

FCC Part 15C Measurement and Test Report

For

Shenzhen CooSpo Tech Co., Ltd.

Room 401, Lingyun Building, Honglang North 2nd Road, Bao'an District,

Shenzhen, Guangdong, China(Mainland)

FCC ID: 2AF9HBK465

FCC Rule(s):	<u>FCC Part 15.247</u>
Product Description:	<u>Cycling Speed & Cadence Sensor</u>
Tested Model:	<u>BK465</u>
Report No.:	<u>STR17108278I-1</u>
Sample Receipt Date:	<u>2017-10-30</u>
Tested Date:	<u>2017-11-01 to 2017-11-22</u>
Issued Date:	<u>2017-11-22</u>
Tested By:	<u>Mike Shi / Engineer</u> <i>Mike Shi</i>
Reviewed By:	<u>Silin Chen / EMC Manager</u> <i>Silin chen</i>
Approved & Authorized By:	<u>Jandy So / PSQ Manager</u> <i>Jandyso</i>
Prepared By:	

Shenzhen SEM Test Technology Co., Ltd.

1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road,
Bao'an District, Shenzhen, P.R.C. (518101)

Tel.: +86-755-33663308 Fax.: +86-755-33663309 Website: www.semtest.com.cn

Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen SEM.Test Technology Co., Ltd.

TABLE OF CONTENTS

1. GENERAL INFORMATION	3
1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	3
1.2 TEST STANDARDS	4
1.3 TEST METHODOLOGY	4
1.4 TEST FACILITY	4
1.5 EUT SETUP AND TEST MODE	5
1.6 MEASUREMENT UNCERTAINTY	5
1.7 TEST EQUIPMENT LIST AND DETAILS	6
2. SUMMARY OF TEST RESULTS	7
3. RF EXPOSURE	8
3.1 STANDARD APPLICABLE	8
3.2 TEST RESULT	8
4. ANTENNA REQUIREMENT	9
4.1 STANDARD APPLICABLE	9
4.2 EVALUATION INFORMATION	9
5. POWER SPECTRAL DENSITY	10
5.1 STANDARD APPLICABLE	10
5.2 TEST PROCEDURE	10
5.3 ENVIRONMENTAL CONDITIONS	10
5.4 SUMMARY OF TEST RESULTS/PLOTS	10
6. 6DB BANDWIDTH	13
6.1 STANDARD APPLICABLE	13
6.2 TEST PROCEDURE	13
6.3 ENVIRONMENTAL CONDITIONS	13
6.4 SUMMARY OF TEST RESULTS/PLOTS	13
7. RF OUTPUT POWER	16
7.1 STANDARD APPLICABLE	16
7.2 TEST PROCEDURE	16
7.3 ENVIRONMENTAL CONDITIONS	16
7.4 SUMMARY OF TEST RESULTS/PLOTS	16
8. FIELD STRENGTH OF SPURIOUS EMISSIONS	19
8.1 STANDARD APPLICABLE	19
8.2 TEST PROCEDURE	19
8.3 CORRECTED AMPLITUDE & MARGIN CALCULATION	20
8.4 ENVIRONMENTAL CONDITIONS	20
8.5 SUMMARY OF TEST RESULTS/PLOTS	21
9. OUT OF BAND EMISSIONS	28
9.1 STANDARD APPLICABLE	28
9.2 TEST PROCEDURE	28
9.3 ENVIRONMENTAL CONDITIONS	29
9.4 SUMMARY OF TEST RESULTS/PLOTS	29

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: Shenzhen CooSpo Tech Co., Ltd.
Address of applicant: Room 401, Lingyun Building, Honglang North 2nd Road, Bao'an District, Shenzhen, Guangdong, China(Mainland)

Manufacturer: Shenzhen CooSpo Tech Co., Ltd.
Address of manufacturer: Room 401, Lingyun Building, Honglang North 2nd Road, Bao'an District, Shenzhen, Guangdong, China(Mainland)

General Description of EUT	
Product Name:	Cycling Speed & Cadence Sensor
Brand Name:	/
Model No.:	BK465
Adding Model(s):	BK463, BK467, BK6, CY3
Rated Voltage:	DC 3V by Battery
Battery Capacity:	210 mAh
Power Adapter:	/
Software Version:	V3.2
Hardware Version:	V1.4
<i>Note: The test data is gathered from a production sample provided by the manufacturer. The appearance of others models listed in the report is different from main-test model BK465, but the circuit and the electronic construction do not change, declared by the manufacturer.</i>	

Technical Characteristics of EUT	
Bluetooth Version:	V4.0 (BLE mode)
Frequency Range:	2402-2480MHz
RF Output Power:	-7.12dBm (Conducted)
Data Rate:	1Mbps
Modulation:	GFSK
Quantity of Channels:	40
Channel Separation:	2MHz
Type of Antenna:	PCB
Antenna Gain:	0dBi

1.2 Test Standards

The following report is prepared on behalf of the Shenzhen CooSpo Tech Co., Ltd. in accordance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 of the Federal Communication Commissions rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard for Testing Unlicensed Wireless Devices, and ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. The measurement guide KDB 558074 D01 v04 for digital transmission systems shall be performed also.

1.4 Test Facility

FCC – Registration No.: 125990

Shenzhen SEM Test Technology Co., Ltd. Laboratory has been recognized to perform compliance testing on equipment subject to the Commissions Declaration Of Conformity (DOC). The Designation Number is CN5010, and Test Firm Registration Number is 125990.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

1.5 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	GFSK(BLE)	2402MHz, 2442MHz, 2480MHz

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
/	/	/	/

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
RF Output Power	Conducted	$\pm 0.42\text{dB}$
Occupied Bandwidth	Conducted	$\pm 1.5\%$
Power Spectral Density	Conducted	$\pm 1.8\text{dB}$
Conducted Spurious Emission	Conducted	$\pm 2.17\text{dB}$
Conducted Emissions	Conducted	$\pm 2.88\text{dB}$
Transmitter Spurious Emissions	Radiated	$\pm 5.1\text{dB}$

1.7 Test Equipment List and Details

No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due Date
SEMT-1072	Spectrum Analyzer	Agilent	E4407B	MY41440400	2017-06-12	2018-06-11
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2017-06-12	2018-06-11
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2017-06-12	2018-06-11
SEMT-1008	Amplifier	Agilent	8447F	3113A06717	2017-06-12	2018-06-11
SEMT-1043	Amplifier	C&D	PAP-1G18	2002	2017-06-12	2018-06-11
SEMT-1011	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2017-06-08	2018-06-07
SEMT-1042	Horn Antenna	ETS	3117	00086197	2017-06-08	2018-06-07
SEMT-1121	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170582	2017-06-08	2018-06-07
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2017-06-08	2018-06-07
SEMT-1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2017-06-12	2018-06-11
SEMT-1003	L.I.S.N	Schwarz beck	NSLK8126	8126-224	2017-06-12	2018-06-11
SEMT-1002	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2017-06-12	2018-06-11
SEMT-1168	Pre-amplifier	Direction Systems Inc.	PAP-0126	14141-12838	2017-08-15	2018-08-14
SEMT-1169	Pre-amplifier	Direction Systems Inc.	PAP-2640	14145-14153	2017-08-15	2018-08-14
SEMT-1163	Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2017-06-12	2018-06-11
SEMT-1170	DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2017-03-09	2018-03-08

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§ 2.1093	RF Exposure	Compliant
§ 15.203; § 15.247(b)(4)(i)	Antenna Requirement	Compliant
§15.205	Restricted Band of Operation	Compliant
§ 15.207(a)	Conducted Emission	N/A
§ 15.247(e)	Power Spectral Density	Compliant
§ 15.247(a)(2)	6 dB Bandwidth	Compliant
§ 15.247(b)(3)	RF Output Power	Compliant
§ 15.209(a)	Radiated Emission	Compliant
§ 15.247(d)	Band Edge (Out of Band Emissions)	Compliant

N/A: not applicable

3. RF Exposure

3.1 Standard Applicable

According to § 1.1307 and § 2.1093, the portable transmitter must comply the RF exposure requirements.

3.2 Test Result

This product complied with the requirement of the RF exposure, please see the RF Exposure Report.

4. Antenna Requirement

4.1 Standard Applicable

According to FCC Part 15.203, 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.

4.2 Evaluation Information

This product has a PCB antenna, fulfill the requirement of this section.

5. Power Spectral Density

5.1 Standard Applicable

According to 15.247(a)(1)(iii), For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

5.2 Test Procedure

According to the KDB 558074 D01 v04, the test method of power spectral density as below:

- a) Set analyzer center frequency to DTS channel center frequency.
- b) Set the span to 1.5 times the DTS bandwidth.
- c) Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- d) Set the VBW $\geq 3 \times \text{RBW}$.
- e) Detector = peak.
- f) Sweep time = auto couple.
- g) Trace mode = max hold.
- h) Allow trace to fully stabilize.
- i) Use the peak marker function to determine the maximum amplitude level within the RBW.
- j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

5.3 Environmental Conditions

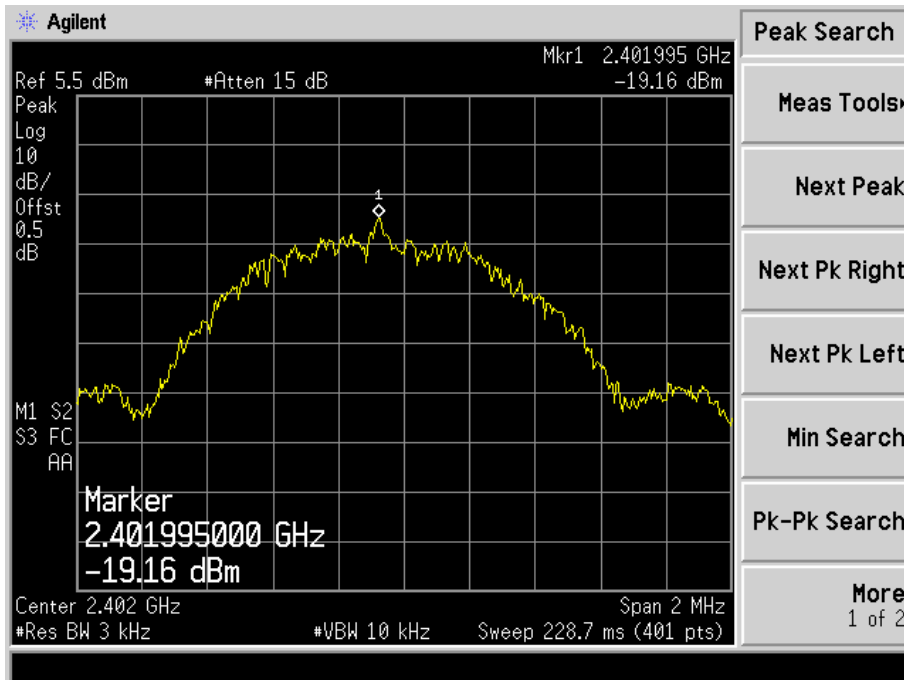
Temperature:	26° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

