




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	
<b>Report Reference No.</b> .....	20151015-01R-7 Glasses_FCC_BT_LE
Date of Issue .....	12/16/2015
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<b>Test Specification Standard</b> .....	FCC CFR Title 47 Part 15 Subpart C 15.205, 15.209, 15.247
Test Procedure .....	KDB 558074 D01 DTS Meas Guidance v03r04 & ANSI C63.4:2009, ANSI C63.10:2009 (Test Procedures)
Judgment .....	Complies as tested
<b>Test Item Description</b> .....	802.11 b/g/n, Bluetooth 4.1 Smart, 802.11n 5 GHz, GPS/GLONASS Enabled Augmentation Eyewear
Manufacturer Logo .....	
Manufacturer .....	Osterhout Design Group
Model/Type Reference .....	R-7 Glasses
RF Operating Frequency Bands .....	2.402 - 2.48 GHz, 5.18 - 5.825 GHz



ISO/IEC

17025:2005

Accredited

Laboratory

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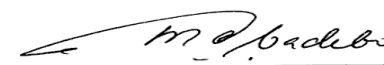
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## documentation

**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)	:	Shane Duncan	
		:	Shane Duncan	
	Tested By (Name + Signature)	:	Michael Gbadebo, PE	
	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 <sup>rd</sup> Party Test Facility	:		
	Testing Location/Address	:		
	Tested By (Name + Signature)	:		
	Approved By (+ Signature)	:		

**1.2 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.

**1.3 Revision History**

#	Revision Date	Revision
1	01/15/2016	Tested radiated emissions at middle low and high frequency page 10 Tested Radiated spurious emissions middle low and high frequency page 20

## 1.4 Condition of EUT

Equipment Under Test (EUT) was tested as it was received. The radiated mode tests utilize the EUT internal antenna. Both the WiFi and the Bluetooth radios use the same antenna. For the conducted mode tests, the internal antenna RF cable connector is disconnected from the PCB and a suitable patch cable to the spectrum analyzer is used. The EUT WiFi and Bluetooth radios are software controllable by means of a laptop and a USB connection.

## 1.5 General Description of EUT

Product	R-7 Glasses
Model No.	N/A
Power Supply	Internal rechargeable Lithium Polymer battery, 1300 mAh (2)
I/O Ports	Custom magnetic USB / charging receptacle
Operating Frequency Range	2.402- 2.48 GHz, 5.18- 5.825 GHz
<b>802.11 b/g/n</b>	
FCC ID	2ADCMR7
Modulation Type	CCK, BPSK, QPSK, 16-QAM, 64-QAM
Modulation Technology	b: DSSS; g: DSSS, OFDM; n: OFDM
Transfer Rate	b: 1-11 Mbps, g: 6-54 Mbps, n: 7.2-72.2 Mbps (20 MHz channel)
Number of Channels	11
Maximum Output Power	+20dBm
<b>Bluetooth 4.1 Smart</b>	
FCC ID	2ADCMR7
Modulation Type	GFSK (1 Mbps)
Modulation Technology	FHSS, AFH
Transfer Rate	1 Mbps
Number of Channels	40
Maximum Output Power	0 dBm typ.
<b>802.11n (5 GHz)</b>	
FCC ID	2ADCMR7
Modulation Type	CCK, BPSK, QPSK, 16-QAM, 64-QAM
Modulation Technology	n: OFDM
Transfer Rate	n: 7.2-72.2 Mbps (20 MHz channel)
Number of Channels	45
Maximum Output Power	+11 to +16 dBm typ.
<b>Antenna</b>	
Antenna Type	Chip antenna
Antenna Gain, Peak	1.5
Radiation Pattern	Omni-directional

## 1.6 Operational Description of EUT

The R-7 Smart Glasses offers immersive 3D HD viewing of stored or streaming video content, with stereo audio, in a static setting, or in a head orientation tracking augmented vision mode.

## 1.7 List of Applicant Peripherals/ Supporting Equipments Used During Test

Description	Manufacturer	Model Name	Serial Number
Laptop	Apple	MacBook Pro	N/A*
AC Adapter	Apple	N/A*	N/A*

\*N/A- Not Applicable

## 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 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 Title 47 CFR	Test Description	Result
15.209	Radiated Emissions, general	Passed
15.207	Conducted Emissions	Passed
15.247 (a)(2)	6 dB Bandwidth	Passed
15.247 (b)(3)	Peak Conducted Output Power	Passed
15.247 (e)	Power Spectral Density	Passed
15.247 (d)	Band-Edge Measurement	Passed
2.1049 (h)	Occupied Bandwidth	Passed
15.209/.205	Conducted Spurious & Restricted Band Emissions	Passed
15.247 (b)(4)	Gain of Transmission Antenna	Passed

## 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	$\pm 1.5$
2	Radiated emission of transmitter (30MHz - 1 GHz ) @ 3m	$\pm 3.2$
3	Radiated emission of transmitter (1 - 25 GHz ) @ 3m	$\pm 2.5$



