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Emissions
Test Report

EUT Name: Wireless Audio Headset

Model No.: Ear Force Stealth 600X

CFR 47 Part 15.247: 2017 and RSS 247 Issue 2, 2017

Prepared for:

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0	06/02/2017	Original Document	N/A
1	07/20/2017	Updated the IC Identification Number	J. Luong

Note: Latest revision report will replace all previous reports.

Statement of Compliance

Manufacturer:	Voyetra Turtle Beach, Inc. 100 Summit Lake Drive, Suite 100 Valhalla, New York 10595 USA (530) 277-3482
Requester / Applicant:	Tim Blaney
Name of Equipment:	Wireless Audio Headset
Model No.	Ear Force Stealth 600X (TB300-2015-01)
Type of Equipment:	Intentional Radiator
Application of Regulations:	CFR 47 Part 15.247: 2017 and RSS 247 Issue 2, 2017
Test Dates:	24 Apr 2017 to 26 May 2017

Guidance Documents:

Emissions: ANSI C63.10-2013, KDB 558074 D01 DTS Measurement Guidance v04

Test Methods:

Emissions: ANSI C63.10-2013, KDB 558074 D01 DTS Measurement Guidance v04

The electromagnetic compatibility test and documented data described in this report has been performed and recorded by TUV Rheinland, in accordance with the standards and procedures listed herein. As the responsible authorized agent of the EMC laboratory, I hereby declare that the equipment described above has been shown to be compliant with the EMC requirements of the stated regulations and standards based on these results. If any special accessories and/or modifications were required for compliance, they are listed in the Executive Summary of this report.

This report must not be used to claim product endorsement by A2LA or any agency of the U.S. Government. This report contains data that are not covered by A2LA accreditation. This report shall not be reproduced except in full, without the written authorization of TUV Rheinland of North America.

Jeremy Luong

Test Engineer Date July 20, 2017

David Spencer

Laboratory Signature Date July 20, 2017

Testing Cert #3331.02 **US1131** **2932M**

1 Executive Summary 7

1.1 Scope 7

1.2 Purpose 7

1.3 Summary of Test Results 8

1.4 Special Accessories 8

1.5 Equipment Modifications 8

2 Laboratory Information 9

2.1 Accreditations & Endorsements 9

2.1.1 US Federal Communications Commission 9

2.1.2 NIST / A2LA 9

2.1.3 Canada – Industry Canada 9

2.1.4 Japan – VCCI 9

2.1.5 Acceptance by Mutual Recognition Arrangement 10

2.2 Test Facilities 10

2.2.1 Emission Test Facility 10

2.2.2 Immunity Test Facility 10

2.3 Measurement Uncertainty 10

2.3.1 Sample Calculation – radiated & conducted emissions 11

2.3.2 Measurement Uncertainty 11

2.3.3 Measurement Uncertainty Immunity 12

2.4 Calibration Traceability 12

3 Product Information 13

3.1 Product Description 13

3.2 Equipment Configuration 13

3.3 Operating Mode 13

3.4 Unique Antenna Connector 14

3.4.1 Results 14

3.5 Duty Cycle 15

3.5.1 Results 15

4 Emissions 19

4.1 Output Power Requirements 19

4.1.1 Test Method 19

4.1.2 Results 20

4.2 Occupied Bandwidth 27

4.2.1 Test Method 27

4.2.2 Results 27

4.3 Peak Power Spectral Density 38

4.3.1 Test Method 38

4.3.2 Results 38

4.4 Out of Band Emissions ____ 45
4.4.1 Test Method ____ 45
4.4.2 Results ____ 46

4.5 Transmit Spurious Emissions ____ 56
4.5.1 Test Methodology ____ 56
4.5.2 Transmitter Spurious Emission Limit ____ 57
4.5.3 Test Results ____ 57
4.5.4 Sample Calculation ____ 85

4.6 AC Conducted Emissions ____ 86
4.6.1 Test Methodology ____ 86
4.6.2 Test Results ____ 86

4.7 Maximum Permissible Exposure ____ 91
4.7.1 Test Methodology ____ 91
4.7.2 FCC KDB 447498 D01 – General SAR Test Exclusion Guidance ____ 91
4.7.3 EUT Operating Condition ____ 92
4.7.4 Classification ____ 92
4.7.5 SAR Test Exclusion Threshold ____ 92

5 Test Equipment List ____ 93

5.1 Equipment List ____ 93

6 EMC Test Plan ____ 94

6.1 Introduction ____ 94

6.2 Customer ____ 94

6.3 Equipment Under Test (EUT) ____ 95

6.4 Test Specifications ____ 98

Table 1: Summary of Test Results 8
Table 2: RF Output Power at the Antenna Port – Test Results 19
Table 3: Average Output Power at the Antenna Port – Reference Use Only 20
Table 4: Occupied Bandwidth – Test Results 27
Table 5: Peak Power Spectral Density – Test Results 38
Table 6: Emissions at the Band-Edge – Test Results 45
Table 7: Transmit Spurious Emission at Band-Edge Requirements 57
Table 8: AC Conducted Emissions – Test Results 85
Table 9: Customer Information 93
Table 10: Technical Contact Information 93
Table 11: EUT Specifications 94
Table 12: Antenna Information 95
Table 13: EUT Channel Power Specifications 95
Table 14: Interface Specifications 95
Table 15: Supported Equipment 96
Table 16: Description of Sample used for Testing 96
Table 17: Description of Test Configuration used for Radiated Measurement. 96
Table 18: Test Specifications 97

1 Executive Summary

1.1 Scope

This report is intended to document the status of conformance with the requirements of the CFR 47 Part 15.247: 2017 and RSS 247 Issue 2, 2017 based on the results of testing performed on 24 Apr 2017 to 26 May 2017 on the Wireless Audio Headset Model Ear Force Stealth 600X manufactured by Voyetra Turtle Beach, Inc. This report only applies to the specific samples tested under the stated test conditions. It is the responsibility of the manufacturer to assure that additional production units of this model are manufactured with identical or EMI equivalent electrical and mechanical components. This report is further intended to document changes and modifications to the EUT throughout its life cycle. All documentation will be included as a supplement.

1.2 Purpose

Testing was performed to evaluate the EMC performance of the EUT in accordance with the applicable requirements, procedures, and criteria defined in the application of regulations and application of standards listed in this report. The 2412 MHz to 2462 MHz frequency band for Wi-Fi is covered in this document.

1.3 Summary of Test Results

Table 1: Summary of Test Results

Test	Test Method ANSI C63.10:2013	Test Parameters	Measured Value	Result
Spurious Emission in Transmitted Mode	CFR47 15.209, CFR47 15.247 (d) RSS-GEN Sect.8.9, RSS 247 Sect. 6.2.1.2	Class B	-7.40 dB (Margin)	**Complied**
Restricted Bands of Operation	CFR47 15.205, RSS GEN Sect.8.10	Class B		**Complied**
AC Power Conducted Emission	CFR47 15.207, RSS-GEN Sect.8.8	Class B	-2.76 dB (Margin)	**Complied**
Occupied Bandwidth	CFR47 15.247 (a1), RSS GEN Sect.6.6	≥ 500 kHz	11.758 MHz (DTS) 16.312 MHz (99%)	**Complied**
Maximum Output Power	CFR47 15.247 (b), RSS 247 Sect. 5.4.4, 6.2.4.1	30 dBm w/ 6 dBi antenna	+8.00 dBm (802.11b) +7.77 dBm (802.11g) +7.80 dBm (HT 20)	**Complied**
Peak Power Spectral Density	CFR47 15.247 (e), RSS 247 Sect. 5.2.2	8 dBm/ 3 kHz	-24.91 dBm	**Complied**
Out of Band Emission	CFR47 15.247 (d), RSS 247 Sect.5.5	-30 dBr	-12.78 dB (Margin)	**Complied**
RF Exposure	CFR47 15.247 (i), 2.1093 RSS-102 Issue 5	General Population	Excluded	**Complied**

Note: This test report covers 2400 MHz to 2483.5 MHz band.

1.4 Special Accessories

No special accessories were necessary in order to achieve compliance.

1.5 Equipment Modifications

None

2 Laboratory Information

2.1 Accreditations & Endorsements

2.1.1 US Federal Communications Commission

TUV Rheinland of North America at 1279 Quarry Ln, Pleasanton, CA 94566 is recognized by the commission for performing testing services for the general public on a fee basis. These laboratory test facilities have been fully described in reports submitted to and accepted by the FCC (US1131). The laboratory scope of accreditation includes: Title 47 CFR Parts 15, 18, and 90. The accreditation is updated every 3 years.

2.1.2 NIST / A2LA

TUV Rheinland of North America is accredited by the National Voluntary Laboratory Accreditation Program, which is administered under the auspices of the National Institute of Standards and Technology. The laboratory has been assessed and accredited in accordance with ISO Guide 17025:1999 and ISO 9002 (Lab Code Testing Cert #3331.02). The scope of laboratory accreditation includes emission and immunity testing. The accreditation is updated annually.

2.1.3 Canada – Industry Canada

TUV Rheinland of North America at the 1279 Quarry Ln, Pleasanton, CA 94566 address is accredited by Industry Canada for performing testing services for the general public on a fee basis. This laboratory test facilities have been fully described in reports submitted to and accepted by Industry Canada (File Number 2932M). This reference number is the indication to the Industry Canada Certification Officers that the site meets the requirements of RSS 212, Issue 1 (Provisional). The accreditation is updated every 3 years.

2.1.4 Japan – VCCI

The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) is a group that consists of Information Technology Equipment (ITE) manufacturers and EMC test laboratories. The purpose of the Council is to take voluntary control measures against electromagnetic interference from Information Technology Equipment, and thereby contribute to the development of a socially beneficial and responsible state of affairs in the realm of Information Technology Equipment in Japan. TUV Rheinland of North America at 1279 Quarry Ln, Pleasanton, CA 94566 has been assessed and approved in accordance with the Regulations for Voluntary Control Measures.

VCCI Registration No. for Pleasanton: A-0261

2.1.5 Acceptance by Mutual Recognition Arrangement

The United States has an established agreement with specific countries under the Asia Pacific Laboratory Accreditation Corporation (APLAC) Mutual Recognition Arrangement. Under this agreement, all TUV Rheinland at 1279 Quarry Ln, Pleasanton, CA 94566 test results and test reports within the scope of the laboratory NIST / A2LA accreditation will be accepted by each member country.

2.2 Test Facilities

All of the test facilities are located at 1279 Quarry Lane, Pleasanton, California 94566, USA. The 2305 Mission College, Santa Clara, 95054, USA location is considered a Pleasanton annex.

2.2.1 Emission Test Facility

The Semi-Anechoic chamber and AC Line Conducted measurement facility used to collect the radiated and conducted data has been constructed in accordance with ANSI C63.7:1992. The site has been measured in accordance with and verified to comply with the theoretical normalized site attenuation requirements of ANSI C63.4-2014, at a test distance of 3 and 5 meters. The site is listed with the FCC and accredited by A2LA (Lab Code Testing Cert #3331.02). The 3/5-meter semi-anechoic chamber used to collect the radiated data has been verified to comply with the theoretical normalized site attenuation requirements of ANSI C63.4-2014, at a test distance of 3 meter and 5 meters. A report detailing this site can be obtained from TUV Rheinland of North America.

2.2.2 Immunity Test Facility

ESD, EFT, Surge, PQF: These tests are performed in an environmentally controlled room with a 3.7 m x 4.8 m x 3.175 mm thick aluminum floor connected to PE ground.

For ESD testing, tabletop equipment is placed on an insulated mat with a surface resistivity of 10^9 Ohms/square on a 1.6 m x 0.8 m x 0.8 m high non-conductive table with a 3.175 mm aluminum top (Horizontal Coupling Plane). The HCP is connected to the main ground plane via a low impedance ground strap through two 470-kΩ resistors. The Vertical Coupling Plane consists of an aluminum plate 50 cm x 50 cm x 3.175 mm thick. The VCP is connected to the main ground plane via a low impedance ground strap through two 470-kΩ resistors.

For EFT, Surge, PQF, the HCP and VCP are removed.

RF Field Immunity testing is performed in a 7.3m x 4.3m x 4.1m anechoic chamber.

RF Conducted and Magnetic Field Immunity testing is performed on a 4.8m x 3.7m x 3.175mm thick aluminum ground plane.

All test areas allow a minimum distance of 1 meter from the EUT to walls or conducting objects.

2.3 Measurement Uncertainty

Two types of measurement uncertainty are expressed in this report, per *ISO Guide To The Expression Of Uncertainty In Measurement*, 1st Edition, 1995.

The Combined Standard Uncertainty is the standard uncertainty of the result of a measurement when that result is obtained from the values of a number of other quantities; it is equal to the positive square root of the sum of the variances or co-variances of these other quantities, weighted according to how the measurement result varies with changes in these quantities. The term *standard uncertainty* is the result of a measurement expressed as a standard deviation.

2.3.1 Sample Calculation – radiated & conducted emissions

The field strength is calculated by subtracting the Amplifier Gain and adding the Cable Loss and Antenna Correction Factor to the measured reading. The basic equation is as follows:

Field Strength (dBμV/m) = RAW - AMP + CBL + ACF

Where: RAW = Measured level before correction (dBμV)

AMP = Amplifier Gain (dB)

CBL = Cable Loss (dB)

ACF = Antenna Correction Factor (dB/m)

$$\mu V/m = 10^{\frac{dB\mu V/m}{20}}$$

Sample radiated emissions calculation @ 30 MHz

Measurement +Antenna Factor–Amplifier Gain+Cable loss=Radiated Emissions (dBuV/m)

25 dBuV/m + 17.5 dB – 20 dB + 1.0 dB = 23.5 dBuV/m

2.3.2 Measurement Uncertainty

Per CISPR 16-4-2	**U_{lab}**	**U_{cispr}**
Radiated Disturbance @ 10 meters		
30 – 1,000 MHz	2.25 dB	4.51 dB
Radiated Disturbance @ 3 meters		
30 – 1,000 MHz	2.26 dB	4.52 dB
1 – 6 GHz	2.12 dB	4.25 dB
6 – 18 GHz	2.47 dB	4.93 dB
Conducted Disturbance @ Mains Terminals		
150 kHz – 30 MHz	1.09 dB	2.18 dB
Disturbance Power		
30 MHz – 300 MHz	3.92 dB	4.3 dB

Voltech PM6000A

The estimated combined standard uncertainty for harmonic current and flicker measurements is ± 5.0%.	Per CISPR 16-4-2 Methods

2.3.3 Measurement Uncertainty Immunity

The estimated combined standard uncertainty for ESD immunity measurements is ± 8.2%.	Per IEC 61000-4-2
The estimated combined standard uncertainty for radiated immunity measurements is ± 4.10 dB.	Per IEC 61000-4-3
The estimated combined standard uncertainty for conducted immunity measurements with CDN is ± 3.66 dB	Per IEC 61000-4-6
The estimated combined standard uncertainty for power frequency magnetic field immunity is ± 2.9%.	Per IEC 61000-4-8

Thermo KeyTek EMC Pro

The estimated combined standard uncertainty for EFT fast transient immunity measurements is ± 2.6%.
The estimated combined standard uncertainty for surge immunity measurements is ± 2.6%.
The estimated combined standard uncertainty for voltage variation and interruption measurements is ± 1.74%.

The expanded uncertainty at a level of 95% confidence is obtained by multiplying the combined standard uncertainty by a coverage factor of 2. Compliance criteria are not based on measurement uncertainty.

2.4 Calibration Traceability

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Measurement method complies with ANSI/NCSL Z540-1-1994 and ISO Standard 17025:2005. Equipment calibration records are kept on file at the test facility.

3 Product Information

3.1 Product Description

The Stealth 600X is a completely wireless Xbox One audio gaming headset. It wirelessly connects directly to the Xbox One console over either a 2.4 GHz or 5.0 GHz Wi-Fi link. The functionality in the headset consists of 50mm speaker drivers, a flip up non-removable microphone, microphone monitoring (adjustable via EFAH) and game/chat mix controls on the headset. Additionally, it has a ProSpecs alternative glasses relief ear pad design. With the Microsoft integrated radio module, this headset is also capable of working with compatible Windows PCs in the future.

3.2 Equipment Configuration

A description of the equipment configuration is given in the Test Plan Section. The EUT was tested as called for in the test standard and was configured and operated in a manner consistent with its intended use. The EUT was connected to rated power and allowed to reach intended operating conditions. The placement of the EUT system components was guided by the test standard and selected to represent typical installation conditions.

In the case of an EUT that can operate in more than one configuration, preliminary testing was performed to determine the configuration that produced maximum radiation.

The final configuration was selected to produce the worst case radiation for emissions testing and to place the EUT in the most susceptible state for immunity testing.

3.3 Operating Mode

A description of the operation mode is given in the Test Plan Section. In the case of an EUT that can operate in more than one state, preliminary testing was performed to determine the operating mode that produced maximum radiation.

The final operating mode was selected to produce the worst case radiation for emissions testing and to place the EUT in the most susceptible state for immunity testing.

3.4 Unique Antenna Connector

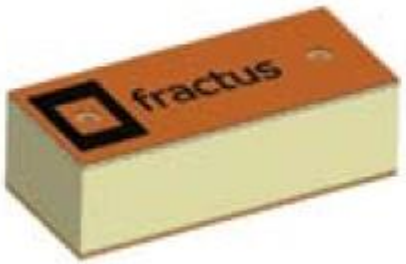
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of CFR47 Parts 15.211, 15.213, 15.217, 15.219, or 15.221.

3.4.1 Results

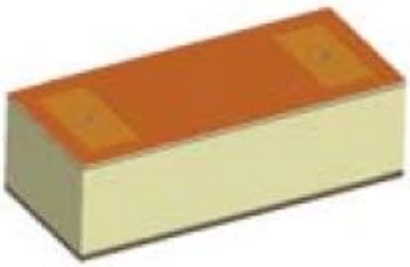
The Wireless Audio Headset uses a dual band Fractus chip antenna for the 2.4 GHz and 5150 MHz to 5850 MHz bands. The chip antenna is integrated onto the PCB. It has a peak gain of 1.8 dBi in the 2.4GHz band and 4.9 dBi in the 5150MHz to 5850MHz bands.

There is an additional antenna specification available in the submittal package.

7.0 mm x 3.0 mm x 2.0 mm (image larger than real size)



TOP



BOTTOM

3.5 Duty Cycle

The Ear Force Stealth 600X, SN: PP1 was measured for the duty cycle

3.5.1 Results

Mode	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Factor (dB)
802.11b	100	0	100	0
802.11g	100	0	100	0
802.11n HT20	100	0	100	0
Notes: EUT configured and measured for the duty cycle. All measurements use 100% duty cycle.				