5.4 Summary of Test Results/Plots

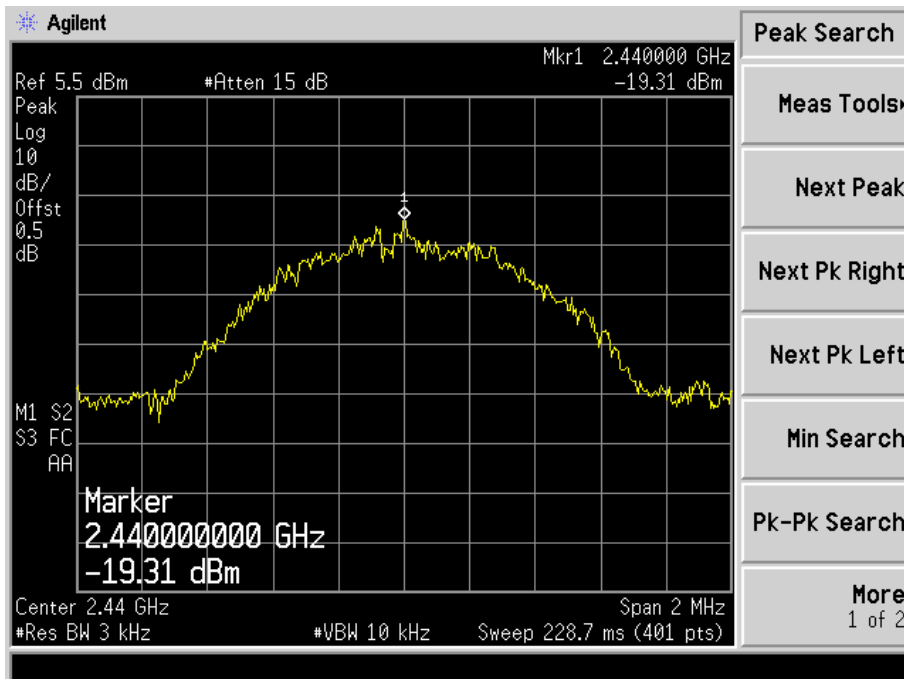
Test Mode	Test Channel MHz	Power Spectral Density dBm/3kHz	Limit dBm/3kHz
GFSK(BLE)	2402	-19.16	8
	2442	-19.31	8
	2480	-20.76	8

Please refer to the following test plots:

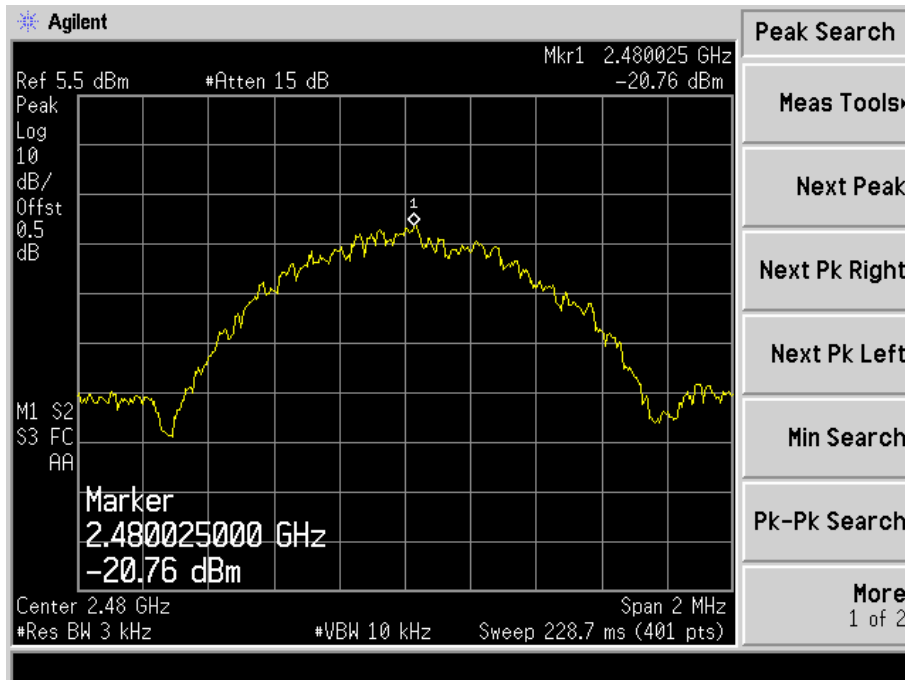
Low Channel



Middle Channel



High Channel



6. 6dB Bandwidth

6.1 Standard Applicable

According to 15.247(a)(2). Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

6.2 Test Procedure

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

6.3 Environmental Conditions

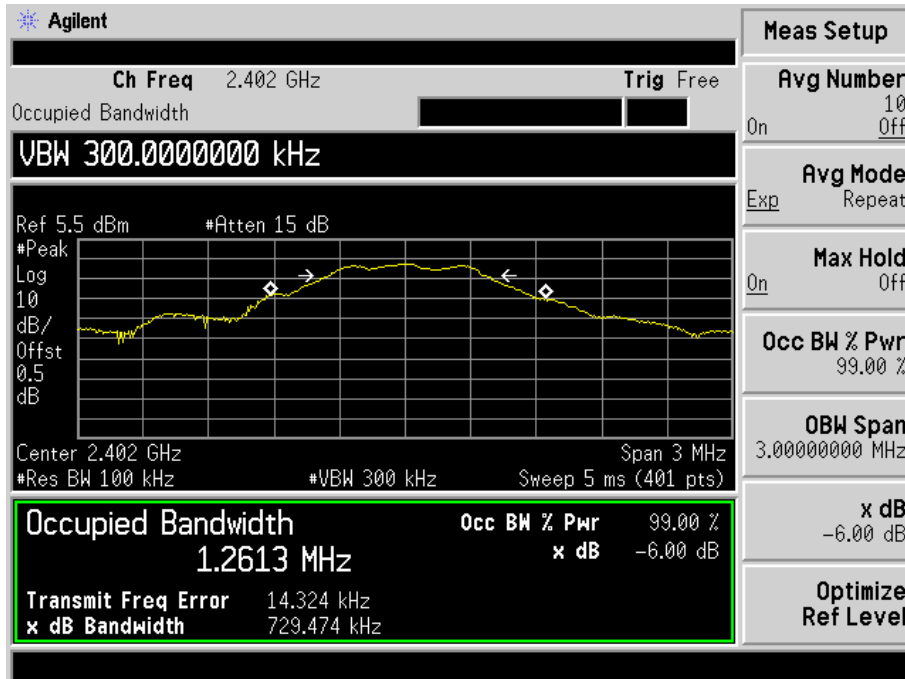
Temperature:	25° C
Relative Humidity:	53%
ATM Pressure:	1018 mbar

6.4 Summary of Test Results/Plots

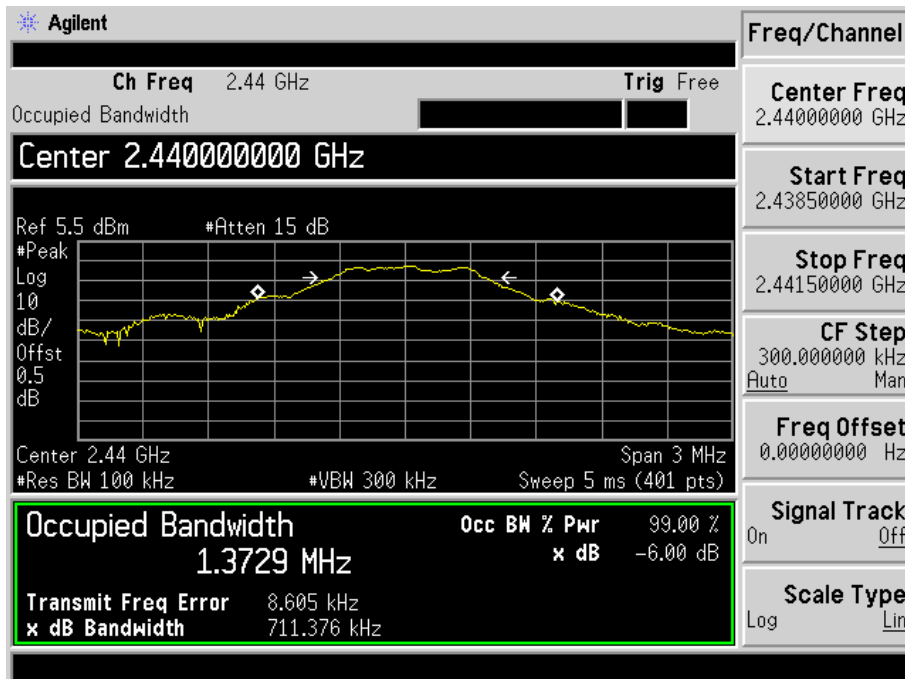
Test Mode	Test Channel MHz	6 dB Bandwidth kHz	99% Bandwidth kHz	Limit kHz
GFSK(BLE)	2402	729.474	1261.300	≥ 500
	2442	711.376	1372.900	≥ 500
	2480	694.327	1079.300	≥ 500

Please refer to the following test plots:

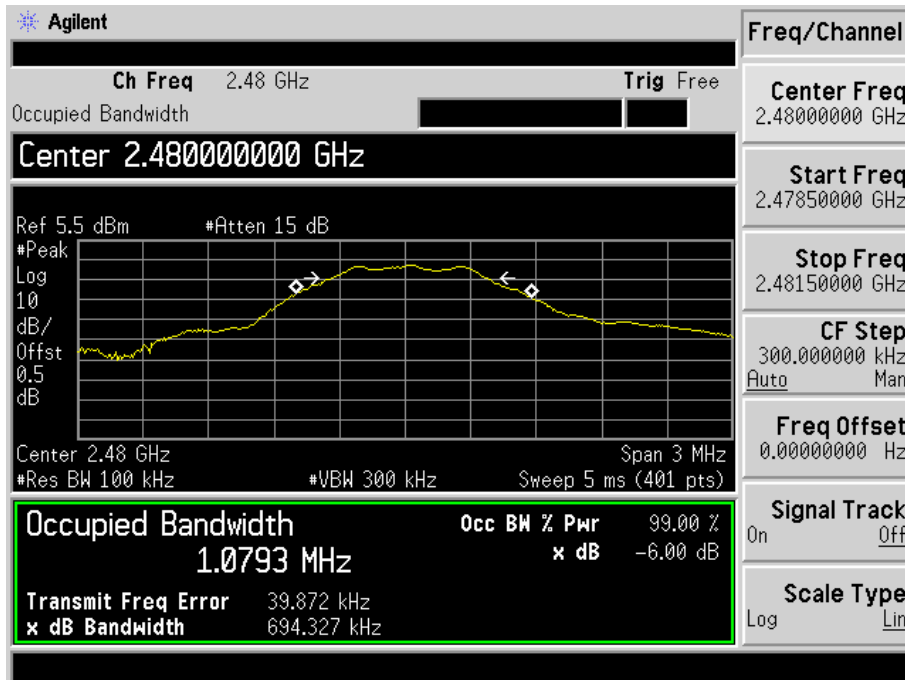
For BLE
Low Channel:



Middle Channel:



High Channel:



7. RF Output Power

7.1 Standard Applicable

According to 15.247(b)(3). For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.

7.2 Test Procedure

According to section KDB-558074 D01 v04 section 9.1.1, this procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the DTS bandwidth.

- a) Set the RBW \geq DTS bandwidth.
- b) Set VBW $\geq 3 \times$ RBW.
- c) Set span $\geq 3 \times$ RBW
- d) Sweep time = auto couple.
- e) Detector = peak.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use peak marker function to determine the peak amplitude level.

7.3 Environmental Conditions

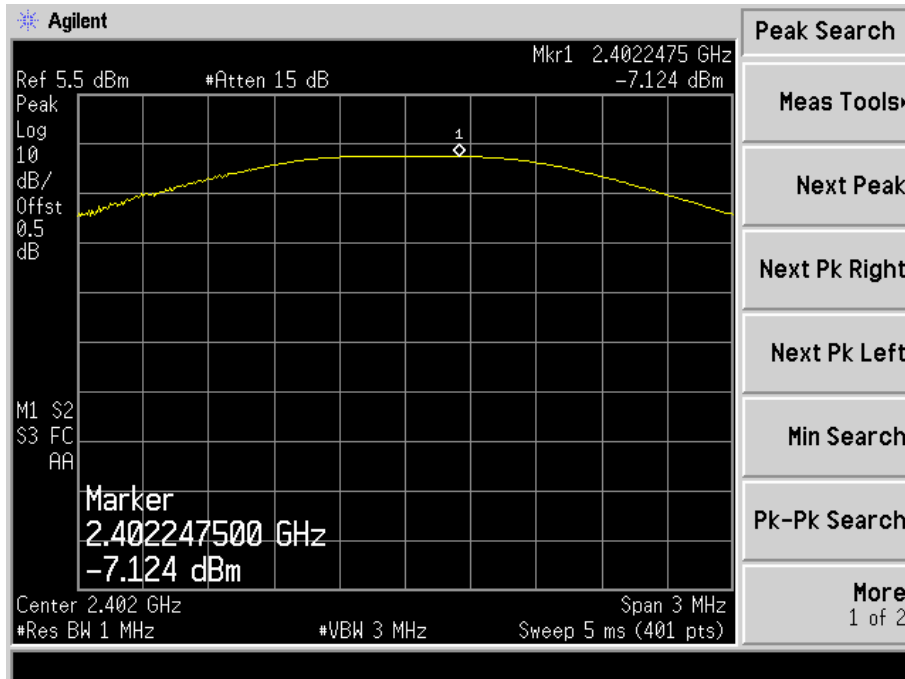
Temperature:	26° C
Relative Humidity:	57%
ATM Pressure:	1011 mbar

7.4 Summary of Test Results/Plots

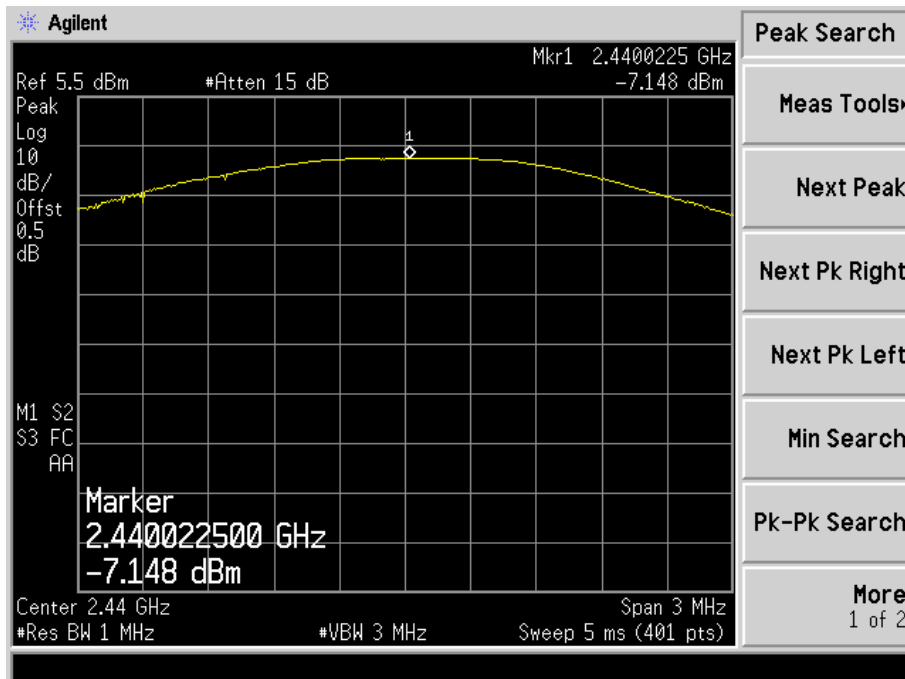
Test Mode	Frequency MHz	Reading dBm	Output Power mW	Limit mW
GFSK(BLE)	2402	-7.12	0.19	1000
	2442	-7.15	0.19	1000
	2480	-7.27	0.19	1000

Note: the antenna gain of -4.1dBi less than 6dBi maximum permission antenna gain value based on 1 watt peak output power limit.

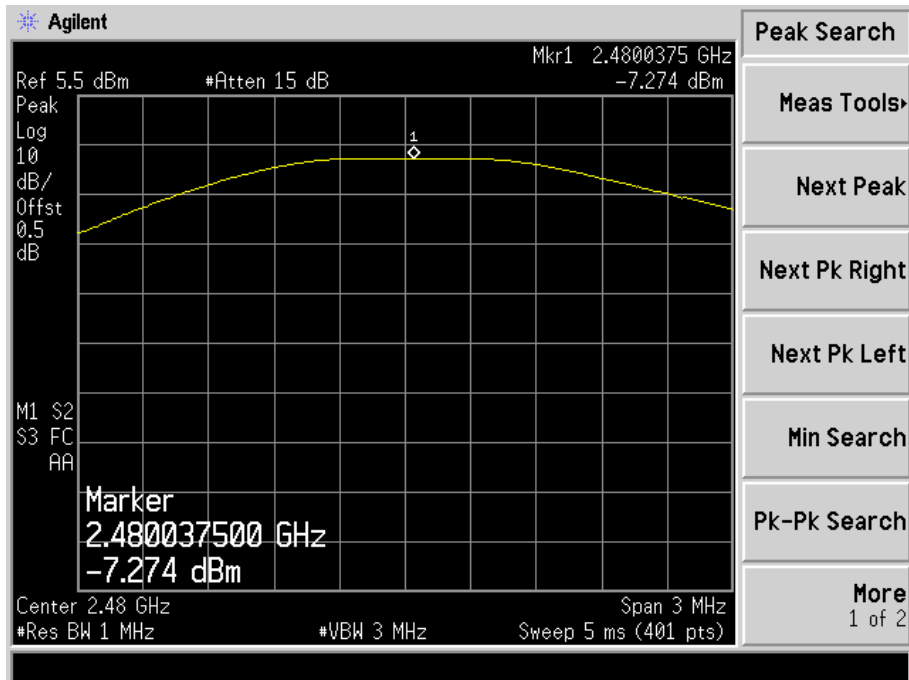
For BLE
Low Channel:



Middle Channel:



High Channel:



8. Field Strength of Spurious Emissions

8.1 Standard Applicable

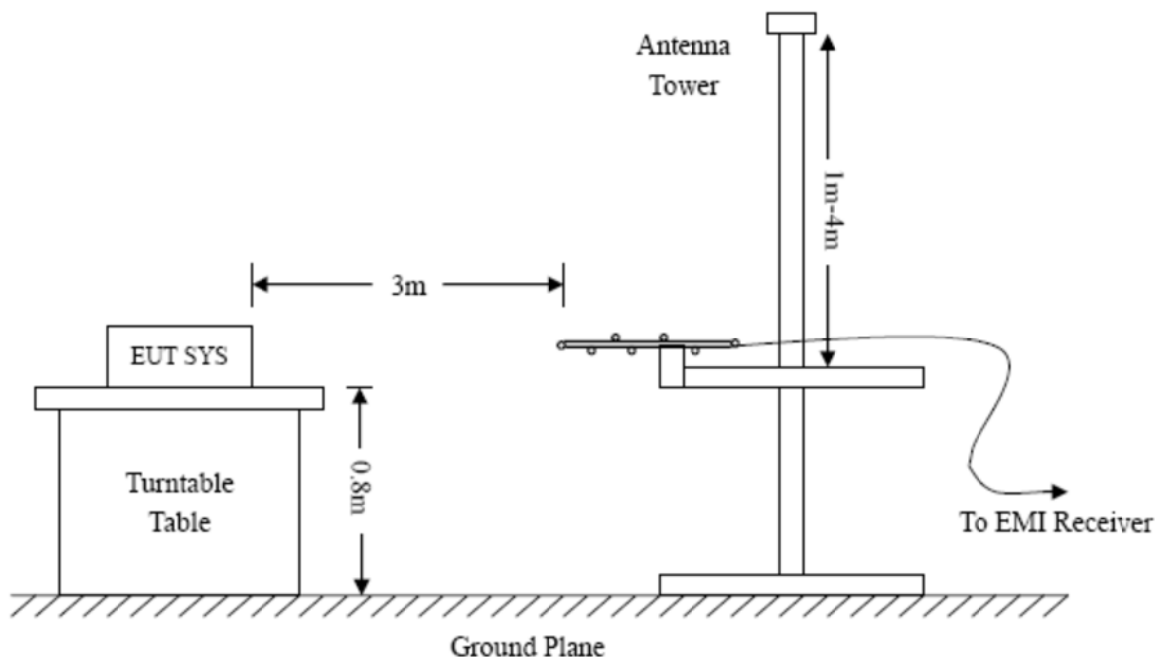
According to §15.247(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

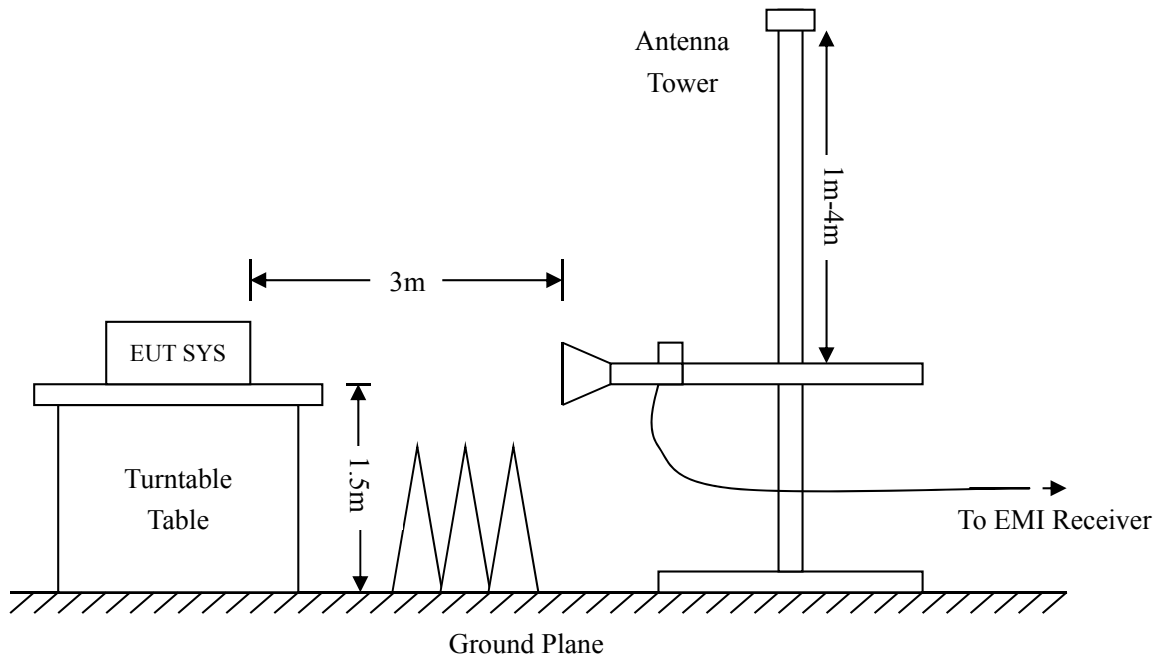
The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

8.2 Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.205 15.247(a) and FCC Part 15.209 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle. The spacing between the peripherals was 10 cm.





Frequency :9kHz-30MHz
 RBW=10KHz,
 VBW =30KHz
 Sweep time= Auto
 Trace = max hold
 Detector function = peak

Frequency :30MHz-1GHz
 RBW=120KHz,
 VBW=300KHz
 Sweep time= Auto
 Trace = max hold
 Detector function = peak, QP

Frequency :Above 1GHz
 RBW=1MHz,
 VBW=3MHz(Peak), 10Hz(AV)
 Sweep time= Auto
 Trace = max hold
 Detector function = peak, AV

8.3 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Ant. Factor} + \text{Cable Loss} - \text{Ampl. Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dB μ V means the emission is 6dB μ V below the maximum limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15 Limit}$$

8.4 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

8.5 Summary of Test Results/Plots

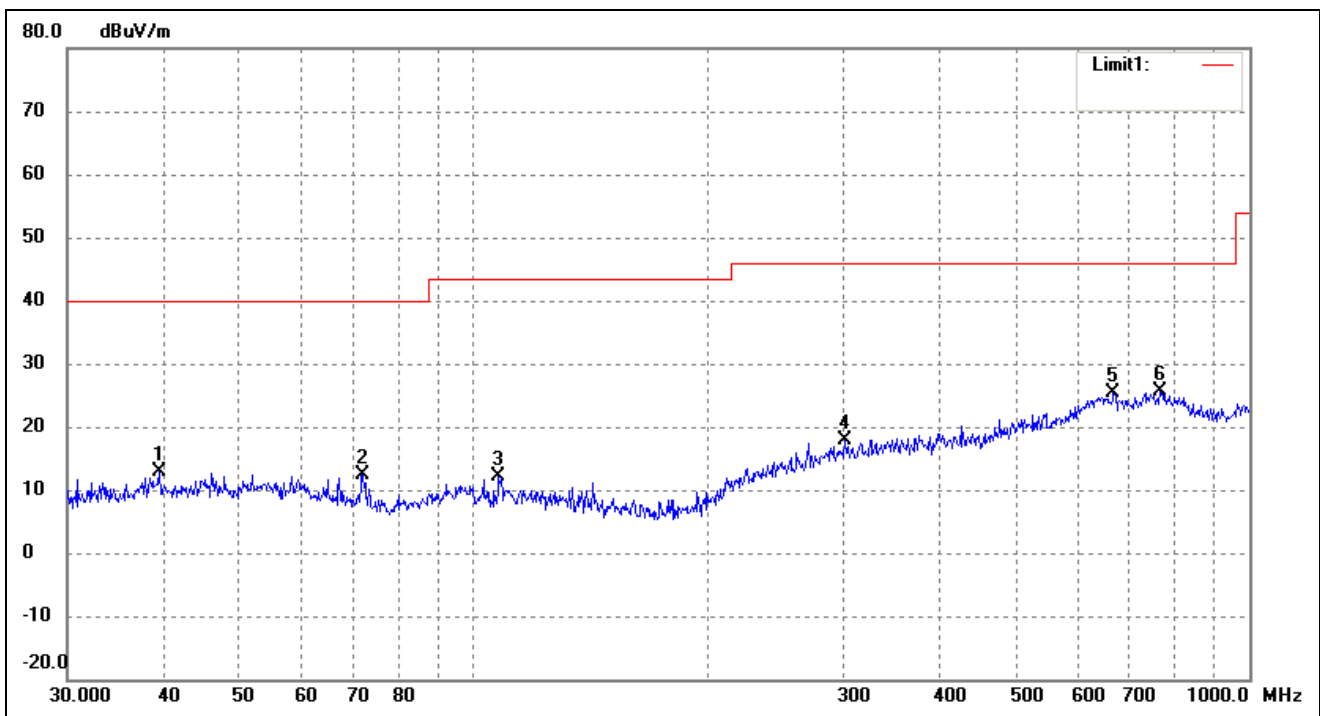
According to the data below, the FCC Part 15.205, 15.209 and 15.247 standards, and had the worst cases:

Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

Plot of Radiated Emissions Test Data

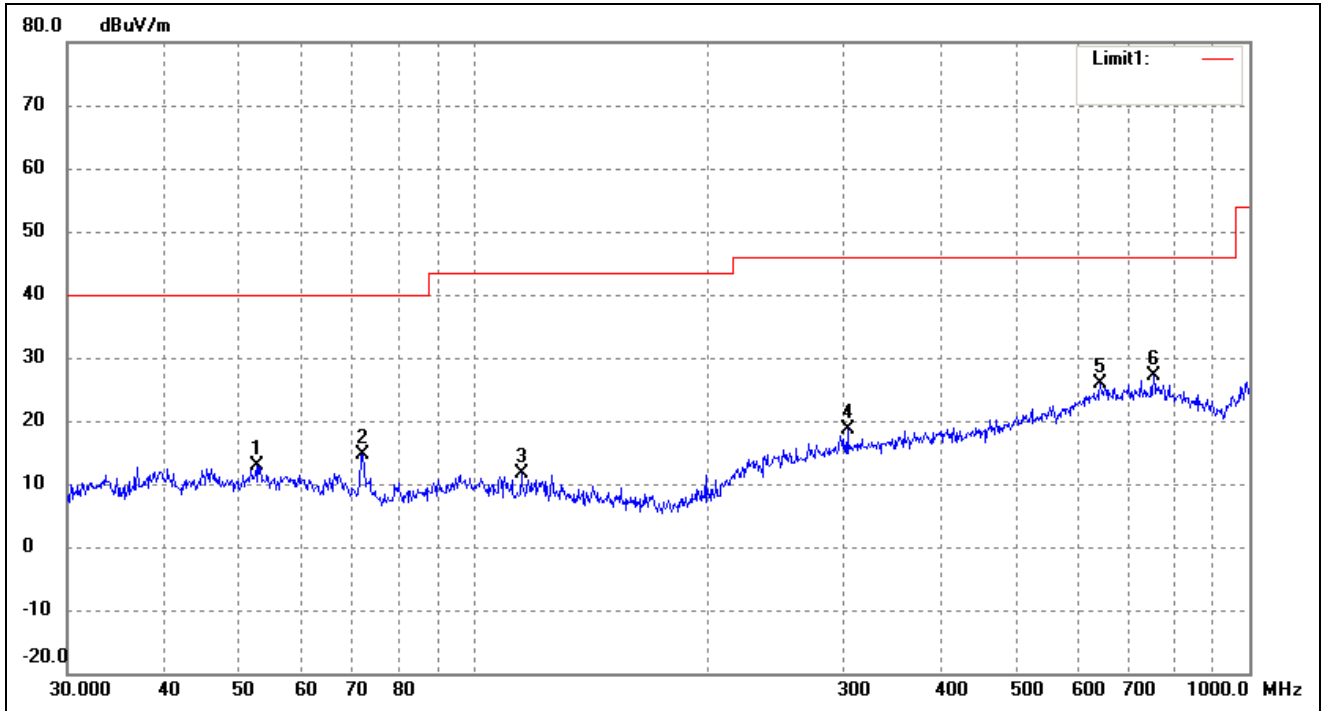
EUT: *Cycling Speed & Cadence Sensor*
 Tested Model: *BK465*
 Operating Condition: *Transmitting-Low channel (2402MHz)*
 Comment: *DC 3V by Battery*