## 1.11 Test Set up Photos



Figure 1: Conducted RF Test Setup

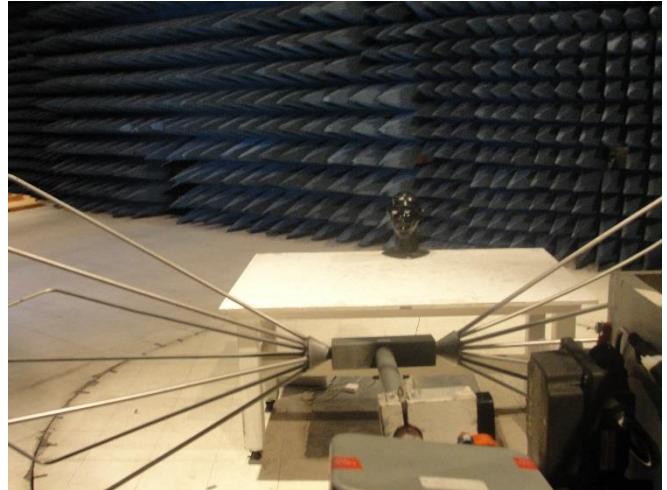


Figure 2: RE Test Setup – Biconical Antenna

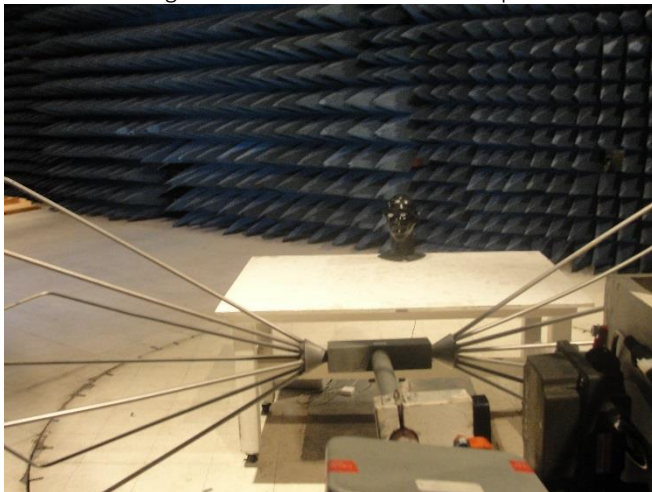


Figure 3: RE Test Setup - Log Periodic Antenna



Figure 4: EUT RE Test Setup



Figure 5: RE Test Setup - Active Loop Antenna,  
Vertical Polarization



Figure 6: RE Test Setup - Active Loop Antenna,  
Horizontal Polarization



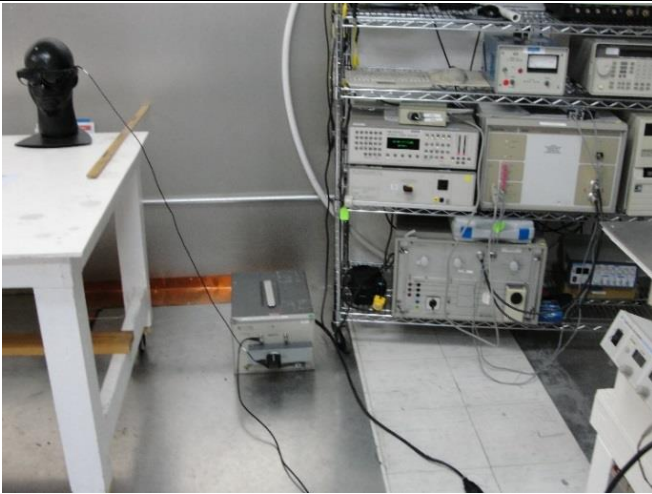


Figure 7: CE Test Setup - Front View



Figure 8: CE Test Setup - Side View



Figure 9: RE Test Setup DRG Horn Antenna(1-18GHz)

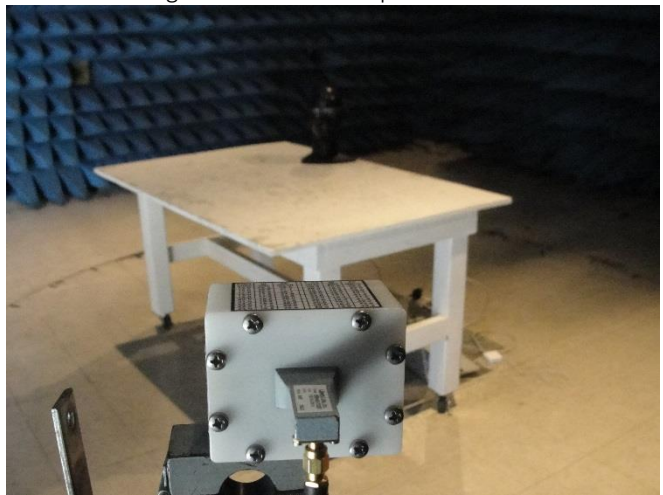


Figure 10: RE Test Setup Horn Antenna(18-40GHz)

## 2 Radiated Emissions Per FCC Part 15.209

### 2.1 Administrative and Environmental Details

Site Used:	Semi Anechoic Chamber
Test Date:	1/15/16
Test Engineer:	Shane Duncan
Temperature	23°C avg.
Humidity:	33% avg.

### 2.2 Test Equipment

Equipment Description	Manufacturer	Model Name	Serial Number	Calibration Due Date	Calibration Interval
EMC Analyzer	Agilent	E7402A	MY45112375	7/16/16	2 yr
Active Loop Antenna	EMCO	6502	1071/1001	10/14/16	2 yr
Bi-Conical Antenna	EMCO	3104	3459	10/14/16	2 yr
Log Periodic Antenna	EMCO	3146	9510-4202	6/16/16	2 yr

### 2.3 Test Set up Photo(s)

Refer to Figures 2-6.

### 2.4 Limits/Requirements

Frequency (MHz)	Field strength Average (μV/m)	Field strength Average (dBμV/m)	Field strength Peak (dBμV/m)	Measurement distance (m)	Average Limit @ 3m (dBμV/m)	Peak Limit @ 3m (dBμV/m)
0.009-0.49	267 – 4.9 **	48.5 - 13.8	68.5 – 33.8	300*	88.5 – 53.8	108.5 – 73.8
0.49-1.705	49 – 14.1 ***	33.8 - 23	53.8 - 43	30*	53.8 - 43	73.8 - 63
1.705-30	30	29.5	49.5	30*	49.5	69.5
30-88	100	40	60	3	-	-
88-216	150	z	63.5	3	-	-
216-960	200	46	66	3	-	-
Above 960	500	54	74	3	-	-

\*Measurement performed at 3m per 47 CFR 15.31 (f)(2) distance scaling factor.

\*\* 2400/F(kHz)

\*\*\* 24000/F(kHz)

### 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 active loop is located 3 m away, and the biconical, and log-periodic are located 10m away from the EUT. The elevation of the antennas above the ground plane is adjusted (1-4 m) for maximum signal, except for the active loop which is fixed at 1m. Both horizontally and vertically polarized signals are detected and recorded. All the radiated emissions tests were performed in three orthogonal planes. Data plots included below are the worst case data.

## 2.6 Test Data Table

### 9 KHz-30MHz Radiated Emissions

Transmit Freq (MHz)	Freq (MHz)		Peak Emission (dBuV/m)		Average (dBuV/m)		Quasi-Peak (dBuV/m)		Result	Limit (dBuV/m)
	H	V	H	V	H	V	H	V		
2402	27.16	11.56	36.8	36.48	26.7	27.59	31.08	28.19	Passed	43
2446	27.11	11.63	35.57	36.81	27.28	25.15	29.83	29.44	Passed	43
2480	27.15	11.4	37.88	35.33	35.23	32.38	31.48	28.12	Passed	43

### 30-200 MHz Radiated Emissions

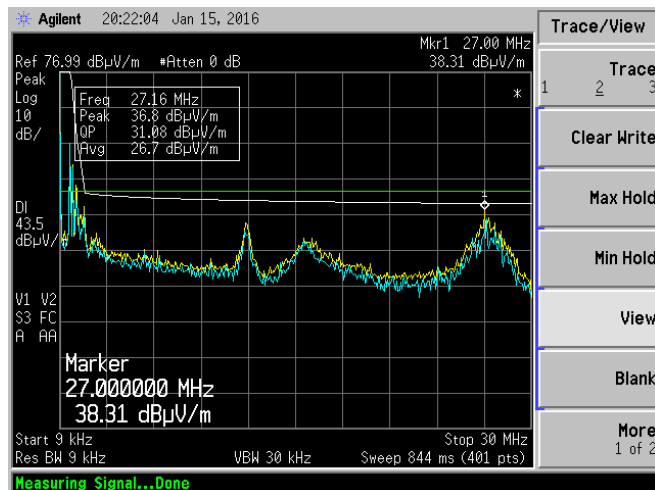
Transmit Freq (MHz)	Freq (MHz)		Peak Emission (dBuV/m)		Average (dBuV/m)		Quasi-Peak (dBuV/m)		Result	Limit (dBuV/m)
	H	V	H	V	H	V	H	V		
2402	192	134.3	39.11	35.12	37.23	31.0	37.68	28.19	Passed	43.5
2446	192	192	37.41	29.44	33.74	16.73	35.61	26.76	Passed	43.5
2480	192	192	37.43	29.57	33.38	17.5	35.45	26.82	Passed	43.5

