



Test Report issued under the responsibility of:
ITC ENGINEERING SERVICES, INC.

FCC CFR Title 47 Part 15 Subpart C 15.205, 15.209, 15.247	
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Test Specification Standard	FCC CFR Title 47 Part 15 Subpart C 15.205, 15.209, 15.247
Test Procedure	ANSI C63.4:2009, ANSI C63.10:2009 (Test Procedures) & Public Notice DA 00-705:2000
Judgment	Complies
Test Item Description	Bluetooth, Low-Energy Wearable Device – Motion Sensor
Manufacturer Logo.....	
Manufacturer	Dysonics, Inc.
Model/Type Reference.....	RondoMotion
RF Operating Frequency Band.....	2.400 - 2.4835 GHz



TESTING CERT #3382.01

ISO/IEC 17025:2005 Accredited Laboratory

TABLE OF CONTENTS

1 DOCUMENTATION	5
1.1 TESTING LOCATION.....	5
1.2 REVISION HISTORY.....	5
1.3 DECLARATION/DISCLAIMER.....	6
1.4 CONDITION OF EUT.....	6
1.5 GENERAL DESCRIPTION OF EUT.....	6
1.6 OPERATIONAL DESCRIPTION OF EUT.....	6
1.7 LIST OF APPLICANT PERIPHERALS/SUPPORTING EQUIPMENT USED DURING TEST	6
1.8 GENERAL TEST REMARKS.....	7
1.9 SUMMARY OF TESTS.....	7
1.10 MEASUREMENT UNCERTAINTY	8
1.11 TEST SET UP PHOTOS	8
2 RADIATED EMISSIONS PER FCC PART 15.209.....	11
2.1 ADMINISTRATIVE AND ENVIRONMENTAL DETAILS	11
2.2 TEST EQUIPMENT.....	11
2.3 TEST SET UP PHOTO(S).....	11
2.4 LIMITS/REQUIREMENTS.....	11
2.5 TEST DESCRIPTION AND PROCEDURE	11
2.6 TEST DATA PLOTS.....	12
3 CONDUCTED POWER LINE EMISSIONS PER FCC PART 15.207	15
3.1 ADMINISTRATIVE AND ENVIRONMENTAL DETAILS	15
3.2 TEST EQUIPMENT.....	15
3.3 TEST SET UP PHOTO(S).....	15
3.4 LIMITS/REQUIREMENTS	15
3.5 TEST DESCRIPTION AND PROCEDURE	15
3.6 TEST DATA PLOTS.....	16
4 MINIMUM 6 DB BANDWIDTH PER FCC PART 15.247 (A)(2).....	17
4.1 ADMINISTRATIVE AND ENVIRONMENTAL DETAILS	17
4.2 TEST EQUIPMENT.....	17
4.3 TEST SET UP PHOTO(S).....	17
4.4 LIMITS/REQUIREMENTS	17
4.5 TEST DESCRIPTION AND PROCEDURE	17
4.6 6DB MEASUREMENT TEST DATA	18
4.7 6DB MEASUREMENT PLOTS	18
4.8 CARRIER FREQUENCY SEPARATION PLOT	20
5 PEAK CONDUCTED OUTPUT POWER PER FCC PART 15.247 (B)(3)	21
5.1 ADMINISTRATIVE AND ENVIRONMENTAL DETAILS	21
5.2 TEST EQUIPMENT.....	21
5.3 TEST SET UP PHOTO(S).....	21
5.4 LIMITS/REQUIREMENTS	21
5.5 TEST DESCRIPTION AND PROCEDURE	21

5.6 TEST DATA TABLES	21
5.7 PEAK POWER PLOTS.....	22
6 GAIN OF TRANSMISSION ANTENNA PER FCC PART 15.247 (B)(4)	23
6.1 LIMITS/REQUIREMENTS	23
7 POWER SPECTRAL DENSITY PER FCC PART 15.247 (D)	24
7.1 ADMINISTRATIVE AND ENVIRONMENTAL DETAILS	24
7.2 TEST EQUIPMENT.....	24
7.3 TEST SET UP PHOTO(S).....	24
7.4 LIMITS/REQUIREMENTS	24
7.5 TEST DESCRIPTION AND PROCEDURE	24
7.6 TEST DATA TABLES	25
7.7 POWER SPECTRAL DENSITY PLOTS.....	25
8 BAND-EDGE MEASUREMENT PER FCC PART 15 SECTION 15.247 (D)	27
8.1 ADMINISTRATIVE AND ENVIRONMENTAL DETAILS	27
8.2 TEST EQUIPMENT.....	27
8.3 TEST SET UP PHOTO(S).....	27
8.4 LIMITS/REQUIREMENTS	27
8.5 TEST DESCRIPTION AND PROCEDURE	27
8.6 TEST PLOTS.....	28
9 SPURIOUS & RESTRICTED BANDS EMISSIONS PER FCC PART 15 SECTIONS 15.209 & 15.205	29
9.1 ADMINISTRATIVE AND ENVIRONMENTAL DETAILS	29
9.2 TEST EQUIPMENT.....	29
9.3 TEST SET UP PHOTO(S).....	29
9.4 LIMITS/REQUIREMENTS	29
9.5 TEST DESCRIPTION AND PROCEDURE	30
9.6 SPURIOUS EMISSIONS PLOTS.....	31
10 APPENDIX	38
10.1 EUT TECHNICAL SPECIFICATIONS.....	38
10.2 EUT PHOTOS	38

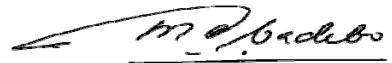
LIST OF FIGURES

FIGURE 1: CONDUCTED RF TEST SETUP	8
FIGURE 2: RE TEST SETUP– ACTIVE MAGNETIC LOOP ANTENNA	9
FIGURE 3: RE TEST SETUP– BICONICAL ANTENNA –LOG PERIODIC ANTENNA	9
FIGURE 4: CE TEST SETUP – FRONT VIEW – SIDE VIEW	9
FIGURE 5: RADIATED EMISSIONS TEST SETUP - HORN ANTENNAS	10
FIGURE 6: TRANSMITTER RADIATED SPURIOUS EMISSIONS TEST SETUP.....	10
FIGURE 7: RADIATED EMISSIONS – ACTIVE MAGNETIC LOOP, 9 KHZ – 2 MHZ.....	12
FIGURE 8: RADIATED EMISSIONS – ACTIVE MAGNETIC LOOP, 9 KHZ – 30 MHZ.....	12
FIGURE 9: RADIATED EMISSIONS – BICONICAL, HORIZONTAL POLARIZATION	13
FIGURE 10: RADIATED EMISSIONS – BICONICAL, VERTICAL POLARIZATION	13
FIGURE 11: RADIATED EMISSIONS – LOG-PERIODIC, HORIZONTAL POLARIZATION	14
FIGURE 12: RADIATED EMISSIONS – LOG-PERIODIC, VERTICAL POLARIZATION	14

FIGURE 13: CONDUCTED EMISSIONS – HOT AC LINE.....	16
FIGURE 14: CONDUCTED EMISSIONS – NEUTRAL AC LINE	16
FIGURE 15: BLUETOOTH V4.0 LE CHANNELS (3 ADVERTISING, 37 DATA).....	17
FIGURE 16: 6DB BANDWIDTH (CH37)	18
FIGURE 17: 6DB BANDWIDTH (CH20)	19
FIGURE 18: 6DB BANDWIDTH (CH39)	19
FIGURE 19: CARRIER FREQUENCY SEPARATION 2 MHZ	20
FIGURE 20: CH37 PEAK POWER	22
FIGURE 21: CH20 PEAK POWER	22
FIGURE 22: CH39 PEAK POWER	23
FIGURE 23: CH37 POWER SPECTRAL DENSITY	25
FIGURE 24: CH20 POWER SPECTRAL DENSITY	26
FIGURE 25: CH39 POWER SPECTRAL DENSITY	26
FIGURE 26: CH37 BAND-EDGE PEAK; MAX POWER SETTING = 0 DBM	28
FIGURE 27: CH39 BAND-EDGE PEAK; MAX POWER SETTING = 0 DBM	28
FIGURE 28: SPURIOUS EMISSION – RX OFF, TX OFF	31
FIGURE 29: SPURIOUS EMISSION – HORIZONTAL POLARIZATION - TX CH37, 20, 39	31
FIGURE 30: SPURIOUS EMISSION – HORIZONTAL POLARIZATION - TX CH37, 20, 39	32
FIGURE 31: SPURIOUS EMISSION – HORIZONTAL POLARIZATION - TX CH37, 20, 39	32
FIGURE 32: SPURIOUS EMISSION – HORIZONTAL POLARIZATION - RX CH37, 20, 39	33
FIGURE 33: SPURIOUS EMISSION – HORIZONTAL POLARIZATION - RX CH37, 20, 39	33
FIGURE 34: SPURIOUS EMISSION – HORIZONTAL POLARIZATION - RX CH37, 20, 39	34
FIGURE 35: SPURIOUS EMISSION – VERTICAL POLARIZATION - TX CH37, 20, 39	34
FIGURE 36: SPURIOUS EMISSION – VERTICAL POLARIZATION - TX CH37, 20, 39	35
FIGURE 37: SPURIOUS EMISSION – VERTICAL POLARIZATION - TX CH37, 20, 39	35
FIGURE 38: SPURIOUS EMISSION – VERTICAL POLARIZATION - RX CH37, 20, 39	36
FIGURE 39: SPURIOUS EMISSION – VERTICAL POLARIZATION - RX CH37, 20, 39	36
FIGURE 40: SPURIOUS EMISSION – VERTICAL POLARIZATION - RX CH37, 20, 39	37
FIGURE 41: TOP & CONNECTOR VIEW	38
FIGURE 42: BOTTOM VIEW.....	39

1 DOCUMENTATION

1.1 TESTING LOCATION

<input checked="" type="checkbox"/> ITC Testing Laboratory:	:	ITC Engineering Services, Inc.
Testing Location/Address	:	9959 Calaveras Road, PO Box 543, Sunol, CA 94586, USA
Prepared By (Name + Signature)	:	D.E. Waldbeser 
Tested By (Name + Signature)	:	D.E. Waldbeser 
Approved By (Name + Signature)	:	Michael Gbadebo, PE 
<input type="checkbox"/> Manufacturer Facility	:	
Testing Location/Address	:	
Tested By (Name + Signature)	:	
Approved By (+ Signature)	:	
<input type="checkbox"/> 3 rd Party Test Facility	:	
Testing Location/Address	:	
Tested By (Name + Signature)	:	
Approved By (+ Signature)	:	

1.2 REVISION HISTORY

#	Revision Date	Old Report Number	New Report Number	Revision
1	3/24/14	20130905-01 Dysonics_FCC	20130905-01R Dysonics_FCC	(1) Change report structure consistent with system utilizing digital modulation techniques. (2) Expanded radiated emission frequency range to include 32 kHz clock.
2	4/3/14	20130905-01R Dysonics_FCC	20130905-01R2 Dysonics_FCC	Change sections 1 and 2 to reflect use of magnetic loop antenna in place of active monopole antenna for 9 kHz – 30 MHz measurement

1.3 DECLARATION/DISCLAIMER

It is the manufacturer's responsibility to assure that additional production units of these models are manufactured with identical electrical and mechanical characteristics. This report is the confidential property of the applicant. As a mutual protection to our applicants, the public, and ourselves, extracts from the test report shall not be reproduced except in full without ITC Engineering Service's written approval. The applicant/manufacturer shall not use this report to claim product endorsement by any US Government agency.

1.4 CONDITION OF EUT

Equipment Under Test (EUT) was tested as it was received. Two device configurations were used to facilitate RF testing. One configuration was fitted with an RF connector, bypassing the on-board chip antenna, for conducted level tests. This unit was also software controllable by means of a laptop and interface device. The other unit was packaged normally and contained a custom firmware that enabled fixed discrete operating modes to be selected.