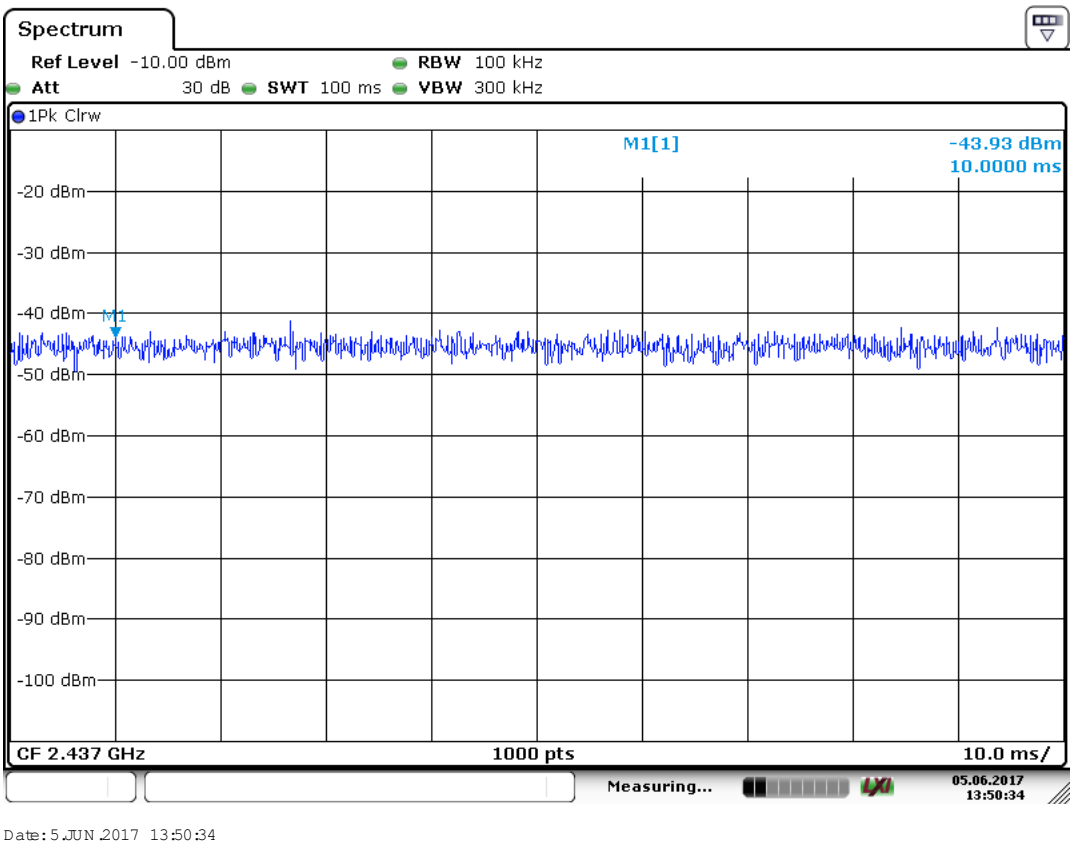


Figure 1: Duty Cycle for 802.11b

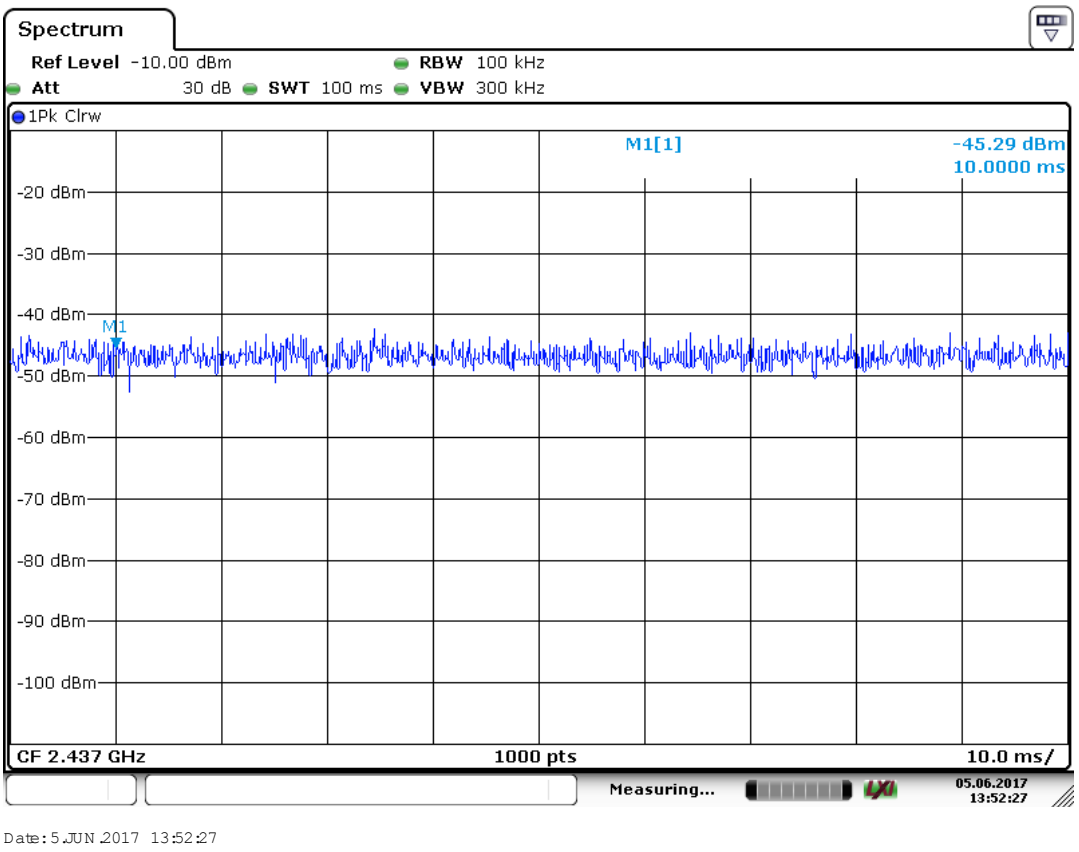


Figure 2: Duty Cycle for 802.11g

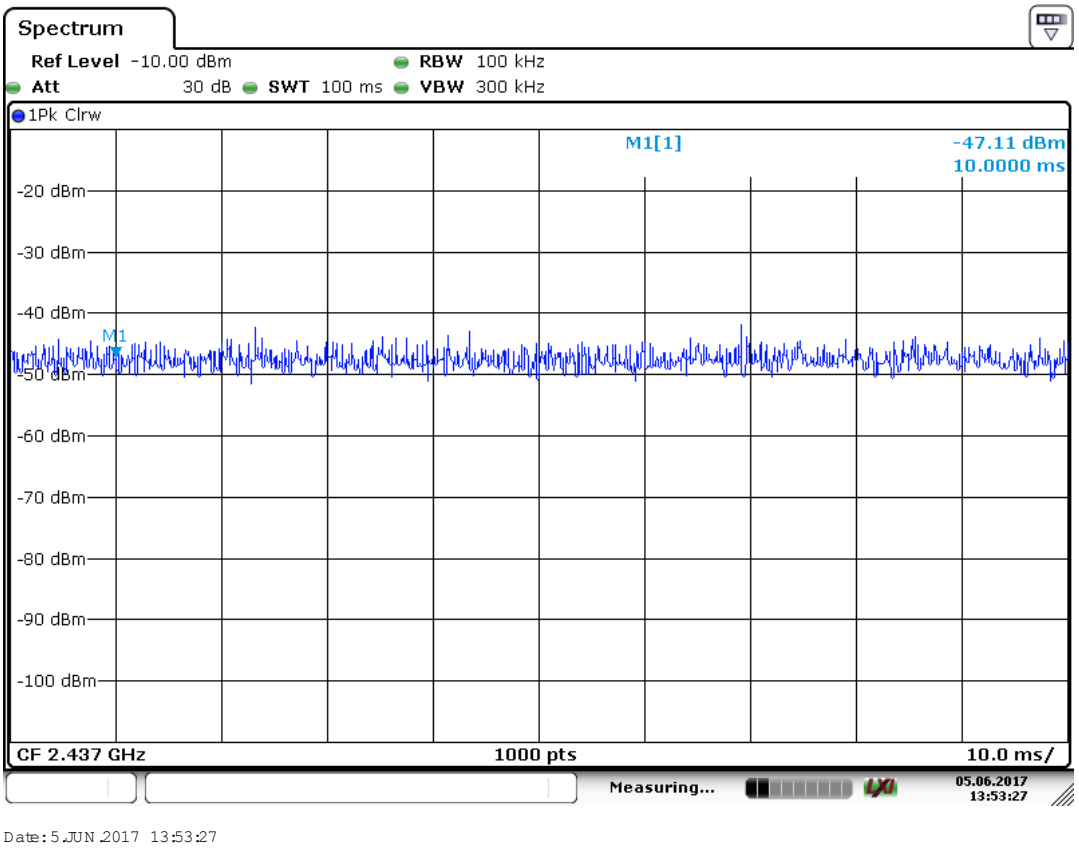


Figure 3: Duty Cycle for 802.11n HT20

4 Emissions

Testing was performed in accordance with CFR 47 Part 15.247: 2017 and RSS 247 Issue 2, 2017. These test methods are listed under the laboratory's A2LA Scope of Accreditation. This test measures the levels emanating from the EUT, thus evaluating the potential for the EUT to cause radio frequency interference to other electronic devices. Procedures described in section 8 of the standard were used.

4.1 Output Power Requirements

The maximum output power requirement is the maximum equivalent isotropic radiated power delivering at the transmitting antenna under specified conditions of measurements in the presence of modulation.

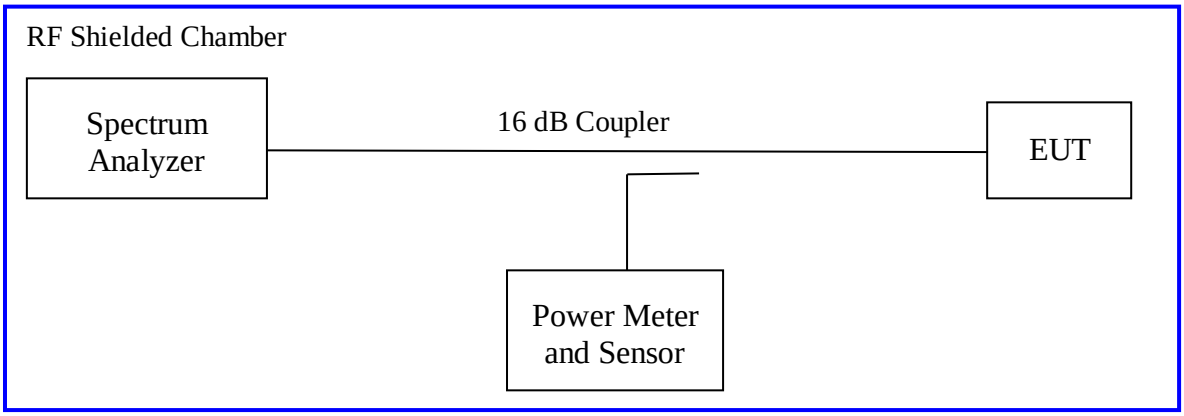
The maximum output power and harmonics shall not exceed CFR47 Part 15.247 (b):2017 and RSS 247: 2017 Sect. 5.4.4.

The maximum transmitted power in the band 2400-2483.5 MHz: 1 W

4.1.1 Test Method

The ANSI C63.10-2013 Section 11.9.2.2.2. Conducted method was used to measure the channel power output. The preliminary investigation was performed at different data rate / chain to determine the highest power output for each mode. The worst findings were conducted on 3 channels in each operating range per CFR47 Part 15.247(b) and RSS 247 Sect. 5.4.4. The worst mode results indicated below.

Test Setup:



Method AVGSA-1 of "KDB 558074 – DTS Measurement Guidance v04" applies since the EUT continuously transmits with duty cycle greater than 98%. Sample detector was used.

4.1.2 Results

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Table 2: RF Output Power at the Antenna Port – Test Results

Test Conditions: Conducted Measurement			**Date:** May 1, 2017		
Antenna Type: Integrated			**Power Setting:** See test plan.		
Antenna Gain: 1.8 dBi			**Signal State:** Modulated at 100%		
Ambient Temp.: 23 °C			**Relative Humidity:**33%		
802.11b					
Frequency (MHz)	**Limit [dBm]**	**Output [dBm]**	**Duty Cycle [dB]**	**∑ Power [dBm]**	**Margin [dB]**
2412	+30.00	7.97			-22.03
2437	+30.00	8.00			-21.95
2462	+30.00	7.64			-22.36
Note: The headset transmitted at 100% duty cycle.					
802.11g					
Frequency (MHz)	**Limit [dBm]**	**Output [dBm]**	**Duty Cycle [dB]**	**∑ Power [dBm]**	**Margin [dB]**
2412	+30.00	7.61			-22.39
2437	+30.00	7.77			-22.23
2462	+30.00	7.23			-22.77
Note: The headset transmitted at 100% duty cycle.					
802.11n HT20					
Frequency (MHz)	**Limit [dBm]**	**Output [dBm]**	**Duty Cycle [dB]**	**∑ Power [dBm]**	**Margin [dB]**
2412	+30.00	7.80			-22.20
2437	+30.00	7.79			-22.21
2462	+30.00	7.18			-22.82
Note: The headset transmitted at 100% duty cycle.					

Table 3: Average Output Power at the Antenna Port – Reference Use Only

Test Conditions: Conducted Measurement	**Date:** May 1, 2017
Antenna Type: Integrated	**Power Setting:** See test plan.
Antenna Gain: 1.8 dBi	**Signal State:** Modulated at 100%
Ambient Temp.: 23 °C	**Relative Humidity:**33%

802.11b Mode

Frequency	Limit [dBm]	Output [dBm]	Duty Cycle [dB]	∑ Power [dBm]	Margin [dB]
2412 MHz	N/A	7.65			N/A
2437 MHz	N/A	7.57			N/A
2462 MHz	N/A	7.43			N/A

Note: The highest output power was observed at 1Mbps.

802.11g Mode

Frequency	Limit [dBm]	Output [dBm]	Duty Cycle [dB]	∑ Power [dBm]	Margin [dB]
2412 MHz	N/A	7.28			N/A
2437 MHz	N/A	7.45			N/A
2462 MHz	N/A	6.95			N/A

Note: The highest output power was observed at 6 Mbps.

802.11n (HT20) Mode

Frequency	Limit [dBm]	Output [dBm]	Duty Cycle [dB]	∑ Power [dBm]	Margin [dB]
2412 MHz	N/A	7.44			N/A
2437 MHz	N/A	7.46			N/A
2462 MHz	N/A	6.89			N/A

Note: The highest output power was observed at MCS0, 6.5Mbps.