Test Specification: *Horizontal*



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	39.4372	29.38	-16.62	12.76	40.00	-27.24	227	100	peak
2	72.0843	31.36	-18.97	12.39	40.00	-27.61	306	100	peak
3	107.8877	28.73	-16.61	12.12	43.50	-31.38	100	100	peak
4	301.4224	27.47	-9.59	17.88	46.00	-28.12	198	100	peak
5	668.1423	26.34	-1.04	25.30	46.00	-20.70	80	100	peak
6	766.0572	26.64	-0.93	25.71	46.00	-20.29	110	100	peak

Test Specification: Vertical

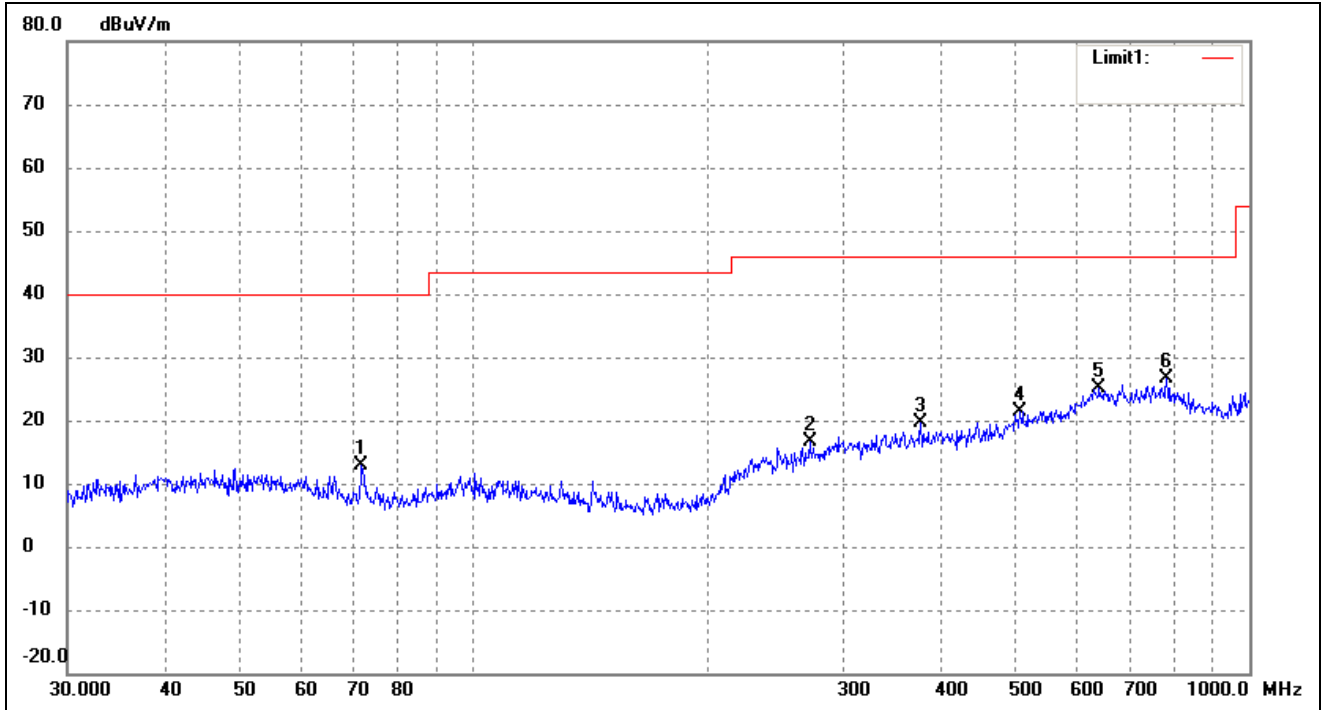


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	52.5753	29.38	-16.49	12.89	40.00	-27.11	84	100	peak
2	72.0843	33.66	-18.97	14.69	40.00	-25.31	144	100	peak
3	115.3205	28.15	-16.64	11.51	43.50	-31.99	58	100	peak
4	303.5437	28.18	-9.56	18.62	46.00	-27.38	104	100	peak
5	642.8613	26.88	-1.08	25.80	46.00	-20.20	164	100	peak
6	752.7432	27.35	-0.33	27.02	46.00	-18.98	146	100	peak

Plot of Radiated Emissions Test Data

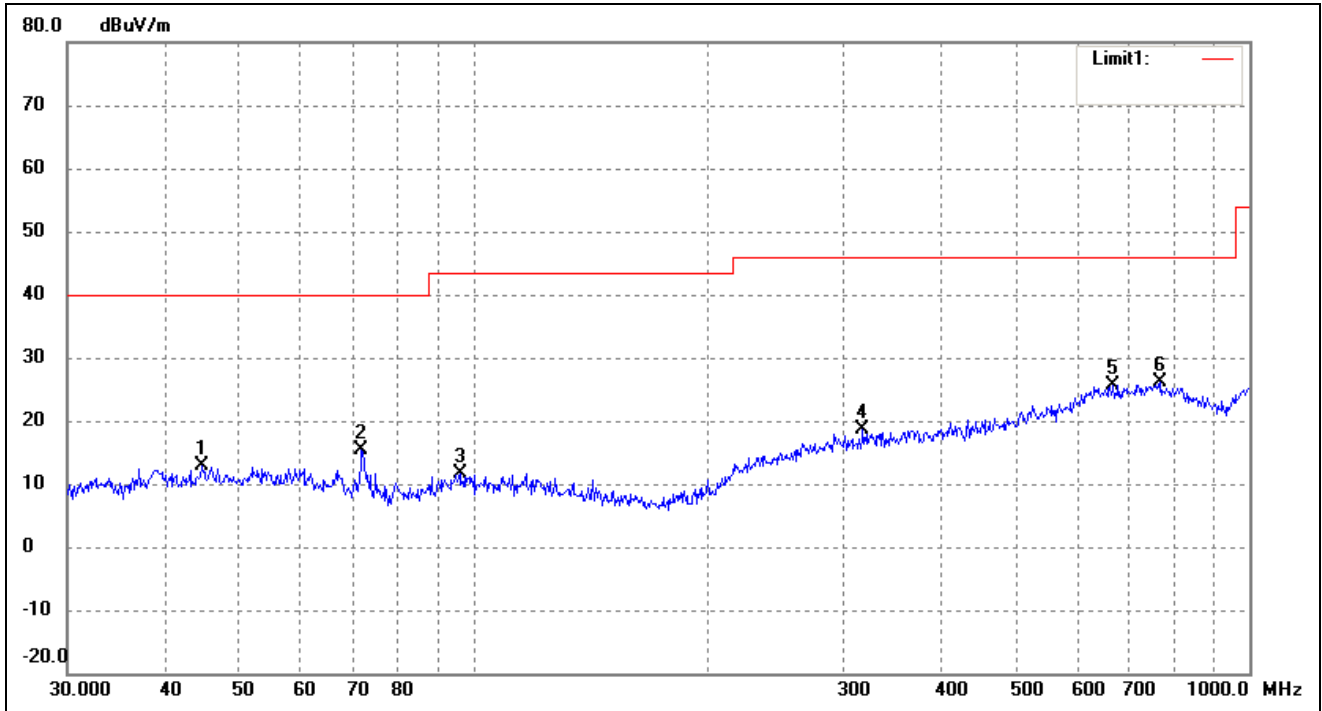
EUT: *Cycling Speed & Cadence Sensor*
 Tested Model: *BK465*
 Operating Condition: *Transmitting-Middle channel (2442MHz)*
 Comment: *DC 3V by Battery*

Test Specification: *Horizontal*



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	71.8320	31.78	-18.94	12.84	40.00	-27.16	113	100	peak
2	271.3246	27.65	-10.98	16.67	46.00	-29.33	175	100	peak
3	377.2591	28.53	-8.87	19.66	46.00	-26.34	91	100	peak
4	506.4791	27.04	-5.62	21.42	46.00	-24.58	128	100	peak
5	640.6110	26.08	-1.03	25.05	46.00	-20.95	332	100	peak
6	782.3453	28.48	-1.89	26.59	46.00	-19.41	164	100	peak

