 piece of CR2032 battery)
RF Transmission Frequency: 2450-2457MHz
Total two frequencies: 2450MHz, 2457MHz
No. of Operated Channel: 2
Modulation: GFSK
Duty Cycle: 0.28%
Antenna Type: monopole antenna
Antenna Gain: 0dBi
Description of the EUT: 2.4GHz Low power communication device

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.(SHIELD)	S/N(LENGTH)
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Product Service

4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart C 10-1-2011 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

5 Summary of Test Results

Technical Requirements					
FCC Part 15 Subpart C					
Test Condition	Pages	Test Site	Test Result		
			Pass	Fail	N/A
15.207 Conducted Emission AC Power Port	---	Site 2	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
§15.205(a), §15.209(a), §15.249(a), §15.249(c) Field strength of emissions and Restricted bands	8	Site 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.249(d) Out of band emissions	16	Site 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.215(c) 20dB bandwidth	22	Site 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
§15.203 Antenna requirement	See note 1		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note 1: The EUT uses a integrated monopole antenna, the antenna gain is 0dBi, which in accordance to §15.203, is considered sufficient to comply with the provisions of this section.

6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: O4GSPPRO, which complies with Section 15.207, 15.209, 15.249 of the FCC Part 15, Subpart C Rules.

The SZ2013 Expert is a bicycle computer. The transceiver frequency is 2450MHz ~ 2457MHz.

SUMMARY:

All tests according to the regulations cited on page 5 were

■ - Performed

□ - **Not** Performed

The Equipment Under Test

■ - **Fulfills** the general approval requirements.

□ - **Does not** fulfill the general approval requirements.

Sample Received Date: 06 Nov. 2012

Testing Start Date: 10 Nov. 2012

Testing End Date: 20 Dec. 2012

- Jiangsu TÜV Product Service Ltd. – Shenzhen Branch -

Reviewed by:



Ken Li
EMC Project Manager

Prepared by:



Cookies Bu
EMC Project Engineer

Tested by:



Leo.Li
EMC Test Engineer

7 Technical Requirement

7.1 Field strength of emissions and Restricted bands

Test Method

- 1 The EUT is placed on a turntable, which is 0.8m above ground plane.
- 2 The turntable shall be rotated for 360 degrees to determine the position of maximum emission level
- 3 EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
- 4 The spectrum analyzer or receiver is set as:
Below 1000MHz: Quasi-Peak: RBW = 100 kHz / VBW = 300 kHz / Sweep = Auto
Above 1000MHz:
(1) Peak: RBW = 1MHz / VBW = 1MHz / Sweep = Auto
(2) Average: RBW = 1MHz / VBW = 10Hz / Sweep = Auto
- 5 Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 6 Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

Limits

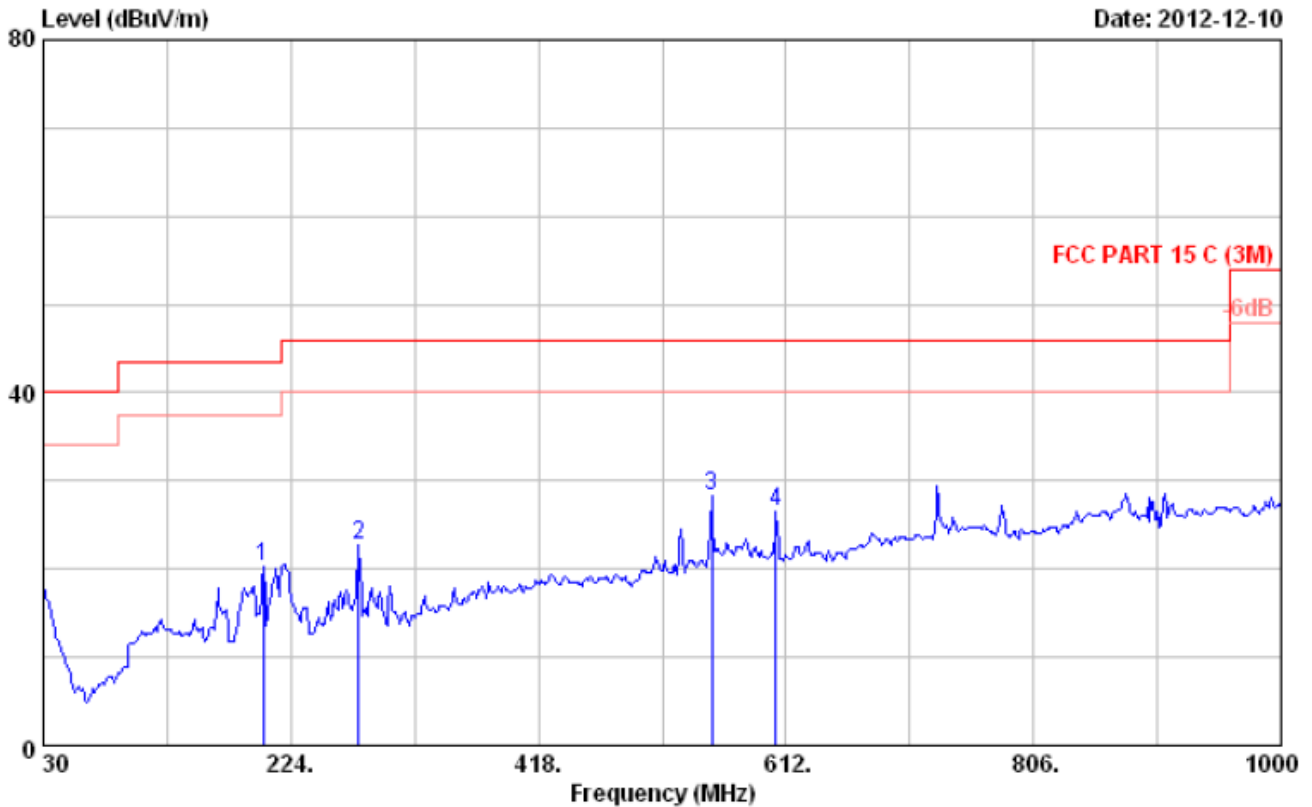
According to §15.249 (a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

According to §15.249 (c), Field strength limits are specified at a distance of 3 meters.
According to §15.249 (d), Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.
According to §15.205 Unwanted emissions falling into restricted bands in §15.205 (a) shall comply with the limits specified in §15.209

Field strength of emissions and Restricted bands

EUT: Bicycle Computer M/N: SZ2013 Expert
 Operating Condition: Tx
 Ant. Polarity: Vertical
 Comment: 30-1000MHz