### 200-1000 MHz Radiated Emissions

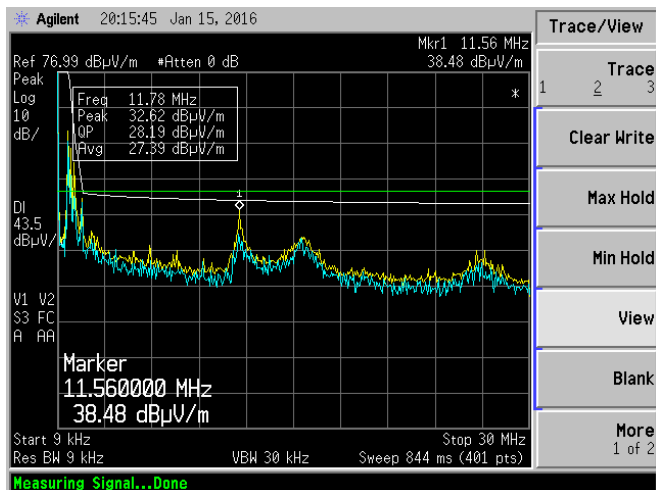
Transmit Freq (MHz)	Freq (MHz)		Peak Emission (dBuV/m)		Average (dBuV/m)		Quasi-Peak (dBuV/m)		Result	Limit (dBuV/m)
	H	V	H	V	H	V	H	V		
2402	587.6	666.7	40.59	39.78	35.5	37.7	36.25	38.21	Passed	46
2446	585.7	417.3	42.27	42.48	41.68	35.38	40.07	42.48	Passed	46
2480	580	415.7	41.55	42.45	39.30	34.24	37.81	42.45	Passed	46

**Note:** H means Horizontal and V means Vertical

## 2.7 Test Data Plots



a) Horizontal polarization



b) Vertical polarization

Figure 11: Radiated Emissions – Active Loop, (Channel 0 Shown 22 &amp;39 similar)

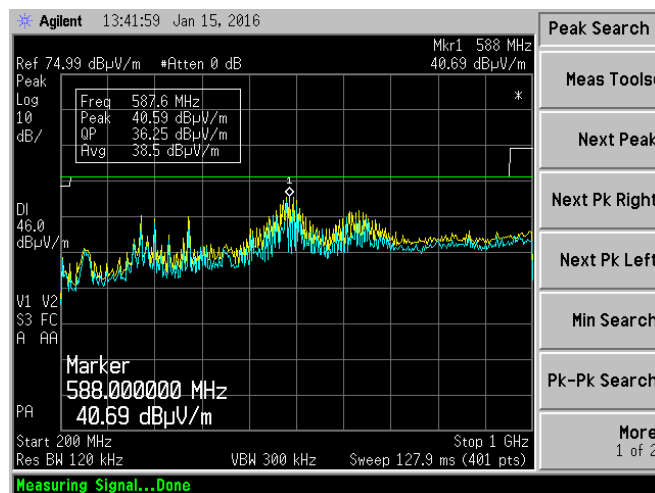


a) Horizontal Polarization

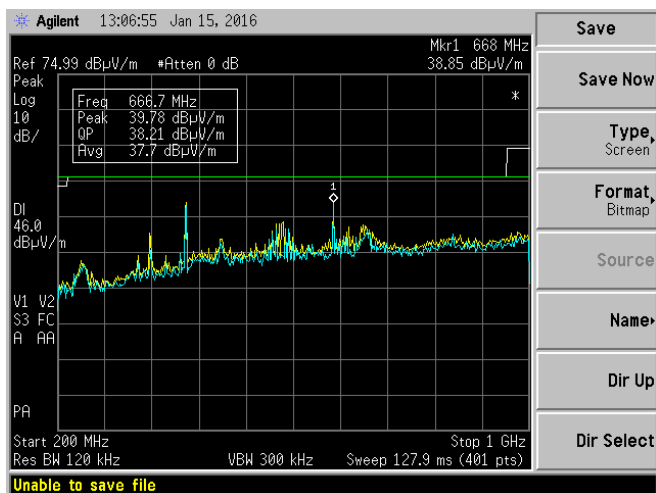


b) Vertical Polarization

Figure 12: Radiated Emissions – Biconical (Channel 0 Shown 22 &amp;39 similar)



a) Horizontal polarization



b) Vertical polarization

Figure 13: Radiated Emissions – Log Periodic (Channel 0 Shown 22 &amp;39 similar)

### 3 Conducted Power Line Emissions Per FCC Part 15.207

#### 3.1 Administrative and Environmental Details

Site Used:	EMC Lab 2A
Test Date:	11/03/15
Test Engineer:	Shane Duncan
Temperature	23°C
Humidity:	33%

#### 3.2 Test Equipment

Equipment Description	Manufacturer	Model Name	Serial Number	Calibration Due Date	Calibration Interval
EMC Analyzer	Agilent	E7402A	MY45112375	7/16/16	2 yr
LISN	EMCO	3825/2	8901-1229	10/15/16	2 yr

#### 3.3 Test Set up Photo(s)

Refer to Figures 7-8.

#### 3.4 Limits/Requirements

Frequency of emission (MHz)	Conducted limit (dBμV)	
	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.

#### 3.1 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 of the charging adapter was supplied to the EUT. The line conducted tests were performed on the AC mains hot and neutral lines.