Test Specification: Vertical

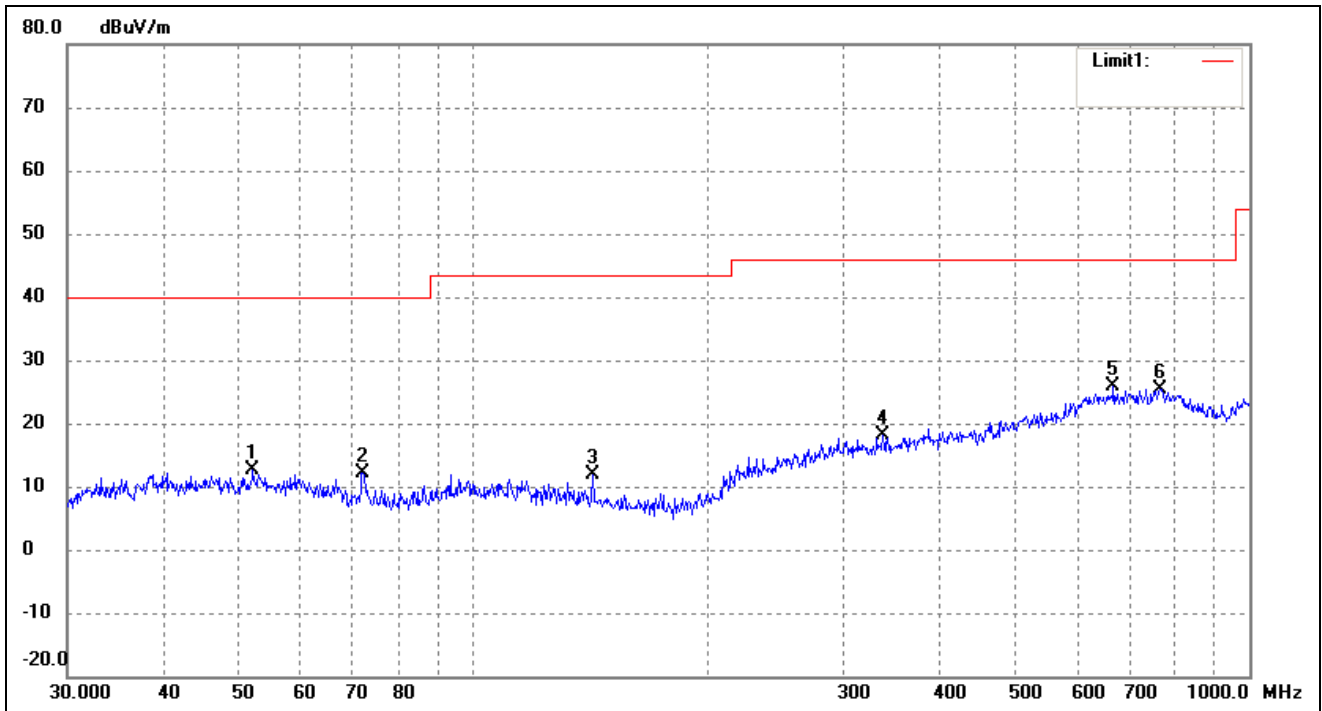


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	44.7434	29.25	-16.48	12.77	40.00	-27.23	320	100	peak
2	71.8320	34.34	-18.94	15.40	40.00	-24.60	94	100	peak
3	96.0986	28.77	-17.14	11.63	43.50	-31.87	128	100	peak
4	317.7011	27.90	-9.36	18.54	46.00	-27.46	90	100	peak
5	668.1423	26.70	-1.04	25.66	46.00	-20.34	169	100	peak
6	768.7482	27.17	-1.10	26.07	46.00	-19.93	189	100	peak

Plot of Radiated Emissions Test Data

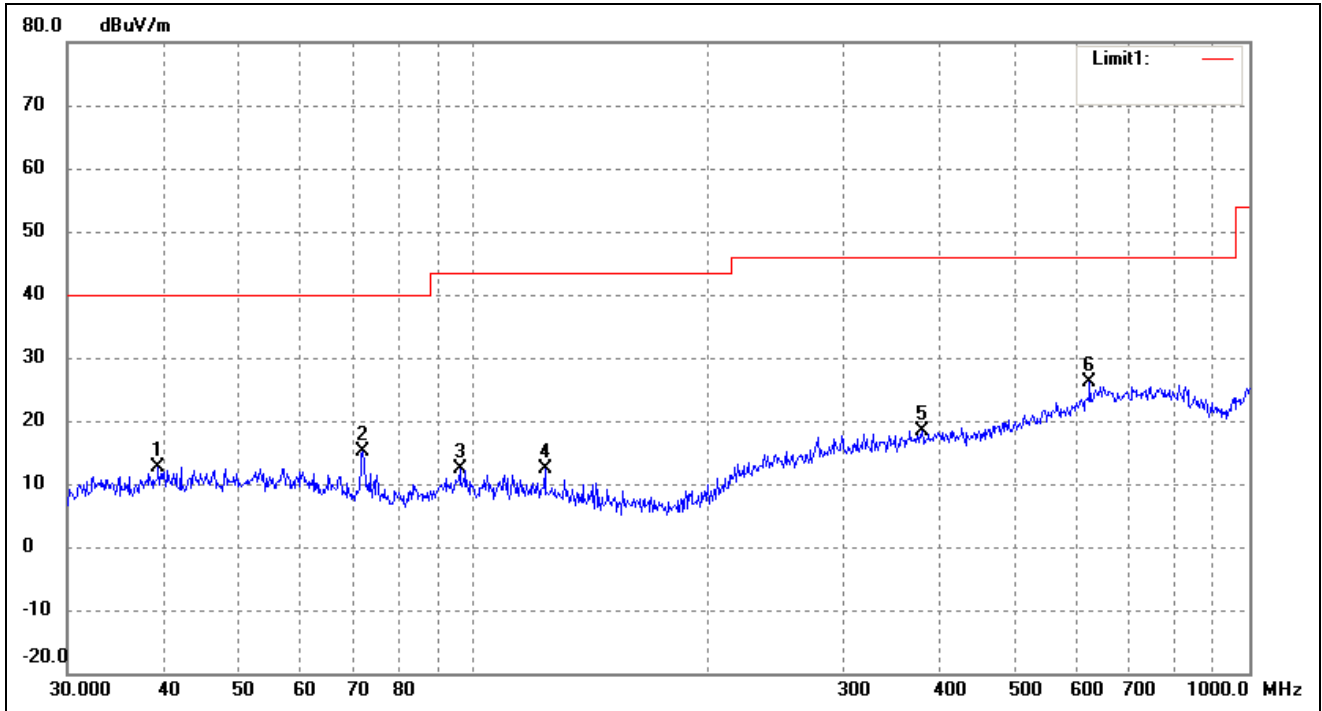
EUT: *Cycling Speed & Cadence Sensor*
 Tested Model: *BK465*
 Operating Condition: *Transmitting-High channel (2480MHz)*
 Comment: *DC 3V by Battery*

Test Specification: *Horizontal*



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	52.0251	29.22	-16.50	12.72	40.00	-27.28	215	100	peak
2	72.0843	31.06	-18.97	12.09	40.00	-27.91	100	100	peak
3	142.8244	30.27	-18.44	11.83	43.50	-31.67	277	100	peak
4	337.2155	27.66	-9.62	18.04	46.00	-27.96	97	100	peak
5	668.1423	26.84	-1.04	25.80	46.00	-20.20	88	100	peak
6	766.0572	26.34	-0.93	25.41	46.00	-20.59	176	100	peak

Test Specification: Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	39.2991	29.19	-16.65	12.54	40.00	-27.46	96	100	peak
2	72.0843	34.02	-18.97	15.05	40.00	-24.95	311	100	peak
3	96.0986	29.64	-17.14	12.50	43.50	-31.00	55	100	peak
4	123.6985	29.41	-16.97	12.44	43.50	-31.06	129	100	peak
5	378.5843	27.19	-8.87	18.32	46.00	-27.68	318	100	peak
6	622.8900	27.68	-1.58	26.10	46.00	-19.90	96	100	peak

Spurious Emissions Above 1GHz
Transmitting: BLE mode:

Frequency (MHz)	Reading (dBuV/m)	Correct dB	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar H/V	Detector
Low Channel-2402MHz							
4804	55.98	-3.59	52.39	74	-21.61	H	PK
4804	41.52	-3.59	37.93	54	-16.07	H	AV
7206	58.70	-0.52	58.18	74	-15.82	H	PK
7206	43.92	-0.52	43.40	54	-10.60	H	AV
4804	60.37	-3.59	56.78	74	-17.22	V	PK
4804	45.71	-3.59	42.12	54	-11.88	V	AV
7206	62.55	-0.52	62.03	74	-11.97	V	PK
7206	44.91	-0.52	44.39	54	-9.61	V	AV
High Channel-2480MHz							
4960	56.14	-3.41	52.73	74	-21.27	H	PK
4960	40.95	-3.41	37.54	54	-16.46	H	AV
7440	58.05	-0.42	57.63	74	-16.37	H	PK
7440	42.55	-0.42	42.13	54	-11.87	H	AV
4960	61.39	-3.41	57.98	74	-16.02	V	PK
4960	47.68	-3.41	44.27	54	-9.73	V	AV
7440	64.42	-0.42	64.00	74	-10.00	V	PK
7440	45.19	-0.42	44.77	54	-9.23	V	AV

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, other than listed in the table above are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

9. Out of Band Emissions

9.1 Standard Applicable

According to §15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

9.2 Test Procedure

According to the KDB 558074 D01 v04, the band-edge radiated test method as follows:

Set span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation (2310MHz to 2420MHz for low bandedge, 2460MHz to 2500MHz for the high bandedge)

RBW = 1MHz, VBW = 1MHz for peak value measured

RBW = 1MHz, VBW = 10Hz for average value measured

Sweep = auto; Detector function = peak/average; Trace = max hold

All the trace to stabilize, set the marker on the emission at the bandedge, or on the highest modulation product outside of the band, if this level is greater than that at the bandedge. Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission. Those emission must comply with the 15.209 limit for fall in the restricted bands listed in section 15.205. Note that the method of measurement KDB publication number: 913591 may be used for the radiated bandedge measurements.

According to the KDB 558074 D01 v04, the conducted spurious emissions test method as follows:

1. Set start frequency to DTS channel edge frequency.
2. Set stop frequency so as to encompass the spectrum to be examined.
3. Set RBW = 100 kHz.
4. Set VBW \geq 300 kHz.
5. Detector = peak.
6. Trace Mode = max hold.
7. Sweep = auto couple.
8. Allow the trace to stabilize (this may take some time, depending on the extent of the span).
9. Use peak marker function to determine maximum amplitude of all unwanted emissions within any 100 kHz bandwidth.