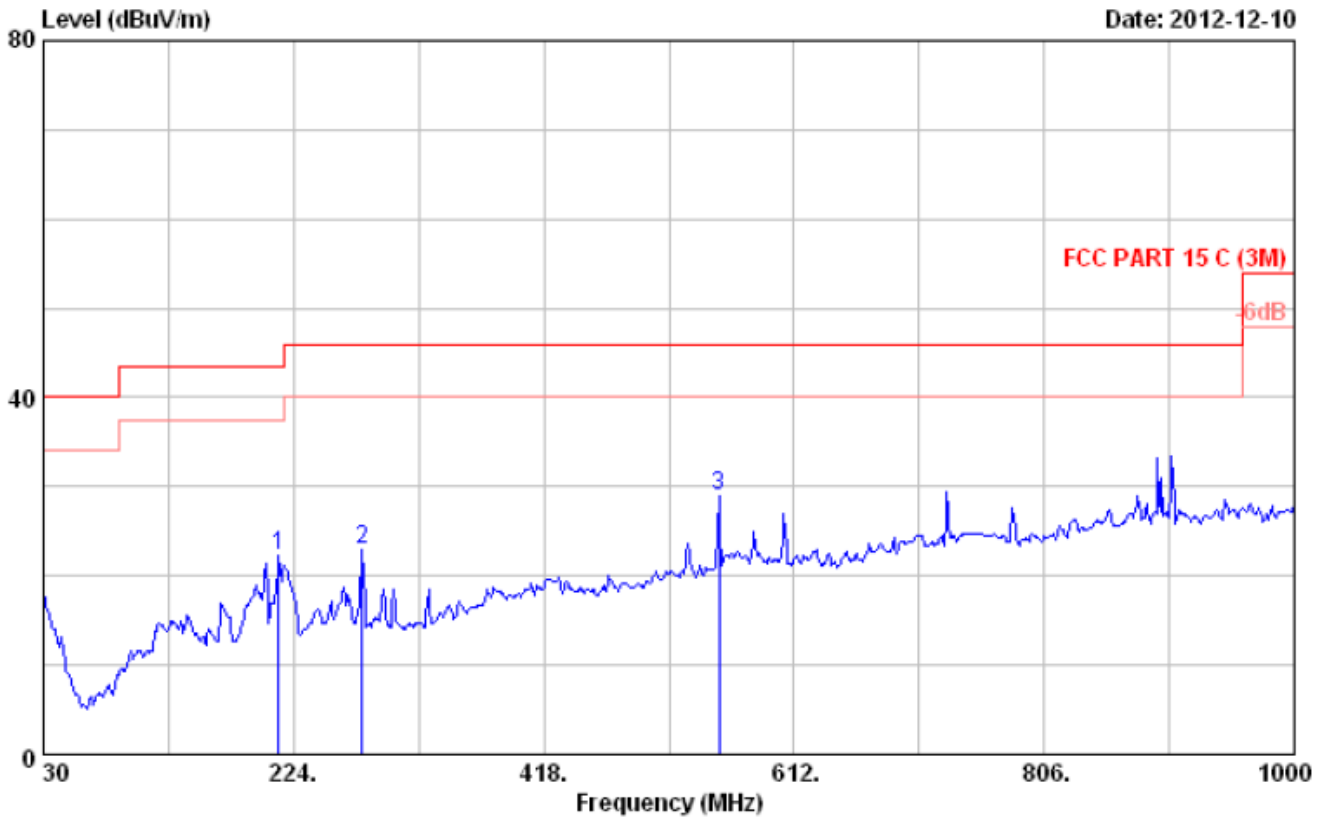


No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	202.660	9.58	1.08	37.25	20.30	43.50	23.20	Peak
2	277.350	13.21	1.23	35.66	22.74	46.00	23.26	Peak
3	553.800	19.35	1.99	35.47	28.26	46.00	17.74	Peak
4	604.240	20.27	2.13	32.80	26.61	46.00	19.39	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.

Field strength of emissions and Restricted bands

EUT: Bicycle Computer M/N: SZ2013 Expert
 Operating Condition: Tx
 Ant. Polarity: Horizontal
 Comment: 30-1000MHz