#### 3.2 Test Data Plots

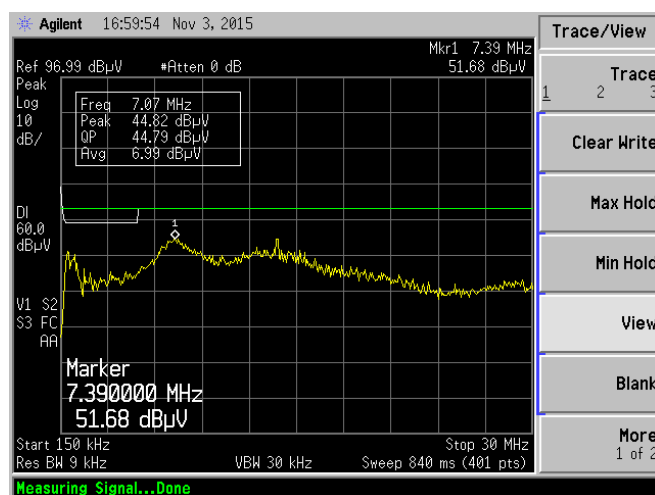


Figure 14: Conducted Emissions Test Data 60 Hz  
Hot 0.15-30 MHz

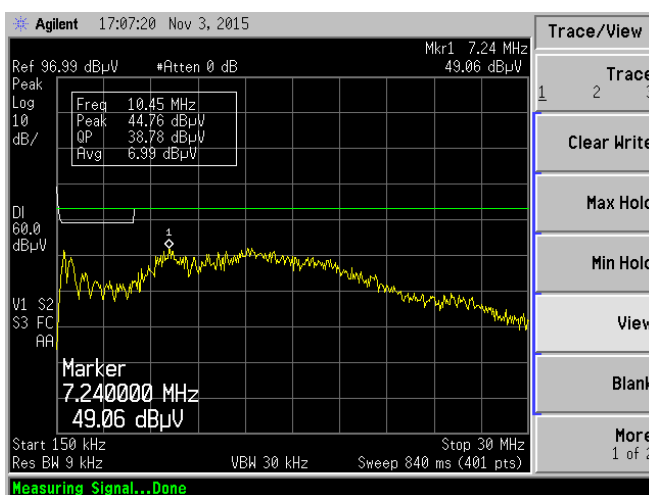


Figure 9: Conducted Emissions Test Data 60 Hz  
Neutral 0.15-30 MHz

#### 4 Minimum 6 dB Bandwidth Per FCC Part 15.247 (a)(2) – Bluetooth 4.1 Smart

##### 4.1 Administrative and Environmental Details

Site Used:	EMC Lab 2A
Test Date:	10/30/15, 11/18/15
Test Engineer:	Shane Duncan
Temperature	21°C avg
Humidity:	48% avg

##### 4.2 Test Equipment

Equipment Description	Manufacturer	Model Name	Serial Number	Calibration Due Date	Calibration Interval
CSA Spectrum Analyzer	Agilent	N1996A	MY45371881	1/05/18	2 yr

##### 4.3 Test Set up Photo(s)

Refer to Figure 1.

##### 4.4 Limits/Requirements

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 is connected to the spectrum analyzer by disconnecting the internal antenna cable from the PCB MHF connector and attaching a suitable patch cable. 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.

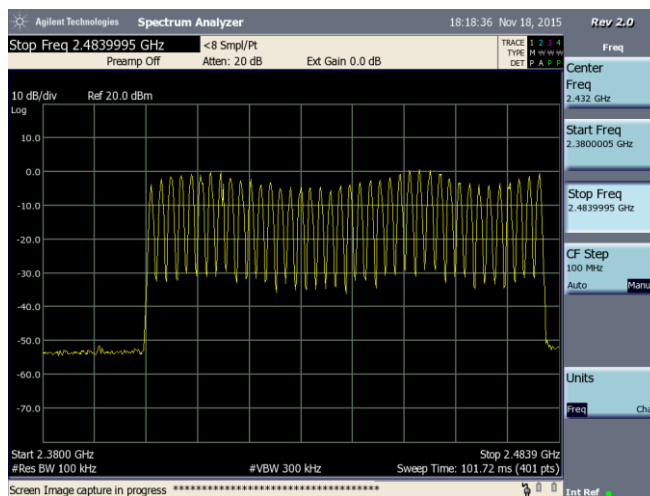


Figure 16: Bluetooth 4.1 Smart Channels (40)

##### 4.6 6 dB Bandwidth Measurement Test Data

Channel	Frequency	gfsk	Results
0	2402	.6	Pass
22	2446	.55	Pass
39	2480	.612	Pass



#### 4.7 6 dB Bandwidth Measurement Plots

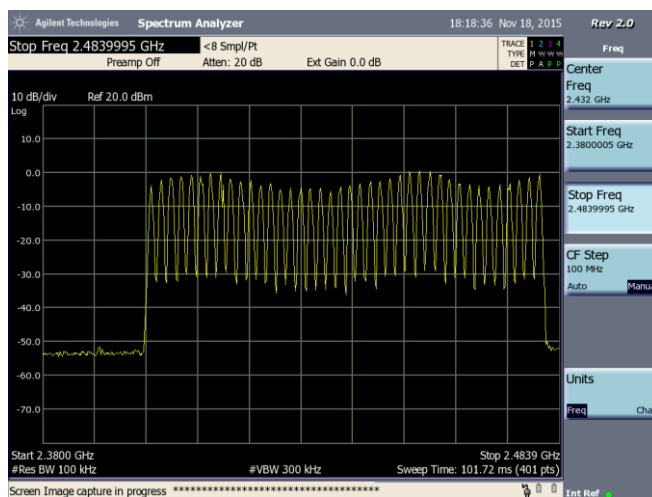


Figure 17: 6dB GFSK bandwidth (Ch0 Shown, Ch22 &amp; 39 Similar)

#### 4.8 Carrier Frequency Separation Plot

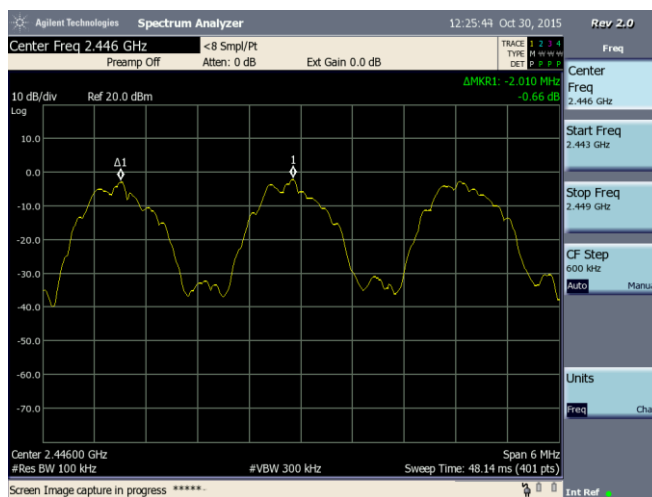


Figure 18: GFSK Carrier Frequency Separation 2 MHz (Ch21, 22 &amp; 23)

## 5 Peak Conducted Output Power Per FCC Part 15.247 (b)(3) – Bluetooth 4.1 Smart

### 5.1 Administrative and Environmental Details

Site Used:	EMC Lab 2A
Test Date:	10/30/15
Test Engineer:	Shane Duncan
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	1/05/18	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) Maximim peak power transmitted is 1 Watt or 30 dBm.