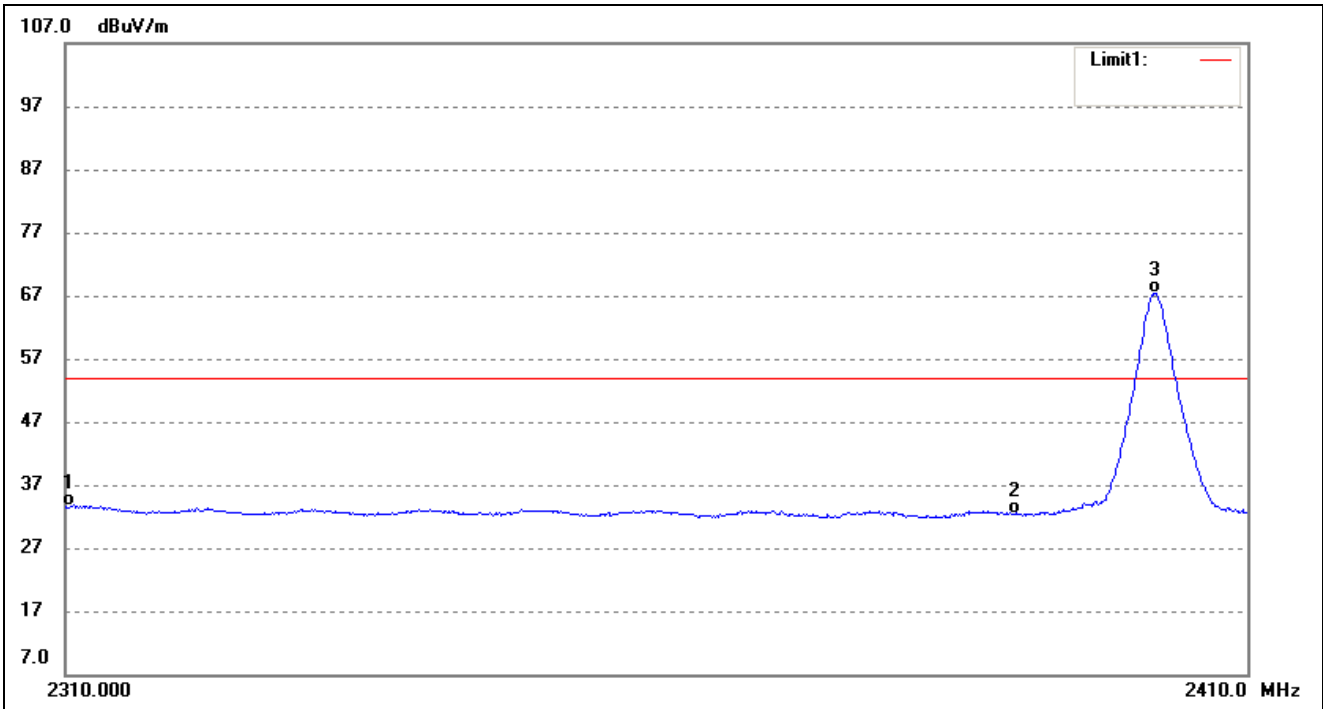
Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements specified in section 8.1. Report the three highest emissions relative to the limit.

9.3 Environmental Conditions

Temperature:	23°C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

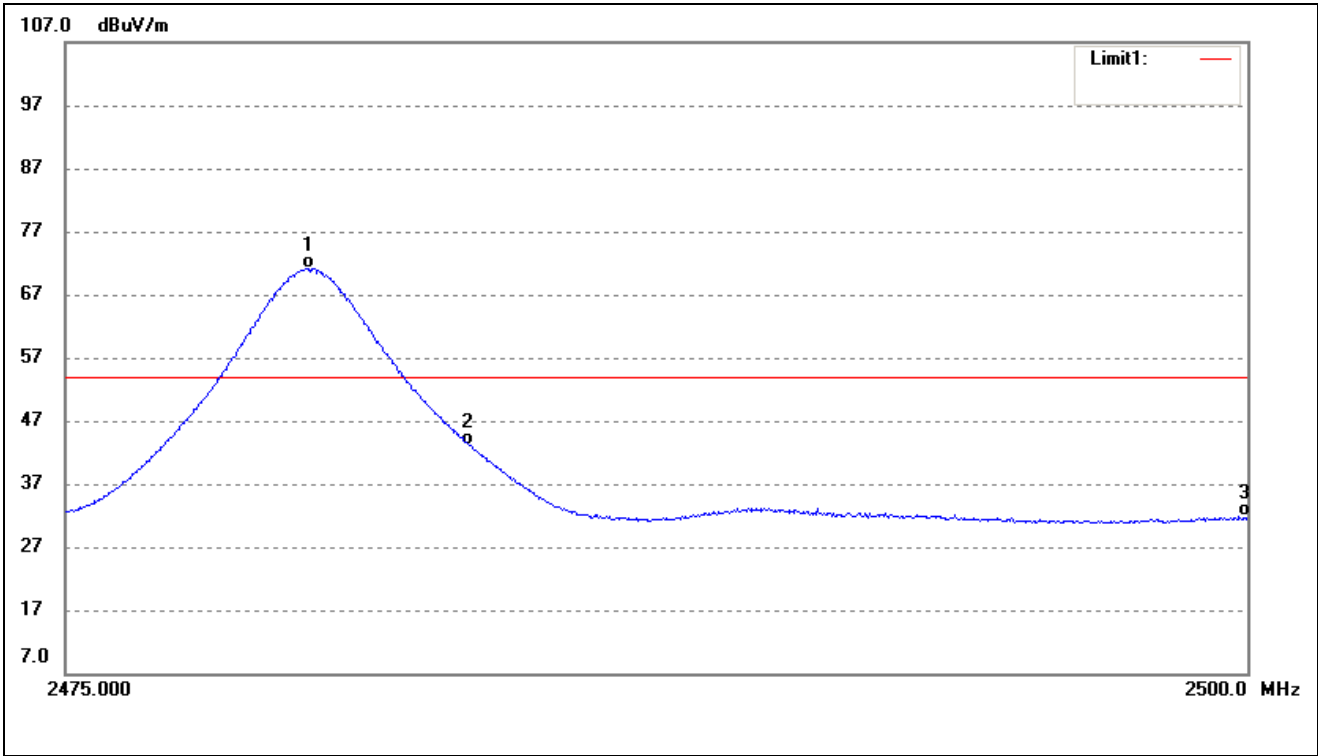
9.4 Summary of Test Results/Plots

Bandedge (Radiated)
 Lowest Bandedge-BLE
 Horizontal (Worst case)



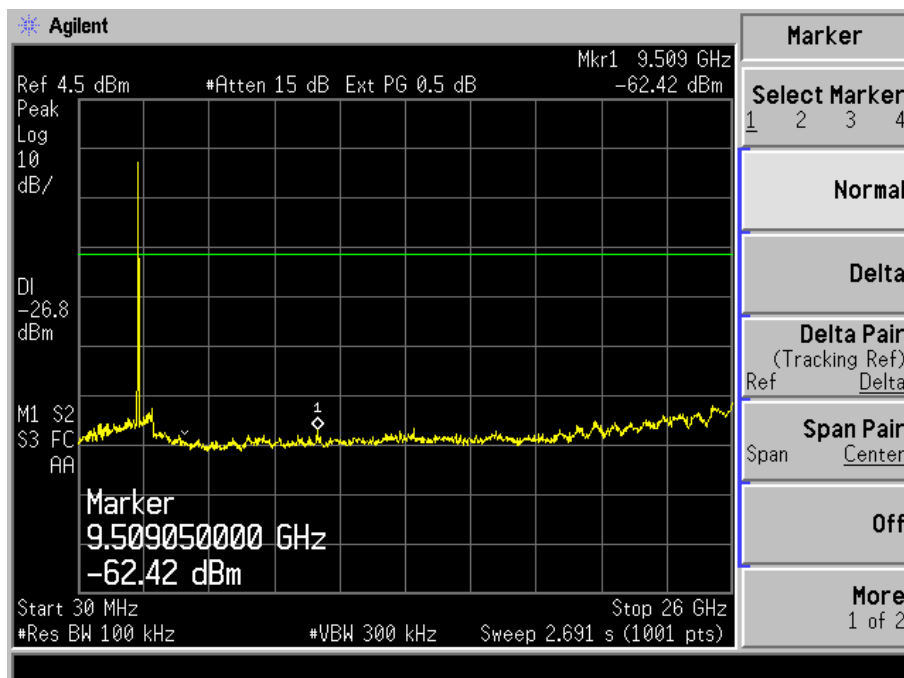
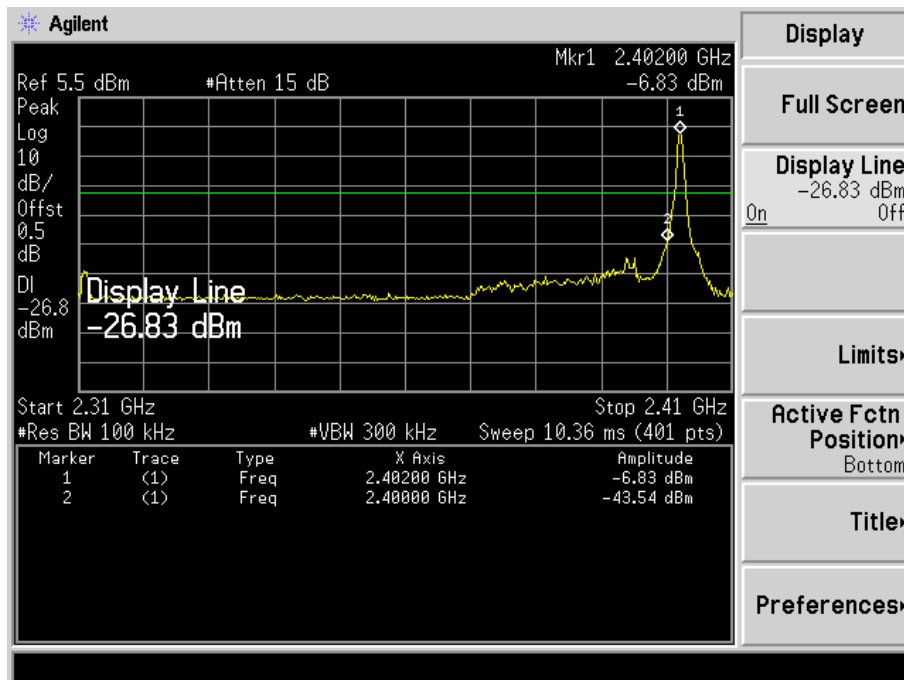
No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2310.000	39.95	-6.38	33.57	54.00	-20.43	Average Detector
		52.02	-6.38	45.64	74.00	-28.36	Peak Detector
2	2390.000	39.58	-7.26	32.32	54.00	-21.68	Average Detector
		56.56	-7.26	49.30	74.00	-24.70	Peak Detector
3	2402.047	74.83	-7.39	67.44	/	/	Average Detector
		96.14	-7.40	88.74	/	/	Peak Detector