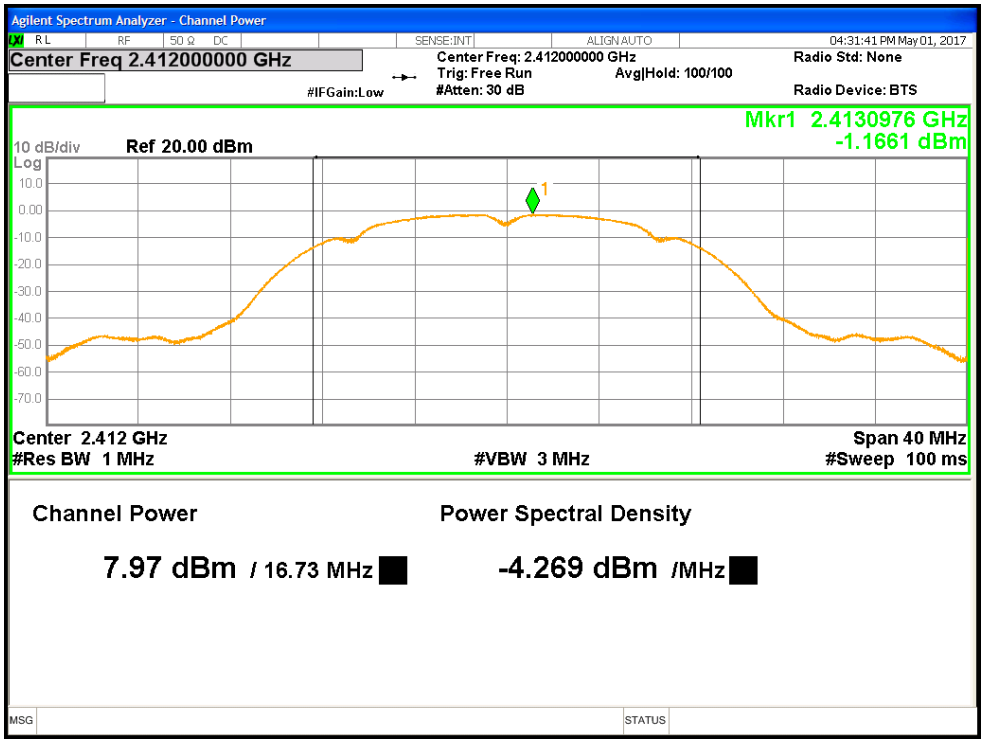


Figure 4: Maximum Transmitted Power, 2412 MHz at 11b 1Mbps

Figure 5: Maximum Transmitted Power, 2437 MHz at 11b 1Mbps

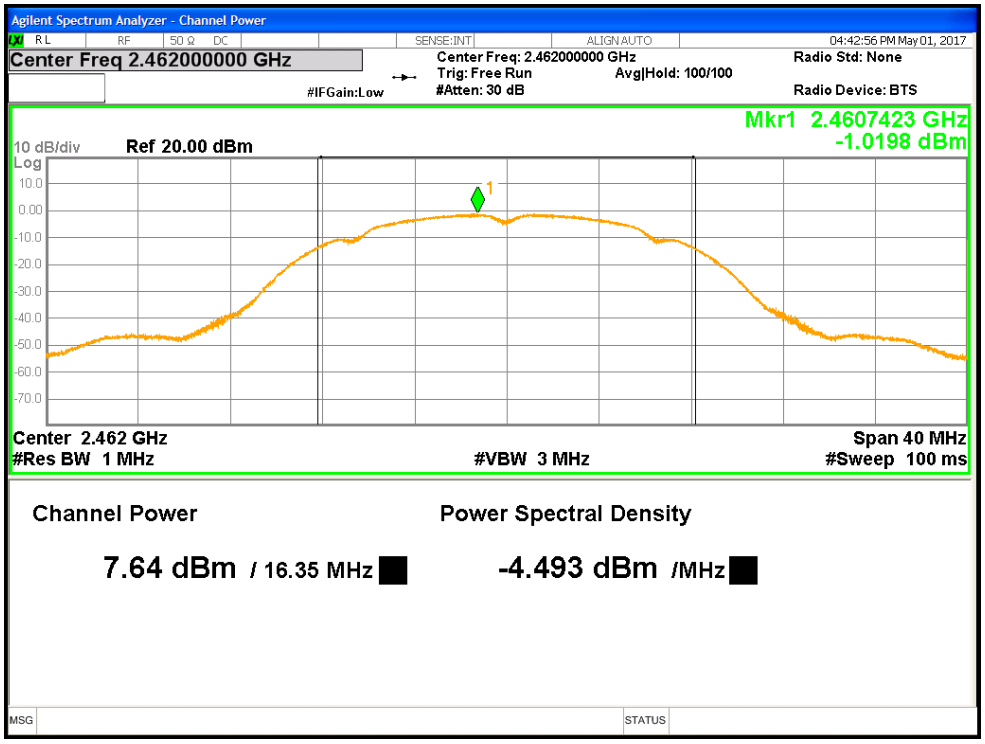


Figure 6: Maximum Transmitted Power, 2462 MHz at 11b 1Mbps

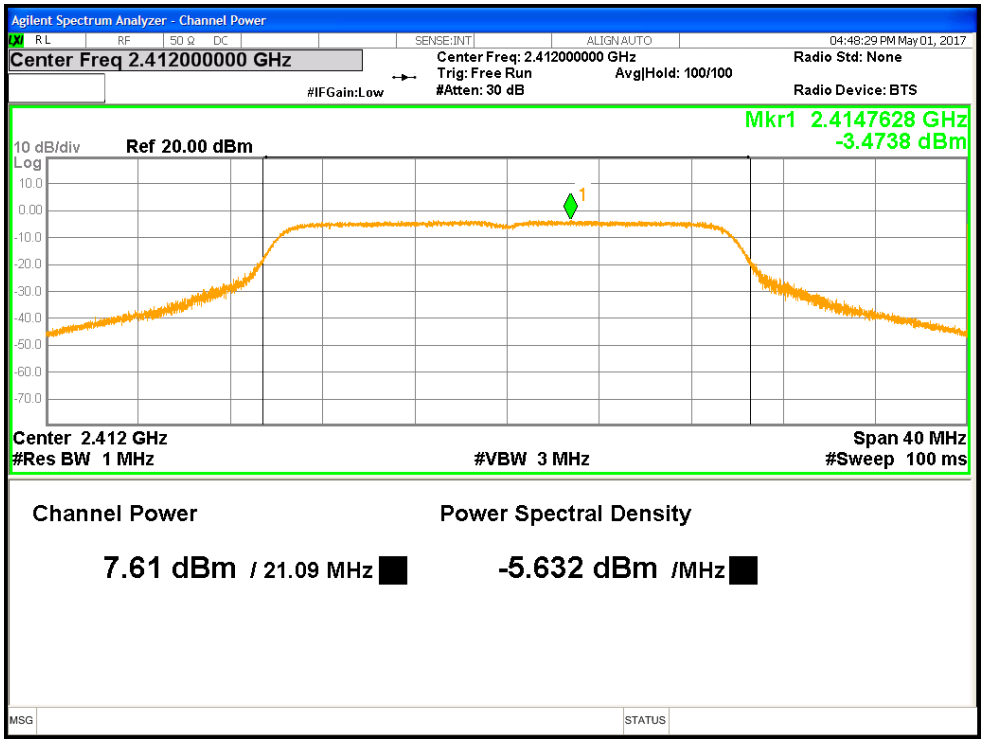


Figure 7: Maximum Transmitted Power, 2412 MHz at 11g 6Mbps

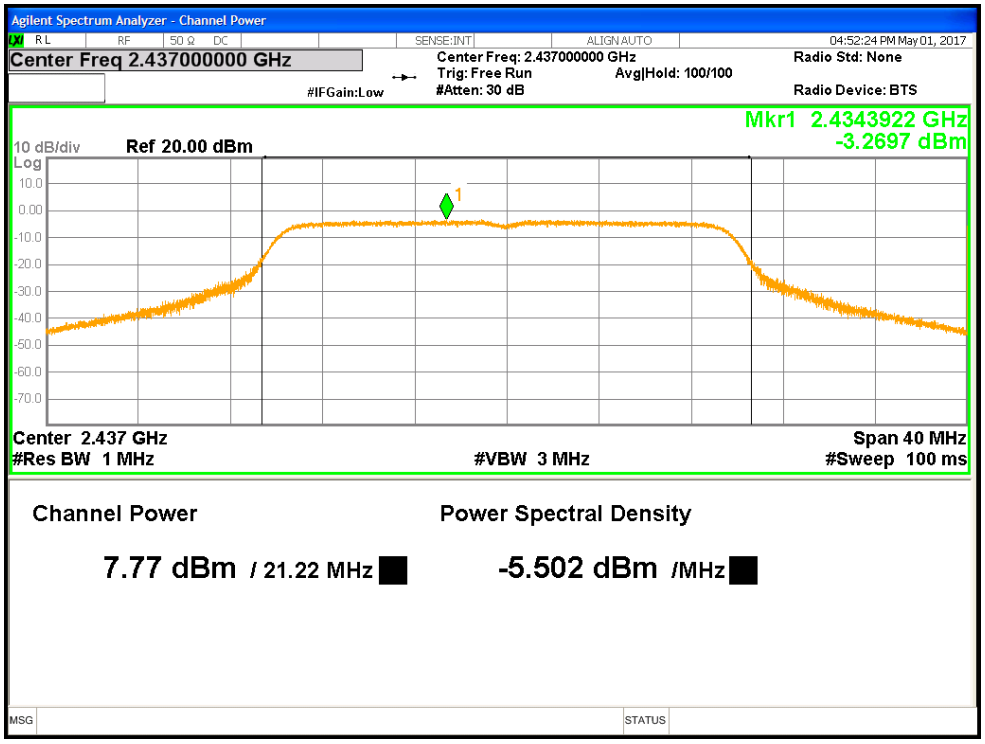


Figure 8: Maximum Transmitted Power, 2437MHz at 11g 6Mbps

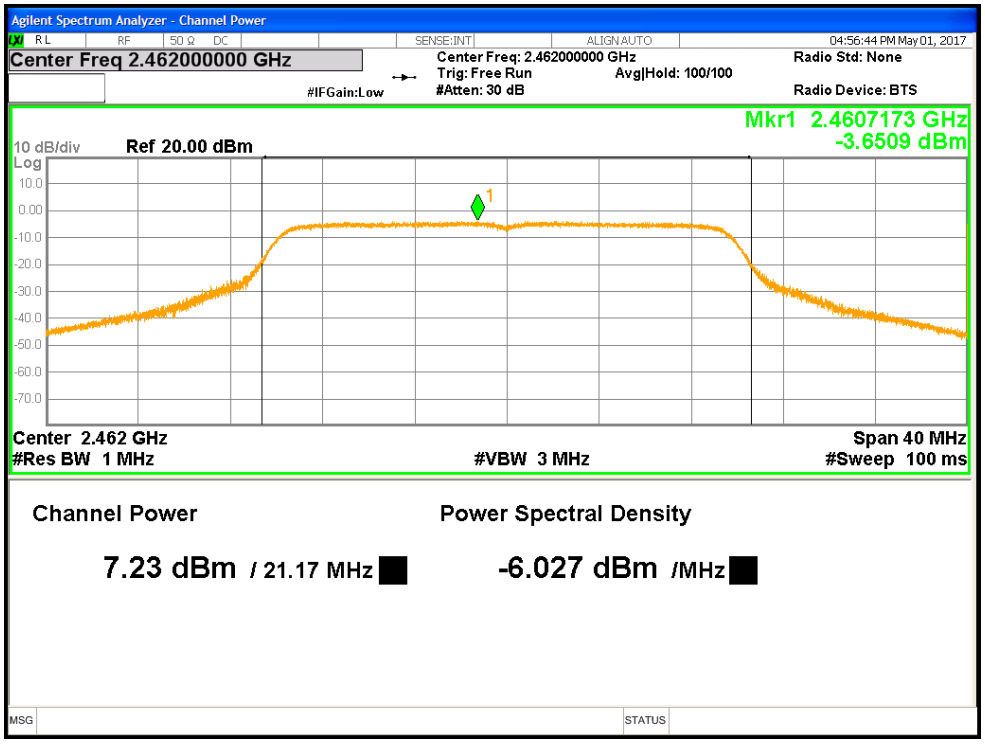


Figure 9: Maximum Transmitted Power, 2462 MHz at 11g 6Mbps

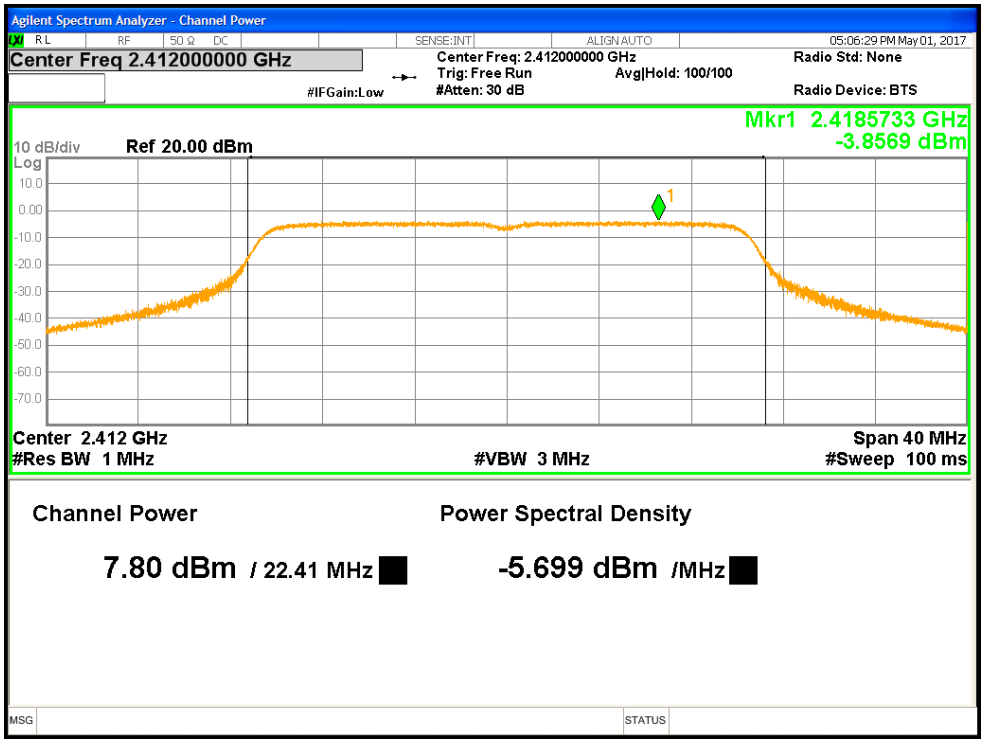


Figure 10: Maximum Transmitted Power, 2412 MHz at HT20 6.5Mbps

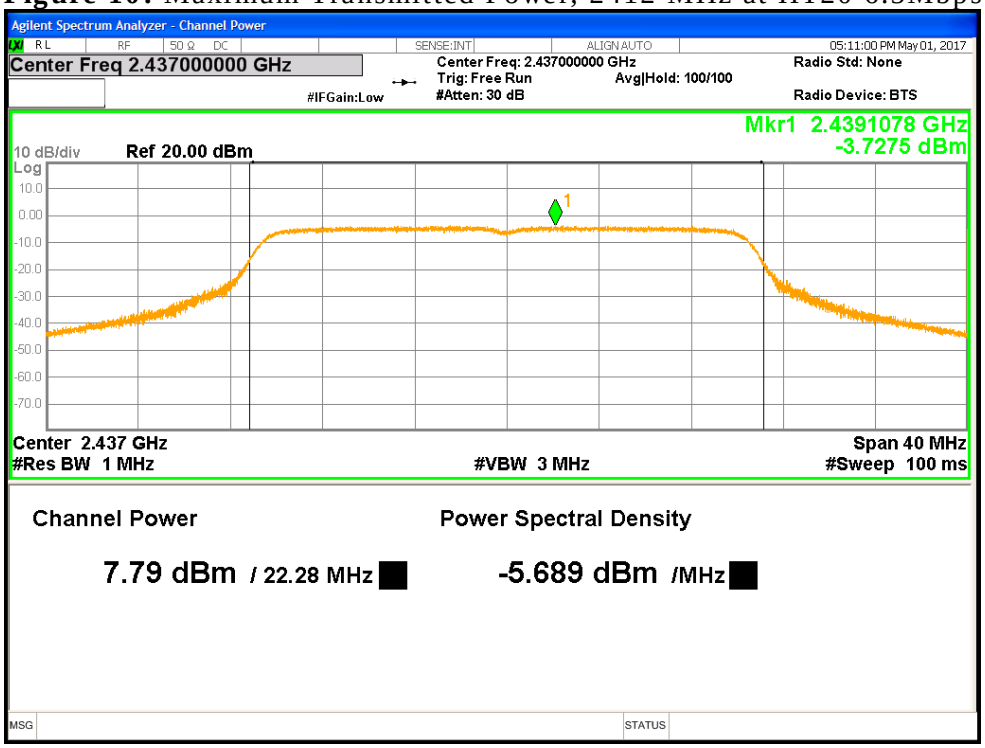


Figure 11: Maximum Transmitted Power, 2437 MHz at HT20 6.5Mbps

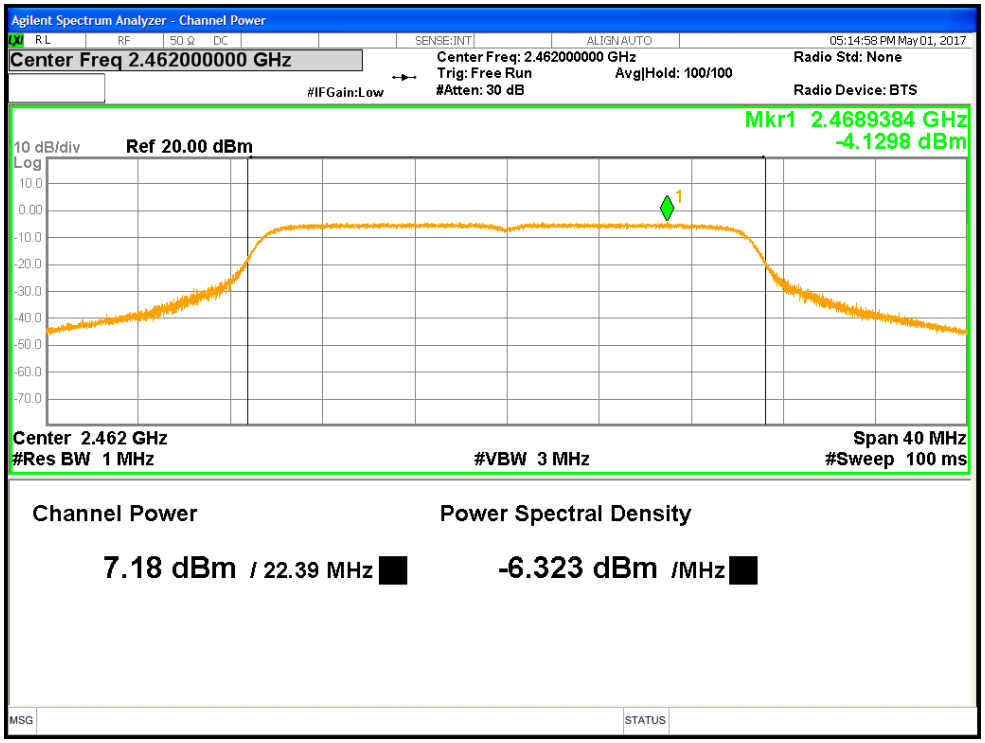


Figure 12: Maximum Transmitted Power, 2462 MHz at HT20 6.5Mbps

4.2 Occupied Bandwidth

The occupied bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency.

The 99% bandwidth is the bandwidth in which 99% of the transmitted power occupied.

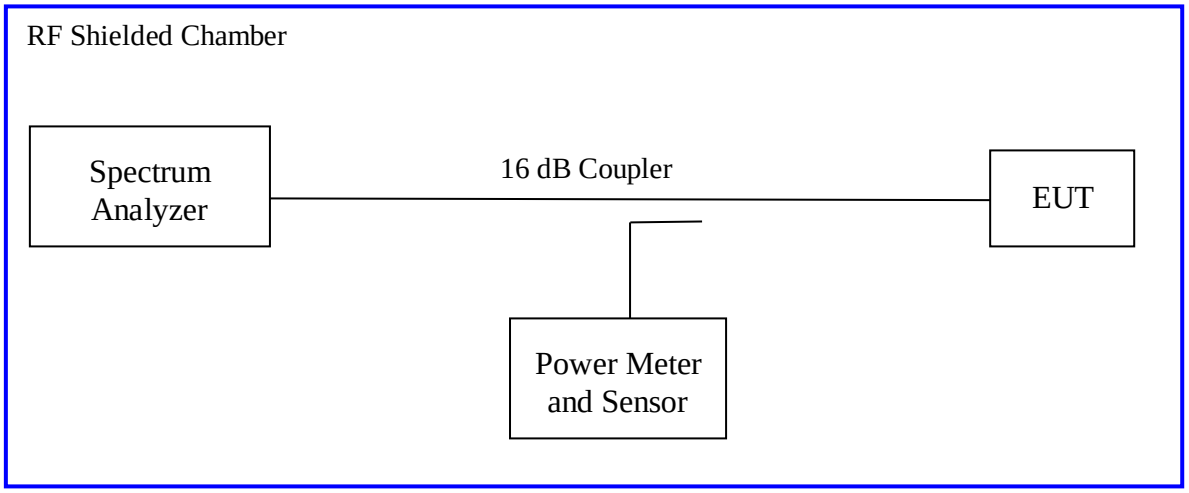
The 6dB bandwidth is defined the bandwidth of 6dBr from highest transmitted level of the fundamental frequency.

The minimum 6 dB bandwidth shall be at least 500 kHz per Section CFR47 15.247(a2) 2017 and RSS-247 Sect. 5.3(a) Issue 2, 2017.

4.2.1 Test Method

The conducted method was used to measure the occupied bandwidth according to ANSI C63.10:2013 Section 11.8. The measurement was performed with modulation per CFR47 15.247 (a) (2) 2016 and RSS Gen Sect. 6.6 2014. The preliminary investigation was performed to find the narrowest 26 dB bandwidth for each operational mode at different data rates. This worst finding was performed on 3 channels in each operating frequency range; 2400 MHz to 2483.5 MHz, a 6 dB bandwidth was used. The worst results indicated below.

Test Setup:



4.2.2 Results

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Table 4: Occupied Bandwidth – Test Results

Test Conditions: Conducted Measurement		**Date:** May 1, 2017		
Antenna Type: Integrated		**Power Setting:** See test plan.		
Antenna Gain: 1.8 dBi		**Signal State:** Modulated at 100%		
Ambient Temp.: 23 °C		**Relative Humidity:**33%		
Bandwidth (MHz) for 802.11b				
Frequency (MHz)	**Limit (kHz)**	**99% BW**	**6 dB BW**	**Results**
2412	500	16.656	11.926	Pass
2437	500	16.664	11.960	Pass
2462	500	16.312	11.758	Pass
Note: The bandwidth was measured at 1Mbps for 802.11b mode.				
Bandwidth (MHz) for 802.11g				
Frequency (MHz)	**Limit (kHz)**	**99% BW**	**6 dB BW**	**Results**
2412	500	19.914	19.405	Pass
2437	500	19.925	19.330	Pass
2462	500	19.918	19.375	Pass
Note: The bandwidth was measured at 6Mbps for 802.11g mode.				
Bandwidth (MHz) for 802.11n HT20				
Frequency (MHz)	**Limit (kHz)**	**99% BW**	**6 dB BW**	**Results**
2412	500	21.152	20.841	Pass
2437	500	21.175	20.868	Pass
2462	500	21.191	20.853	Pass
Note: The bandwidth was observed at MCS0 6.5Mbps mode.				