### 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

Channel	Freq.(MHz)	MPP(dBm)	CPP (dBm)	Margin = 30 - CPP (dB)	Result
		gfsk	gfsk	Gfsk	
0	2402	-1.44	.56	29.44	Passed
22	2446	-.98	1.02	28.98	Passed
39	2480	.92	2.92	27.08	Passed

MPP = Measured Peak Power CPP = Corrected Peak Power = MPP + Cable Loss 2 dB

### 5.7 Peak Power Plots

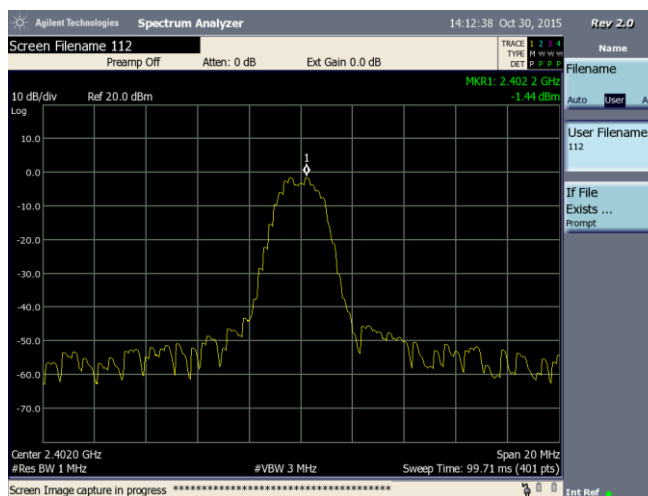


Figure 19: GFSK Peak Power (Ch0 Shown, Ch22 & 39 Similar)

## 6 Power Spectral Density Per FCC Part 15.247 (d) – Bluetooth 4.1 Smart

### 6.1 Administrative and Environmental Details

Site Used:	EMC Lab 2A
Test Date:	11/04/15
Test Engineer:	Shane Duncan
Temperature	23°C
Humidity:	41%

### 6.2 Test Equipment

Equipment Description	Manufacturer	Model Name	Serial Number	Calibration Due Date	Calibration Interval
CSA Spectrum Analyzer	Agilent	N1996A	MY45371881	1/05/18	2 yr

### 6.3 Test Set up Photo(s)

Refer to Figure 1.

### 6.4 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 30kHz 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.

### 6.5 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 high frequencies in the band.

### 6.6 Test Data Tables

Channel	Freq.(MHz)	MPSD (dBm/30 kHz)	CPSD (dBm/30 kHz)	Margin = 8 – CPSD (dB)	Result
		gfsk	gfsk	gfsk	
0	2402	-9.85	-7.85	15.85	Passed
22	2446	-10.97	-8.97	16.97	Passed
39	2480	-10.7	-8.7	16.7	Passed

PSD = Measured Power Spectral Density

CPSD = Corrected Power Spectral Density = MPSD + Cable

Loss 2 dB

### 6.7 Power Spectral Density Plots

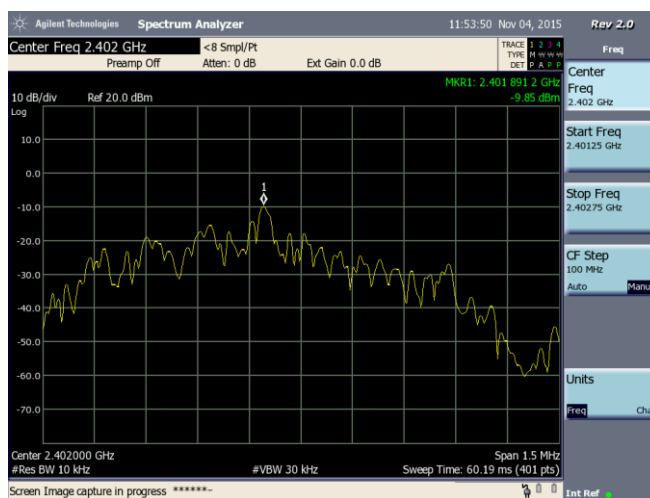


Figure 20: GFSK Power Spectral Density (Ch0 Shown, Ch22 & 39 Similar)

## 7 Lower/Upper Band Edge Per FCC Part 15 Section 15.247 (d) – Bluetooth 4.1 Smart

### 7.1 Administrative and environmental details

Site Used:	EMC Lab 2A
Test Date:	10/30/15
Test Engineer:	Shane Duncan
Temperature	23°C avg
Humidity:	41% avg.

### 7.2 Test Equipment

Equipment Description	Manufacturer	Model Name	Serial Number	Calibration Due Date	Calibration Interval
CSA Spectrum Analyzer	Agilent	N1996A	MY45371881	1/05/18	2 yr

### 7.3 Test Set up Photo(s)

Refer to Figure 1.

### 7.4 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.

### 7.5 Test Description and Procedure

Using the 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.

### 7.6 Test Plots

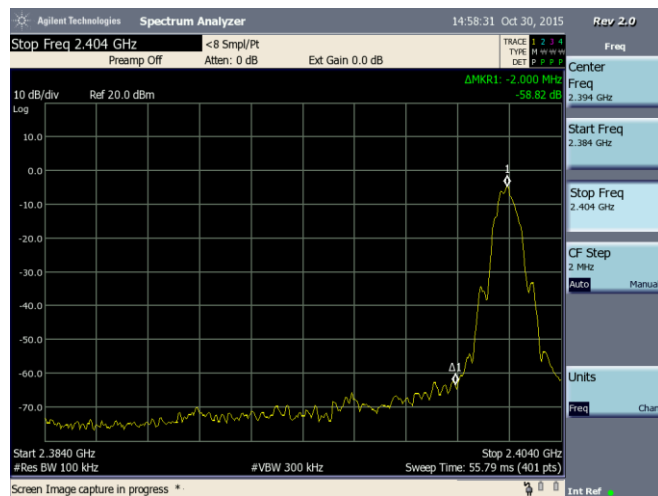


Figure 21: GFSK Ch0 Lower Band Edge

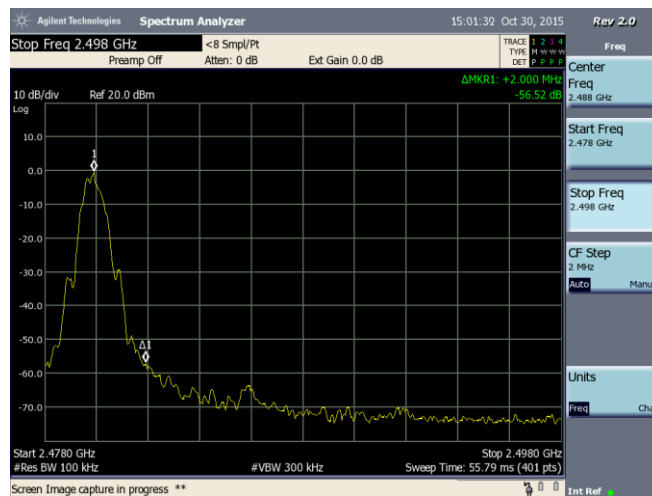


Figure 22: GFSK Ch39 Upper Band Edge

## 8 Occupied Bandwidth Per FCC Part 2 Section 2.1049 (h) – Bluetooth 4.1 Smart

### 8.1 Administrative and Environmental Details

Site Used:	EMC Lab 2a
Test Date:	10/30/15
Test Engineer:	Shane Duncan
Temperature	23°C
Humidity:	41%

### 8.2 Test Equipment

Equipment Description	Manufacturer	Model Name	Serial Number	Calibration Due Date	Calibration Interval
CSA Spectrum Analyzer	Agilent	N1996A	MY45371881	1/05/18	2 yr

### 8.3 Test Set up Photo(s)

Refer to Figure 1.