1.5 GENERAL DESCRIPTION OF EUT

Product	RondoMotion
Model No.	N/A
FCC ID	2AA7UDYSRM001
Power Supply	Internal rechargeable Lithium Polymer battery
Modulation Type	GFSK
Modulation Technology	Bluetooth v4.0 LE (low energy) utilizing digital modulation techniques (DTS)
Transfer Rate	1 Mbps
Operating Frequency Range	2.400- 2.4835 GHz
Number of Channels	40
Maximum Output Power	+4 dBm (default is +0 dBm, not user adjustable)
Antenna Type	On-board, Johanson 2450AT18A100 chip antenna or equiv., 0.5 to -0.5 dBi
I/O Ports	USB Micro-B receptacle

1.6 OPERATIONAL DESCRIPTION OF EUT

The RondoMotion device (EUT) is a portable, self-contained, headset-mountable sensor using Bluetooth v4.0 Low Energy digital modulation technique. 3-axis orientation and acceleration data is transmitted to a paired device supporting the BLE v4.0 stack architecture. The on-board MPU6050 gyro/accelerometer chip provides this data to the Texas Instrument CC2540 system-on-chip which handles all data packet formatting, communication, handshaking, radio control and transmission functions. The negotiated channel RF signal is output from the PCB-mounted omni-directional ceramic chip antenna.

1.7 LIST OF APPLICANT PERIPHERALS/SUPPORTING EQUIPMENT USED DURING TEST

Description	Manufacturer	Model Name	Serial Number
Flash Programmer	Texas Instruments	CC Debugger	-
PC Laptop	Toshiba Satellite	L305-S5877	782722420
iPad	Apple	MD328LL	DLXH3363DVD1
AC Adapter	HTC	TC U250	-

1.8 GENERAL TEST REMARKS

The EUT was operated under the following conditions during the testing:

<input type="checkbox"/>	Standby	<input type="checkbox"/>	Test Program (H – Pattern)
<input type="checkbox"/>	Test Program (Color Bar)	<input checked="" type="checkbox"/>	Test Program (Applicant Specific)
<input type="checkbox"/>	TV/VCR Signal Input	<input type="checkbox"/>	Signal Generator Input
<input type="checkbox"/>	Continuous Audio Tone (1kHz)	<input type="checkbox"/>	Cycled Audio Tone (1kHz)
<input type="checkbox"/>	Printer/Parallel Function	<input type="checkbox"/>	Modem/Serial Function
<input type="checkbox"/>	Serpentine Program with I/O	<input type="checkbox"/>	Serpentine Program without I/O
<input type="checkbox"/>	Practice Operation	<input type="checkbox"/>	Normal Operating Mode
<input type="checkbox"/>	Essential Operation (Functional Safety)	<input type="checkbox"/>	Continuous Unmonitored Operation
<input checked="" type="checkbox"/>	Continuous Monitored Operation	<input type="checkbox"/>	Non-Continuous Operation

The requirements according to the technical regulations are:

<input checked="" type="checkbox"/>	Met	<input type="checkbox"/>	Not Met
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The Equipment Under Test does:

<input checked="" type="checkbox"/>	Fulfill the general approval requirements	<input type="checkbox"/>	Not fulfill the general approval requirements
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1.9 SUMMARY OF TESTS

ITC Engineering Services, Inc. as an independent testing laboratory, declares that the equipment specified above was tested to the requirements of:

Section of FCC 15.xxx	Test Description	Result
209	Radiated Emissions, general	Passed
207	Conducted Emissions	Passed
247 (a)(2)	6 dB Bandwidth	Passed
247 (b)(3)	Peak Conducted Output Power (2400-2483.5MHz)	Passed
247 (b)(4)	Gain of Transmission Antenna	Passed
247 (d)	Band-Edge Measurement	Passed
247 (e)	Power Spectral Density	Passed
209/205	Spurious & Restricted Band Emissions	Passed

Note: The EUT is battery-powered.

1.10 MEASUREMENT UNCERTAINTY

The measurement of uncertainty levels were estimated based on calculation in accordance with TR 100-028-1. Using the value $k = 2$ for expanded uncertainty, this provides a 95% level of confidence.

	Measurement Method	Calculated Uncertainty (dB)
1	RF Power, Conducted	± 1.5
2	Radiated emission of transmitter (30MHz - 1 GHz) @ 3m	± 3.2
3	Radiated emission of transmitter (1 GHz - 24 GHz) @ 3m	± 2.5