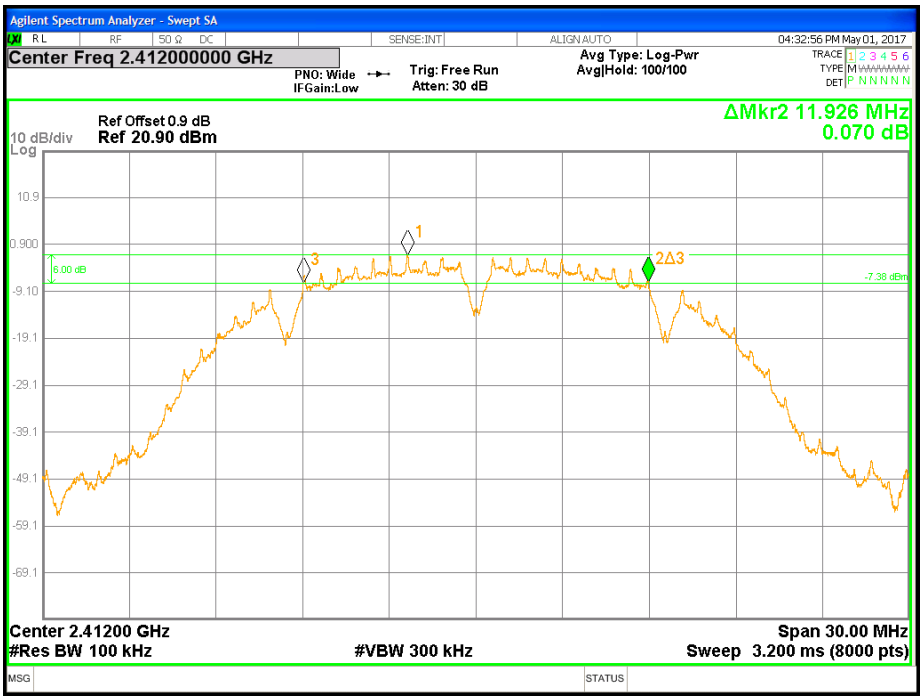


Figure 13: DTS Bandwidth-802.11b-2412 MHz

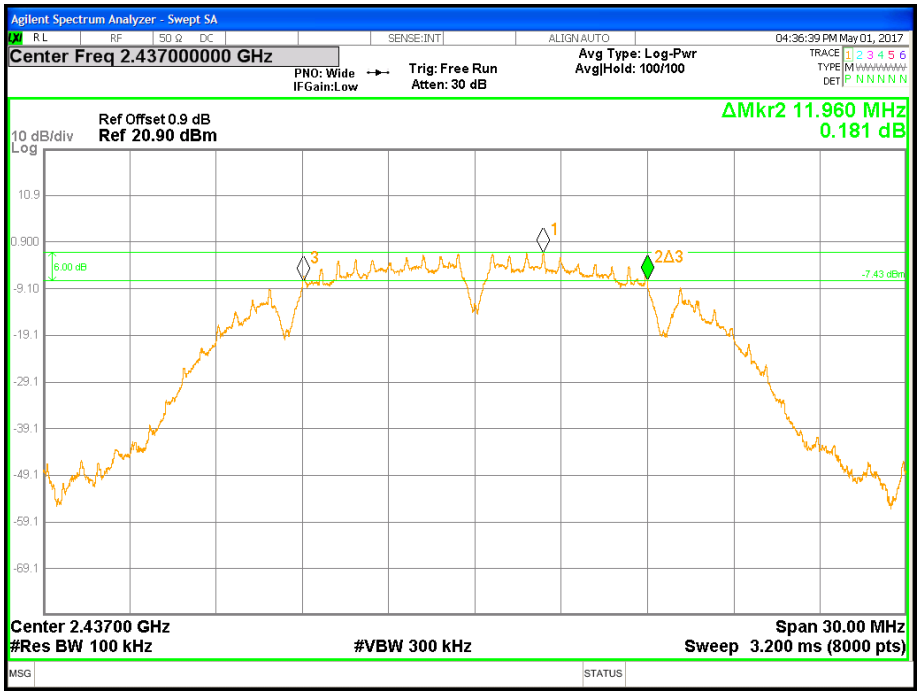


Figure 14: DTS Bandwidth-802.11b-2437 MHz

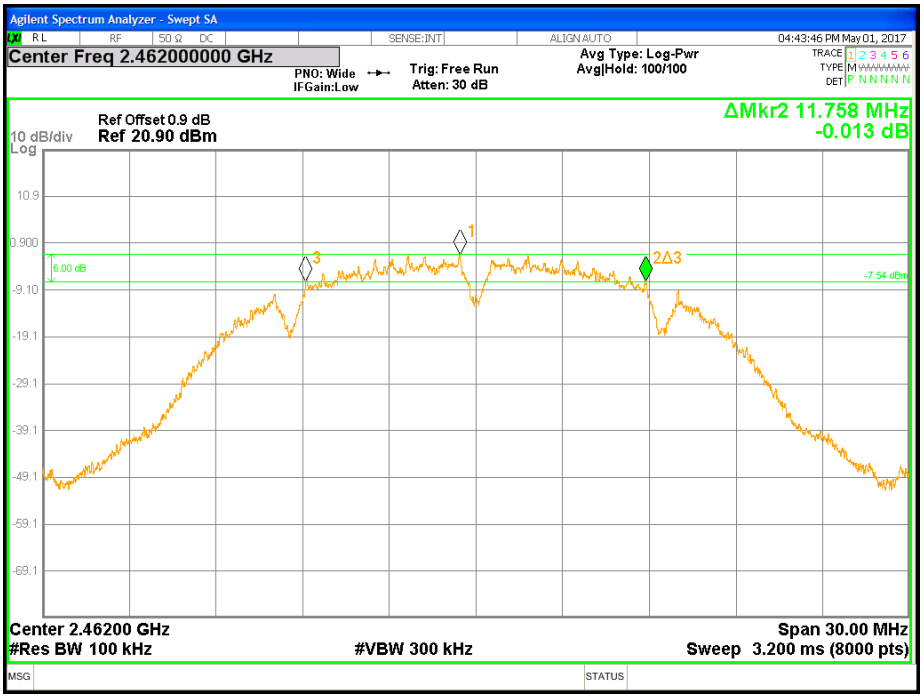


Figure 15: DTS Bandwidth-802.11b-2462 MHz

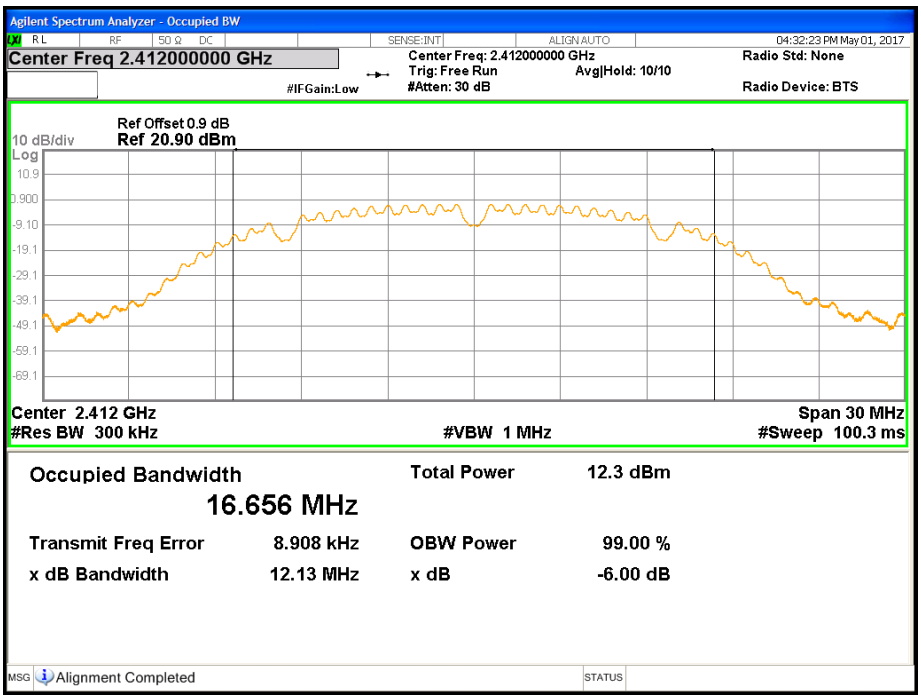


Figure 16: 99% Bandwidth-802.11b-2412 MHz

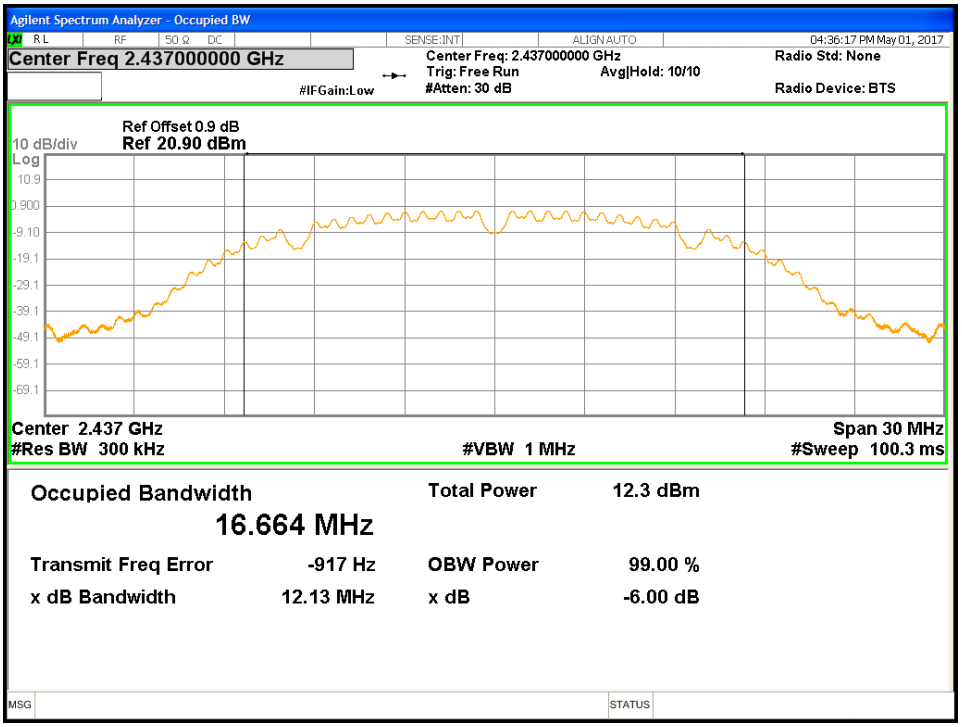


Figure 17: 99% Bandwidth-802.11b-2437 MHz

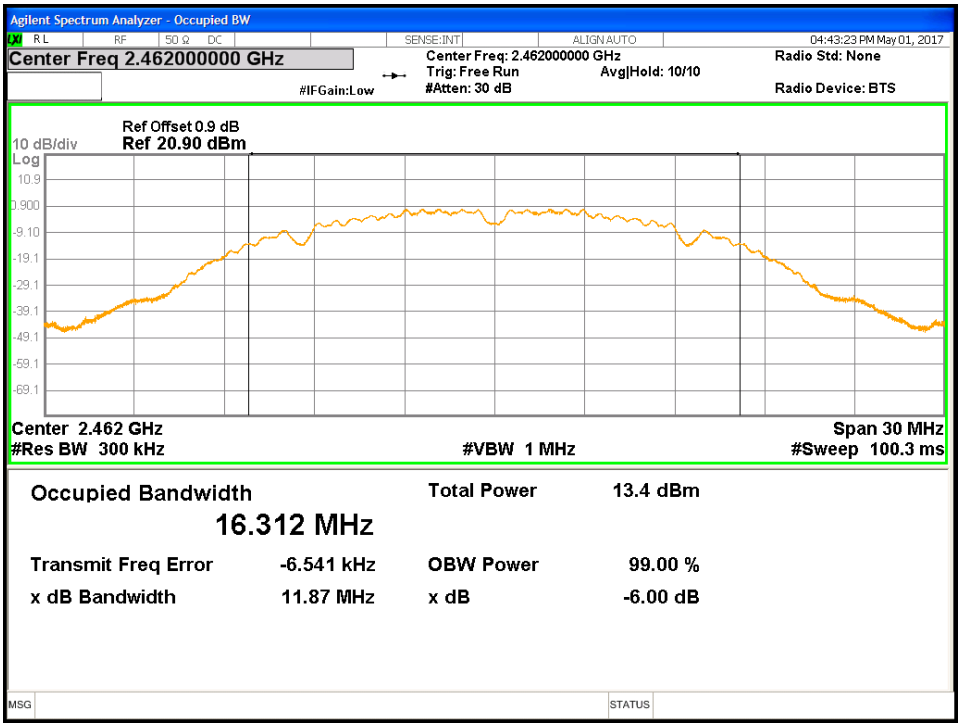


Figure 18: 99% Bandwidth-802.11b-2462 MHz

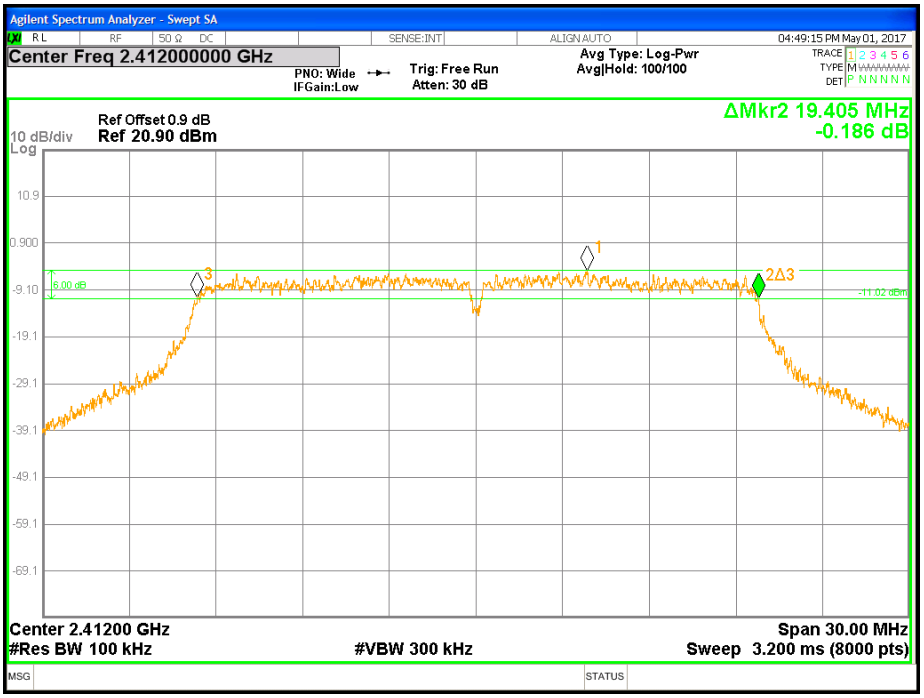


Figure 19: DTS Bandwidth-802.11g-2412 MHz

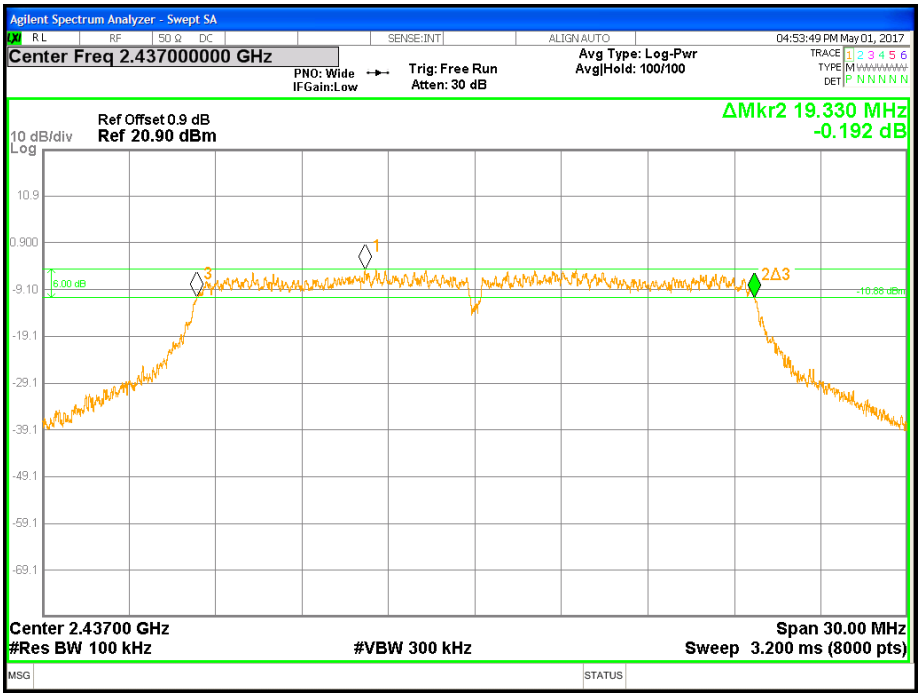


Figure 20: DTS Bandwidth-802.11g-2437 MHz

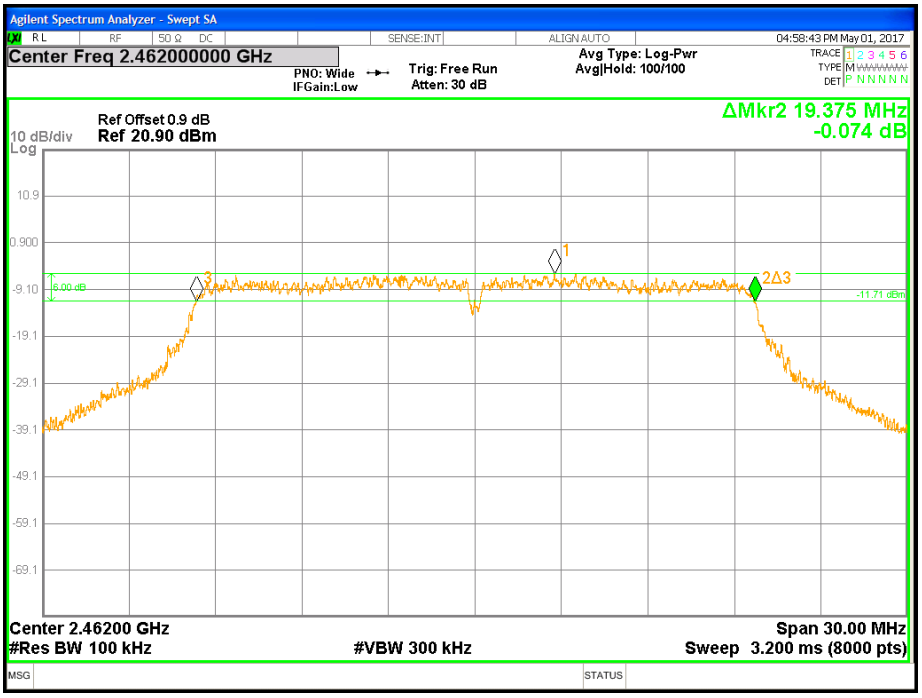


Figure 21: DTS Bandwidth-802.11g-2462 MHz

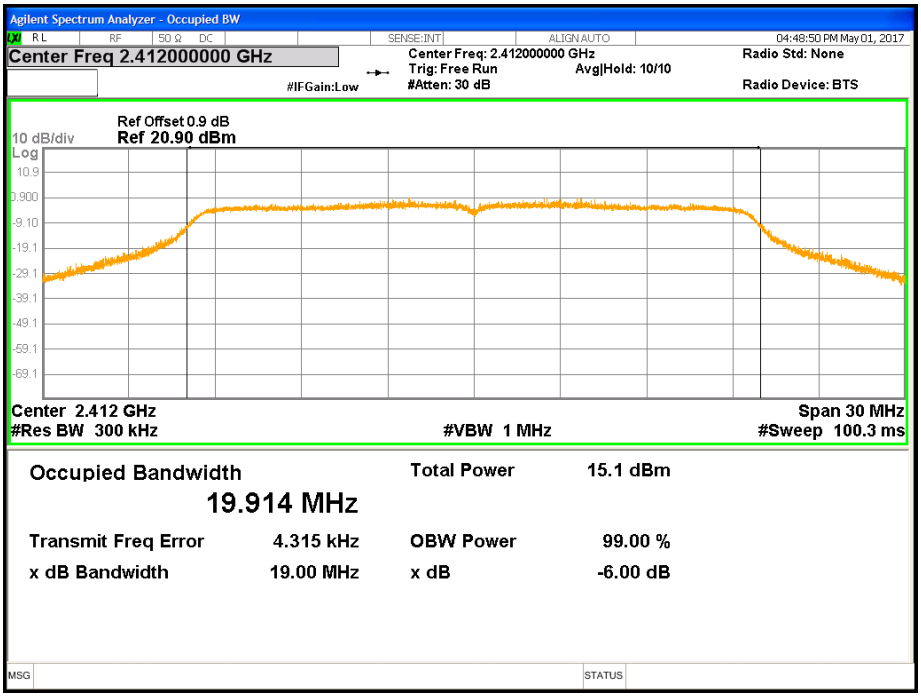


Figure 22: 99% Bandwidth-802.11g-2412 MHz

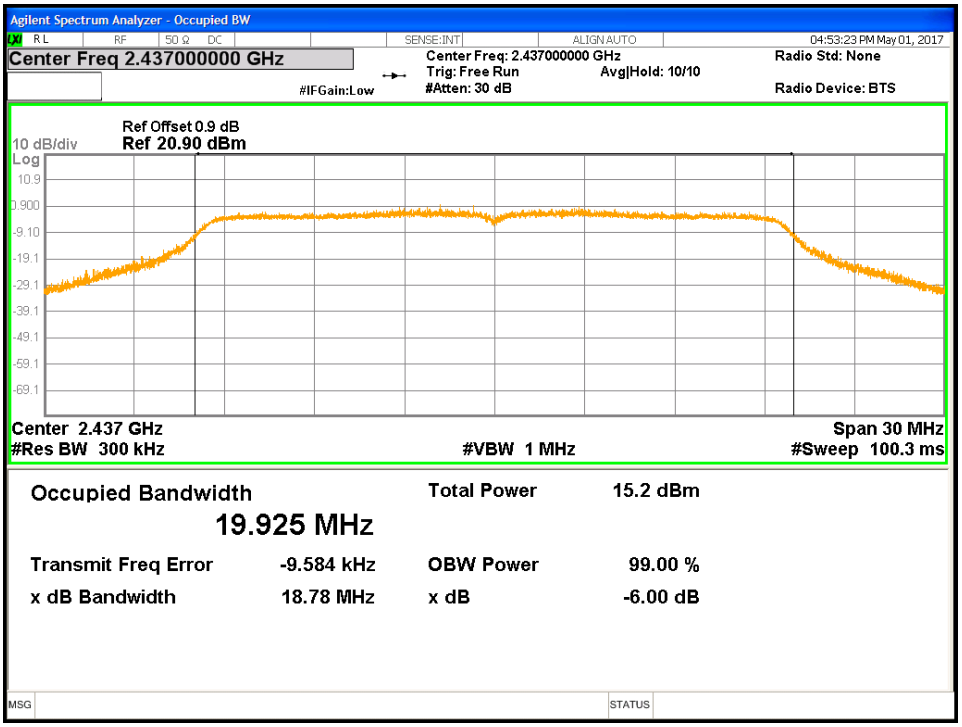


Figure 23: 99% Bandwidth-802.11g-2437 MHz

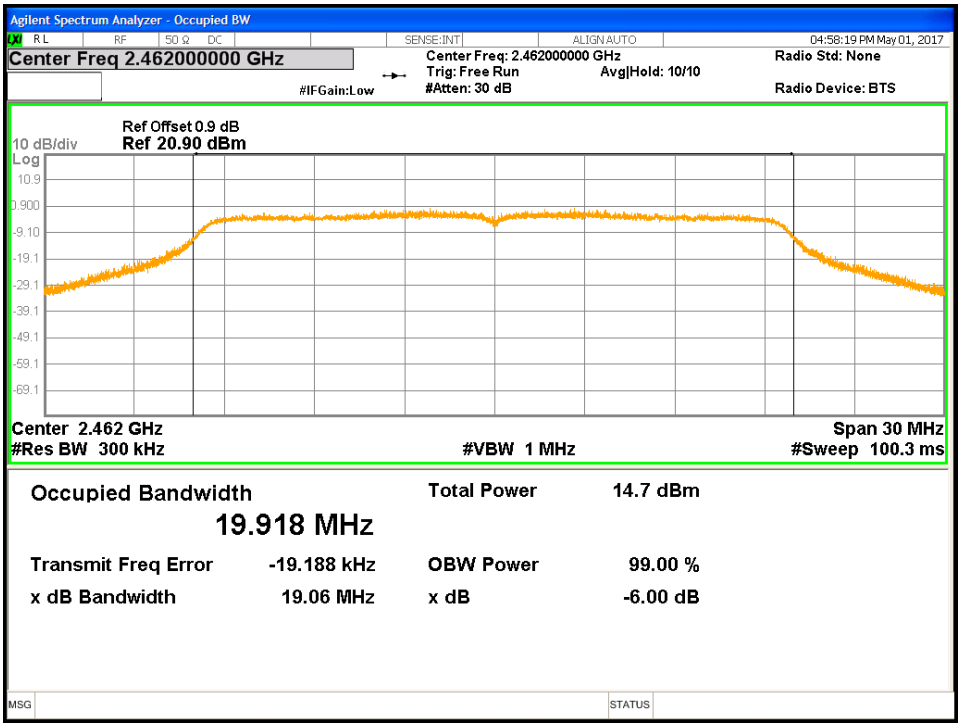


Figure 24: 99% Bandwidth-802.11g-2462 MHz

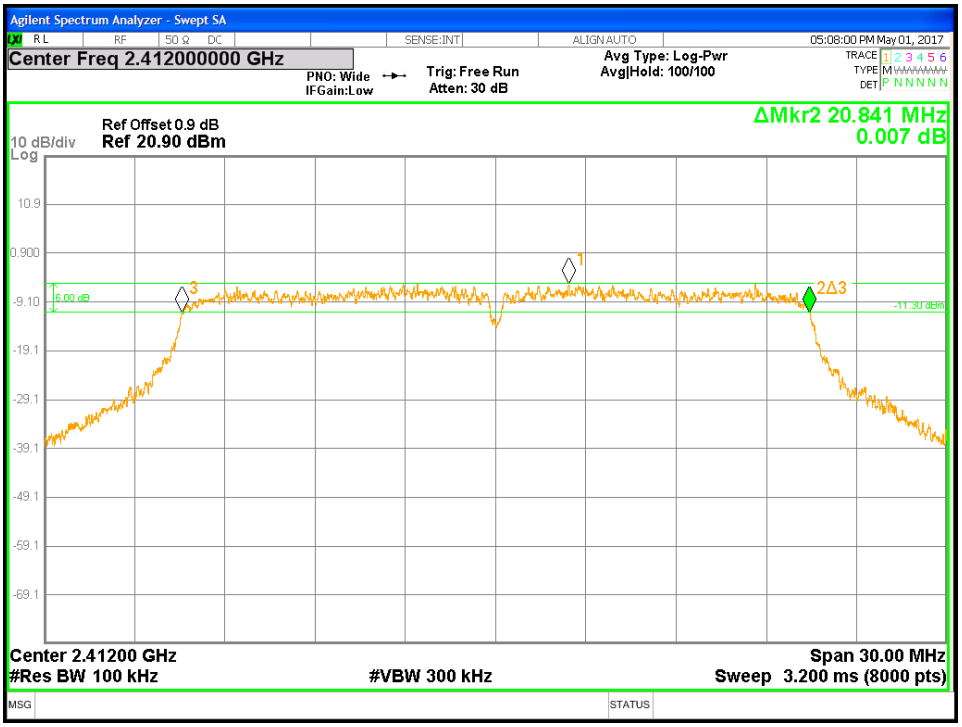


Figure 25: DTS Bandwidth-802.11n HT20-2412 MHz

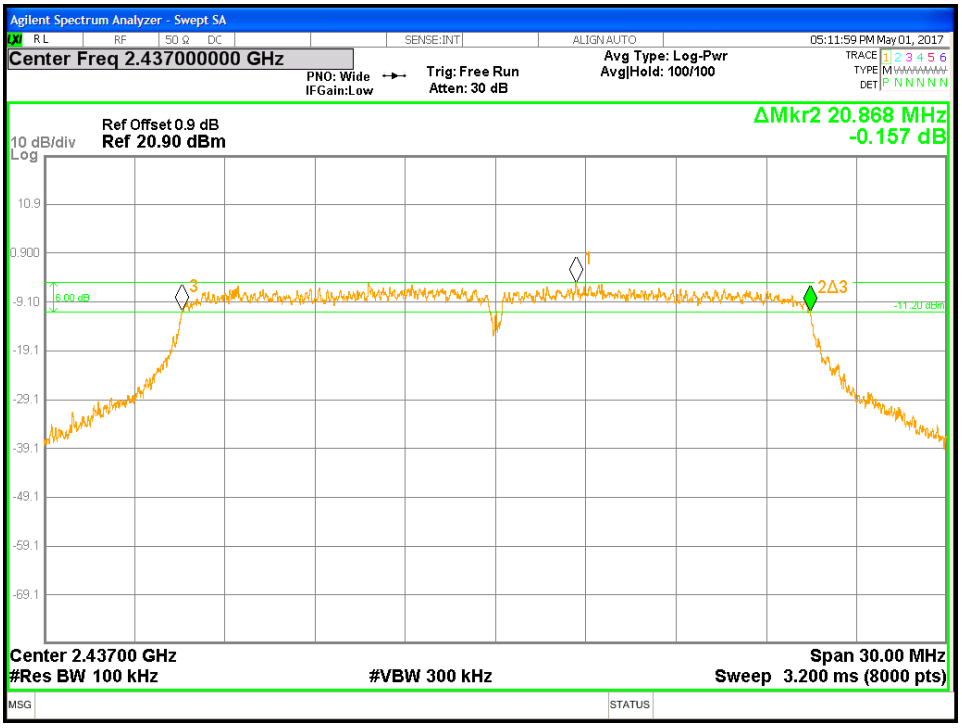


Figure 26: DTS Bandwidth-802.11n HT20-2437 MHz

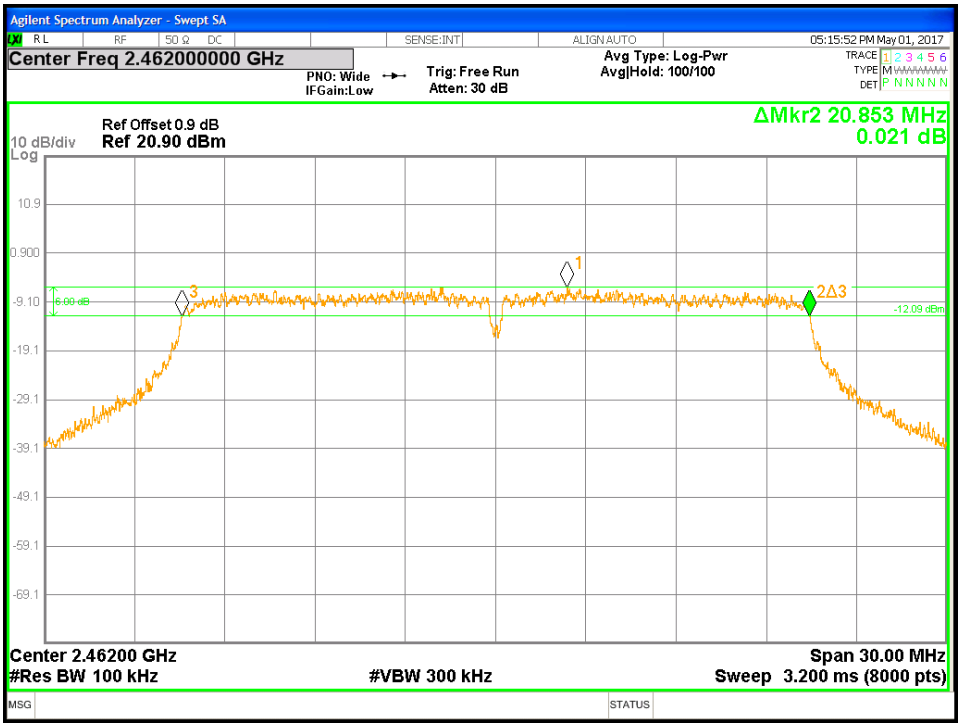


Figure 27: DTS Bandwidth-802.11n HT20-2462 MHz-Ch0

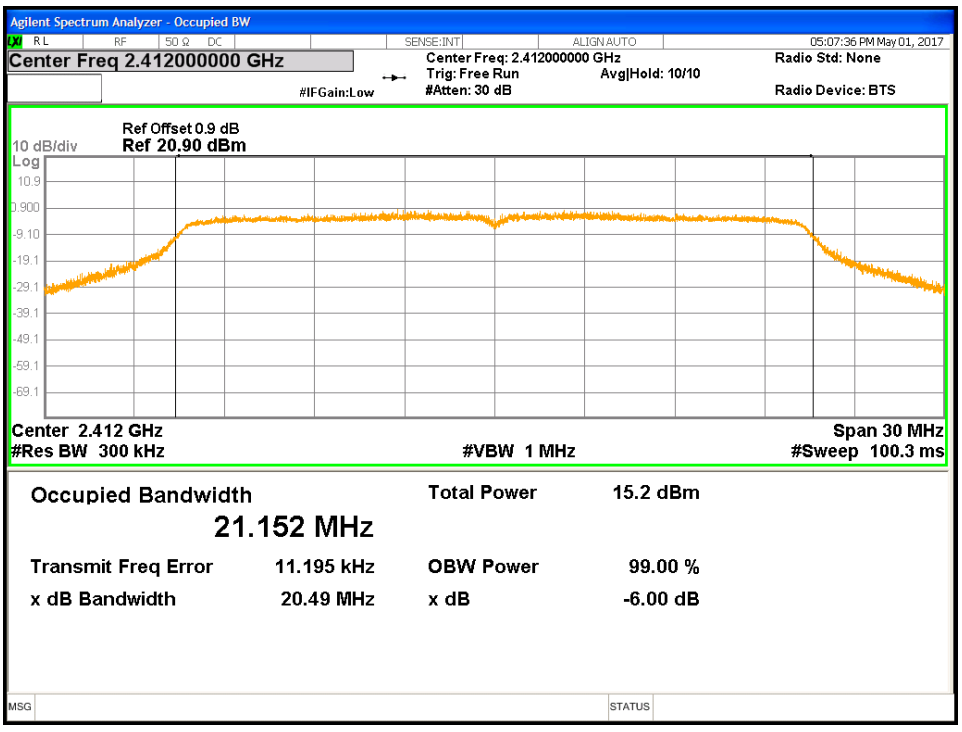


Figure 28: 99% Bandwidth-802.11n HT20-2412 MHz

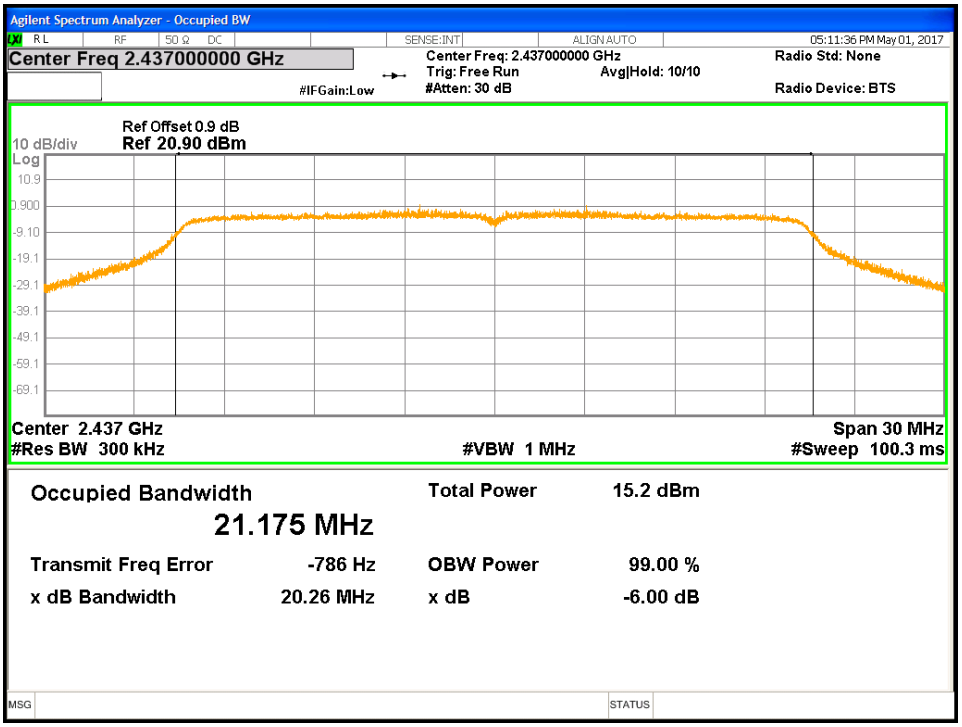


Figure 29: 99% Bandwidth-802.11n HT20-2437 MHz

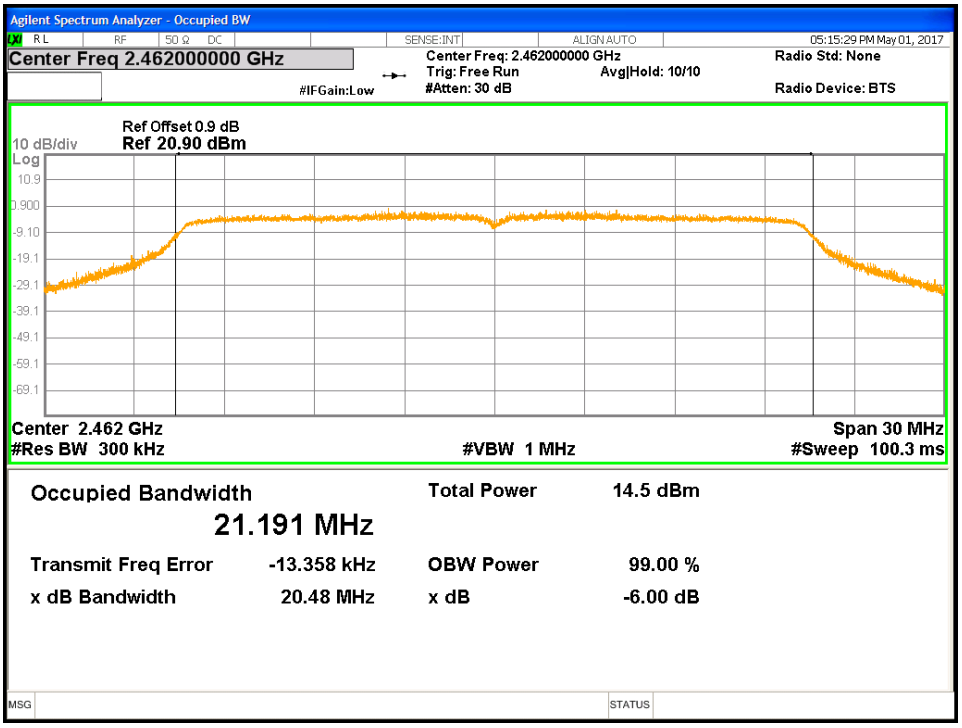


Figure 30: 99% Bandwidth-802.11n HT20-2462 MHz

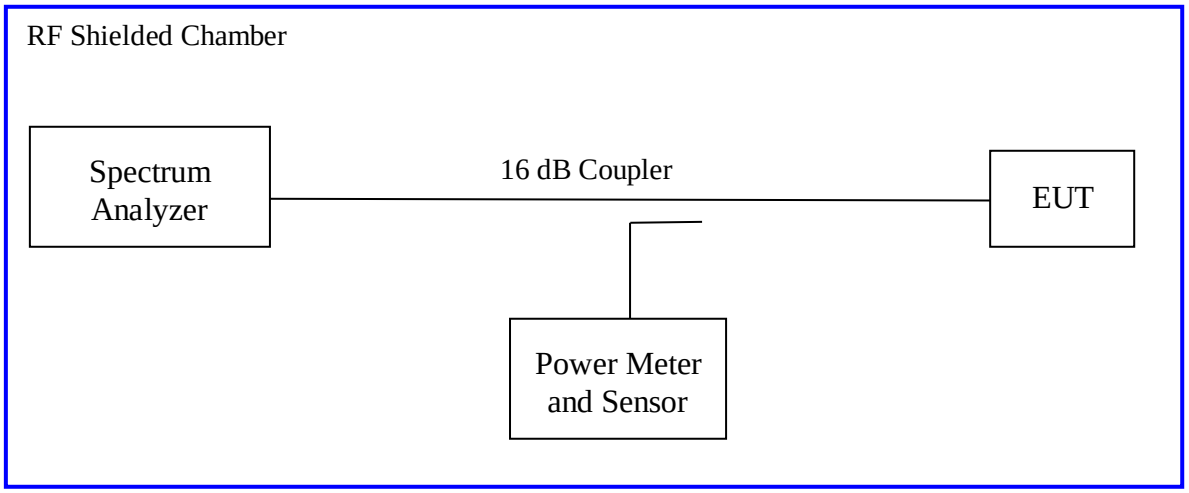
4.3 Peak Power Spectral Density

According to the CFR47 Part 15.247 (e) and RSS 247 Sect.5.2 (b), 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.