### 8.4 Limits/Requirements

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission. Transmitters employing digital modulation techniques—when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment will be operated.

### 8.5 Test Description and Procedure

Using the conducted test method, the occupied bandwidth measurement was made utilizing the CSA Analyzer's OBW function. The span was set to be wide enough to capture the entire operating channel.

### 8.6 Test Plots

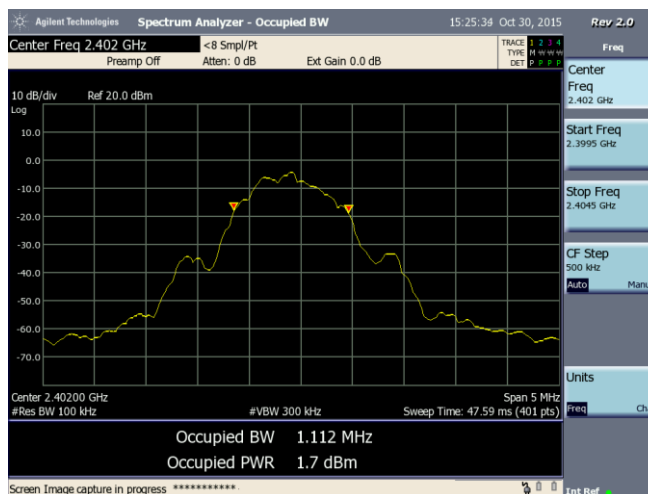


Figure 23: GFSK Occupied Bandwidth (Ch0 Shown, Ch22 & 39 Similar)

## 9 Radiated 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:	1/15/16
Test Engineer:	Shane Duncan
Temperature	20°C
Humidity:	47%

### 9.2 Test Equipment

Equipment Description	Manufacturer	Model Name	Serial Number	Calibration Due Date	Calibration Interval
EMC Analyzer	Agilent	E7405A	US40240257	7/16/16	2 yr
Pre-Amplifier	Agilent	83051A	0000009025	VBU*	N/A**
Amplifier	Giga-tronics	GT-1040A	1112003	VBU*	N/A**
DRG Horn Antenna	AH Systems	SAS-571	587	10/14/16	1yr
Horn Antenna	Schwarzbeck	15633	BBHA9170267	10/16/16	1yr

### 9.3 Test Set up Photo(s)

Refer to Figures 9 and 10.

### 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)
Above 960	500	54	74	3

Table 1- 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 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 the same means as the conducted tests. 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)). Emissions were measured with a peak detector.

## 9.6 Test Data Tables

### 1-3 GHz Radiated Emissions

Freq (MHz)	Channel	Freq (GHz)		Measured Peak Emission (dBuV/m)		Limit (dBuV/m)
		H	V	H	V	
2402	0	1.93	1.93	50.34	49.0	54
2446	22	1.93	1.93	49.26	50.02	54
2480	39	1.93	1.93	46.32	49.32	54

### 3-13 GHz Radiated Emissions

Freq (MHz)	Channel	Freq (GHz)		Measured Peak Emission (dBuV/m)		Limit (dBuV/m)
		H	V	H	V	
2402	0	12.70	12.48	40.93	43.39	54
2446	22	12.20	12.60	40.46	39.81	54
2480	39	12.70	12.70	40.25	41.49	54

### 13-18 GHz Radiated Emissions

Freq (MHz)	Channel	Freq (GHz)		Measured Peak Emission (dBuV/m)		Limit (dBuV/m)
		H	V	H	V	
2402	0	17.50	17.48	48.19	49.06	54
2446	22	17.65	17.61	17.65	48.19	54
2480	39	17.56	17.94	17.56	48.33	54

### 18-25 GHz Radiated Emissions

Freq (MHz)	Channel	Freq (GHz)		Measured Peak Emission (dBuV/m)		Limit (dBuV/m)
		H	V	H	V	
2402	0	19.09	19.05	43.68	41.58	54
2446	22	24.95	19.02	44.03	43.97	54
2480	39	24.62	24.48	44.00	43.85	54

**Note:** H means Horizontal and V means Vertical

## 9.7 Test Data Plots

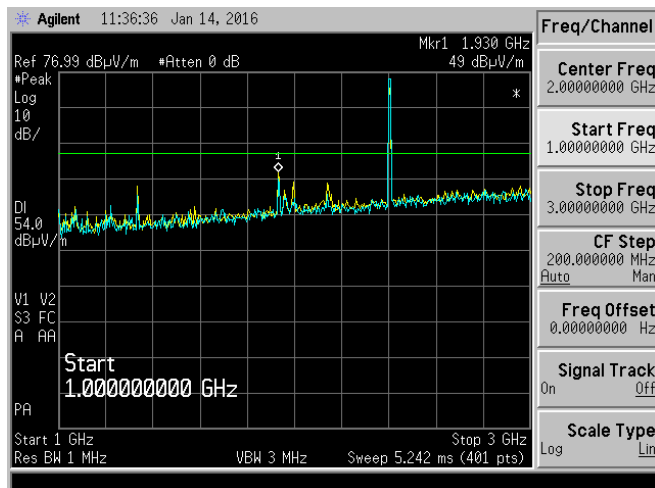


Figure 24: Radiated Spurious Emissions Vertical (1-3 GHz) Channel 0 Shown, 22 and 39 Similar

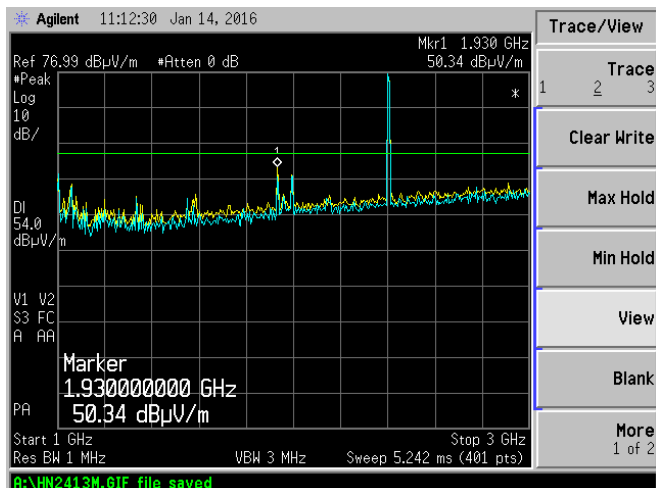


Figure 25: Radiated Spurious Emissions Horizontal (1-3 GHz) Channel 0 Shown, 22 and 39 Similar