1.11 TEST SET UP PHOTOS

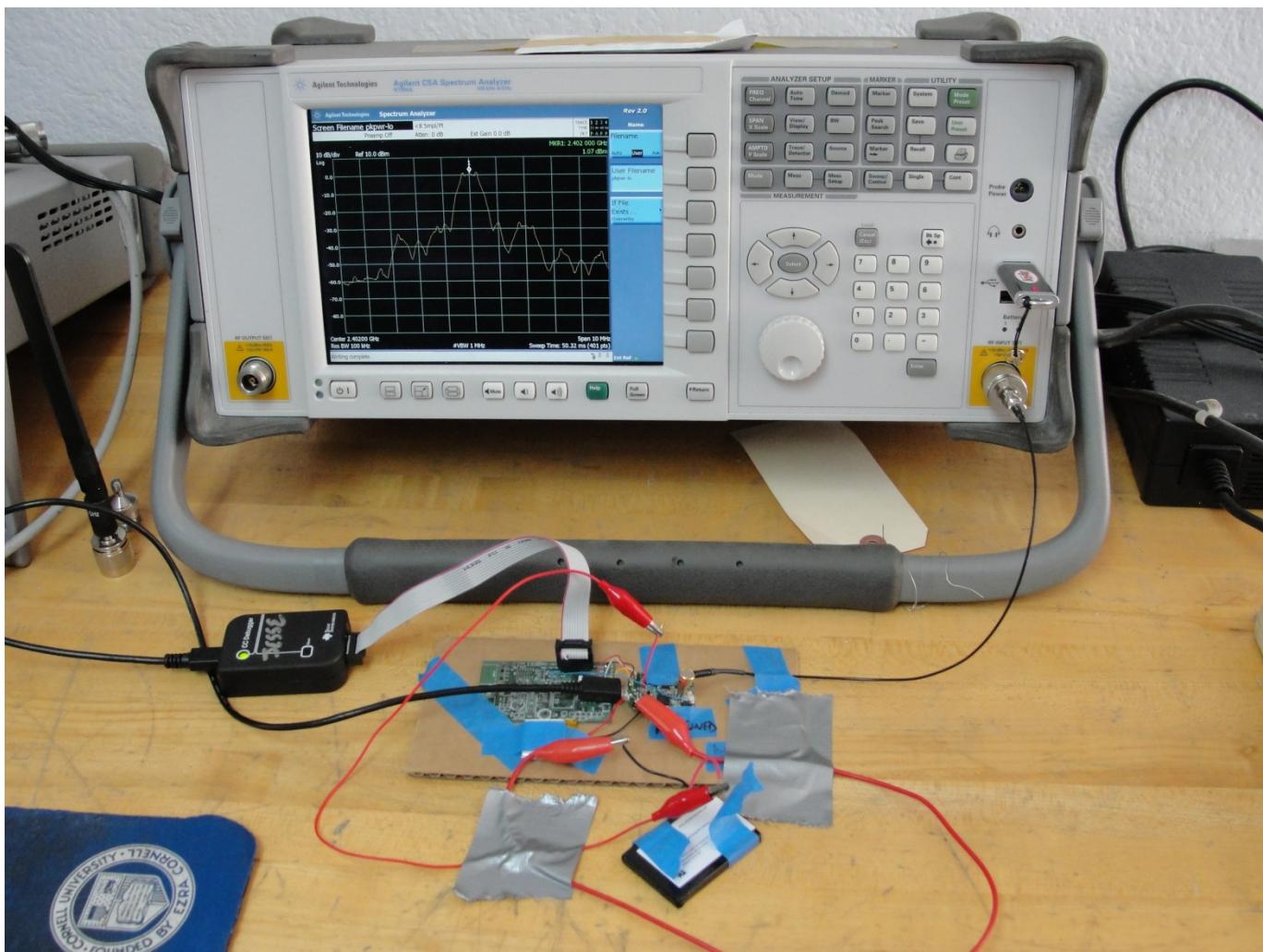


FIGURE 1: Conducted RF Test Setup

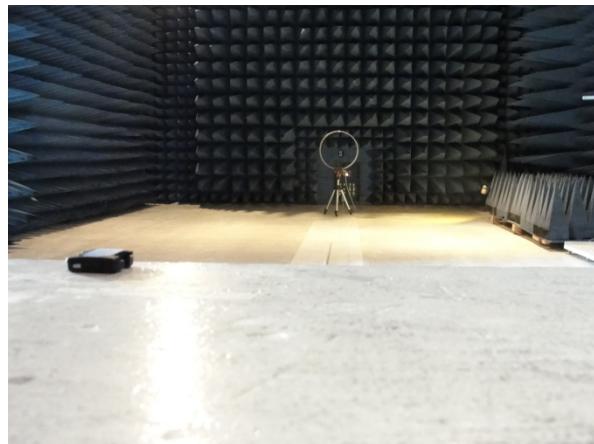


FIGURE 2: RE Test Setup– Active Magnetic Loop Antenna

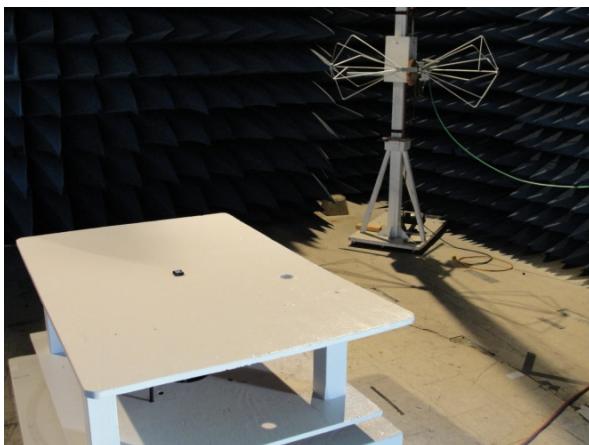


FIGURE 3: RE Test Setup– Biconical Antenna



-Log Periodic Antenna

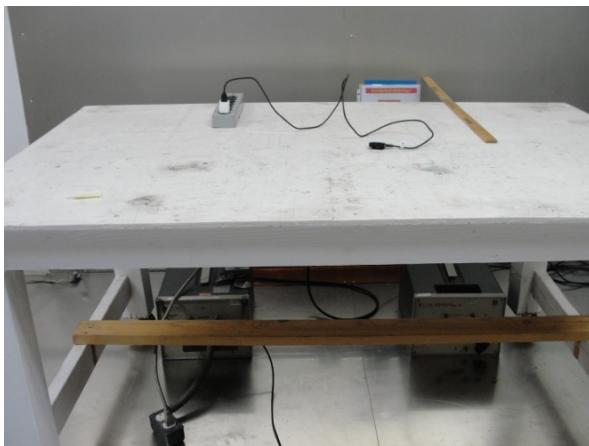


FIGURE 4: CE Test Setup – Front View



– Side View

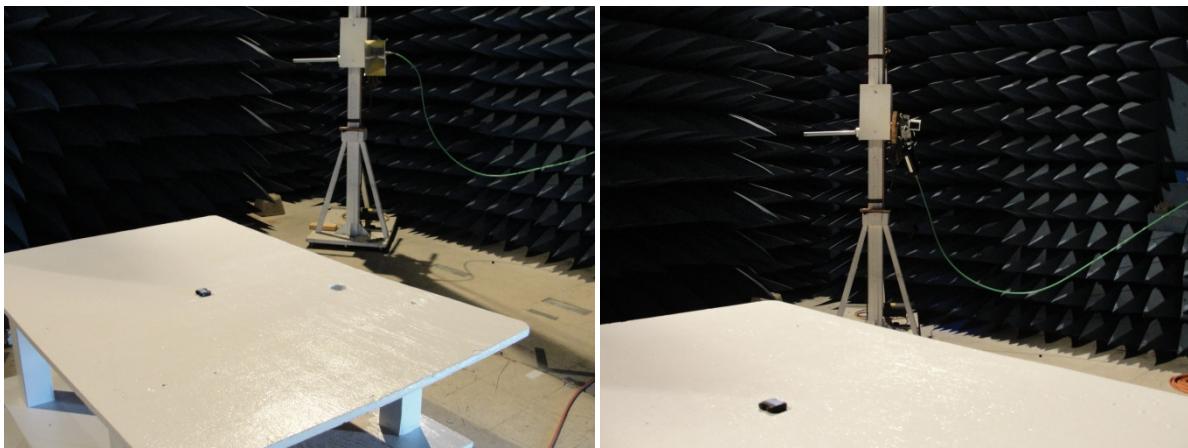


FIGURE 5: Radiated Emissions Test Setup - Horn Antennas

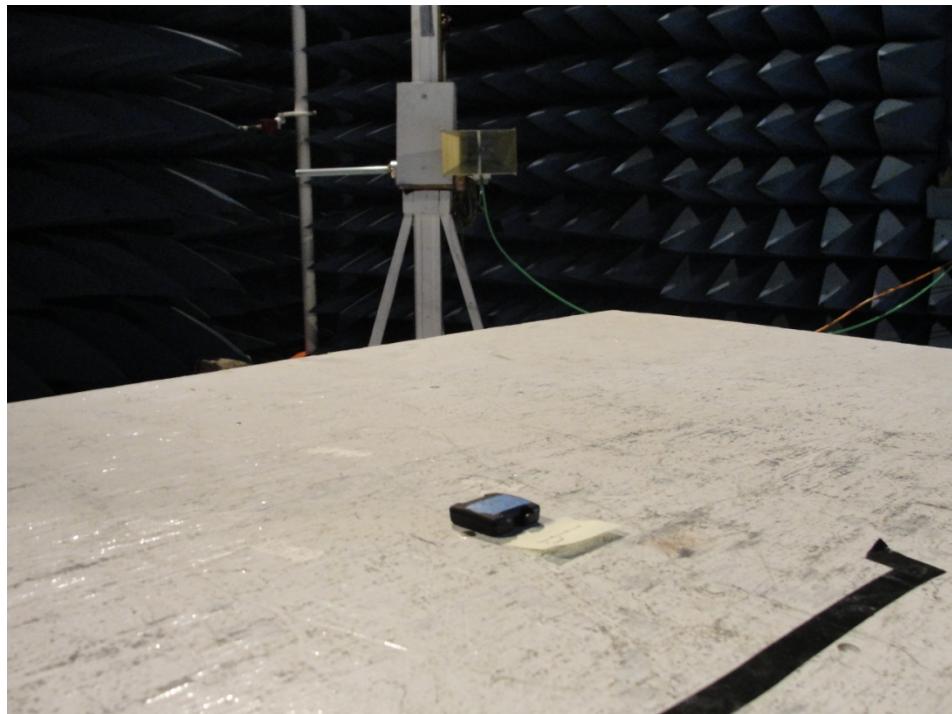


FIGURE 6: Transmitter Radiated Spurious Emissions Test Setup

2 RADIATED EMISSIONS PER FCC PART 15.209

2.1 ADMINISTRATIVE AND ENVIRONMENTAL DETAILS

Site Used:	EMC Lab 2B
Test Date:	9/11/13, 4/3/14
Test Engineer:	D.E. Waldbeser
Temperature	21°C
Humidity:	48%

2.2 TEST EQUIPMENT

Equipment Description	Manufacturer	Model Name	Serial Number	Calibration Due Date	Calibration Interval
EMC Analyzer	Agilent	E7402A	MY45112375	7/31/15	2 yr
Active Magnetic Loop	EMCO	6502	1071/1001	3/5/15	2 yr
Bi-Conical Antenna	EMCO	3104	3459	8/09/14	2 yr
L. P. Antenna	EMCO	3146	1596-1001	5/23/14	2 yr

2.3 TEST SET UP PHOTO(S)

Refer to Section 1.10 (Figures 2-4)

2.4 LIMITS/REQUIREMENTS

FCC Part 15 section 15.209 Radiated emission limits

Frequency (MHz)	Field strength Average (microvolts/meter)	Field strength Average (dBuV/meter)	Field strength Peak (dBuV/meter)	Measurement distance (meters)
0.009-0.49	267 – 4.9 ⁺	48.5 - 13.8	68.5 – 33.8	300*
0.49-1.705	49 – 14.1 ^x	33.8 - 23	53.8 - 43	30*
1.705-30	30	29.5	49.5	30*
30-88	100	40	60	3
88-216	150	43.5	63.5	3
216-960	200	46	66	3
Above 960	500	54	74	3

⁺ 2400/F(kHz) ^x 24000/F(kHz)

*Measurement performed at 10m per 47 CFR 15.31 (f)(2) distance scaling factor.

2.5 TEST DESCRIPTION AND PROCEDURE

The EUT was placed on a non-conducting table whose surface is 80 cm above the ground plane. The table may be rotated in order to maximize the signal received by the measurement system. RF emissions from 9 kHz to 1 GHz are received by a series of antennas. The biconical, log-periodic and DRG horn are located 3m away, their elevation above the ground plane is adjusted (1-4 m) for maximum signal. Both horizontally and vertically polarized signals are detected and recorded.

The active magnetic loop antenna is located at 10m from the EUT with the loop center 1m above the floor. The loop is rotated about the vertical axis for maximum response.

2.6 TEST DATA PLOTS

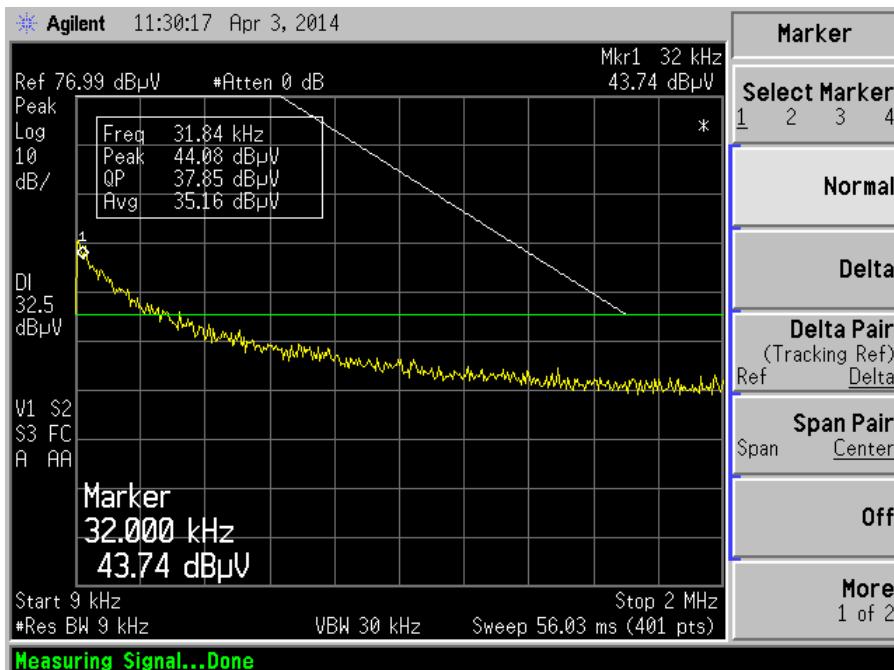


FIGURE 7: Radiated Emissions – Active Magnetic Loop, 9 kHz – 2 MHz

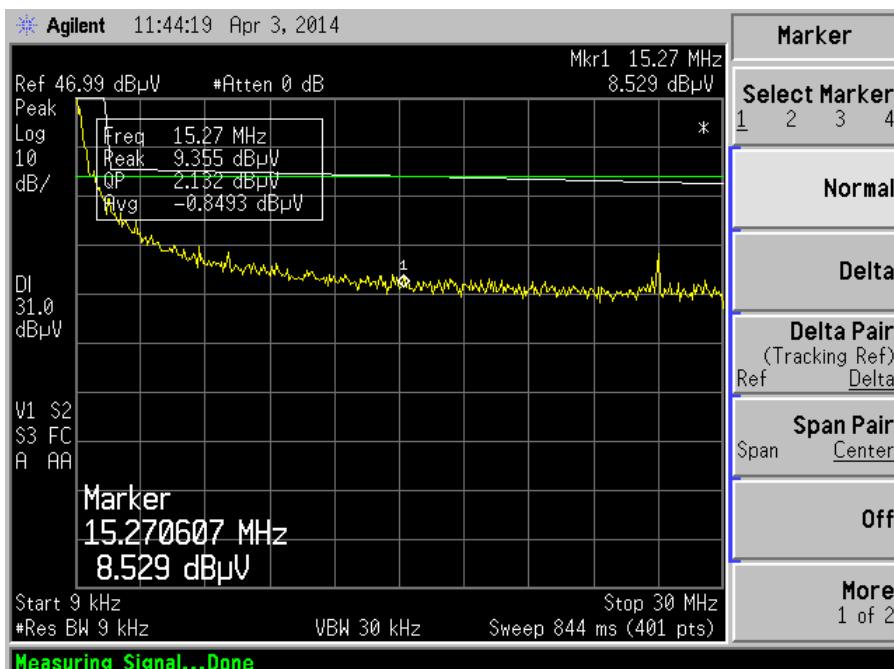


FIGURE 8: Radiated Emissions – Active Magnetic Loop, 9 kHz – 30 MHz



FIGURE 9: Radiated Emissions – Biconical, Horizontal Polarization
A = ambient



FIGURE 10: Radiated Emissions – Biconical, Vertical Polarization
A = ambient

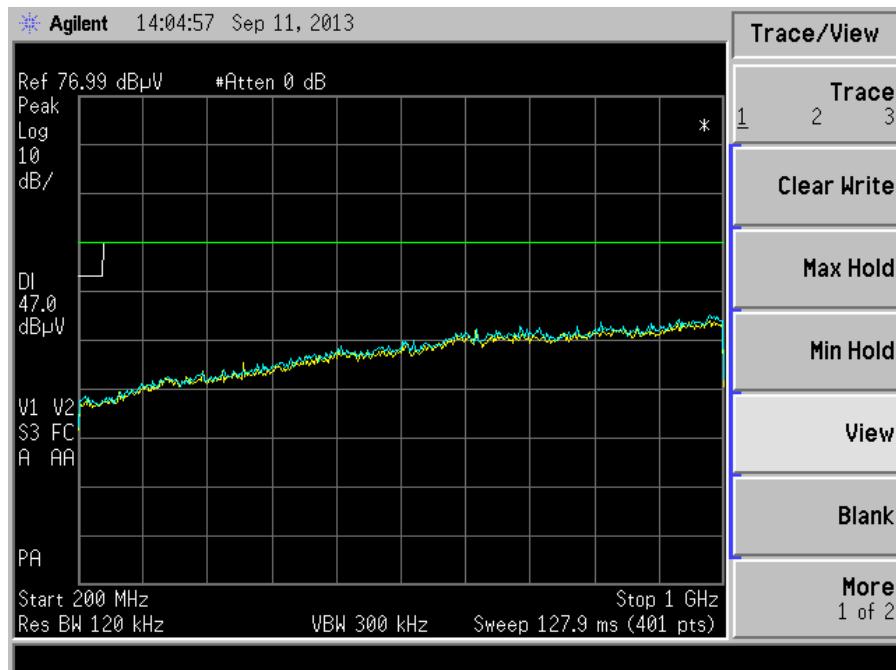


FIGURE 11: Radiated Emissions – Log-periodic, Horizontal Polarization

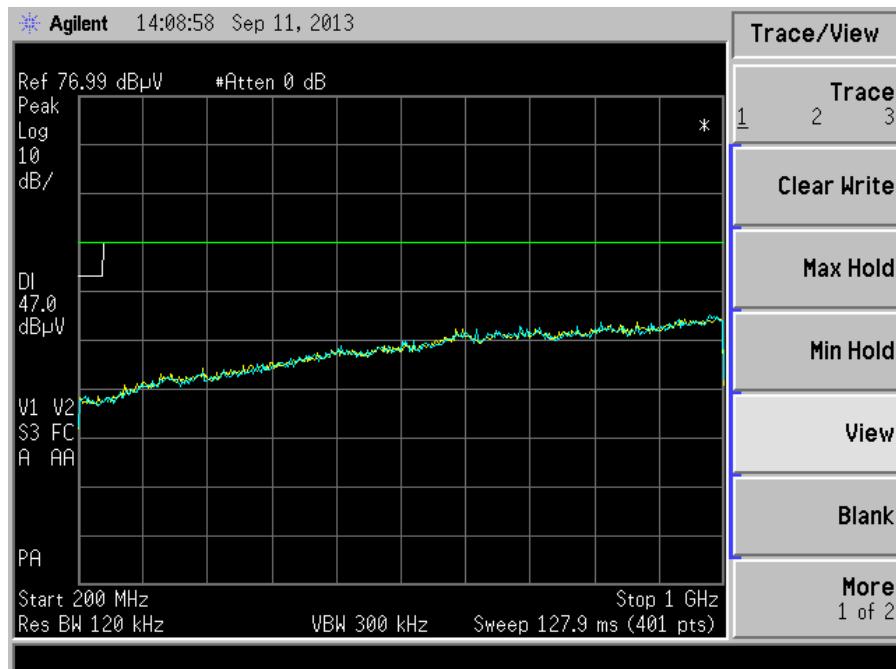


FIGURE 12: Radiated Emissions – Log-periodic, Vertical Polarization

3 CONDUCTED POWER LINE EMISSIONS PER FCC PART 15.207

3.1 ADMINISTRATIVE AND ENVIRONMENTAL DETAILS

Site Used:	EMC Lab 2B
Test Date:	9/11/2013
Test Engineer:	D.E. Waldbeser
Temperature	21°C
Humidity:	48%

3.2 TEST EQUIPMENT

Equipment Description	Manufacturer	Model Name	Serial Number	Calibration Due Date	Calibration Interval
EMC Analyzer	Agilent	E7402A	MY45112375	7/31/15	2 yr
LISN	EMCO	3825/2	8901-1229	8/6/14	2 yr

3.3 TEST SET UP PHOTO(S)

Refer to Section 1.10 (Figures 2-3)

3.4 LIMITS/REQUIREMENTS

FCC Part 15 section 15.207

Frequency of emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

3.5 TEST DESCRIPTION AND PROCEDURE

The EUT was placed in a shielded room 80 cm above the horizontal ground reference plane and 40 cm away from the vertical ground reference plane. AC mains input to the DC charging adapter was supplied through a LISN (Line Impedance Stabilization Network) and the excess power cord was looped into figure "8" above the LISN. The 5Vdc output was supplied to the EUT. The line conducted tests were performed on the AC mains hot and neutral lines.