4.3.1 Test Method

The conducted method was used to measure the channel power output per ANSI C63.10-2013 Section 11.10.3. The measurement was performed with modulation per CFR47 Part 15.247 (e) and RSS 247 Sect.5.2 (b). The pre-evaluation was performed to find the worst modes. The worst findings were conducted on 3 channels in each operating frequency range of 2400 MHz to 2483.5 MHz. The worst sample result indicated below.

Test Setup:



Method AVGSA-1 of "KDB 558074 – DTS Measurement Guidance v04" applies since the EUT continuously transmits with duty cycle greater than 98%. Sample detector was used.

4.3.2 Results

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Table 5: Peak Power Spectral Density – Test Results

Test Conditions: Conducted Measurement	**Date:** May 1, 2017
Antenna Type: Integrated	**Power Setting:** See test plan.
Antenna Gain: 1.8 dBi	**Signal State:** Modulated at 100%
Ambient Temp.: 23 °C	**Relative Humidity:**33%

Peak Power Spectral Density

Freq. (MHz)	Mode	Output [dBm]	CF [dB]	Max. PPSD [dBm]	Limit [dBm]	Margin [dB]
2412	802.11b 1Mbps	-9.68	-15.23	-24.91	8.00	-32.91
2437	802.11b 1Mbps	-9.90	-15.23	-25.13	8.00	-33.13
2462	802.11b 1Mbps	-9.93	-15.23	-25.16	8.00	-33.16
2412	802.11g 6Mbps	-12.82	-15.23	-28.05	8.00	-36.05
2437	802.11g 6Mbps	-12.45	-15.23	-27.68	8.00	-35.68
2462	802.11g 6Mbps	-14.28	-15.23	-29.51	8.00	-37.51
2412	HT20 6.5Mbps	-12.98	-15.23	-28.21	8.00	-36.21
2437	HT20 6.5Mbps	-13.06	-15.23	-28.29	8.00	-36.29
2462	HT20 6.5Mbps	-13.19	-15.23	-28.42	8.00	-36.42

Note: CF accounted for the measured RBW.
The bandwidth ratio is 10*log (3kHz/100kHz) or -15.23 dB.
Headset transmitted at 100% duty cycle.