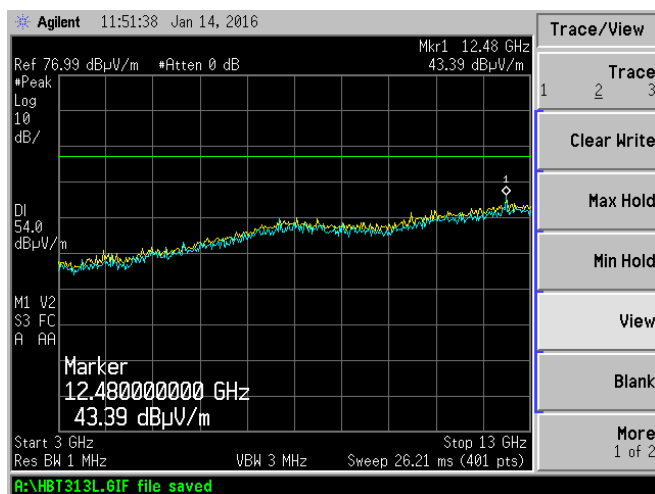


Figure 26: Radiated Spurious Emissions Vertical (3-13 GHz) Channel 0 Shown, 22 and 39 Similar

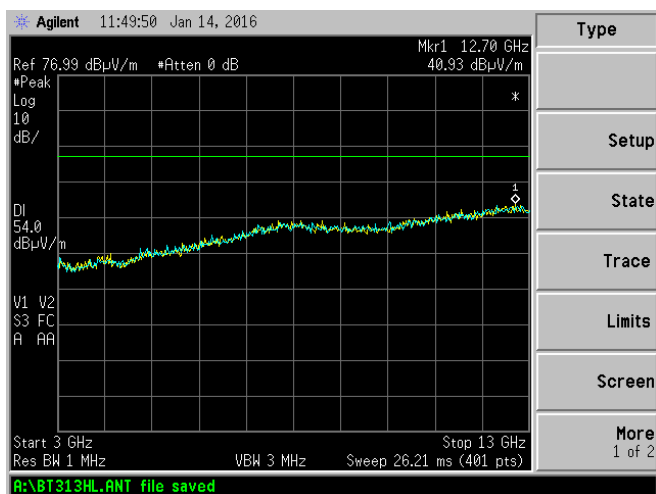


Figure 27: Radiated Spurious Emissions Horizontal (3-13 GHz) Channel 0 Shown, 22 and 39 Similar

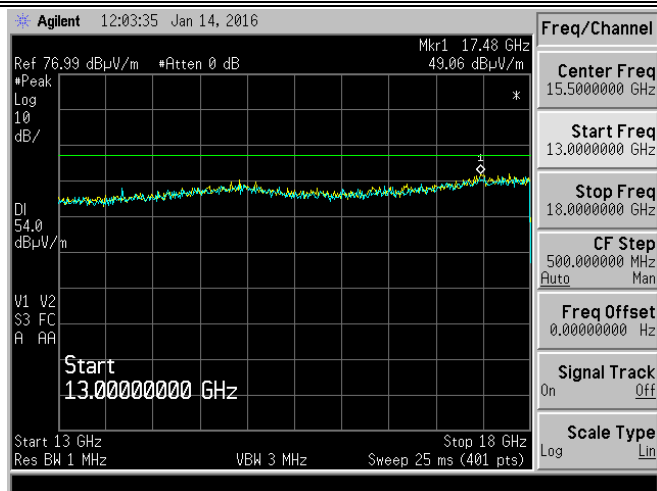


Figure 28: Radiated Spurious Emissions Vertical (13-18 GHz) Channel 0 Shown, 22 and 39 Similar

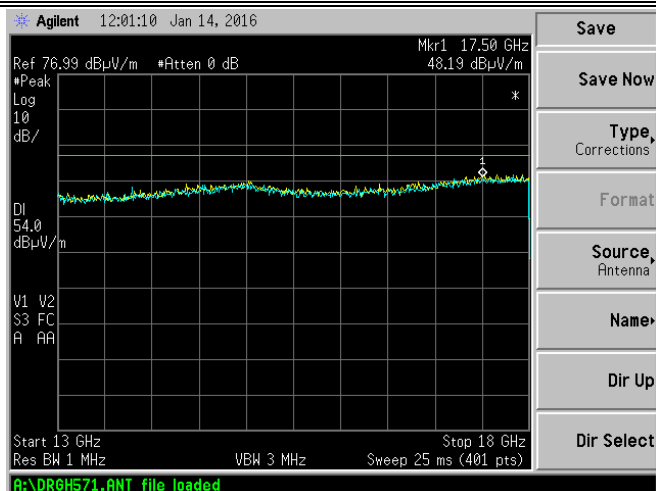


Figure 29: Radiated Spurious Emissions Horizontal (13-18 GHz) Channel 0 Shown, 22 and 39 Similar

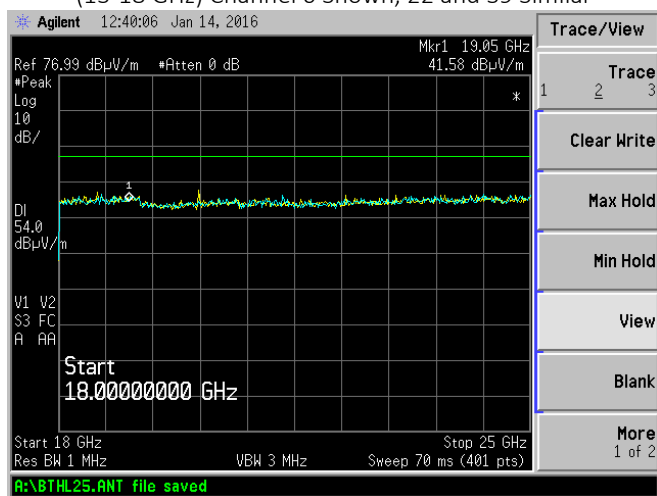


Figure 30: Radiated Spurious Emissions Vertical (18-25 GHz) Channel 0 Shown, 22 and 39 Similar