3.6 TEST DATA PLOTS

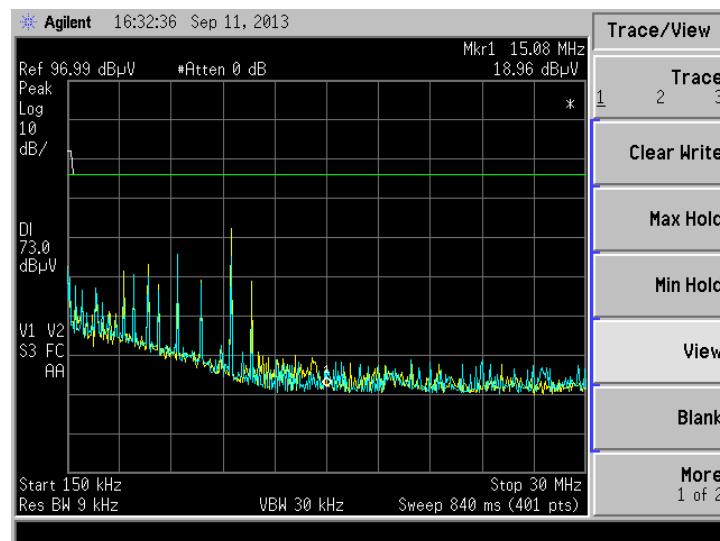


FIGURE 13: Conducted Emissions – Hot AC Line

(Blue = ambient, DC adapter removed; Yellow = DC adapter, EUT on)

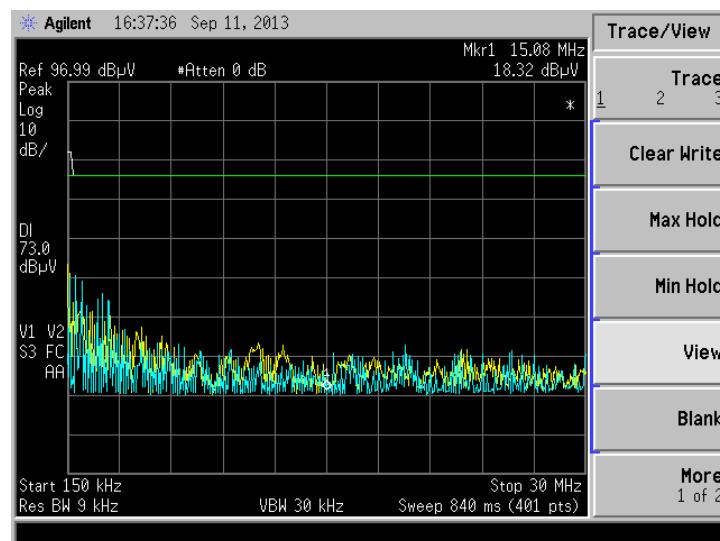


FIGURE 14: Conducted Emissions – Neutral AC Line

(Blue = ambient, DC adapter removed; Yellow = DC adapter, EUT on)

4 MINIMUM 6 DB BANDWIDTH PER FCC PART 15.247 (A)(2)

4.1 ADMINISTRATIVE AND ENVIRONMENTAL DETAILS

Site Used:	EMC Lab 2B
Test Date:	9/13/2013
Test Engineer:	D.E. Waldbeser
Temperature	21°C
Humidity:	48%

4.2 TEST EQUIPMENT

Equipment Description	Manufacturer	Model Name	Serial Number	Calibration Due Date	Calibration Interval
CSA Spectrum Analyzer	Agilent	N1996A	MY45371881	1/17/14	2 yr

4.3 TEST SET UP PHOTO(S)

Refer to Section 1.10(Figure1)

4.4 LIMITS/REQUIREMENTS

(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.

4.5 TEST DESCRIPTION AND PROCEDURE

The EUT, modified to bypass the on-board chip antenna and provide an SMA output antenna port, is connected to the spectrum analyzer. The minimum 6dB bandwidth is determined by measuring the width of the carrier signal between the lowest frequency and the highest frequency of the carrier signal where the level is 6dB below the maximum signal power. The EUT is set to transmit single channel, modulated and maximum controlled power output. The test is performed at or near the low, mid and high channel of the operating band.

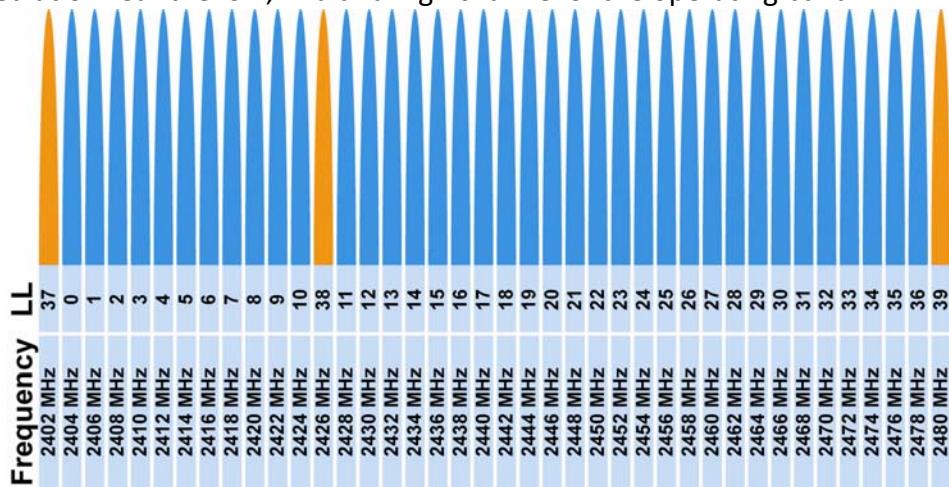


FIGURE 15: Bluetooth v4.0 LE Channels (3 advertising, 37 data)

4.6 6DB MEASUREMENT TEST DATA

Operating Freq band: 2400 -2483.5 MHz

Modulation: Pseudorandom number data, GFSK

Max Power Setting: 0 dBm

Channel	Freq. (MHz)	Measured 6dB BW Limit \geq 500 kHz	Result
37	2402	812	Pass
20	2446	762	Pass
39	2480	725	Pass

4.7 6DB MEASUREMENT PLOTS

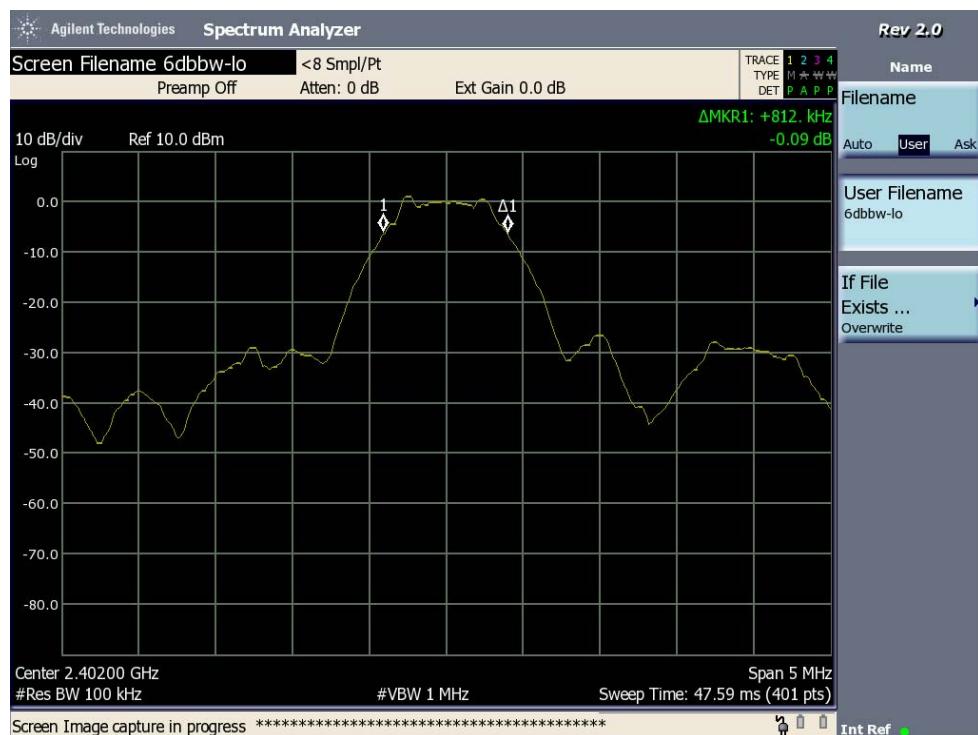


FIGURE 16: 6dB Bandwidth (Ch37)

**FIGURE 17: 6dB Bandwidth (Ch20)****FIGURE 18: 6dB Bandwidth (Ch39)**

4.8 CARRIER FREQUENCY SEPARATION PLOT

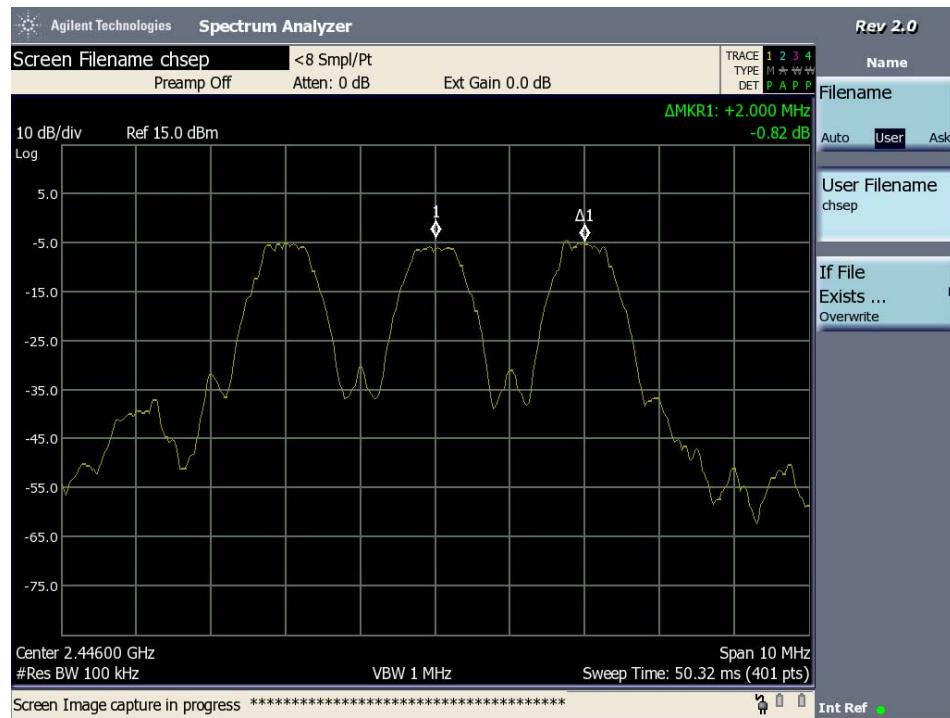


FIGURE 19: Carrier Frequency Separation 2 MHz

5 PEAK CONDUCTED OUTPUT POWER PER FCC PART 15.247 (B)(3)

5.1 ADMINISTRATIVE AND ENVIRONMENTAL DETAILS

Site Used:	EMC Lab 2B
Test Date:	9/13/2013
Test Engineer:	D.E. Waldbeser
Temperature	23°C
Humidity:	41%

5.2 TEST EQUIPMENT

Equipment Description	Manufacturer	Model Name	Serial Number	Calibration Due Date	Calibration Interval
CSA Spectrum Analyzer	Agilent	N1996A	MY45371881	1/17/14	2 yr

5.3 TEST SET UP PHOTO(S)

Refer to section 1.10 (Figure 1)

5.4 LIMITS/REQUIREMENTS

- (b) The maximum peak conducted output power of the intentional radiator shall not exceed the following:
 - (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.