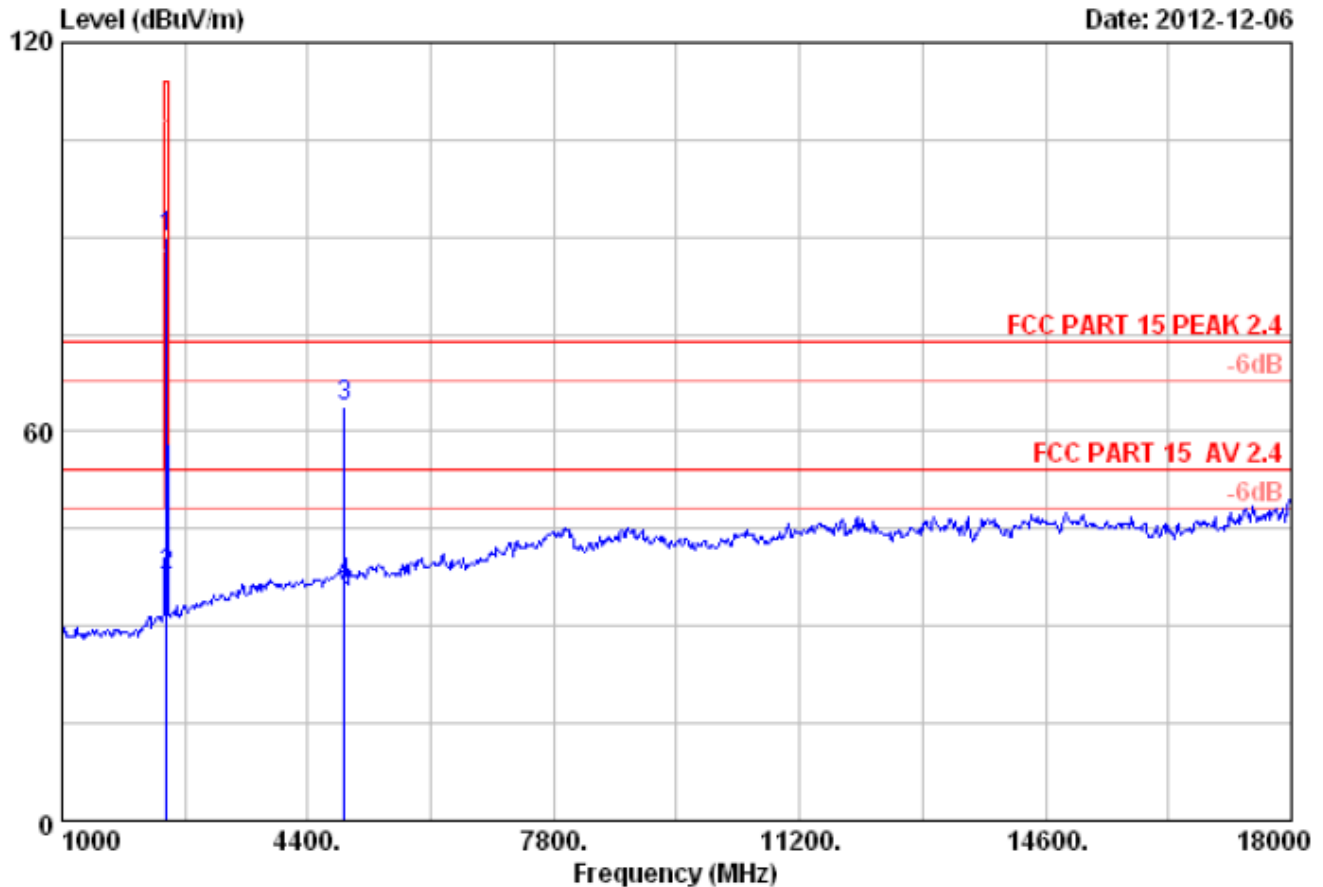


No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	212.360	9.77	1.09	39.04	22.32	43.50	21.18	Peak
2	277.350	13.21	1.23	35.83	22.91	46.00	23.09	Peak
3	553.800	19.35	1.99	36.10	28.89	46.00	17.11	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.

Field strength of emissions and Restricted bands

EUT: Bicycle Computer M/N: SZ2013 Expert
 Operating Condition: TX, 2450MHz
 Ant. Polarity: Vertical
 Comment: Above 1G



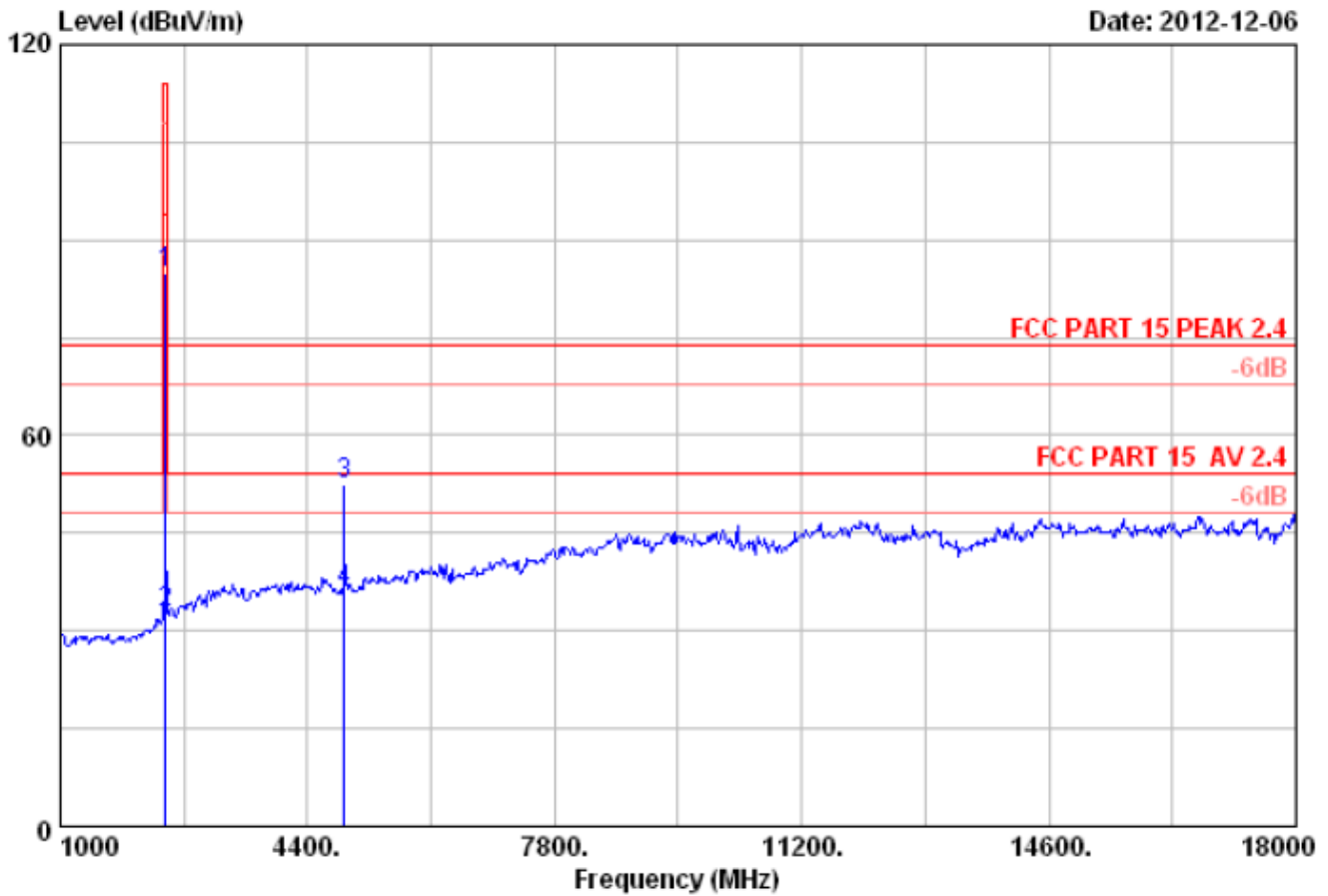
	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2450.000	27.08	6.10	35.92	92.62	89.88	114.00	24.12	Peak
2	2450.000	27.08	6.10	35.92	40.62	37.88	94.00	56.12	Average
3	4900.000	32.68	8.75	35.69	58.27	64.01	74.00	9.99	Peak
4	4900.000	32.68	8.75	35.69	30.57	36.31	54.00	17.69	Average

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Field strength of emissions and Restricted bands

EUT: Bicycle Computer M/N: SZ2013 Expert
 Operating Condition: TX, 2450MHz
 Ant. Polarity: Horizontal
 Comment: Above 1G