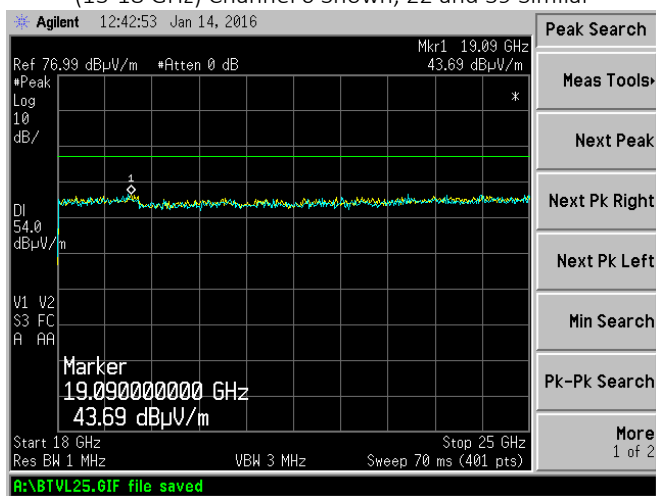


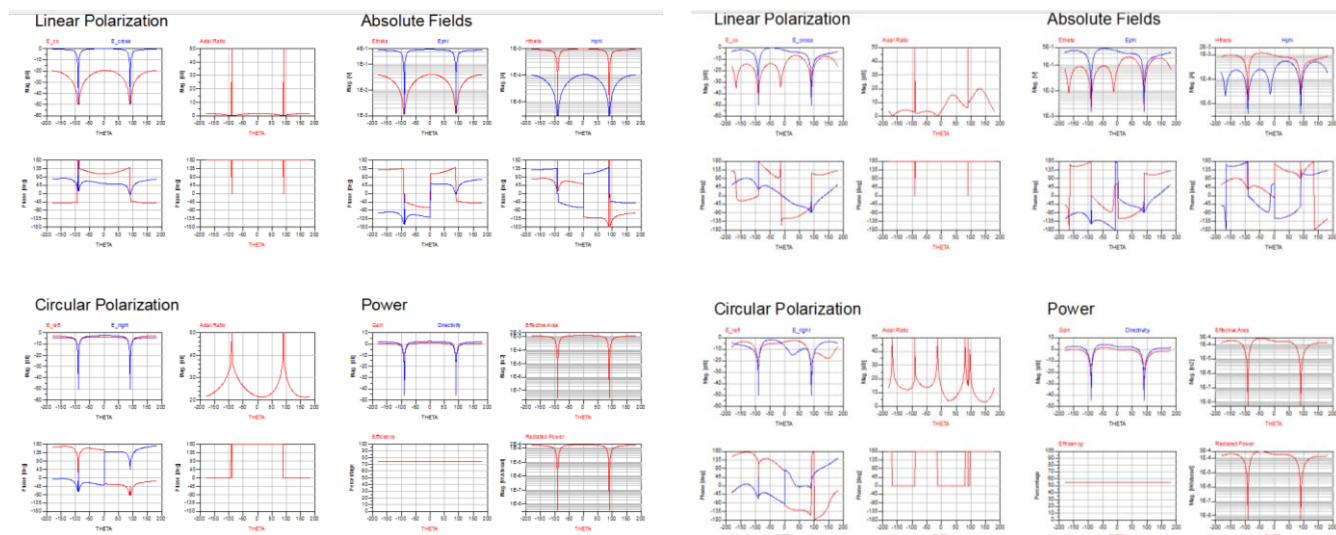
Figure 31: Radiated Spurious Emissions Horizontal (18-25 GHz) Channel 0 Shown, 22 and 39 Similar

## 10 Gain of transmission antenna Per FCC Part 15.247 (b)(4)

### 10.1 Limits/Requirements

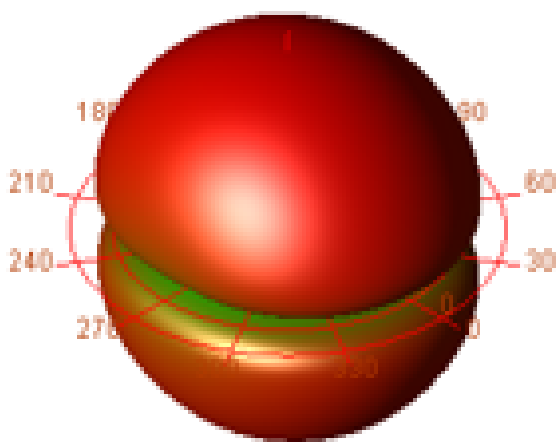
(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi.

The EUT antenna used, has a stated gain over the band of  $\pm 1.5$  dBi.

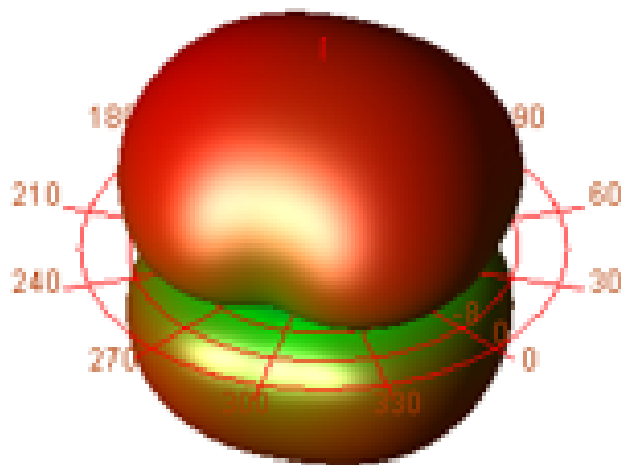


Antenna Specifications in the 2.4-2.5 GHz Band

Antenna Specifications in the 5 GHz Band



2.4 GHz Antenna Radiation Pattern



5 GHz Antenna Radiation Pattern

Figure 32: Antenna Specification

**10.2 R-7 Antenna Specification**

<b>Electrical</b>	
Antenna chip number	140-00092_REVXX_ ANTENNA, WI-FI
Operation frequency (GHz)	2.4, 5.9
Antenna peak gain (dBi)	1.5
Antenna average gain (dBi)	-3
Radiation pattern	Omni
Maximum input power (W)	2
<b>Mechanical</b>	
Antenna element size (mm)	115mm
Coax cable	Micro-coax
Connector	MFH-III

## 11 APPENDIX I

### 11.1 EUT Technical Specification

<b>Manufacturer:</b>	Osterhout Design Group		
<b>General Description:</b>	The R-7 Smart Glasses offers immersive 3D HD viewing of stored or streaming video content, with stereo audio, in a static setting, or in a head orientation tracking augmented vision mode.		
<b>EUT Name:</b>	Smart Glasses	<b>Model:</b>	R-7
<b>Dimensions:</b>	19cm x 14cm x 4.5cm	<b>Serial Number:</b>	R7-P12
<b>Operating Frequency:</b>	2.402 GHz- 2.48 GHz, 5.18-5.825 GHz	<b>Power Cord Type:</b>	<input type="checkbox"/> Shielded <input checked="" type="checkbox"/> Un-Shielded

### 11.2 EUT Photos

Attached in the submittal documents.