5.5 TEST DESCRIPTION AND PROCEDURE

The EUT antenna port is connected to the spectrum analyzer. The maximum peak conducted output power was measured at the center peak of the selected channel. Measurements are performed at each of the low, mid and high frequencies in the band.

5.6 TEST DATA TABLES

Operating Freq band: 2400-2483.5 MHz

Total # Channel Frequencies: 40

Modulation Mode: GFSK

Max Power Setting: 0 dBm

Channel	Freq. (MHz)	Measured Peak Power (dBm)	Correction (Cable loss) (dB)	Calculated Peak Power (dBm)	Margin (dB) Limit = 30 dBm	Result
37	2402	0.86	0.9	1.76	28.24	Passed
20	2446	1.51	0.9	2.41	27.59	Passed
39	2480	0.78	0.9	1.68	28.32	Passed

5.7 PEAK POWER PLOTS

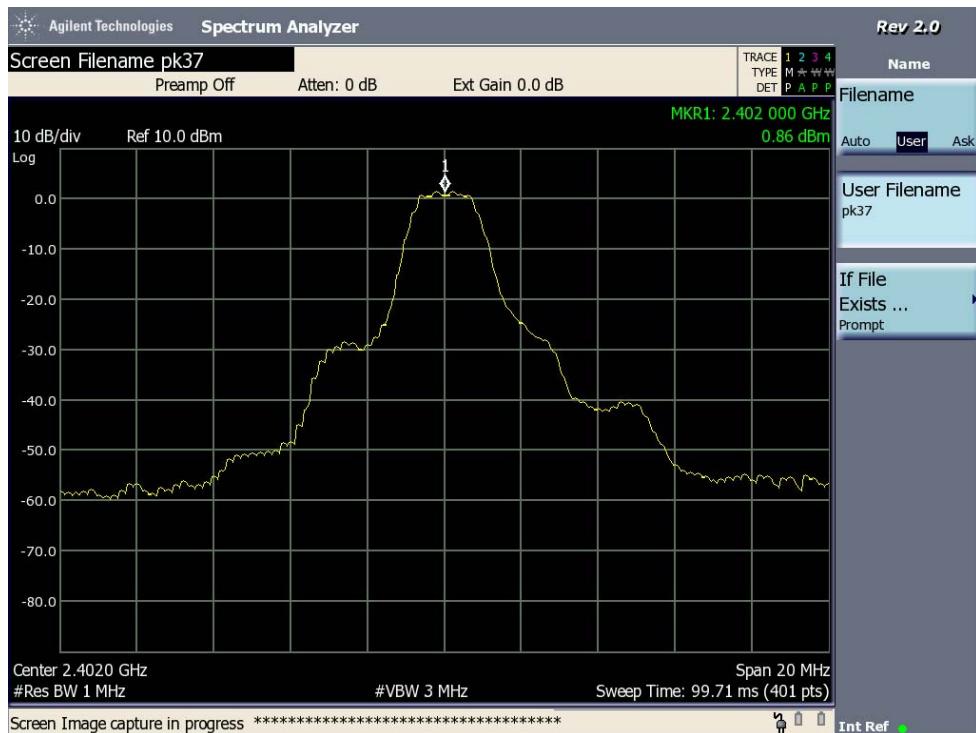


FIGURE 20: Ch37 Peak Power

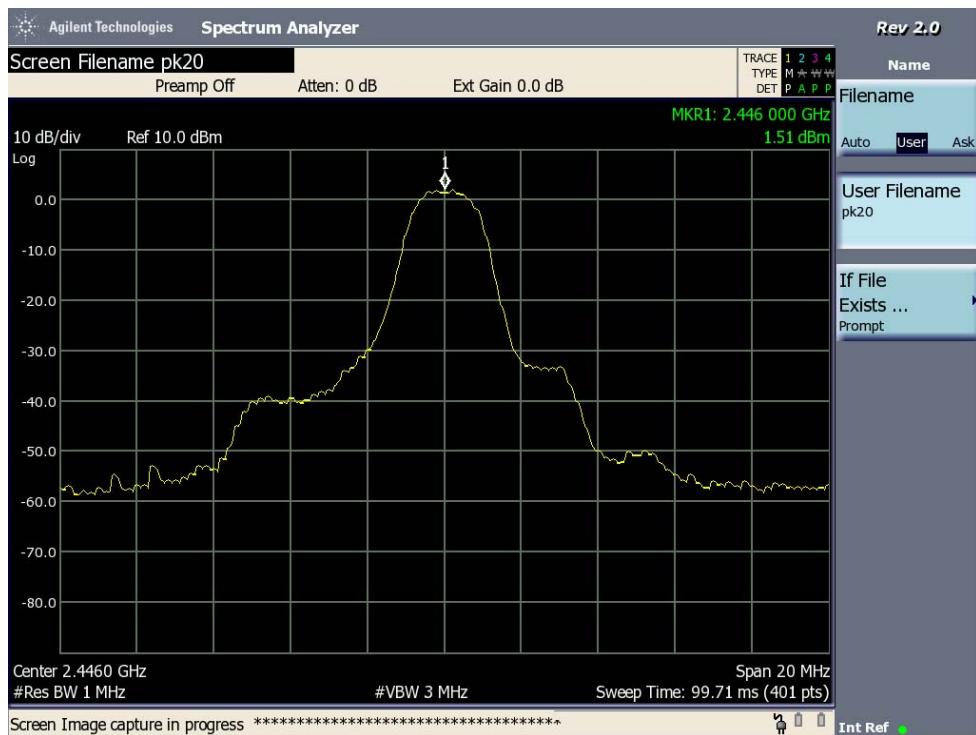


FIGURE 21: Ch20 Peak Power

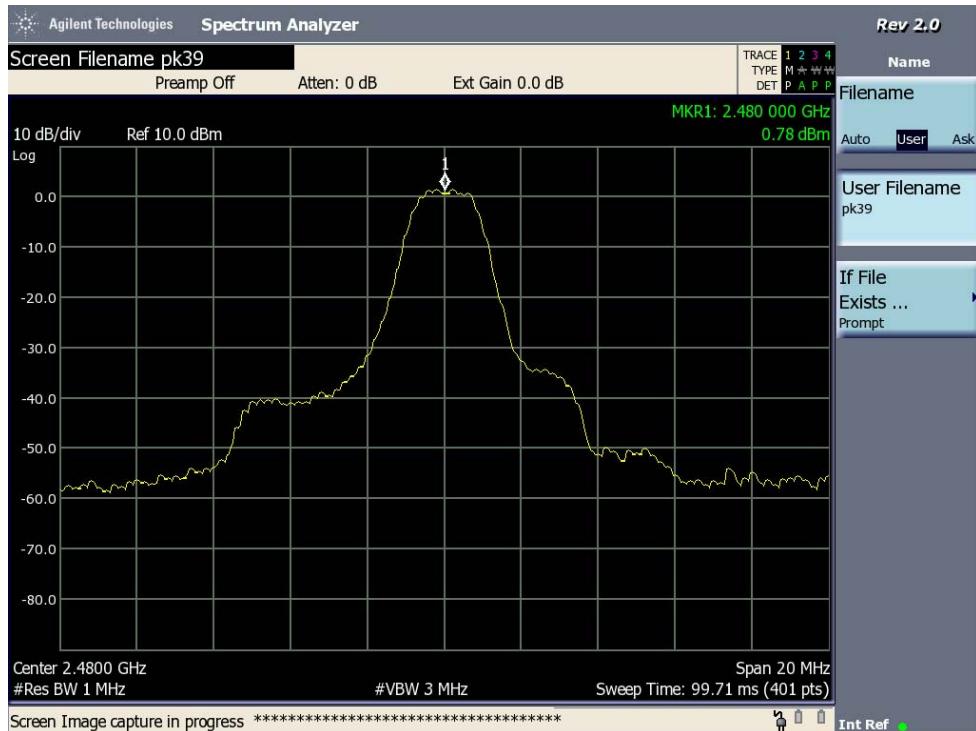


FIGURE 22: Ch39 Peak Power

6 GAIN OF TRANSMISSION ANTENNA PER FCC PART 15.247 (B)(4)

6.1 LIMITS/REQUIREMENTS

(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi.

The EUT antenna used, Johanson 2450AT18A100, has a stated gain over the band of ± 0.5 dBi.

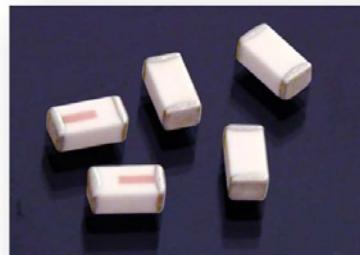
Mini 2.45 GHz Antenna

Detail Specification: 09/03/13

P/N 2450AT18A100

Page 1 of 4

General Specifications	
Part Number	2450AT18A100
Frequency Range	2400 - 2500 Mhz
Peak Gain	0.5 dBi typ. (XZ-V)
Average Gain	-0.5 dBi typ. (XZ-V)
Return Loss	9.5 dB min.
Input Power	2W max. (CW)
Impedance	50 Ω
Operating Temperature	-40 to +85°C
Reel Quantity	3,000



7 POWER SPECTRAL DENSITY PER FCC PART 15.247 (D)

7.1 ADMINISTRATIVE AND ENVIRONMENTAL DETAILS

Site Used:	EMC Lab 2B
Test Date:	9/13/2013
Test Engineer:	D.E. Waldbeser
Temperature	18°C
Humidity:	55%

7.2 TEST EQUIPMENT

Equipment Description	Manufacturer	Model Name	Serial Number	Calibration Due Date	Calibration Interval
CSA Spectrum Analyzer	Agilent	N1996A	MY45371881	1/17/14	2 yr

7.3 TEST SET UP PHOTO(S)

Refer to section 1.10 (Figure1)

7.4 LIMITS/REQUIREMENTS

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. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

7.5 TEST DESCRIPTION AND PROCEDURE

The EUT antenna port is connected to the spectrum analyzer. The power spectral density is measured at the center peak of the selected channel. Measurements are performed at each of the low, mid and hi frequencies in the band.

7.6 TEST DATA TABLES

Operating Freq band: 2400-2483.5 MHz

Total # Channel Frequencies: 40

Modulation Mode: GFSK

Max Power Setting: 0 dBm

Channel	Freq. (MHz)	Measured Power Spectral Density (dBm)	Correction (Cable loss) (dB)	Calculated Power Spectral Density (dBm)	Limit (dBm)	Margin (dB)	Result
37	2402	-12.25	0.9	-11.35	8	19.35	Passed
20	2446	-11.11	0.9	-10.21	8	18.21	Passed
39	2480	-12.13	0.9	-11.23	8	19.23	Passed