Highest Bandedge-BLE
Horizontal (Worst case)

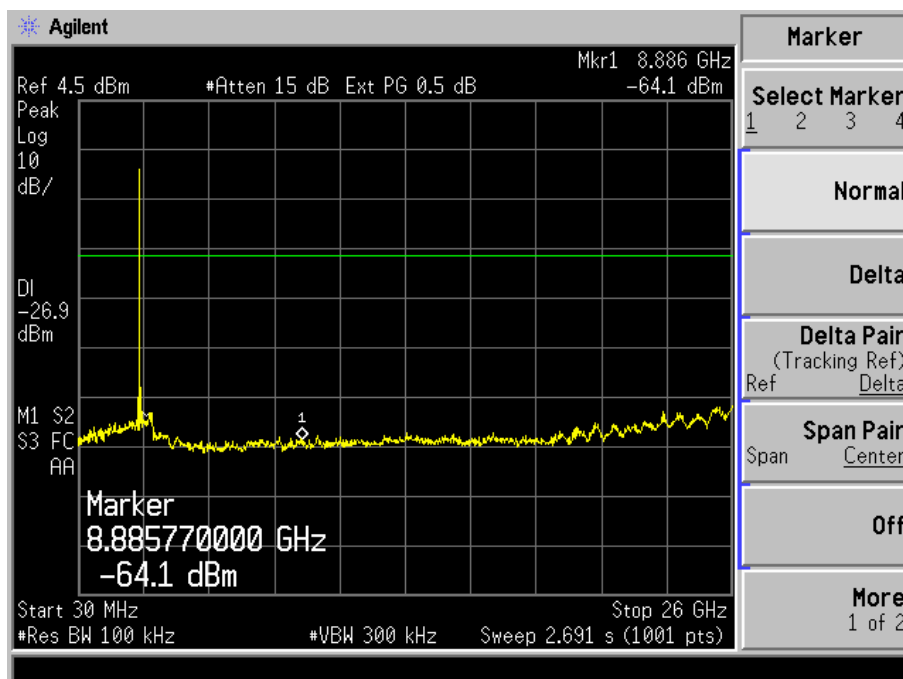
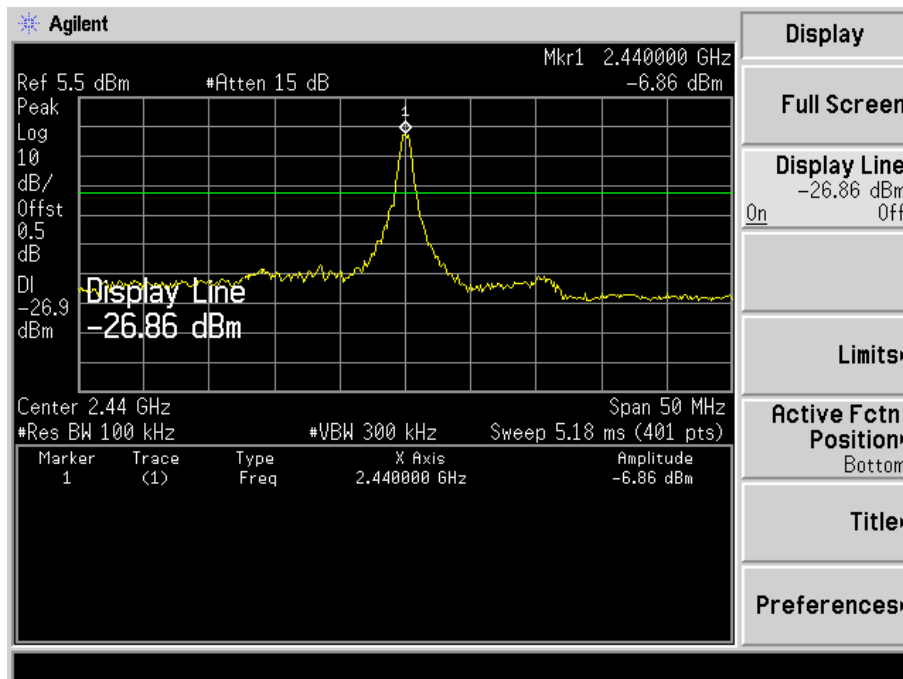


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2480.130	78.41	-7.28	71.13	/	/	Average Detector
	2480.379	100.31	-7.28	93.03	/	/	Peak Detector
2	2483.500	50.42	-7.28	43.14	54.00	-10.86	Average Detector
	2483.500	67.97	-7.28	60.69	74.00	-13.31	Peak Detector
3	2500.000	39.08	-7.25	31.83	54.00	-22.17	Average Detector
	2500.000	50.90	-7.25	43.65	74.00	-30.35	Peak Detector

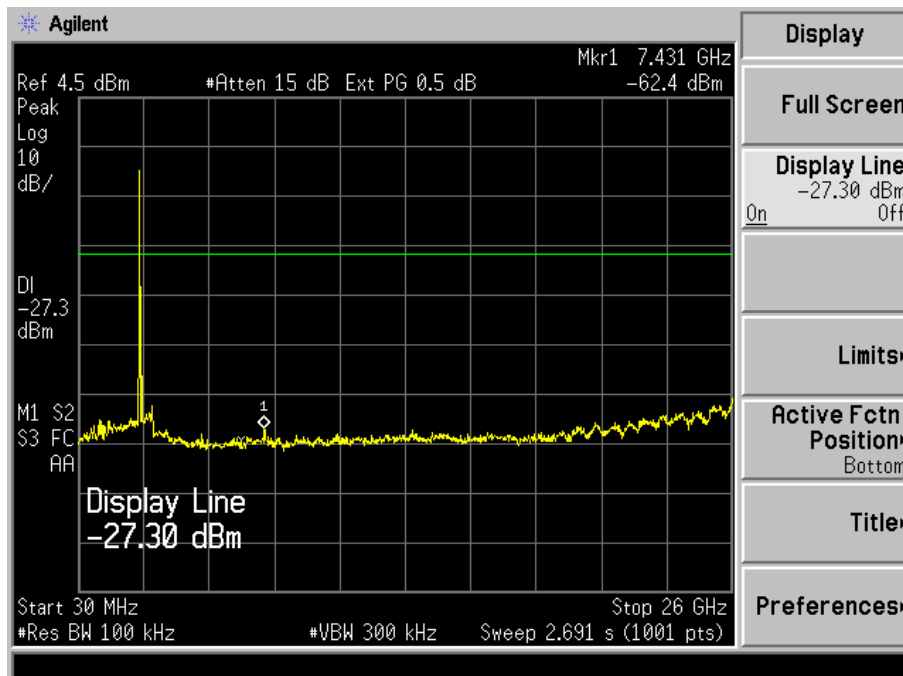
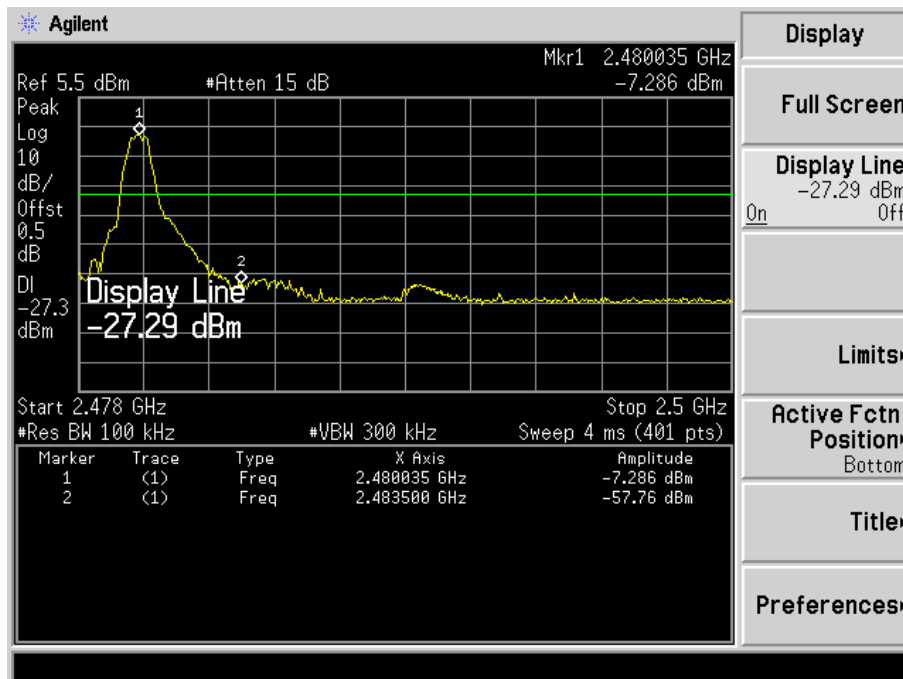
Bandedge (Conducted)
Lowest



Middle Channel:



High Channel:



***** END OF REPORT *****