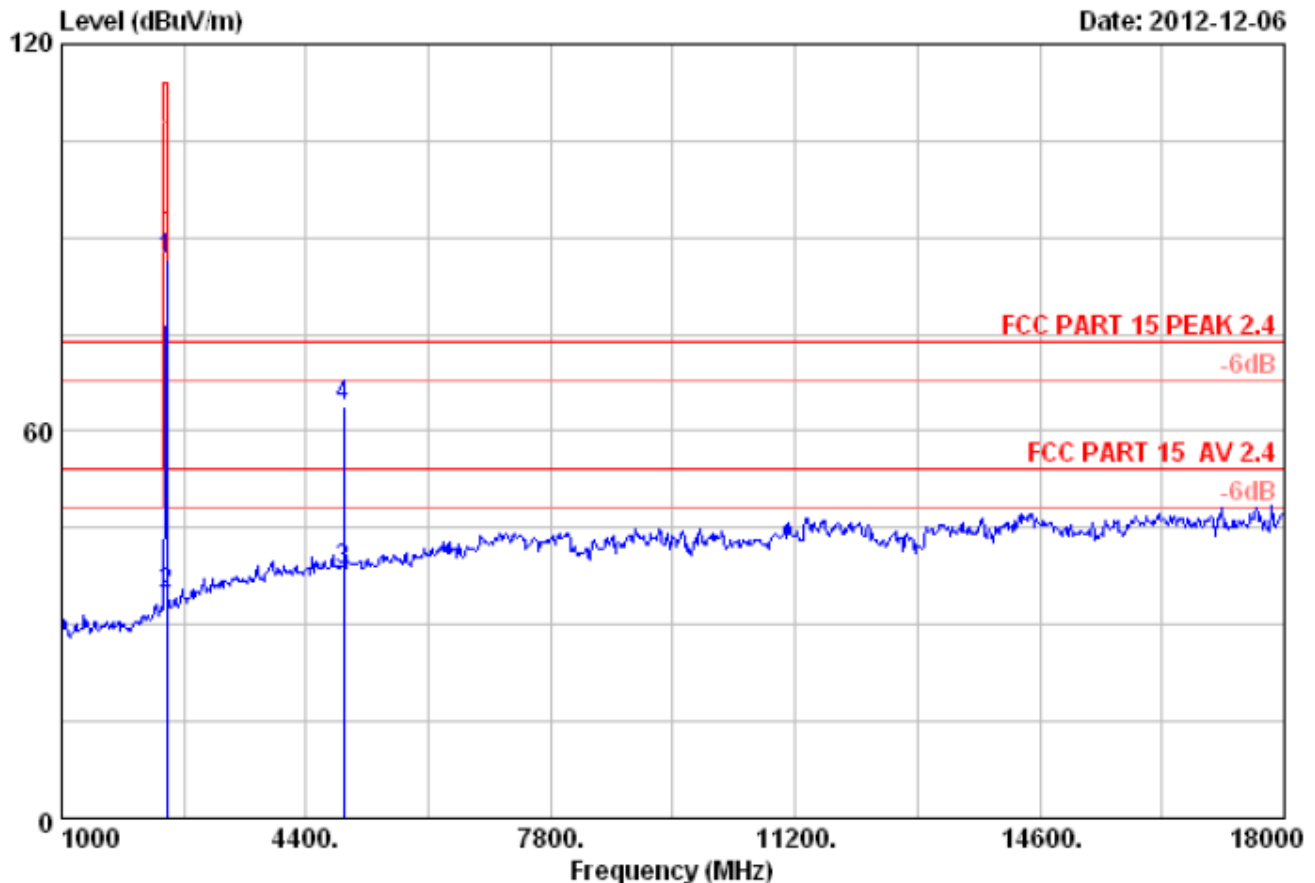
	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2450.000	27.08	6.10	35.92	87.63	84.89	114.00	29.11	Peak
2	2450.000	27.08	6.10	35.92	35.63	32.89	94.00	61.11	Average
3	4900.000	32.68	8.75	35.69	46.65	52.39	74.00	21.61	Peak
4	4900.000	32.68	8.75	35.69	30.37	36.11	54.00	17.89	Average

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Field strength of emissions and Restricted bands

EUT: Bicycle Computer M/N: SZ2013 Expert
 Operating Condition: TX, 2457MHz
 Ant. Polarity: Vertical
 Comment: Above 1G



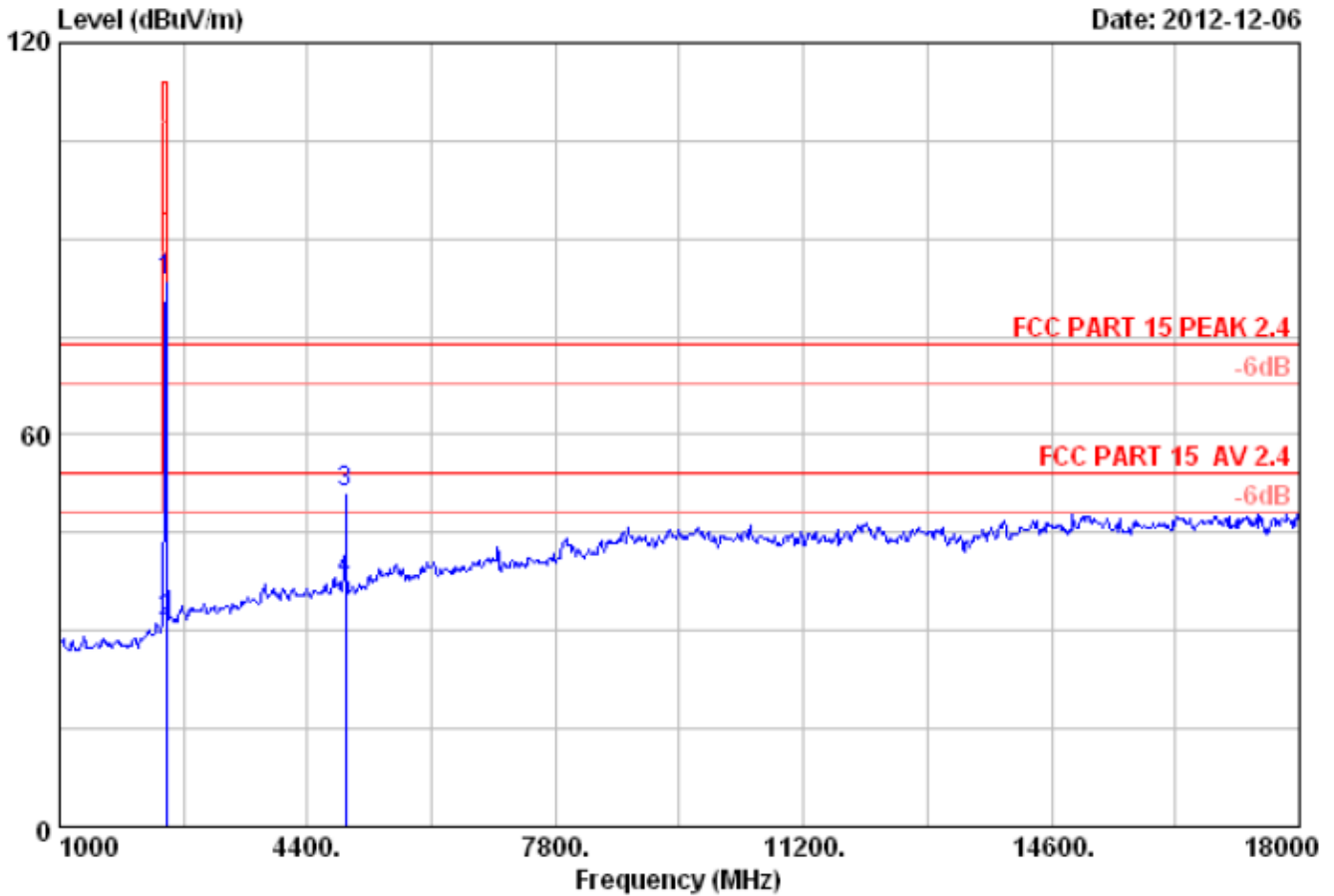
	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2457.000	27.12	6.11	35.92	89.43	86.74	114.00	27.26	Peak
2	2457.000	27.12	6.11	35.92	37.44	34.75	94.00	59.25	Average
3	4914.000	32.71	8.77	35.68	32.60	38.40	54.00	15.60	Average
4	4914.000	32.71	8.77	35.68	58.08	63.88	74.00	10.12	Peak

Remarks:

- Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
- The emission levels that are 20dB below the official limit are not reported.