7.7 POWER SPECTRAL DENSITY PLOTS

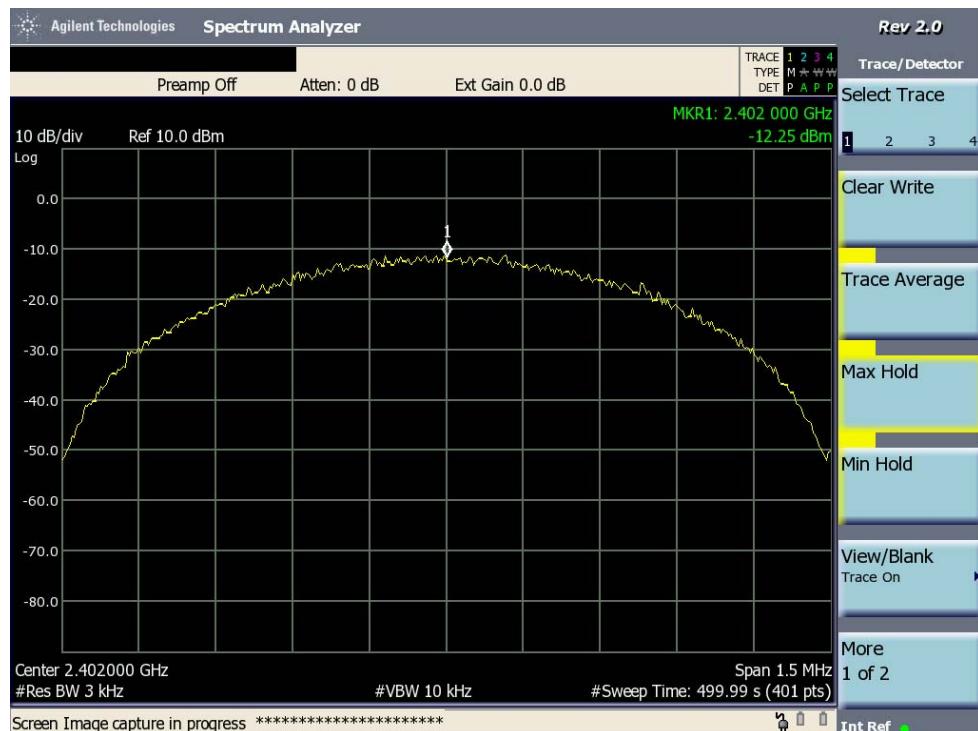
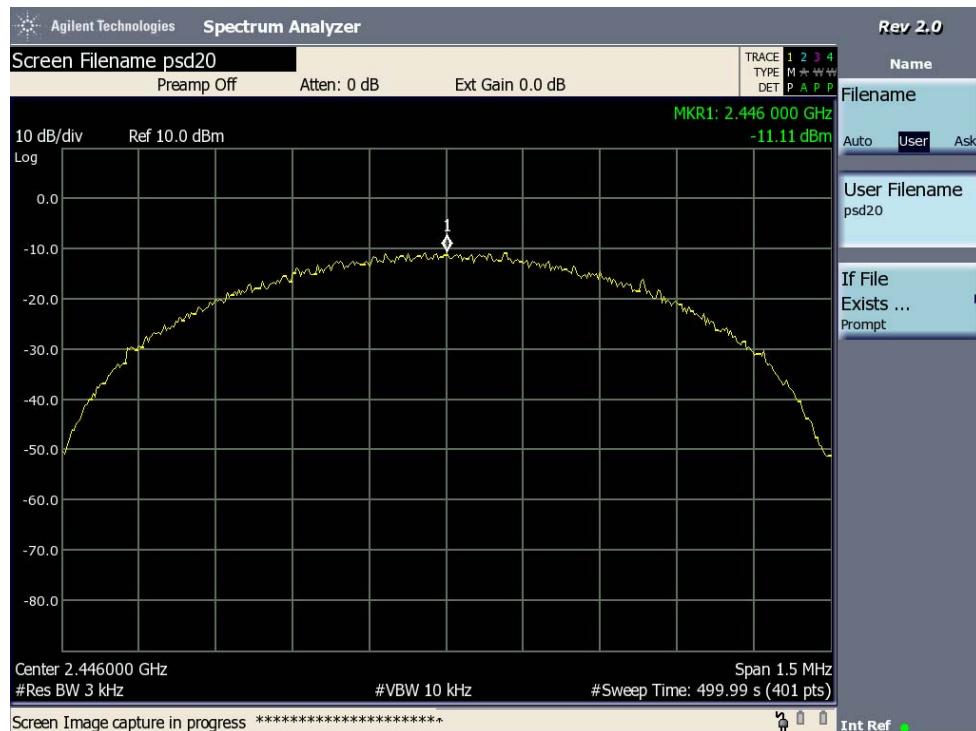


FIGURE 23: Ch37 Power Spectral Density

**FIGURE 24: Ch20 Power Spectral Density****FIGURE 25: Ch39 Power Spectral Density**

8 BAND-EDGE MEASUREMENT PER FCC PART 15 SECTION 15.247 (D)

8.1 ADMINISTRATIVE AND ENVIRONMENTAL DETAILS

Site Used:	EMC Lab 2B
Test Date:	9/13/2013
Test Engineer:	D.E. Waldbeser
Temperature	18°C
Humidity:	55%

8.2 TEST EQUIPMENT

Equipment Description	Manufacturer	Model Name	Serial Number	Calibration Due Date	Calibration Interval
CSA Spectrum Analyzer	Agilent	N1996A	MY45371881	1/17/14	2 yr

8.3 TEST SET UP PHOTO(S)

Refer to section 1.10 (Figure1)

8.4 LIMITS/REQUIREMENTS

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.

8.5 TEST DESCRIPTION AND PROCEDURE

Using conducted test method, the band-edge measurement was made at the peak level of the emission at the band-edge (outside of the operating band) relative to the center peak of the operating frequency channel by using marker delta function. The span was set to be wide enough to capture the highest peak level of the operating channel to the band-edge.

8.6 TEST PLOTS

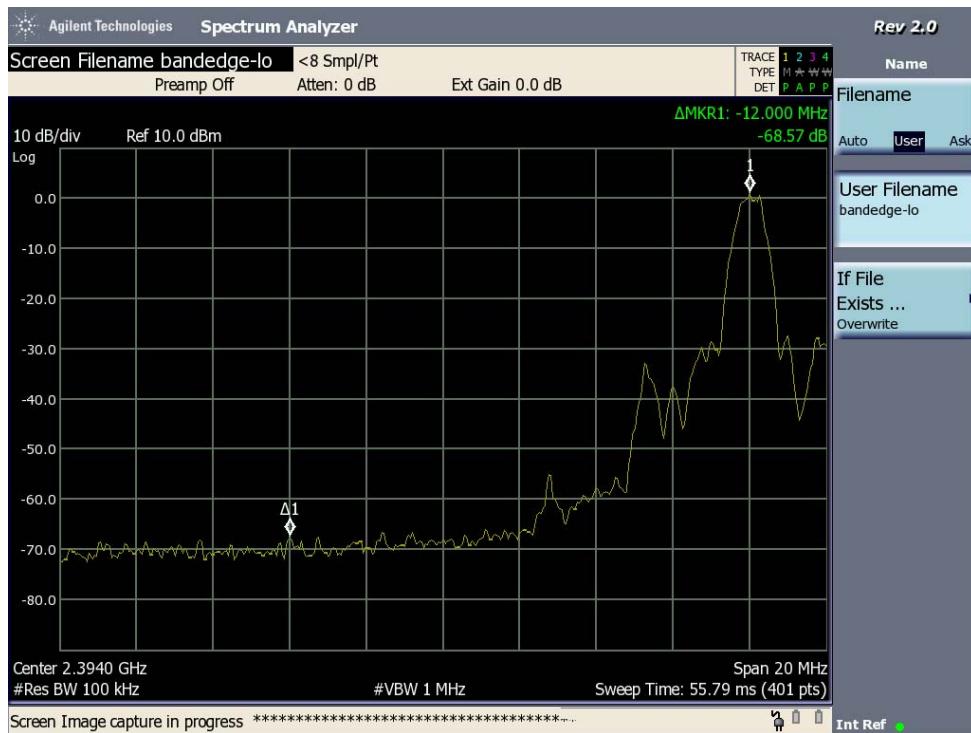


FIGURE 26: Ch37 Band-Edge Peak; Max Power Setting = 0 dBm

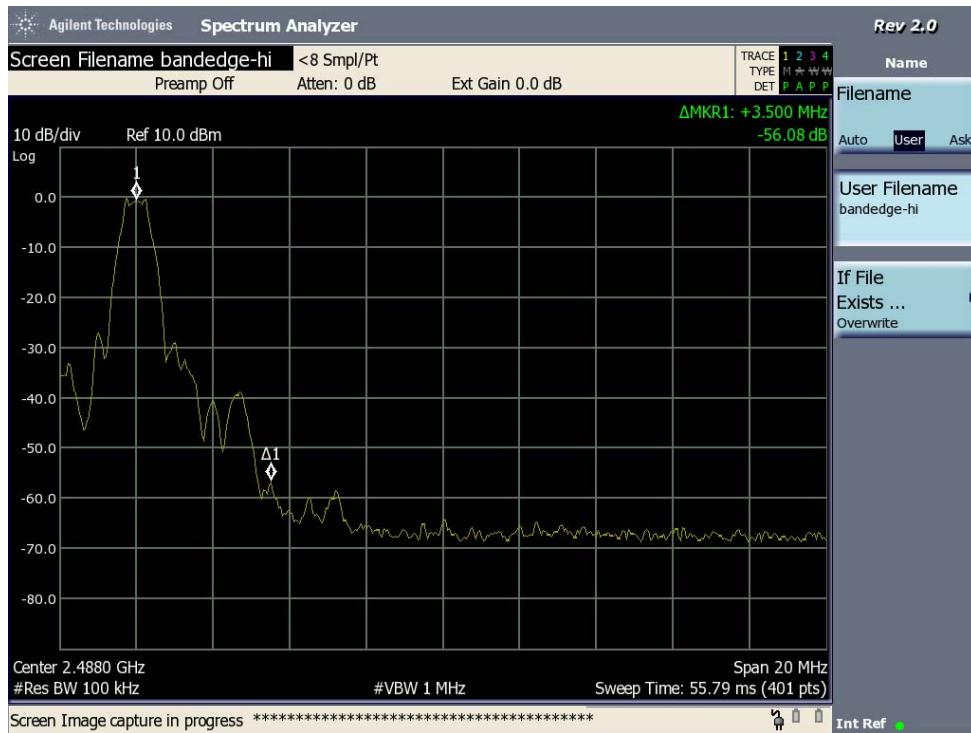


FIGURE 27: Ch39 Band-Edge Peak; Max Power Setting = 0 dBm

9 SPURIOUS & RESTRICTED BANDS EMISSIONS PER FCC PART 15 SECTIONS 15.209 & 15.205

9.1 ADMINISTRATIVE AND ENVIRONMENTAL DETAILS

Site Used:	Semi-Anechoic Chamber
Test Date:	10/4-10/2013
Test Engineer:	D.E. Waldbeser
Temperature	20°C
Humidity:	47%

9.2 TEST EQUIPMENT

Equipment Description	Manufacturer	Model Name	Serial Number	Calibration Due Date	Calibration Interval
Spectrum Analyzer	HP	8565E	07017	1/28/15	2 yr
Amplifier	Giga-tronics	GT-1040A	1116009	N/A	N/A
Amplifier	Agilent	83051	9025	N/A	N/A
Biconical Antenna	EMCO	3104	3459	8/09/14	2 yr
Log-Periodic Antenna	EMCO	3146	1596-1001	5/23/14	2 yr
DRG Horn Antenna	EMCO	3115	645460	4/12/15	2 yr
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170267	12/01/13	2 yr

9.3 TEST SET UP PHOTO(S)

Refer to section 1.10 (Figure2 – 4)

9.4 LIMITS/REQUIREMENTS

FCC Part 15 section 15.209 Radiated emission limits

Frequency (MHz)	Field strength Average (microvolts/meter)	Field strength Average (dBuV/meter)	Field strength Peak (dBuV/meter)	Measurement distance (meters)
30-88	100	40	60	3
88-216	150	43.5	63.5	3
216-960	200	46	66	3
Above 960	500	54	74	3

FCC Part 15 section 15.205 Restricted Bands

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	
13.36-13.41			

9.5 TEST DESCRIPTION AND PROCEDURE

For conducted emissions, the open EUT is operated on a test bench. Any transmit or receive signals are coupled to the spectrum analyzer by means of a temporary SMA connector which bypasses the integrated PCB antenna. A programming connector permits control of the transceiver functions through a USB adapter connected to a PC.

For radiated emissions, the packaged EUT was placed 80 cm above the ground plane on a non-conducting table. The transmit and receive configuration of the EUT was controlled by cycling through custom pre-programmed firmware settings via pushbutton control. The unwanted emissions were detected and recorded by scanning through the frequency range specified in the limit table above. The tests were conducted on the low (Ch37: 2402 MHz), mid (Ch20: 2440 MHz) and hi (Ch39: 2480 MHz) channels as called out in the test data below. This system has only one modulation type, or mode, which is GFSK.

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) (see § 15.205(c)).