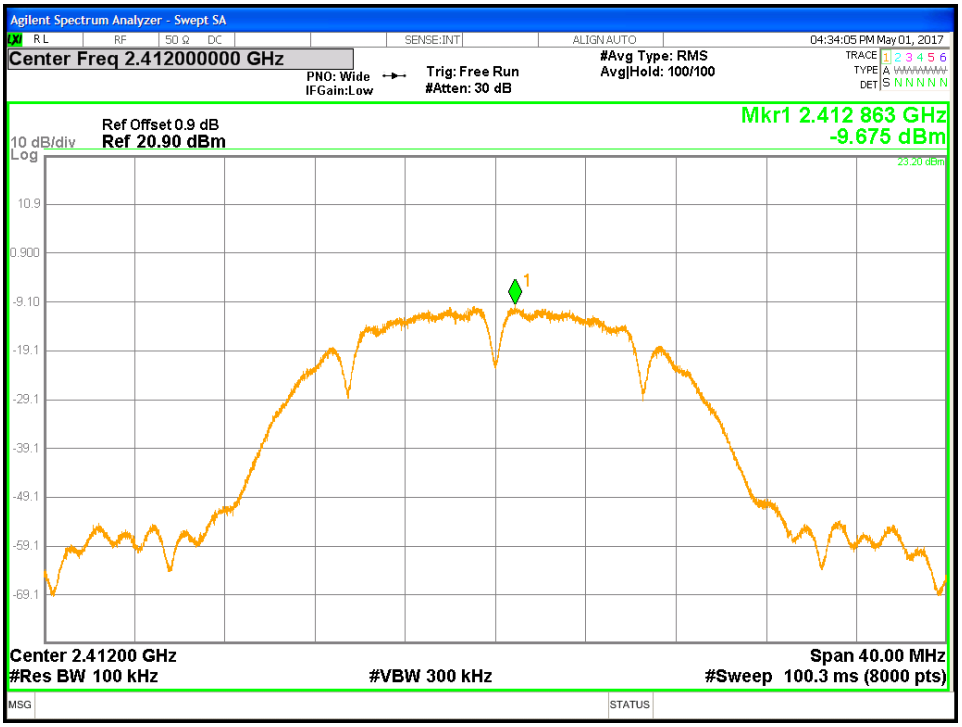


Figure 31: Maximum Power Spectral Density-2412 MHz-11b-1Mbps

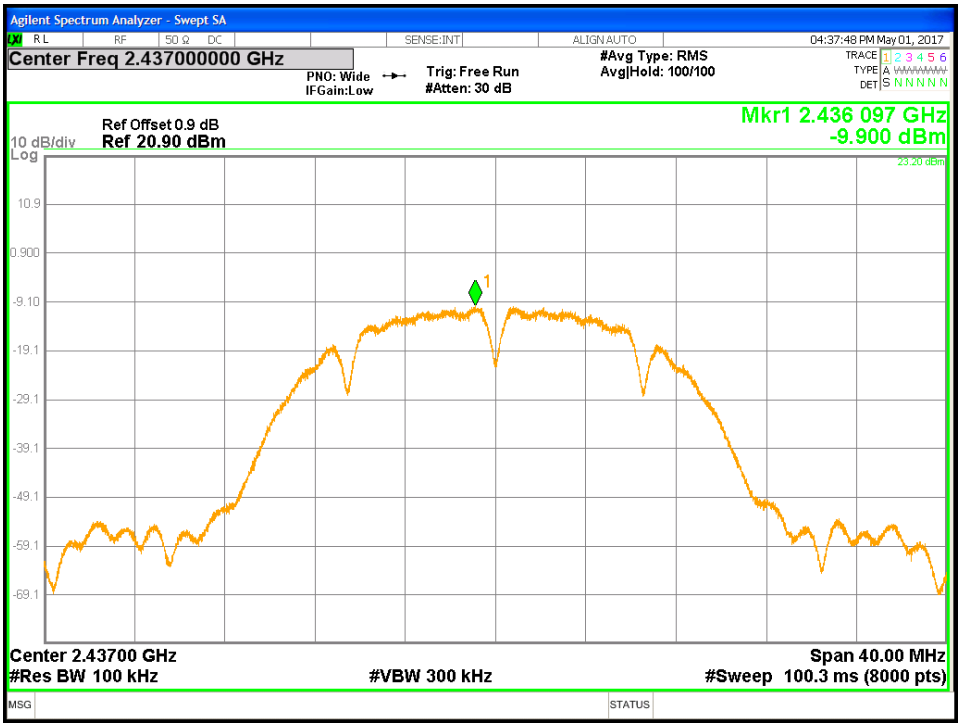


Figure 32: Maximum Power Spectral Density-2437 MHz-11b-1Mbps

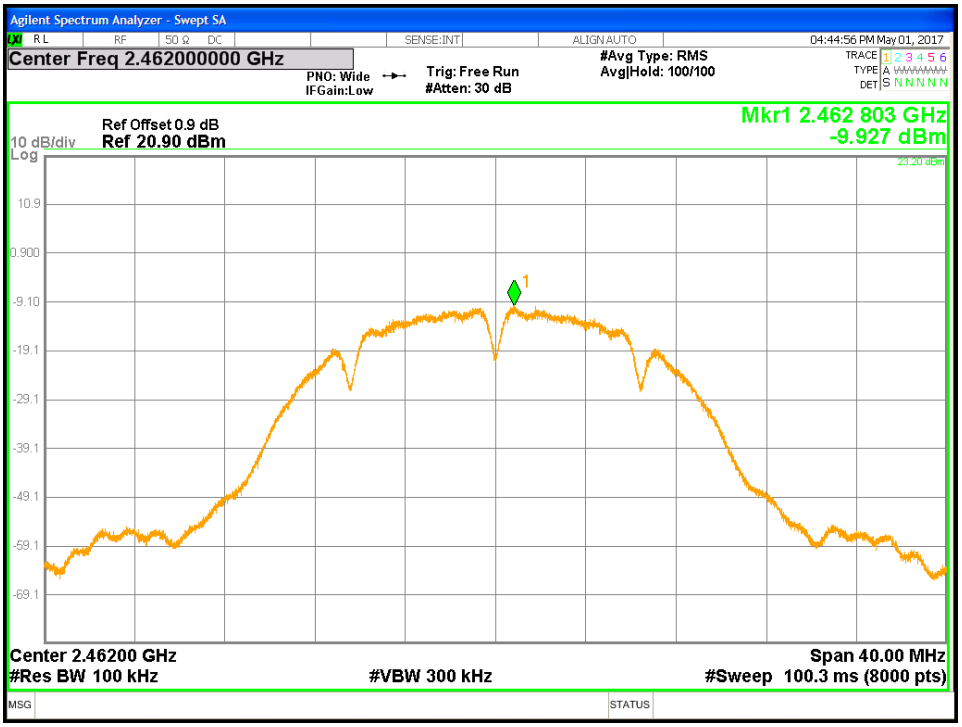


Figure 33: Maximum Power Spectral Density-2462 MHz-11b-1Mbps

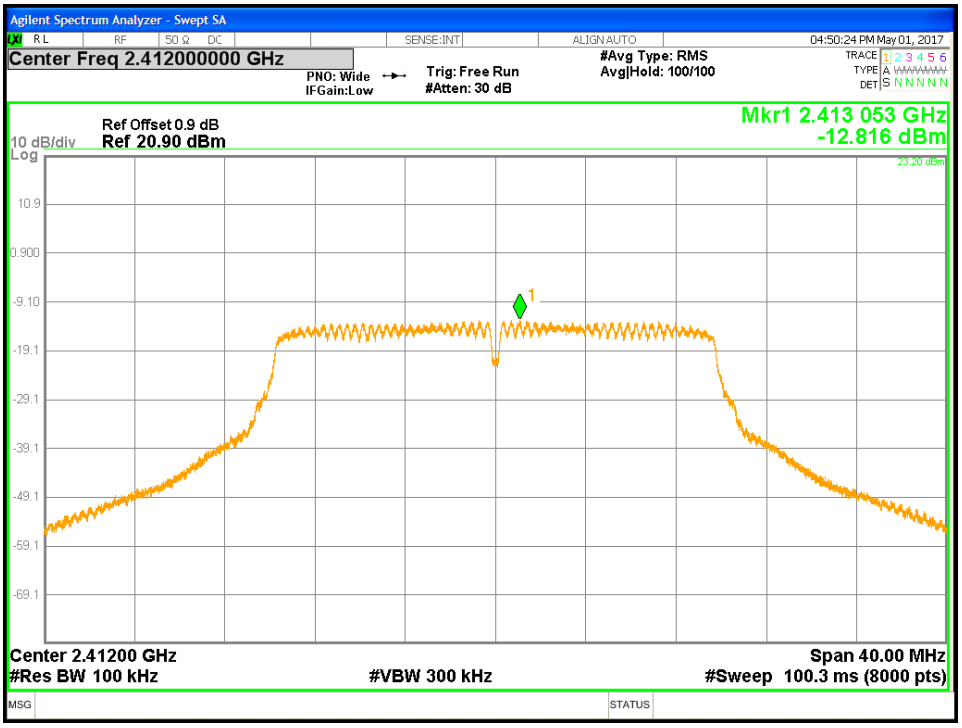


Figure 34: Maximum Power Spectral Density-2412 MHz-11g-6Mbps

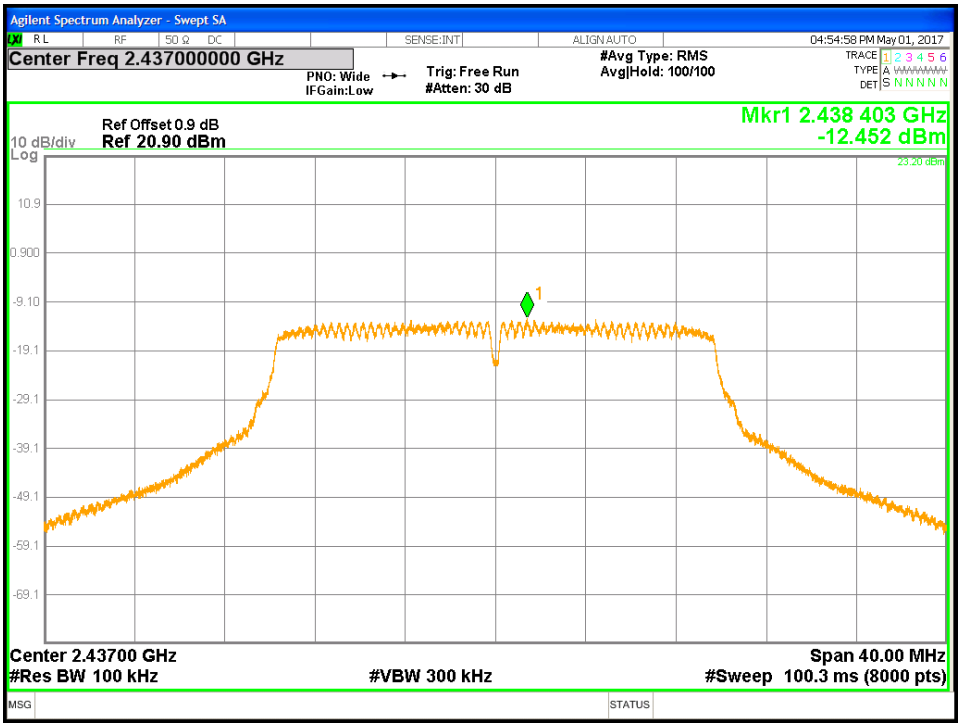


Figure 35: Maximum Power Spectral Density-2437 MHz-11g-6Mbps

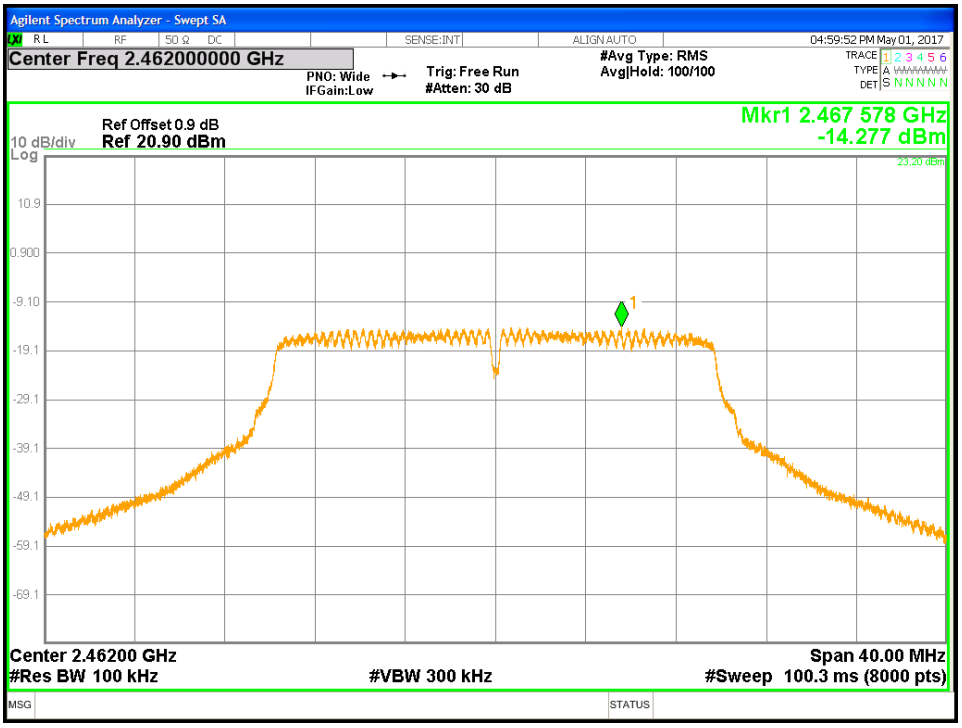


Figure 36: Maximum Power Spectral Density-2462 MHz-11g-6Mbps

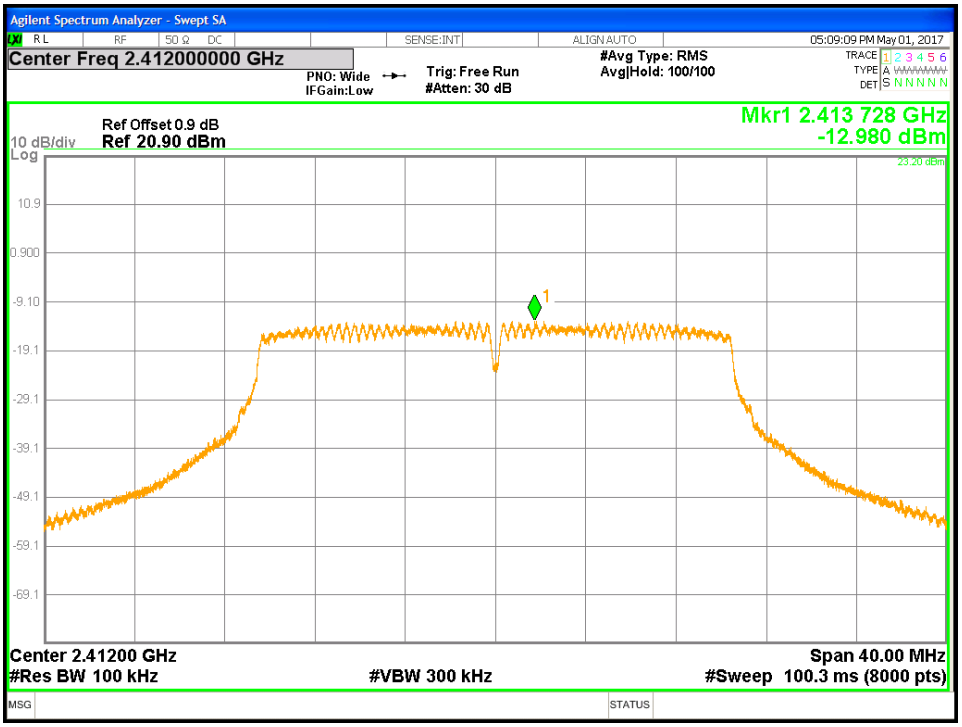


Figure 37: Maximum Power Spectral Density-2412 MHz-HT20-MCS0

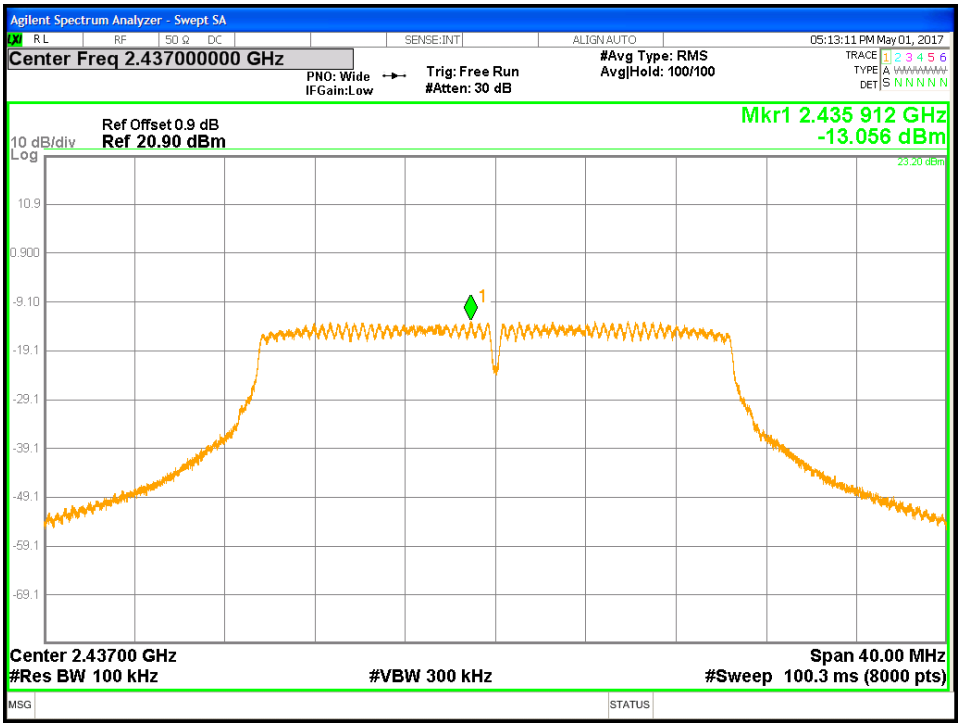


Figure 38: Maximum Power Spectral Density-2437 MHz-HT20-MCS0

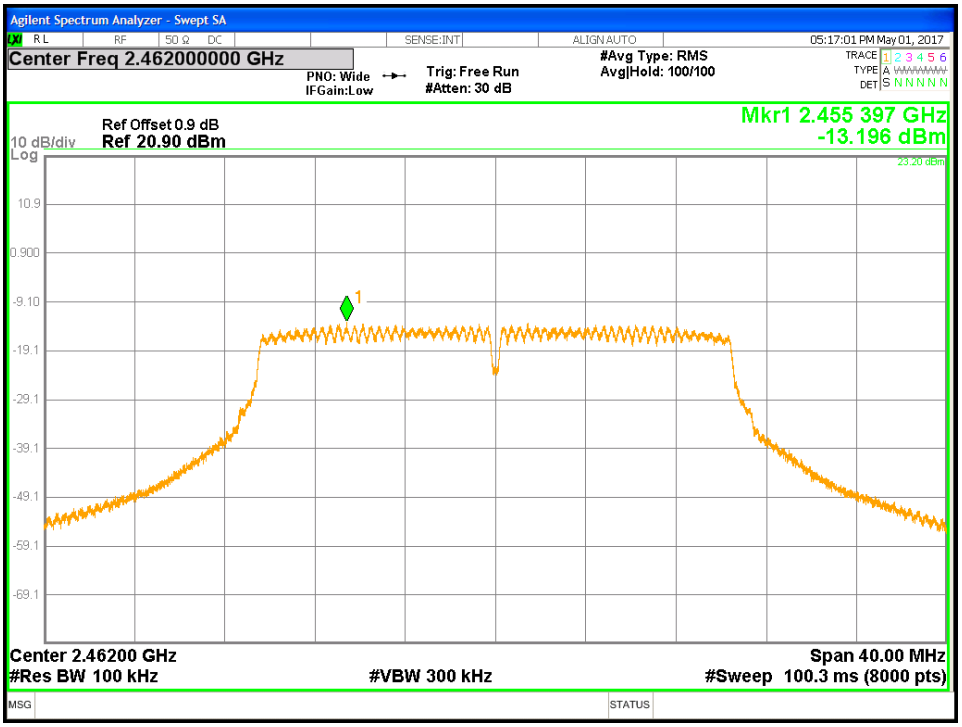


Figure 39: Maximum Power Spectral Density-2462 MHz-HT20-MCS0

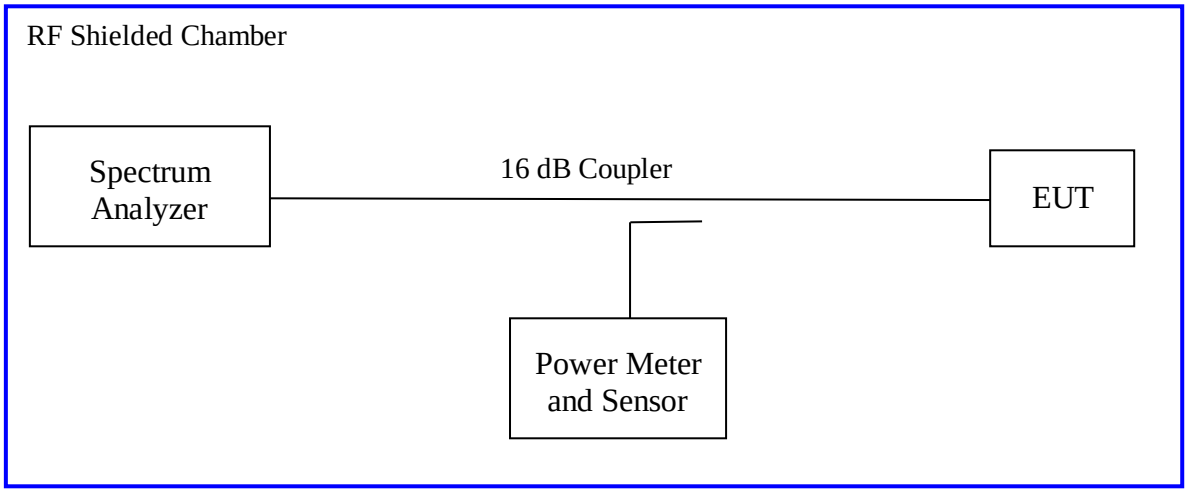
4.4 Out of Band Emissions

Transmitter spurious emissions are emissions outside the frequency range of the equipment when the equipment is in transmitting mode; per requirement of CFR47 15.205, 15.209, 15.247(d), RSS-247 Sect. 5.5, RSS-GEN Sect. 8.9 and 8.10.

4.4.1 Test Method

The conducted method was used to measure the undesirable emission requirement. The measurement was performed with modulation. This test was conducted on 3 channels of Sample in each mode on Sample. The worst sample result indicated below.

Test Setup:



Measurement Procedure AVG2 of KDB 662911

4.4.2 Results

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Table 6: Emissions at the Band-Edge – Test Results

Test Conditions: Conducted Measurement	**Date:** May 1, 2017
Antenna Type: Integrated	**Power Setting:** See test plan.
Antenna Gain: 1.8 dBi	**Signal State:** Modulated at 100%
Ambient Temp.: 23 °C	**Relative Humidity:**33%

Out of Band Results for Wireless Audio Headset				
Frequency (MHz)	**Mode**	**Out of Band Level (dBm)**	**30 dBr Level (dBm)**	**Margin (dB)**
2412	802.11b, 1Mbps	-47.94	-31.62	-16.32
2437	802.11b, 1Mbps	-48.07	-31.28	-16.79
2462	802.11b, 1Mbps	-47.95	-31.93	-16.02
2412	802.11g, 6Mbps	-48.25	-34.40	-13.85
2437	802.11g, 6Mbps	-48.36	-33.91	-14.45
2462	802.11g, 6Mbps	-48.75	-35.30	-13.45
2412	HT20, MCS0	-48.34	-35.56	-12.78
2437	HT20, MCS0	-48.53	-33.97	-14.56
2462	HT20, MCS0	-48.27	-36.21	-12.06

Note: The band-edge level must lower than the 30dBr level.
(*) The band-edge is compared to the highest -30dBr level of the test mode.