Field strength of emissions and Restricted bands

EUT: Bicycle Computer M/N: SZ2013 Expert
 Operating Condition: TX, 2457MHz
 Ant. Polarity: Horizontal
 Comment: Above 1G



	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2457.000	27.12	6.11	35.92	86.18	83.49	114.00	30.51	Peak
2	2457.000	27.12	6.11	35.92	34.19	31.50	94.00	62.50	Average
3	4914.000	32.71	8.77	35.68	45.39	51.19	74.00	22.81	Peak
4	4914.000	32.71	8.77	35.68	32.14	37.94	54.00	16.06	Average

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

**Test Equipment List****Field strength of emissions and Restricted bands**

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL DUE DATE
Spectrum	Agilent	E4446A	US44300459	May 07, 2013
Amp	HP	8449B	3008A02495	May 07, 2013
Antenna	EMCO	3115	9607-4877	May 16, 2013
Bilog Antenna	Schaffner	CBL6111C	2598	Dec.13, 2013
HF Cable	Hubersuhne	Sucoflex104	---	May 07, 2013
3#Chamber	AUDIX	N/A	N/A	Nov.24,2013
EMI Spectrum	Agilent	E4407B	MY41440292	May.08, 2013
Test Receiver	Rohde & Schwarz	ESVS10	834468/011	May.08, 2013
Amplifier	HP	8447D	2648A04738	May.08, 2013
Bilog Antenna	Schaffner	CBL6111C	2598	Dec 26, 2012
RF Cable	MIYAZAKI	CFD400-NL	3# Chamber No.1	May.08, 2013
Coaxial Switch	Anritsu	MP59B	M74389	May.08, 2013

7.2 Out of Band Emissions

Test Method

The EUT is placed on a turntable, which is 0.8m above ground plane.

2 The turntable shall be rotated for 360 degrees to determine the position of maximum emission level

3 EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.

4 The spectrum analyzer or receiver is set as:

(1) Peak: RBW = 1MHz / VBW = 1MHz / Sweep = Auto

(2) Average: RBW = 1MHz / VBW = 10Hz / Sweep = Auto

5 Maximum procedure was performed on the six highest emissions to ensure EUT compliance.

6 Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

Limits

According to §15.249(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

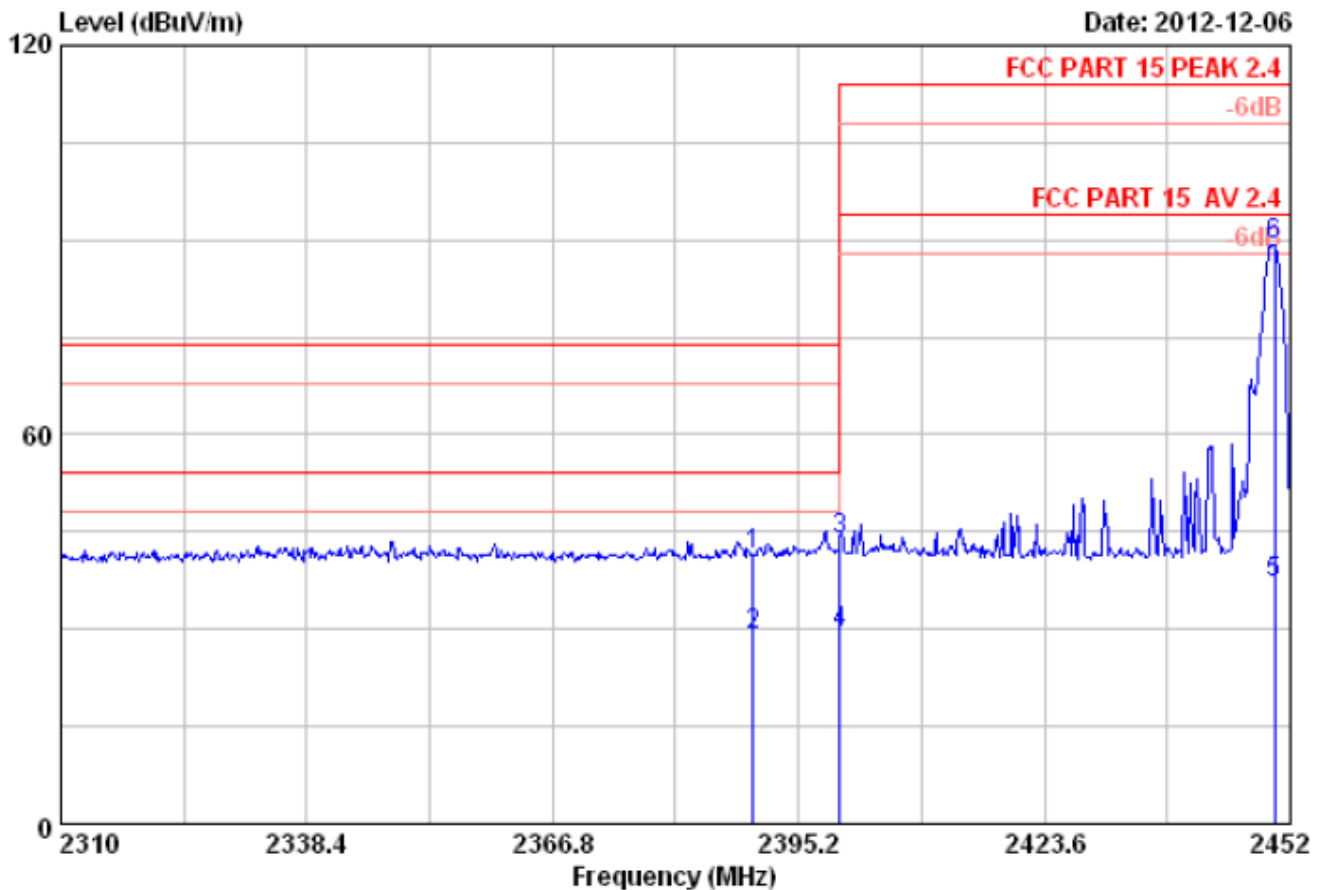
Out of Band Emissions

Lower edge Plot:

EUT: Bicycle Computer M/N: SZ2013 Expert

Operating Condition: TX, 2450MHz

Ant. Polarity: Vertical



	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBUV)	Emission Level (dBUV/m)	Limits (dBUV/m)	Margin (dB)	Remark
1	2390.000	26.70	6.00	35.92	44.57	41.35	74.00	32.65	Peak
2	2390.000	26.70	6.00	35.92	32.23	29.01	54.00	24.99	Average
3	2400.000	26.76	6.02	35.92	46.86	43.72	74.00	30.28	Peak
4	2400.000	26.76	6.02	35.92	32.45	29.31	54.00	24.69	Average
5	2450.154	27.08	6.10	35.92	39.89	37.15	94.00	56.85	Average
6	2450.154	27.08	6.10	35.92	91.89	89.15	114.00	24.85	Peak

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

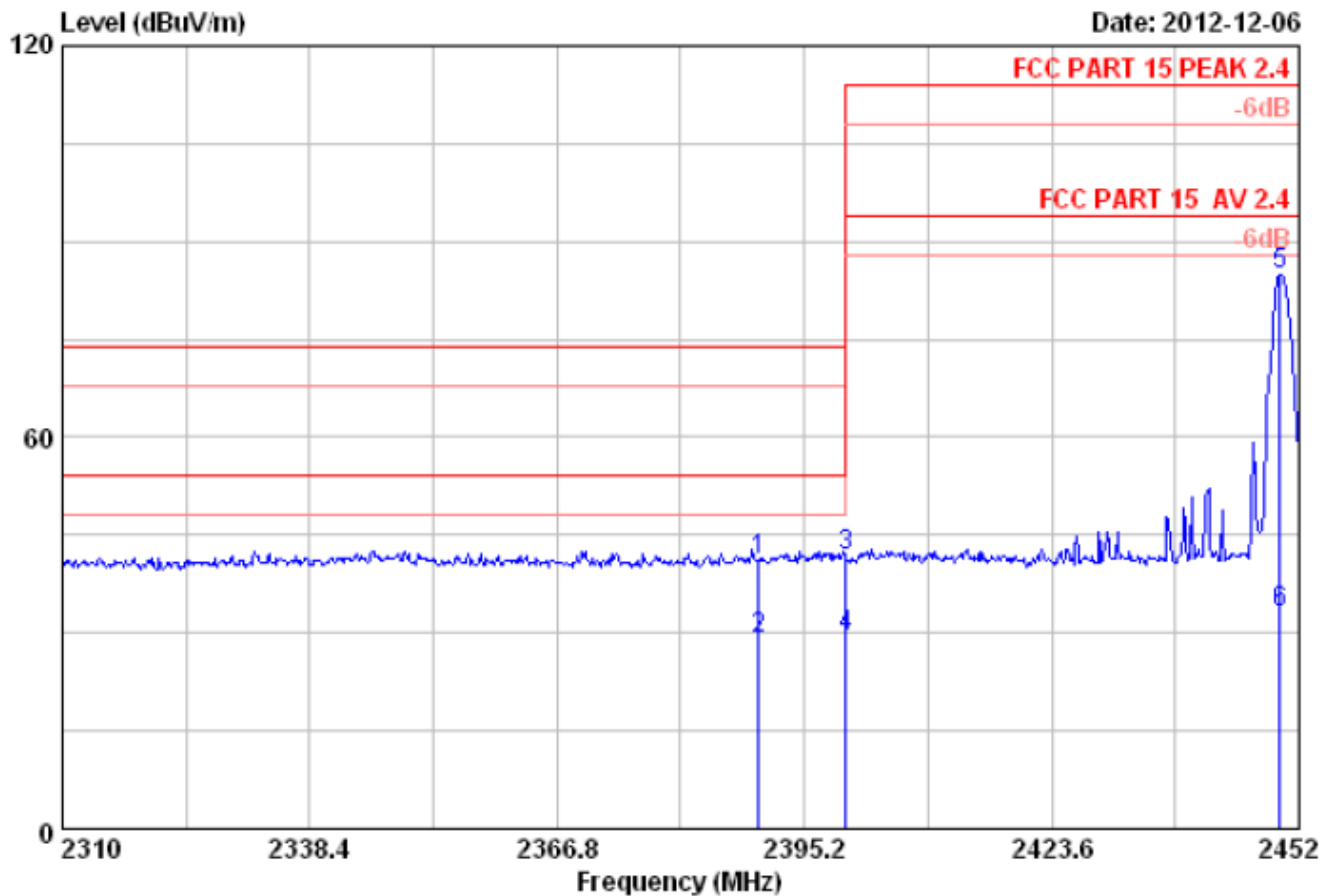
Out of Band Emissions

Lower edge Plot:

EUT: Bicycle Computer M/N: SZ2013 Expert

Operating Condition: TX, 2450MHz

Ant. Polarity: Horizontal



	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2390.000	26.70	6.00	35.92	44.21	40.99	74.00	33.01	Peak
2	2390.000	26.70	6.00	35.92	32.21	28.99	54.00	25.01	Average
3	2400.000	26.76	6.02	35.92	44.83	41.69	74.00	32.31	Peak
4	2400.000	26.76	6.02	35.92	32.45	29.31	54.00	24.69	Average
5	2449.870	27.08	6.10	35.92	87.72	84.98	114.00	29.02	Peak
6	2449.870	27.08	6.10	35.92	35.72	32.98	94.00	61.02	Average

Remarks:

1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

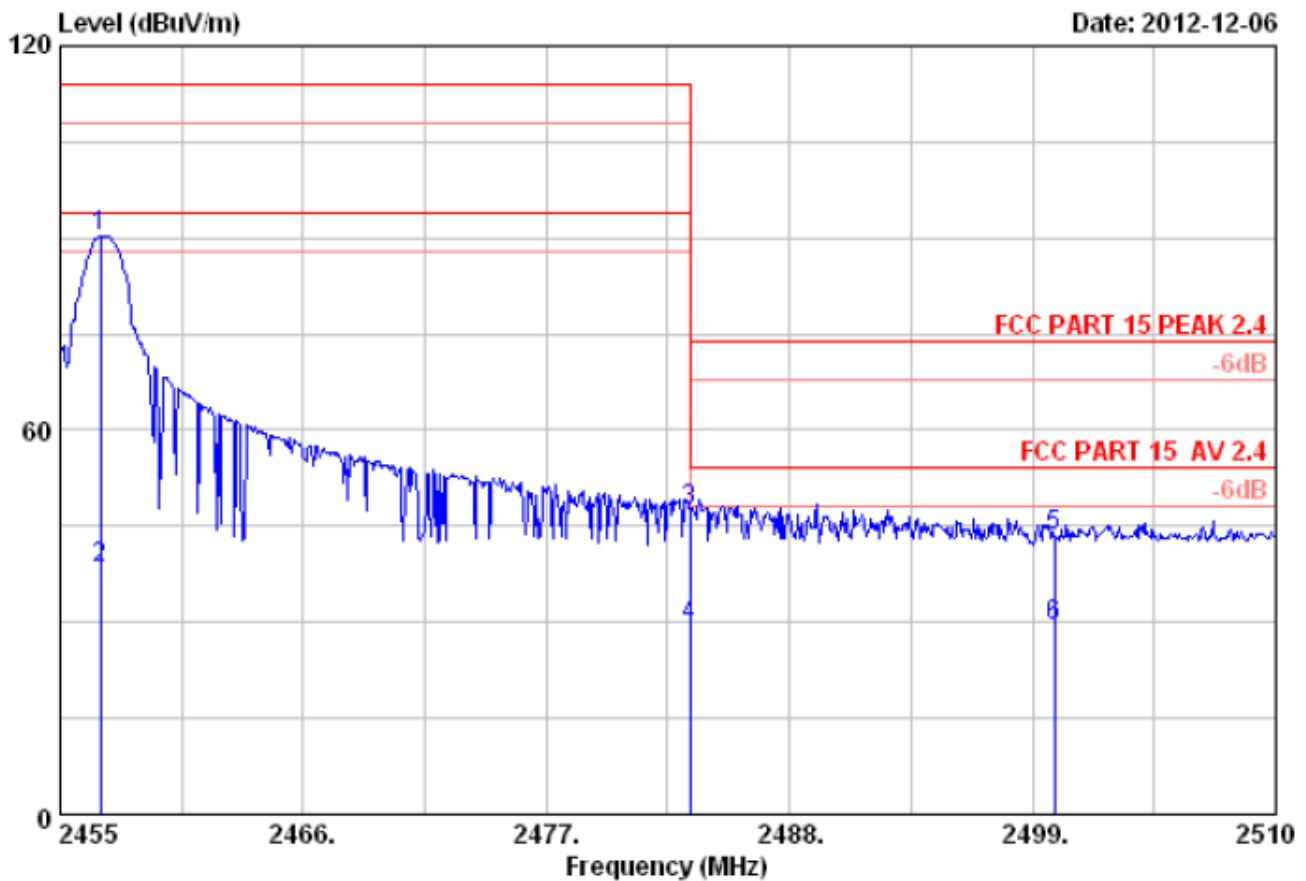
Out of Band Emissions

Upper edge Plot:

EUT: Bicycle Computer M/N: SZ2013 Expert

Operating Condition: TX, 2457MHz

Ant. Polarity: Vertical



	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2456.815	27.12	6.11	35.92	93.03	90.34	114.00	23.66	Peak
2	2456.815	27.12	6.11	35.92	41.03	38.34	94.00	55.66	Average
3	2483.500	27.29	6.16	35.92	49.97	47.50	74.00	26.50	Peak
4	2483.500	27.29	6.16	35.92	31.96	29.49	54.00	24.51	Average
5	2500.000	27.40	6.19	35.93	45.78	43.44	74.00	30.56	Peak
6	2500.000	27.40	6.19	35.93	31.86	29.52	54.00	24.48	Average

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

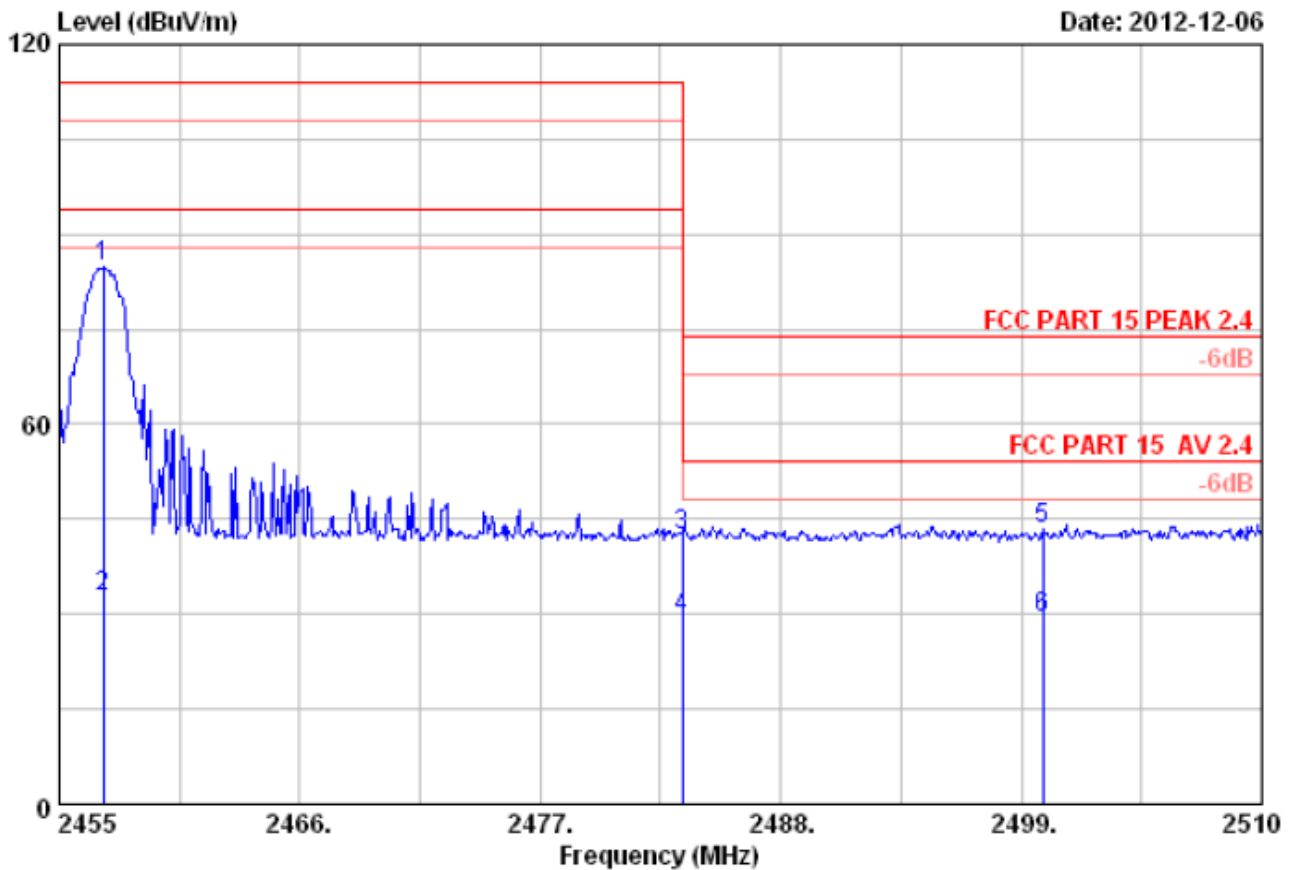
Out of Band Emissions

Upper edge Plot:

EUT: Bicycle Computer M/N: SZ2013 Expert

Operating Condition: TX, 2457MHz

Ant. Polarity: Horizontal



	Freq. (MHz)	Ant. Factor (dB/m)	Cable loss (dB)	Amp. Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2457.035	27.13	6.11	35.92	87.42	84.74	114.00	29.26	Peak
2	2457.035	27.13	6.11	35.92	35.42	32.74	94.00	61.26	Average
3	2483.500	27.29	6.16	35.92	44.88	42.41	74.00	31.59	Peak
4	2483.500	27.29	6.16	35.92	31.97	29.50	54.00	24.50	Average
5	2500.000	27.40	6.19	35.93	45.66	43.32	74.00	30.68	Peak
6	2500.000	27.40	6.19	35.93	31.84	29.50	54.00	24.50	Average

Remarks:

1. Emission Level= Antenna Factor + Cable Loss -Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



Test Equipment List

Out of band emissions

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL DUE DATE
Spectrum	Agilent	E4446A	US44300459	May 07, 2013
Amp	HP	8449B	3008A02495	May 07, 2013
Antenna	EMCO	3115	9607-4877	May 16, 2013
Bilog Antenna	Schaffner	CBL6111C	2598	Dec.13, 2013
HF Cable	Hubersuhne	Sucoflex104	---	May 07, 2013

7.3 20dB Bandwidth

Test Method

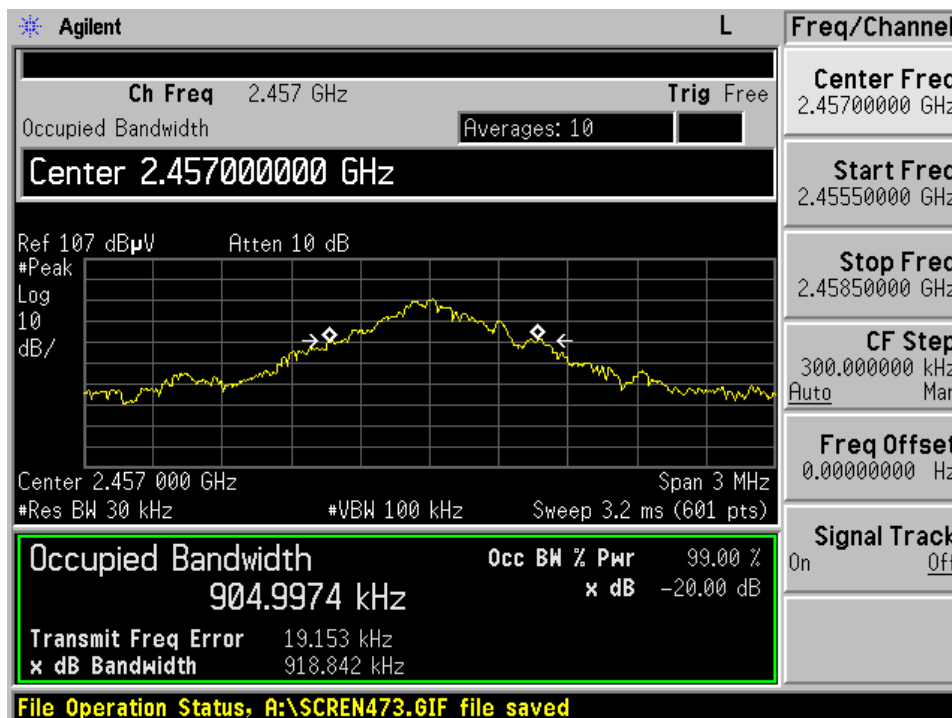
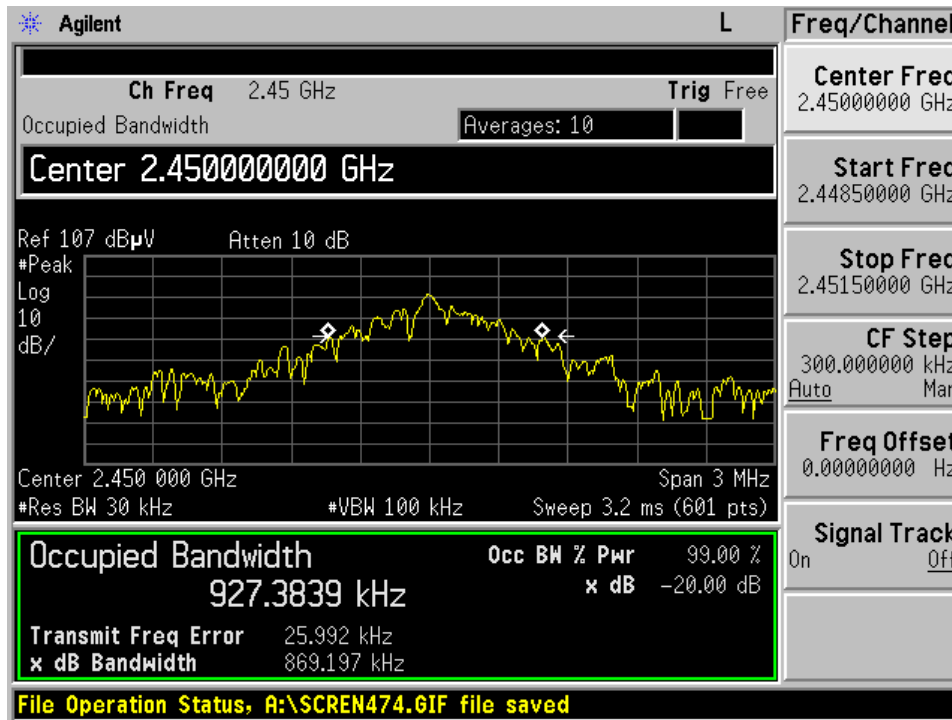
- 1 Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2 Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- 3 Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.

Limits:

According to 15.215 (c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

20dB Bandwidth

Frequency MHz	20dB Bandwidth kHz	Limit kHz	Result kHz
2450MHz	869.197	-	PASS
2457MHz	918.842	-	PASS





Product Service

Test Equipment

20dB Bandwidth

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL DUE DATE
Spectrum	Agilent	E4446A	US44300459	May 08, 2013
HF Cable	Hubersuhne	Sucoflex104	---	May 08, 2013



8 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

System Measurement Uncertainty

Items		Extended Uncertainty
RE	Field strength (dB μ V/m)	U=4.32dB (30MHz-1000MHz) U=3.57dB(1GHz-25GHz)
--	--	--