9.6 SPURIOUS EMISSIONS PLOTS

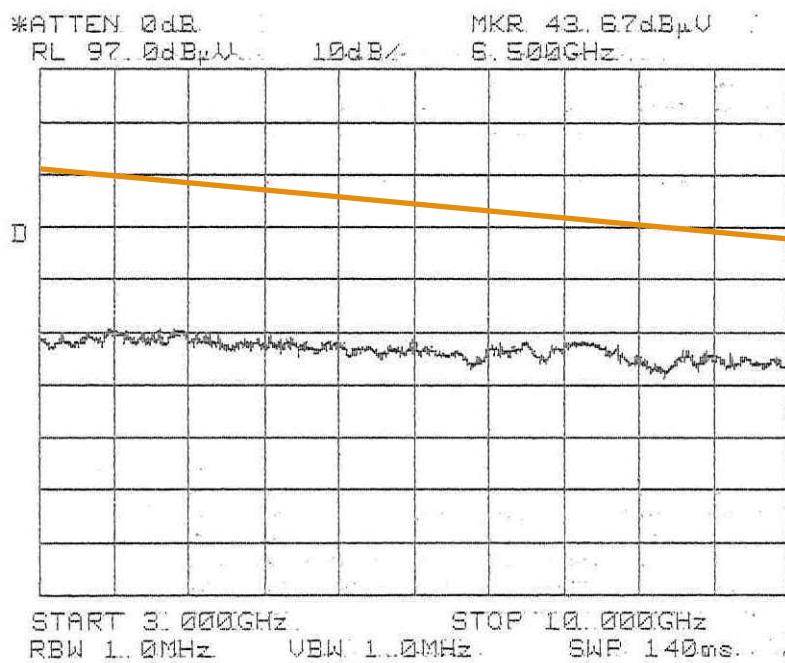


FIGURE 28: Spurious Emission – Rx off, Tx off

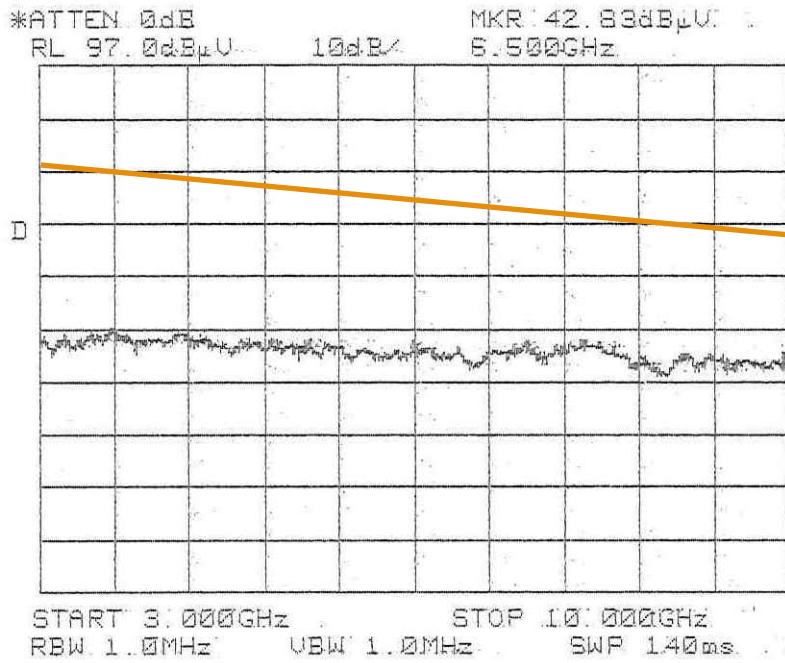


FIGURE 29: Spurious Emission – Horizontal Polarization - Tx Ch37, 20, 39

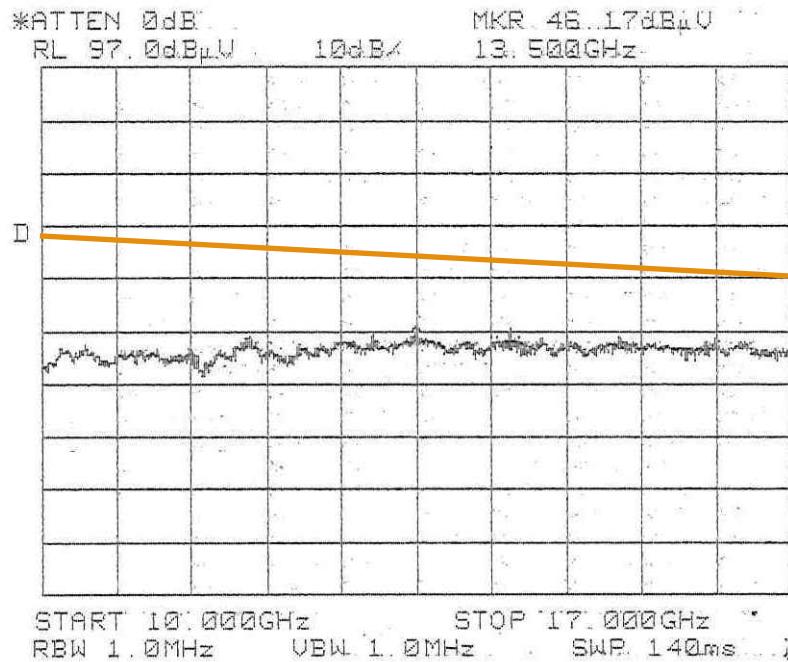


FIGURE 30: Spurious Emission – Horizontal Polarization - Tx Ch37, 20, 39

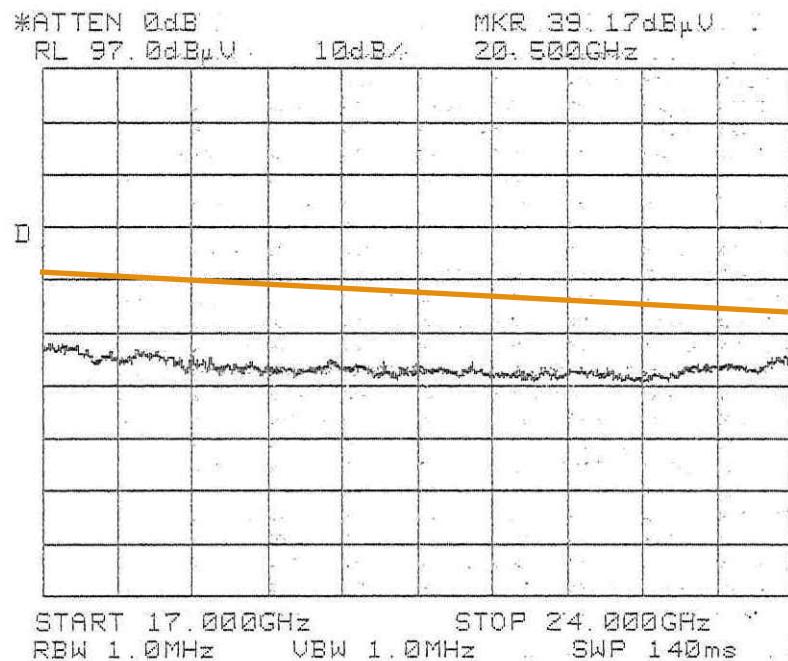


FIGURE 31: Spurious Emission – Horizontal Polarization - Tx Ch37, 20, 39

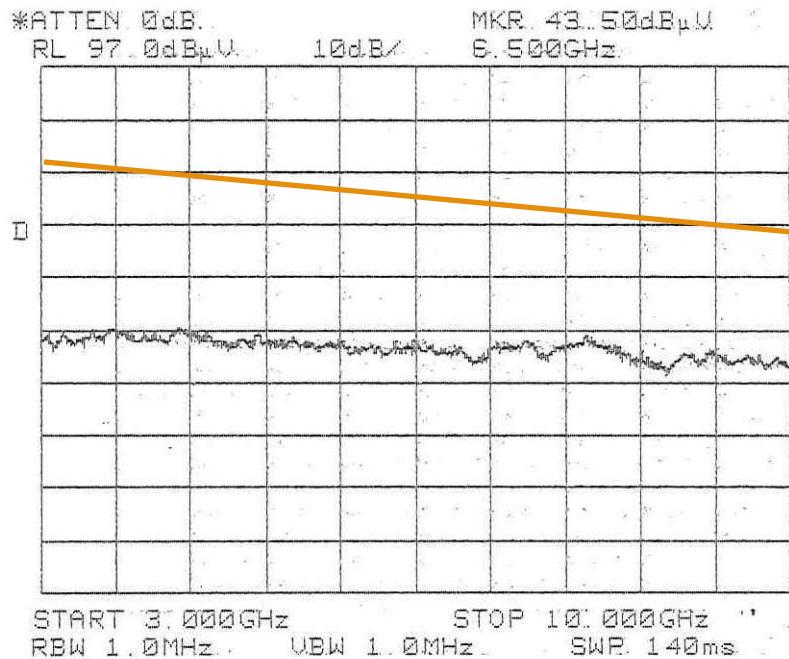


FIGURE 32: Spurious Emission – Horizontal Polarization - Rx Ch37, 20, 39

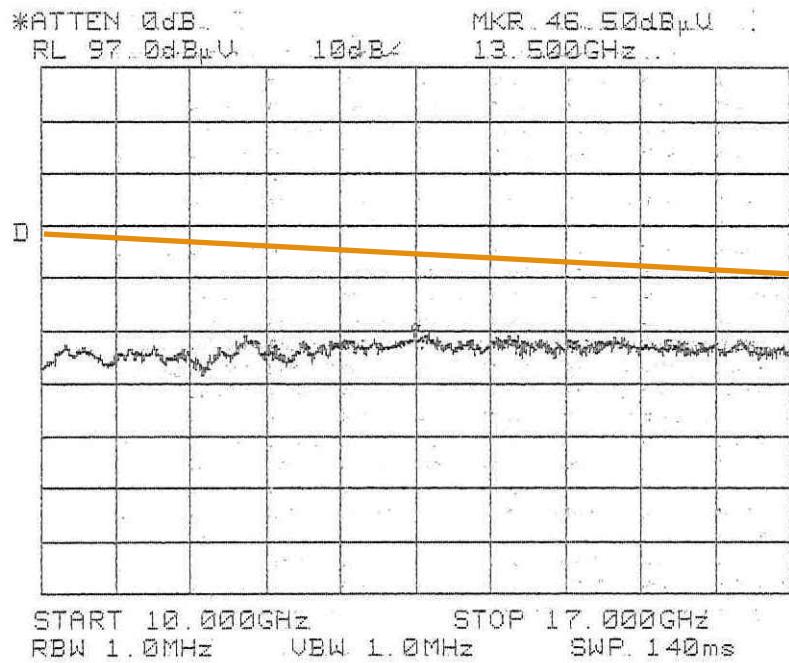
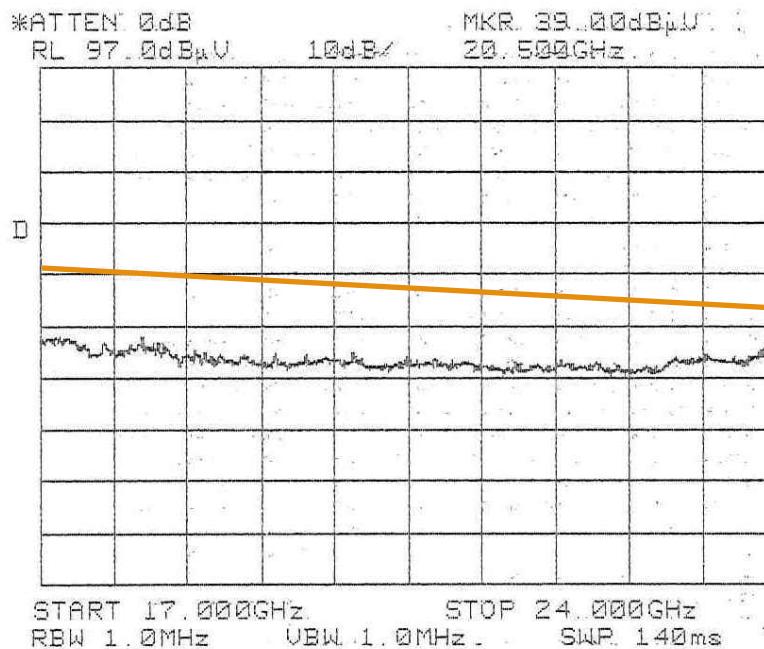
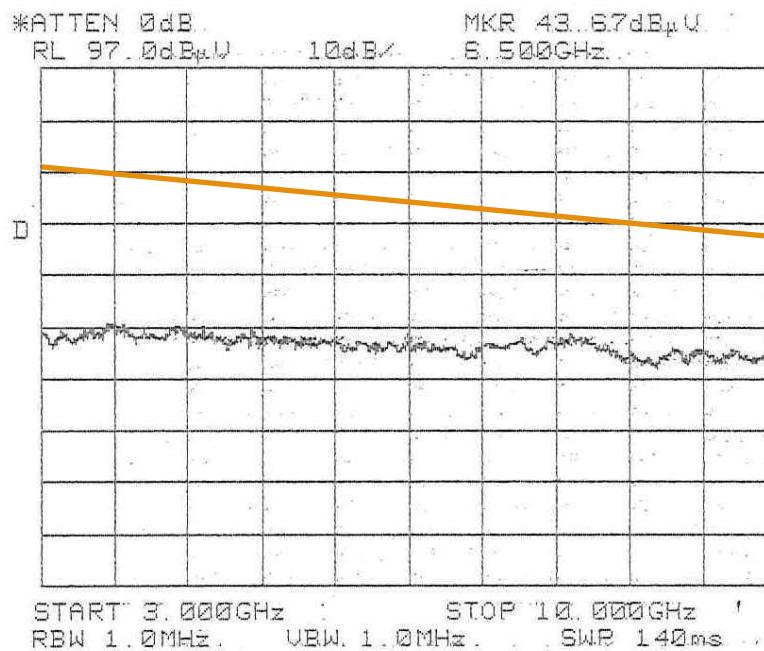