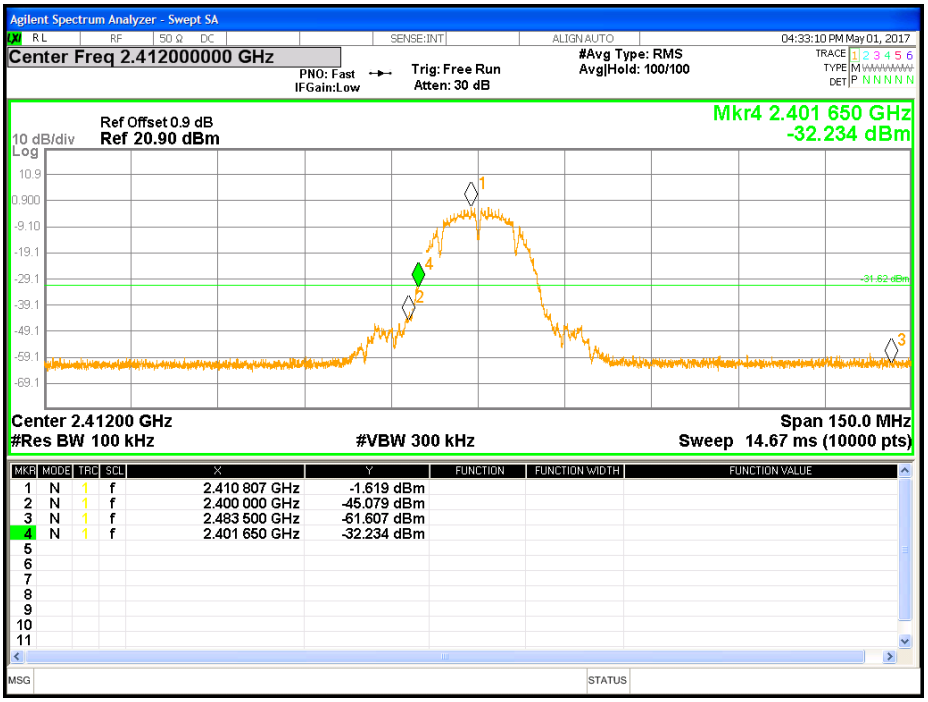


Figure 40: Conducted Band Edge-2412 MHz-11b-1Mbps

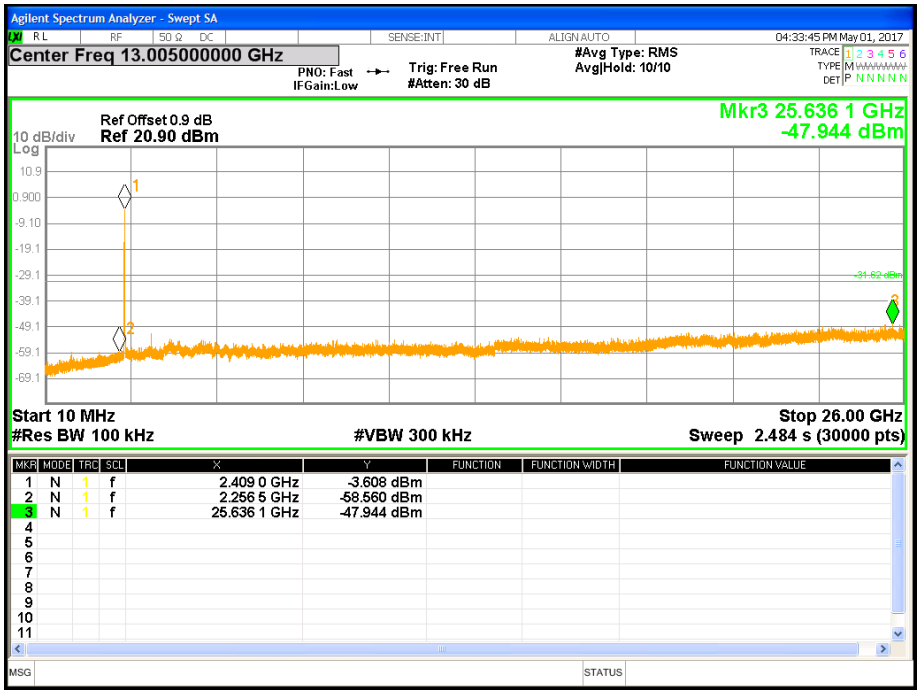


Figure 41: Out of band Emission-2412 MHz-11b-1Mbps

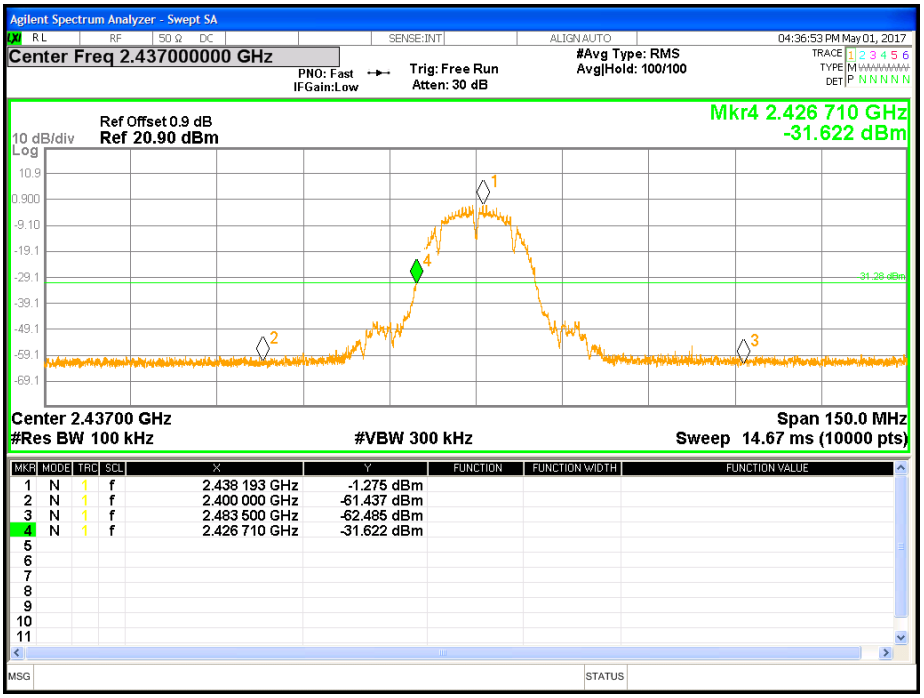


Figure 42: Conducted Band Edge-2437 MHz-11b-1Mbps

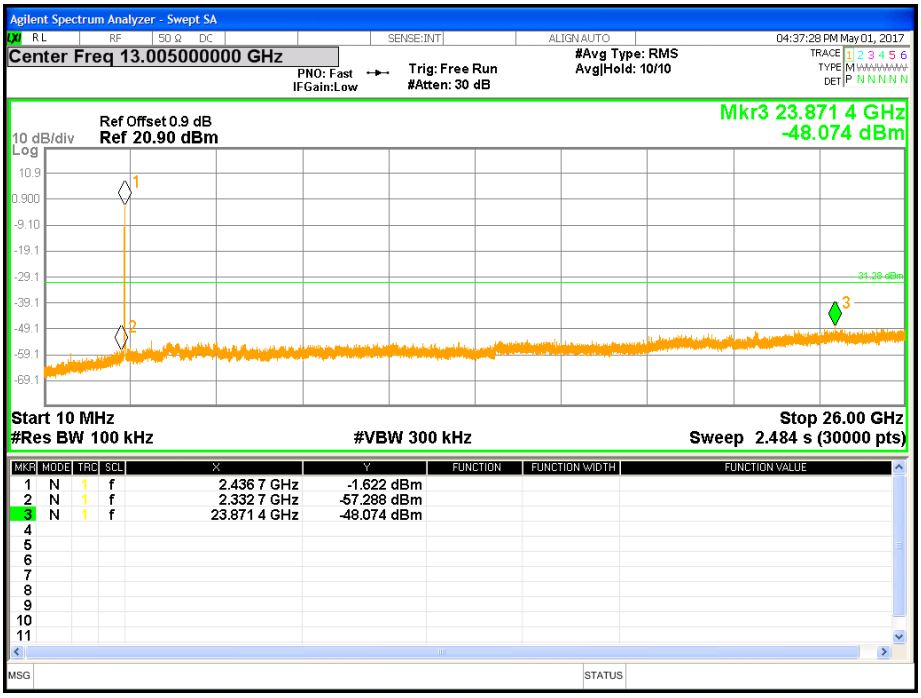


Figure 43: Out of band Emission-2437 MHz-11b-1Mbps

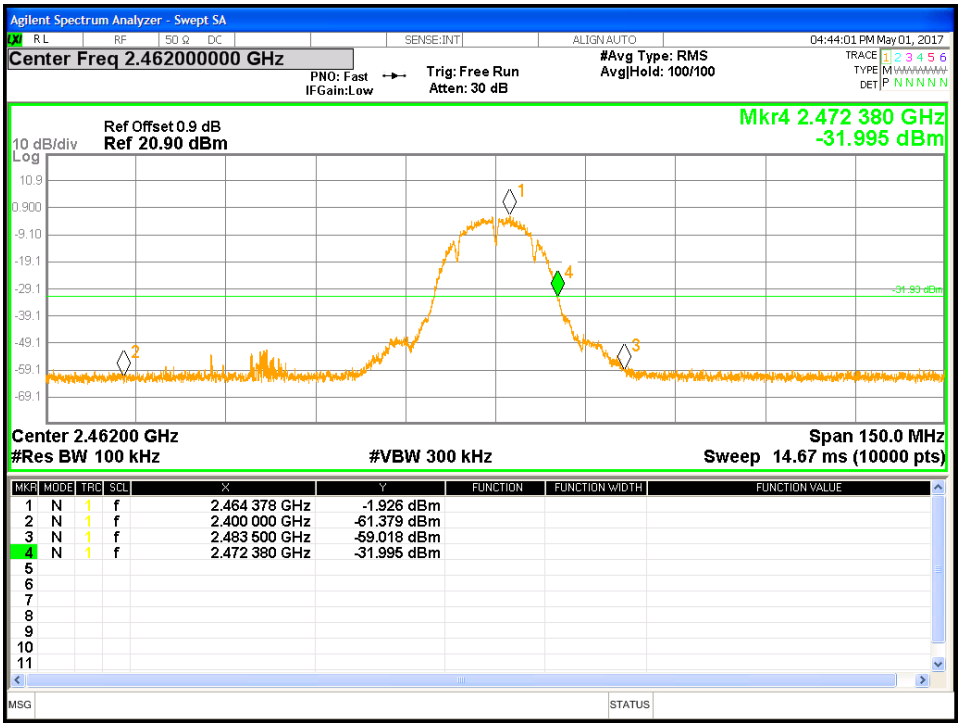


Figure 44: Conducted Band Edge-2462 MHz-11b-1Mbps

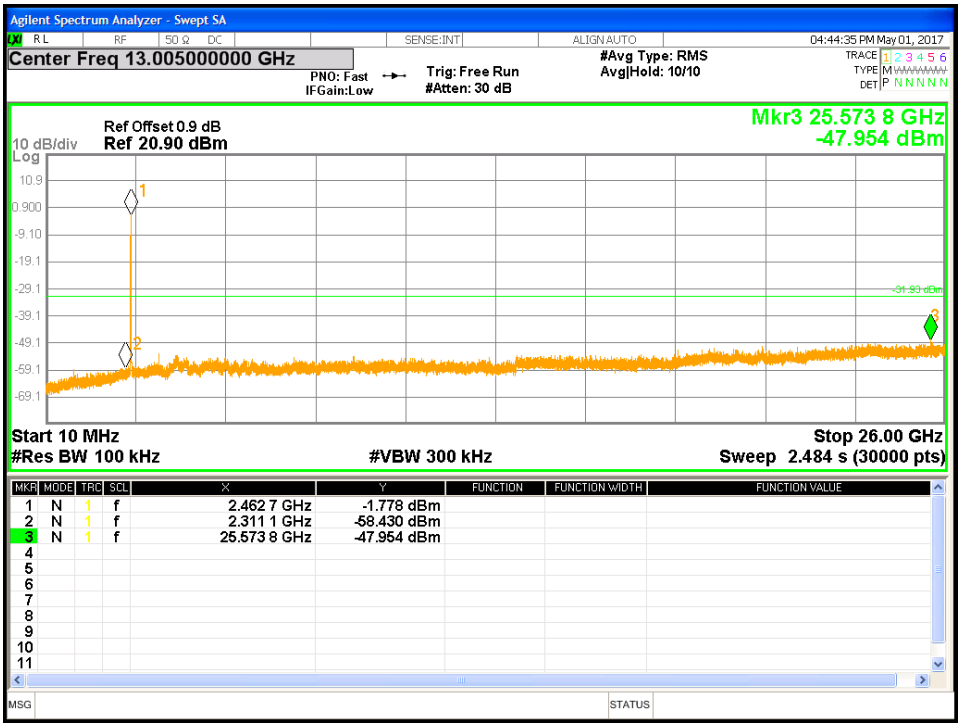


Figure 45: Out of band Emission-2462 MHz-11b-1Mbps

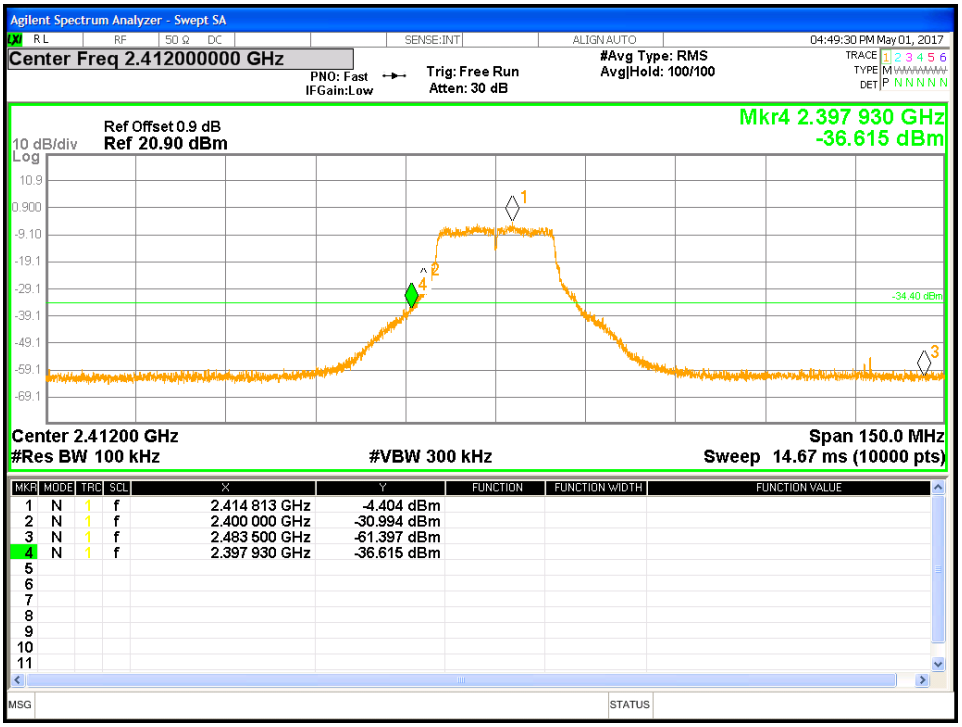


Figure 46: Conducted Band Edge-2412 MHz-11g-6Mbps

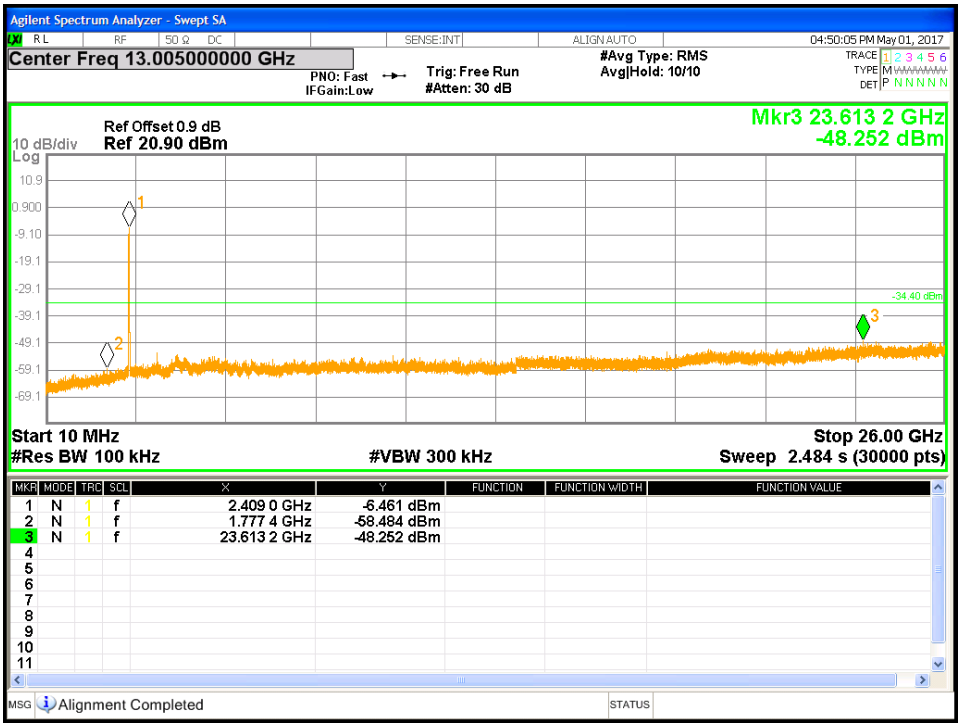


Figure 47: Out of band Emission-2412 MHz-11g-6Mbps

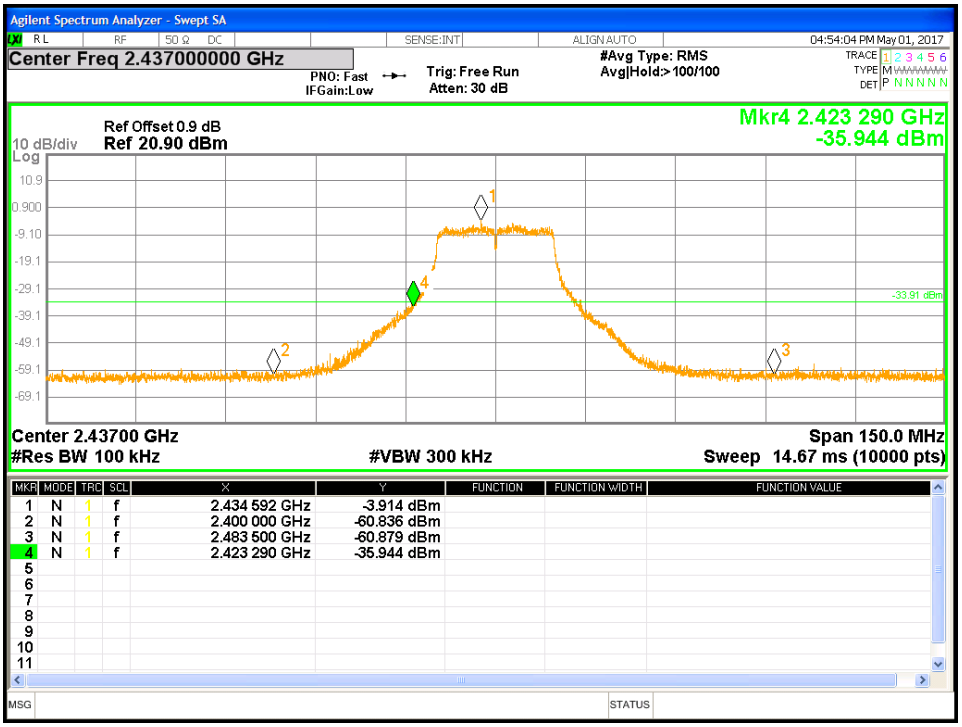


Figure 48: Conducted Band Edge-2437 MHz-11g-6Mbps

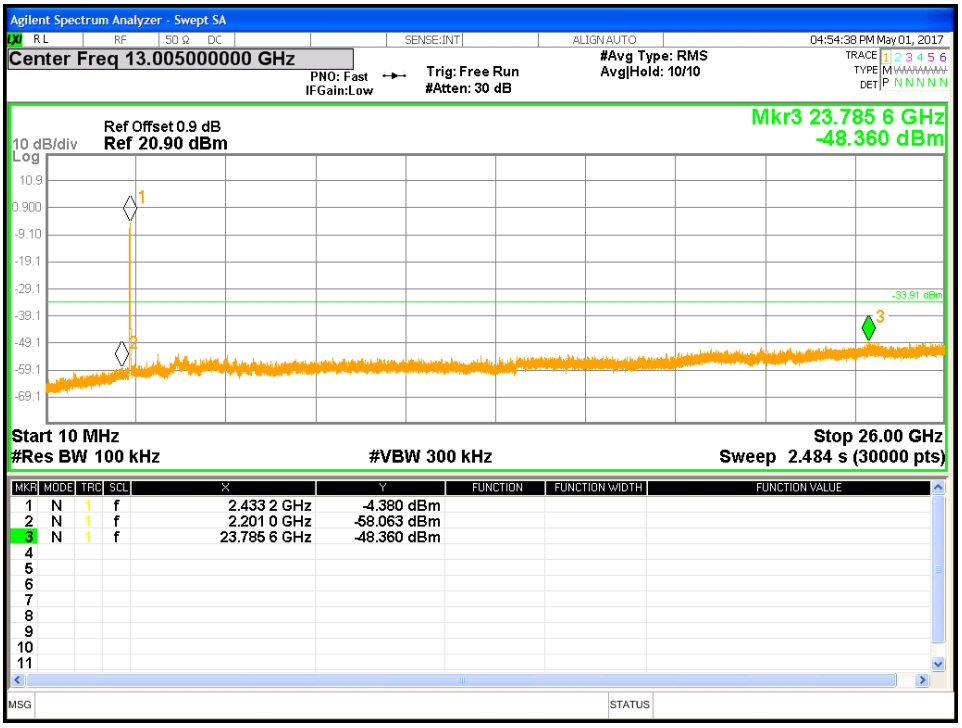


Figure 49: Out of band Emission-2437 MHz-11g-6Mbps

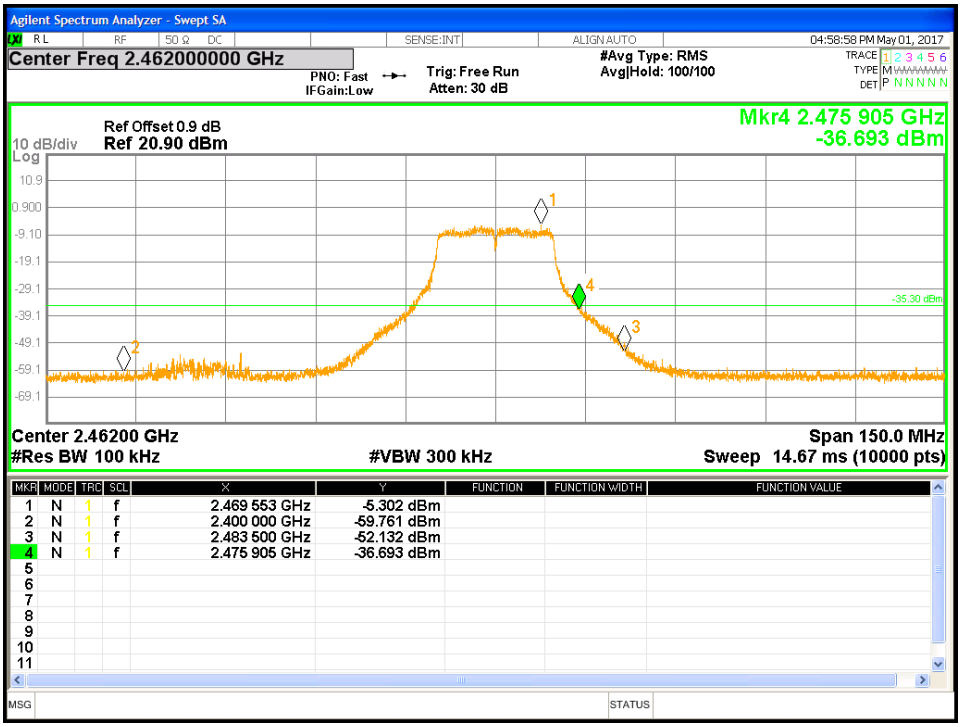


Figure 50: Conducted Band Edge-2462 MHz-11g-6Mbps

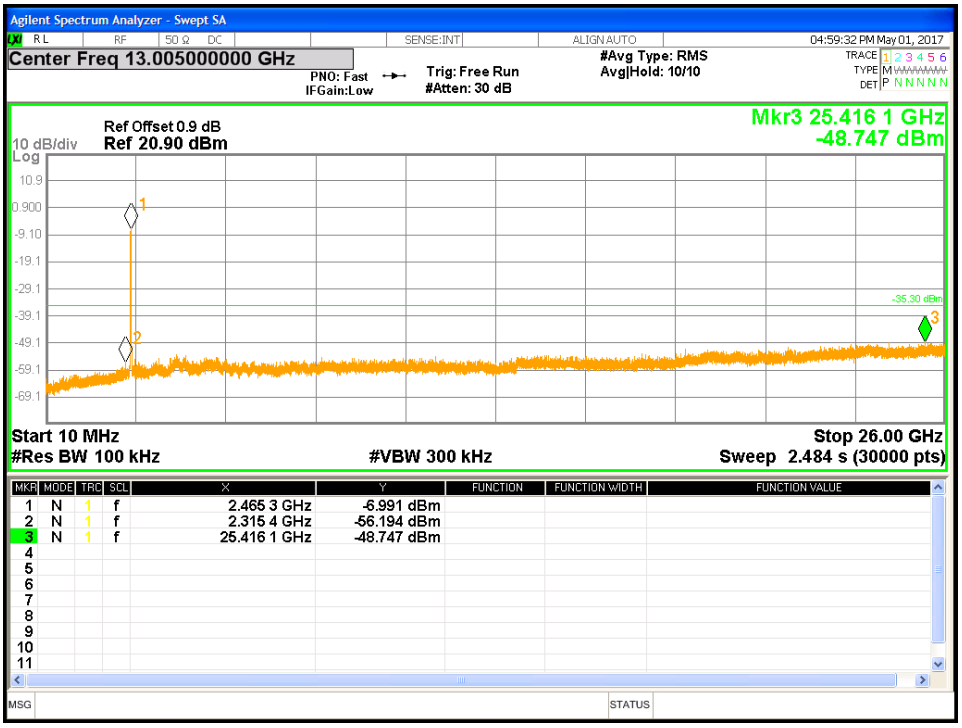


Figure 51: Out of band Emission-2462 MHz-11g-6Mbps

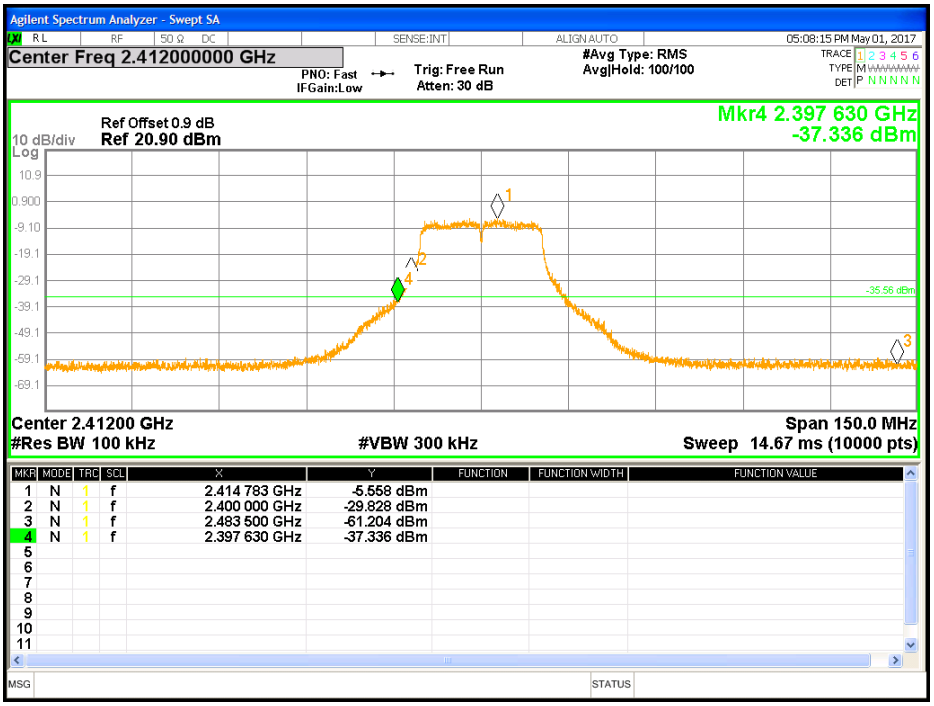


Figure 52: Conducted Band Edge-2412 MHz-HT20-MCS0

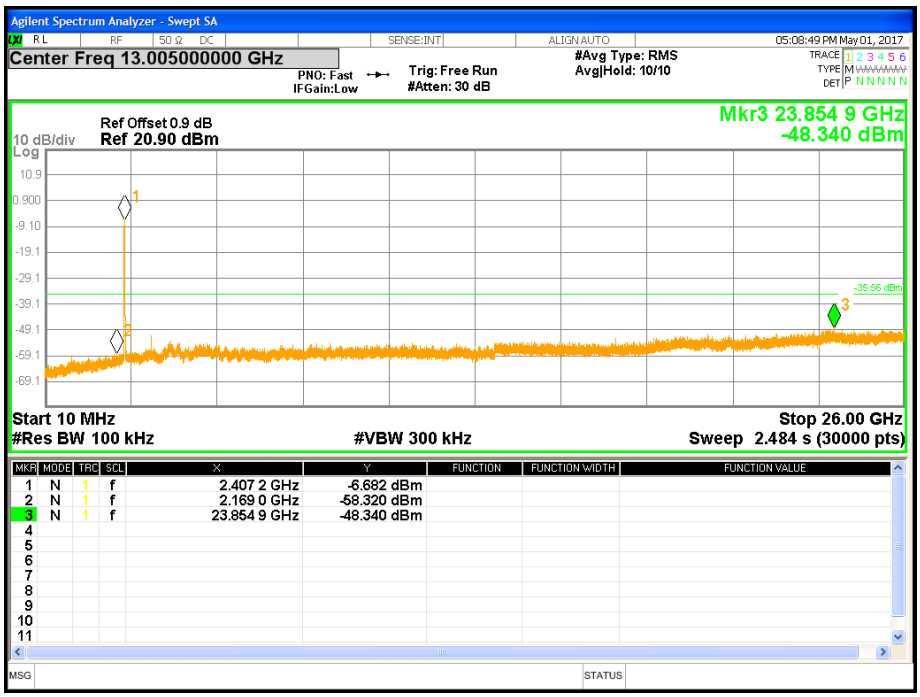


Figure 53: Out of band Emission-2412 MHz-HT20-MCS0

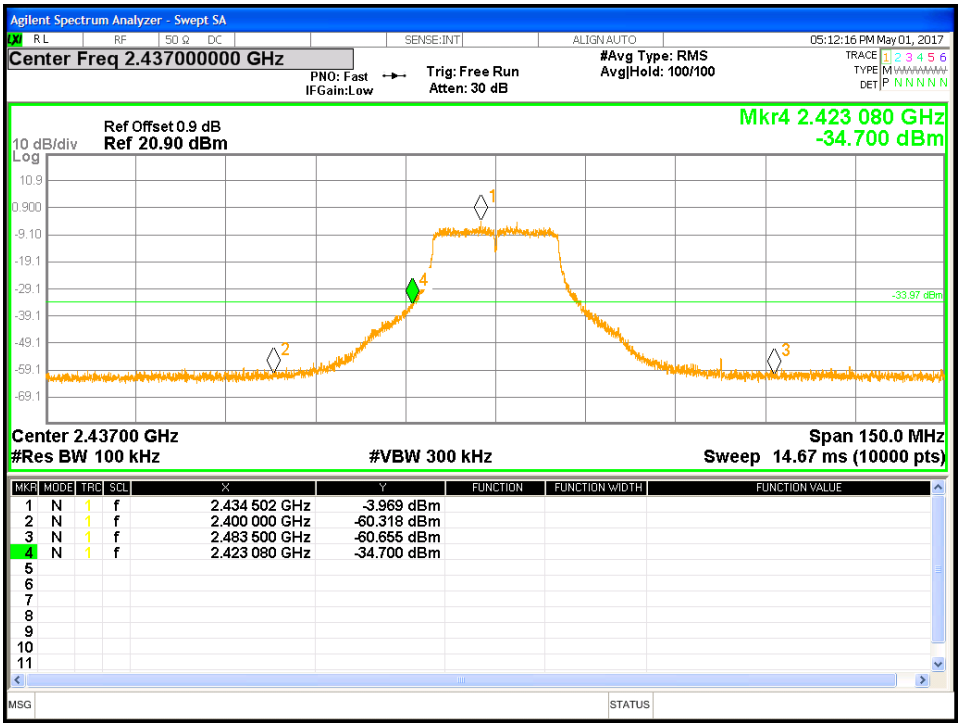


Figure 54: Conducted Band Edge-2437 MHz-HT20-MCS0

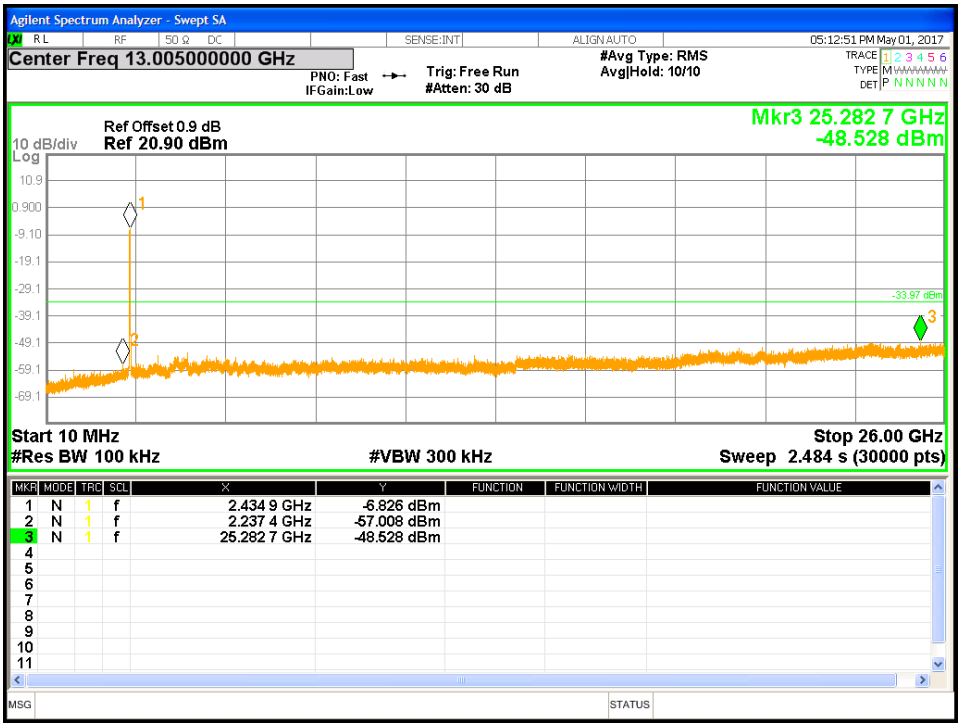


Figure 55: Out of band Emission-2437 MHz-HT20-MCS0

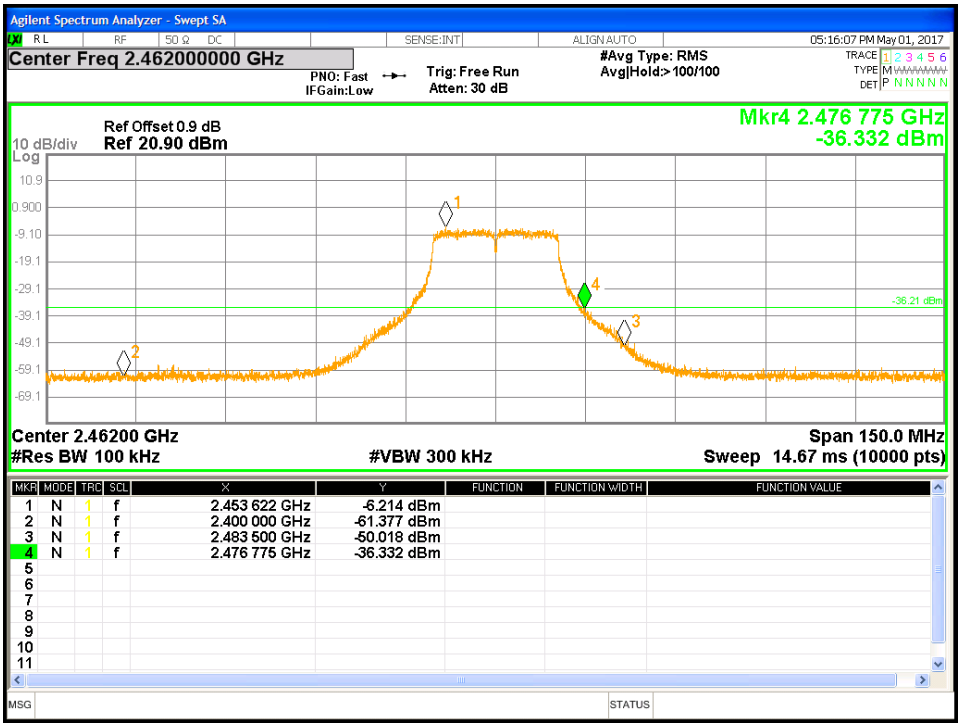


Figure 56: Conducted Band Edge-2462 MHz-HT20-MCS0

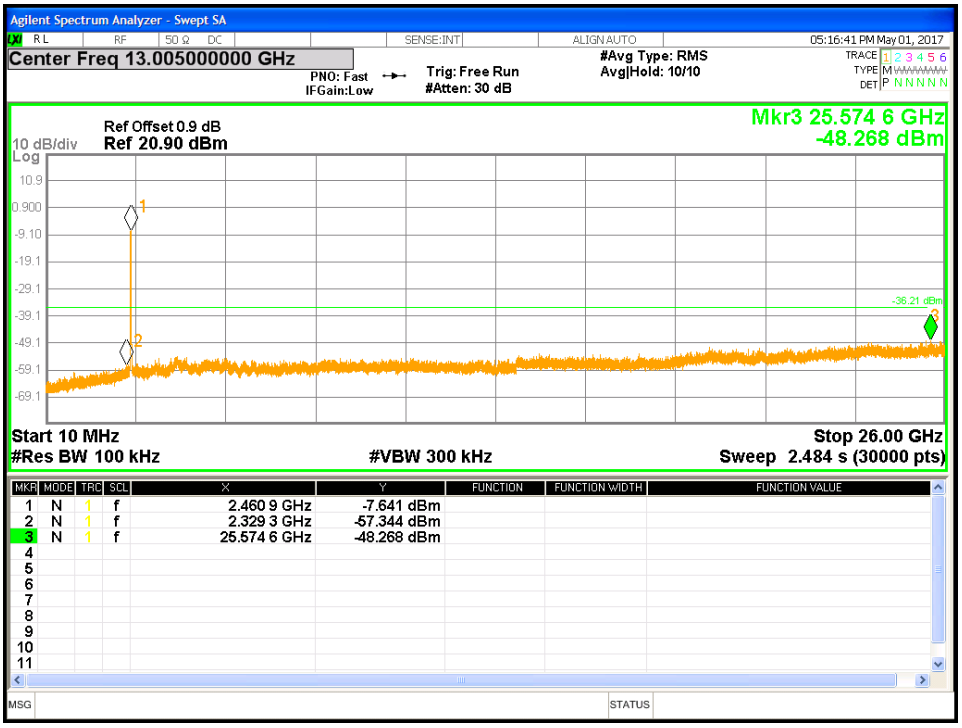


Figure 57: Out of band Emission-2462 MHz-HT20-MCS0

4.5 Transmit Spurious Emissions

Transmitter spurious emissions are emissions outside the frequency range of the equipment when the equipment is in transmit mode; per requirement of CFR47 15.205, 15.209, 15.247(d), RSS 247 Sect.5.5, RSS-GEN Sect. 8.9 and 8.10.

4.5.1 Test Methodology

4.5.1.1 Preliminary Test

A test program that controls instrumentation and data logging was used to automate the preliminary RF emission test procedure. The frequency range of interest was divided into sub-ranges to yield a frequency resolution of approximately 120 kHz and provide a reading at each frequency for no more than 12° of turntable rotation. For each frequency sub-range the turntable was rotated 360° while peak emission data was recorded and plotted over the frequency range of interest in horizontal and vertical antenna polarization's.

Preliminary emission profile testing was performed inside the anechoic chamber. The EUT was placed on a 1.0m x 1.5m non-conductive table 80cm (<1 GHz) and 150cm (>1 GHz) above the floor. The EUT was positioned as shown in the setup photographs. The receiving antenna was placed at a distance of 3m at a fixed height of 1m. Measurement equipment was located outside of the chamber. A video camera was placed inside the chamber to view the EUT.

Pre-scans were performed to determine the worst data rate / chains and EUT orientation.

4.5.1.2 Final Test

For each frequency measured, the peak emission was maximized by manipulating the receiving antenna from 1 to 4 meters above the ground plane and placing it at the position that produced the maximum signal strength reading. The turntable was then rotated through 360° while observing the peak signal and placing the EUT at the position that produced maximum radiation. The six highest emissions relative to the limit were measured unless such emissions were more than 20 dB below the limit. If less than six emissions are within 20 dB of the limit, than the noise level of the receiver is measured at frequencies where emissions are expected. Multiples of all oscillator and microprocessor frequencies were also checked.