FIGURE 33: Spurious Emission – Horizontal Polarization - Rx Ch37, 20, 39

**FIGURE 34: Spurious Emission – Horizontal Polarization - Rx Ch37, 20, 39****FIGURE 35: Spurious Emission – Vertical Polarization - Tx Ch37, 20, 39**

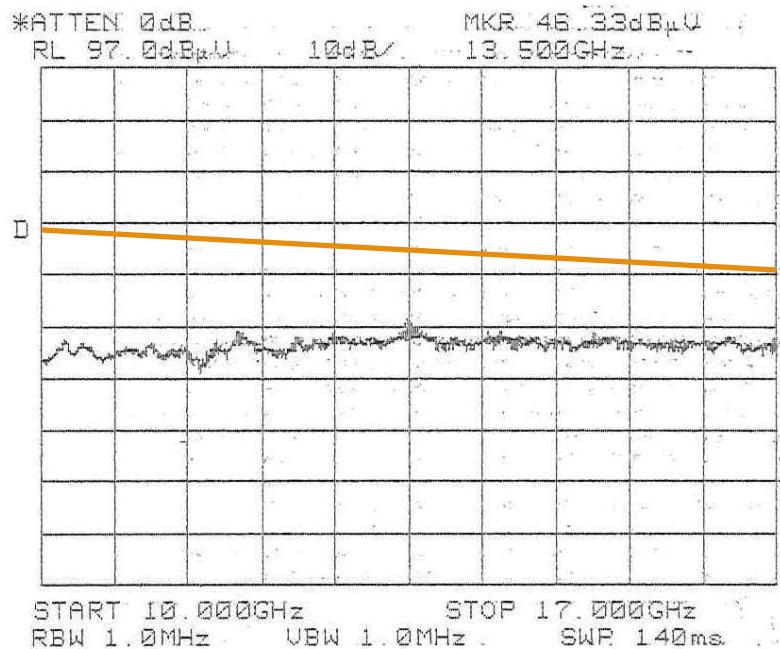


FIGURE 36: Spurious Emission – Vertical Polarization - Tx Ch37, 20, 39

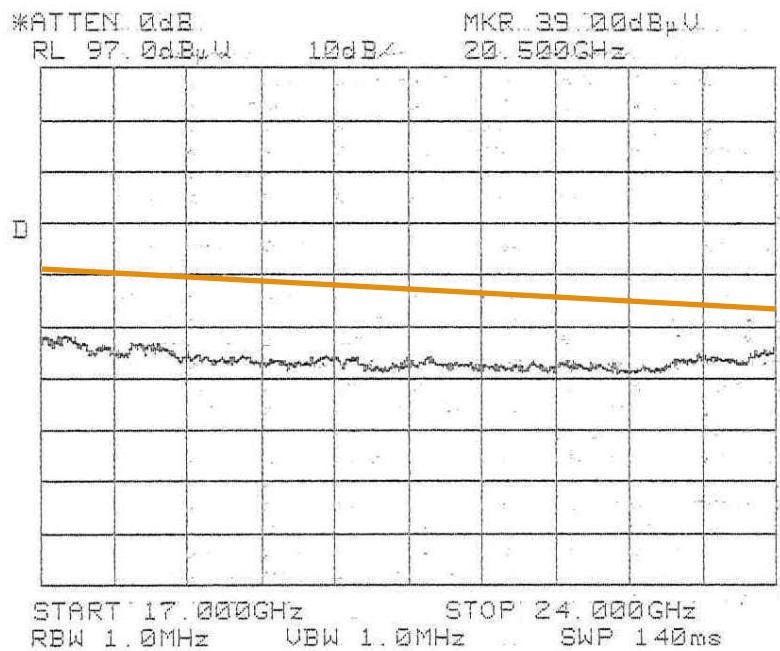
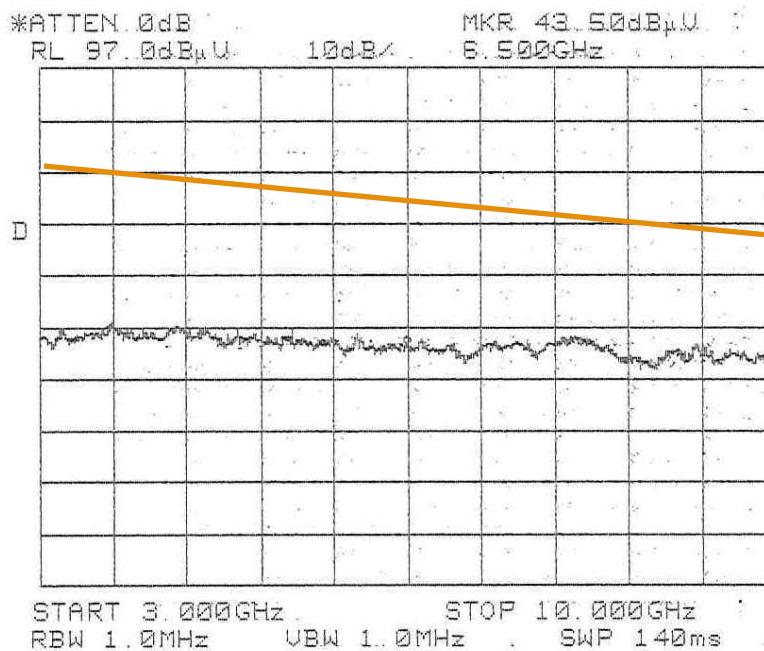
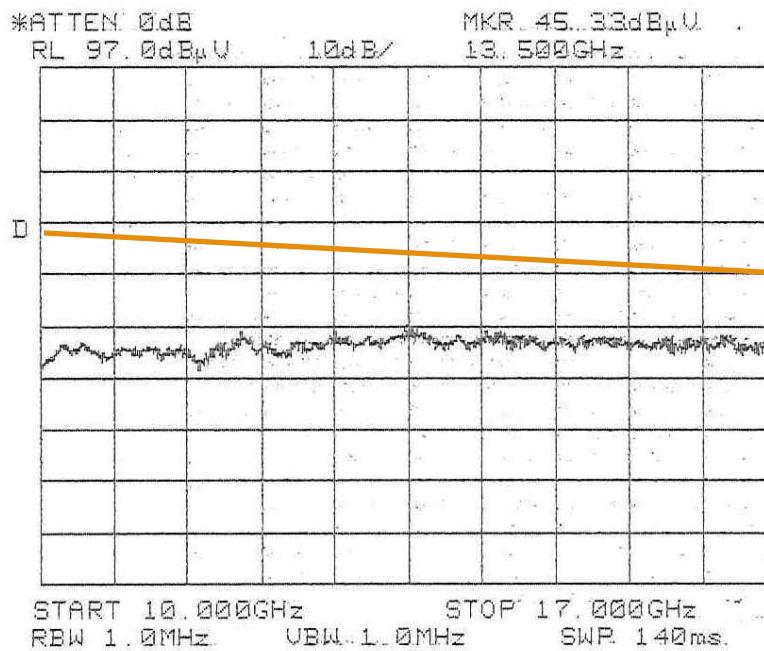


FIGURE 37: Spurious Emission – Vertical Polarization - Tx Ch37, 20, 39

**FIGURE 38: Spurious Emission – Vertical Polarization - Rx Ch37, 20, 39****FIGURE 39: Spurious Emission – Vertical Polarization - Rx Ch37, 20, 39**

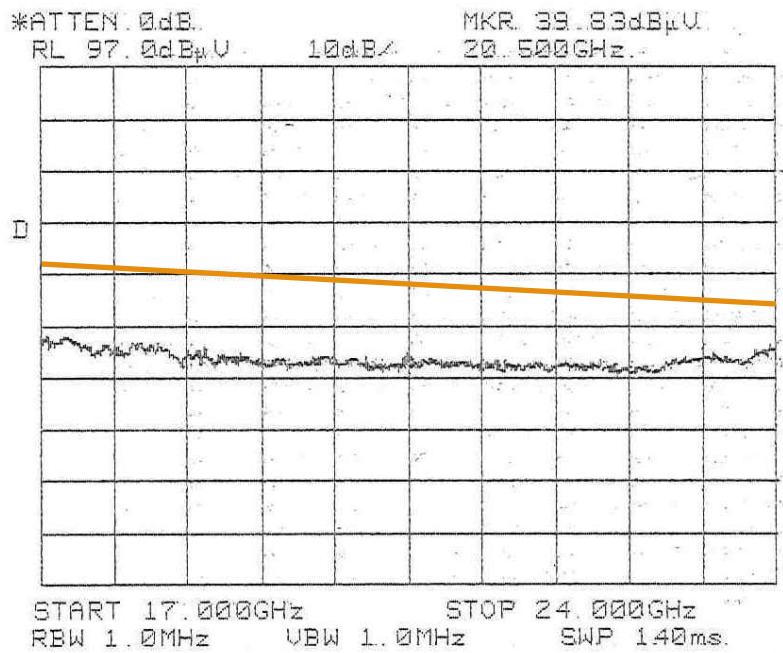


FIGURE 40: Spurious Emission – Vertical Polarization - Rx Ch37, 20, 39

10 APPENDIX

10.1 EUT TECHNICAL SPECIFICATIONS

Manufacturer:	Dysonics, Inc.		
General Description:	The RondoMotion headset-mounted sensor continuously streams orientation and rate information via Bluetooth LE to the target application device.		
EUT Name:	RondoMotion	Model:	N/A
Dimensions:	L=3.7cm, W=3.6cm, H=1cm	Serial Number:	N/A
Operating Frequency:	2.400 GHz- 2.4835 GHz	Power Cord Type:	<input type="checkbox"/> Shielded <input type="checkbox"/> Un-Shielded

10.2 EUT PHOTOS



FIGURE 41: Top & Connector View

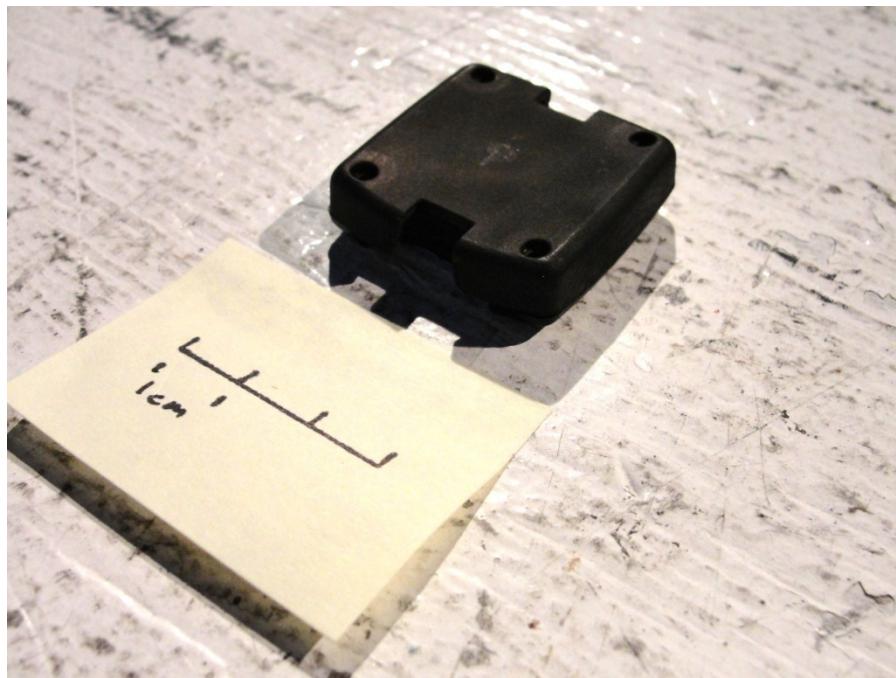


FIGURE 42: Bottom View