Final testing was performed on an NSA compliant test site. The EUT was placed on a 1.0m x 1.5m non-conductive table 80cm (<1 GHz) and 150cm (>1 GHz) above the ground plane. The placement of EUT and cables were the same as for preliminary testing and is shown in the setup photographs.

The final scans performed on the worst axis, Y-Axis up, for three operating channels in each operating mode;

802.11b 1Mbps at 2412 MHz, 2437 MHz, and 2462 MHz

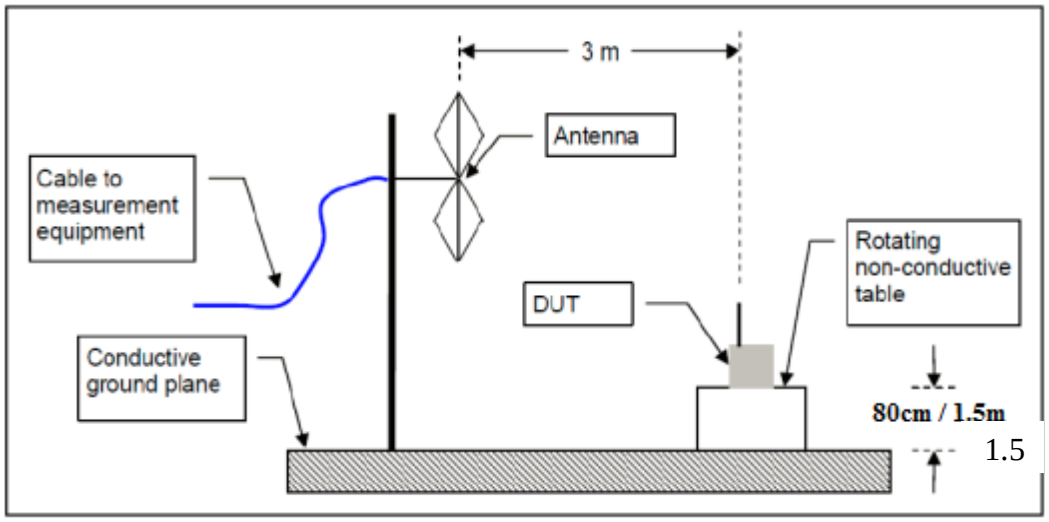
802.11g 6Mbps at 2412 MHz, 2437 MHz, and 2462 MHz

802.11n HT20 MCS0 at 2412 MHz, 2437 MHz, and 2462 MHz

4.5.1.3 Deviations

None.

Test Setup:



4.5.2 Transmitter Spurious Emission Limit

The spurious emissions of the transmitter shall not exceed the values in CFR47 Part 15.205, 15.209: 2017 and RSS Gen Sect. 8.9 and 8.10: 2014.

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490.....	2400/F(kHz)	300
0.490-1.705.....	24000/F(kHz)	30
1.705-30.0.....	30	30
30-88.....	100 **	3
88-216.....	150 **	3
216-960.....	200 **	3
Above 960.....	500	3

All harmonics and spurious emission which are outside of the restricted band shall be 20dB below the in-band emission.

4.5.3 Test Results

The final measurement data was taken under the worst case operating modes, configurations, and/or cable positions. It also reflects the results including any modifications and/or special accessories listed in Sections 1.4 and test plan.

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Table 7: Transmit Spurious Emission at Band-Edge Requirements

Test Conditions: Radiated Measurement	**Date:** May 10, 2017
Antenna Type: Integrated	**Power Setting:** See test plan.
Antenna Gain: 1.8 dBi	**Signal State:** Modulated at 100%
Ambient Temp.: 23 °C	**Relative Humidity:**35%

Band-Edge Results

Center Freq.	Mode	Edge Freq.	Pol	Ant.	Table	Det.	Level	Limit	Margin
MHz		MHz	V/H	cm	Deg.	Pk/Avg	dBuV/m	dBuV/m	dB
2412	802.11b 1Mbps	2390.0	V	226	145	Pk	54.03	74.00	−19.97
2412	802.11b 1Mbps	2390.0	V	226	145	Ave	41.81	54.00	−12.19
2412	802.11b 1Mbps	2390.0	H	304	205	Pk	53.80	74.00	−20.20
2412	802.11b 1Mbps	2390.0	H	304	205	Ave	41.75	54.00	−12.25
2462	802.11b 1Mbps	2483.5	H	220	236	Pk	53.83	74.00	−20.17
2462	802.11b 1Mbps	2483.5	H	220	236	Ave	42.16	54.00	−11.84
2462	802.11b 1Mbps	2483.5	V	288	155	Pk	53.05	74.00	−20.95
2462	802.11b 1Mbps	2483.5	V	288	155	Ave	42.36	54.00	−11.64
2412	802.11g 6Mbps	2390.0	V	301	158	Pk	54.98	74.00	−19.02
2412	802.11g 6Mbps	2390.0	V	301	158	Ave	42.21	54.00	−11.79
2412	802.11g 6Mbps	2390.0	H	163	190	Pk	56.75	74.00	−17.25
2412	802.11g 6Mbps	2390.0	H	163	190	Ave	42.00	54.00	−12.00
2462	802.11g 6Mbps	2483.5	H	302	193	Pk	56.35	74.00	−17.65
2462	802.11g 6Mbps	2483.5	H	302	193	Ave	43.21	54.00	−10.79
2462	802.11g 6Mbps	2483.5	V	287	198	Pk	58.52	74.00	−15.48
2462	802.11g 6Mbps	2483.5	V	287	198	Ave	44.68	54.00	−9.32
2412	HT20 MCS0	2390.0	V	231	187	Pk	55.30	74.00	−18.70
2412	HT20 MCS0	2390.0	V	231	187	Ave	42.39	54.00	−11.61
2412	HT20 MCS0	2390.0	H	290	178	Pk	54.87	74.00	−19.13
2412	HT20 MCS0	2390.0	H	290	178	Ave	41.99	54.00	−12.01
2462	HT20 MCS0	2483.5	H	320	237	Pk	56.98	74.00	−17.02
2462	HT20 MCS0	2483.5	H	320	237	Ave	43.45	54.00	−10.55
2462	HT20 MCS0	2483.5	V	288	193	Pk	59.01	74.00	−14.99
2462	HT20 MCS0	2483.5	V	288	193	Ave	45.02	54.00	−8.98

Note: The emissions were measured at the adjacent restricted band of the fundamental signal.
All the band-edge measurements met the restricted band requirements of CFR47 15.205

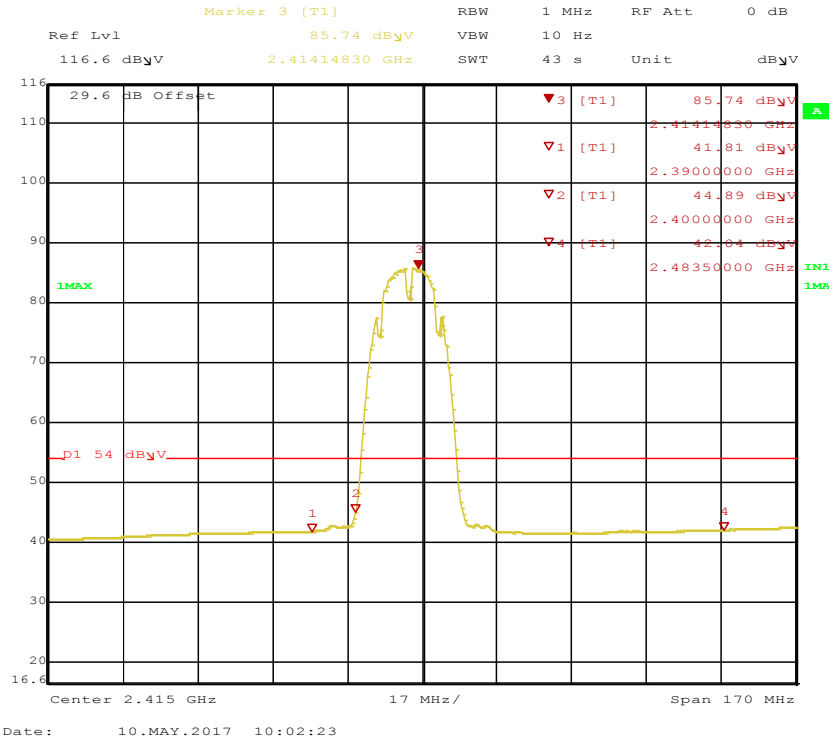


Figure 58: Radiated Emission at the Edge for 11b-2412 MHz-1Mbps-V-Ave

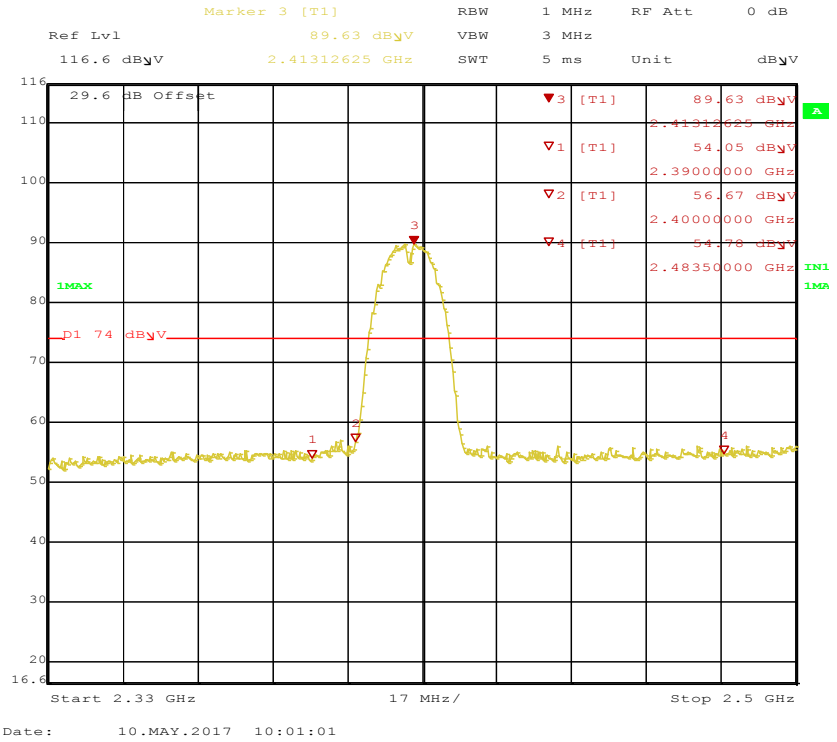


Figure 59: Radiated Emission at the Edge for 11b-2412 MHz-1Mbps-V-Pk

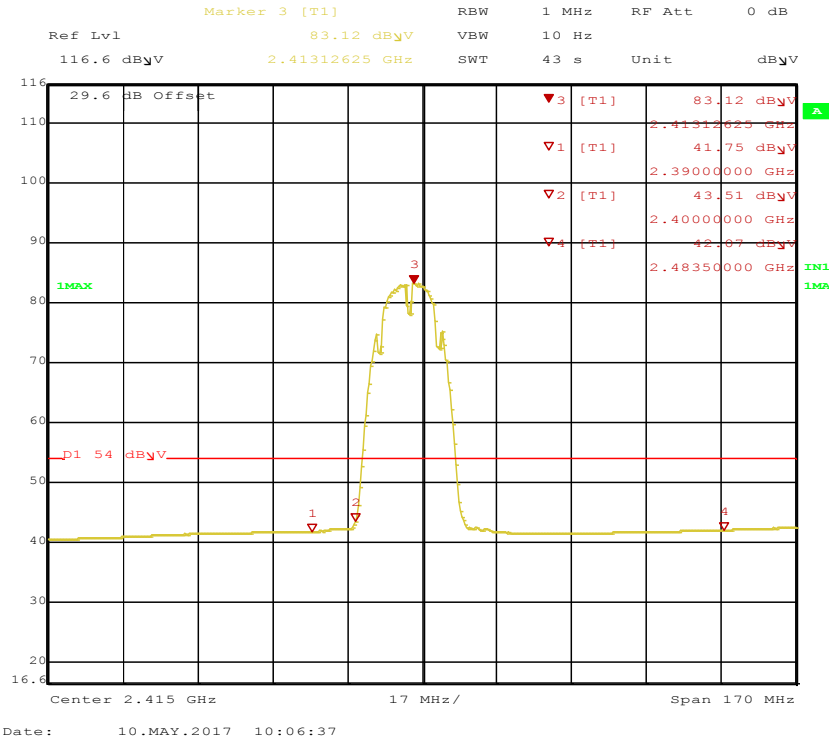


Figure 60: Radiated Emission at the Edge for 11b-2412 MHz-1Mbps-H-Ave

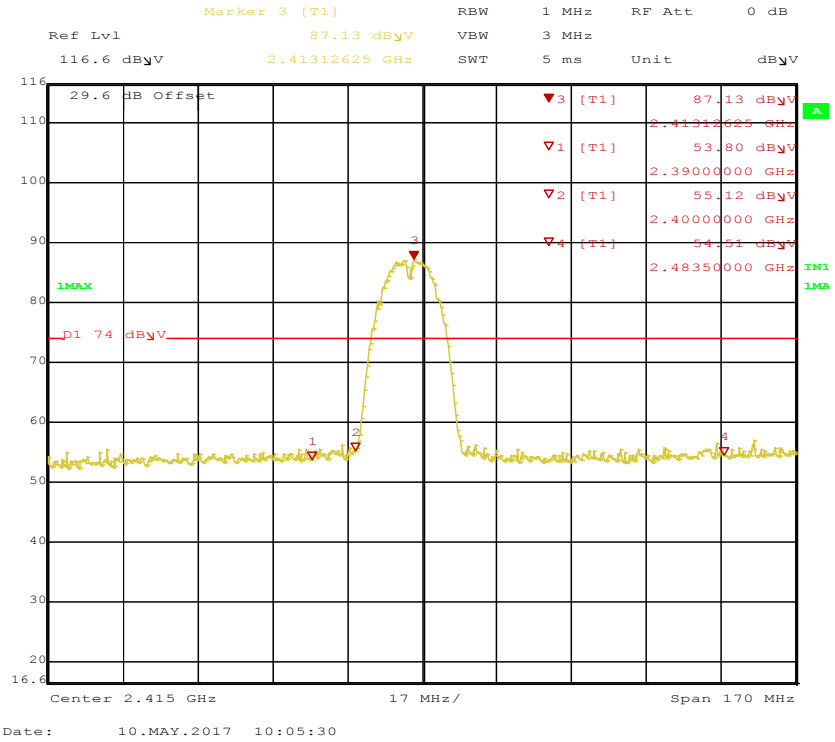


Figure 61: Radiated Emission at the Edge for 11b-2412 MHz-1Mbps-H-Pk

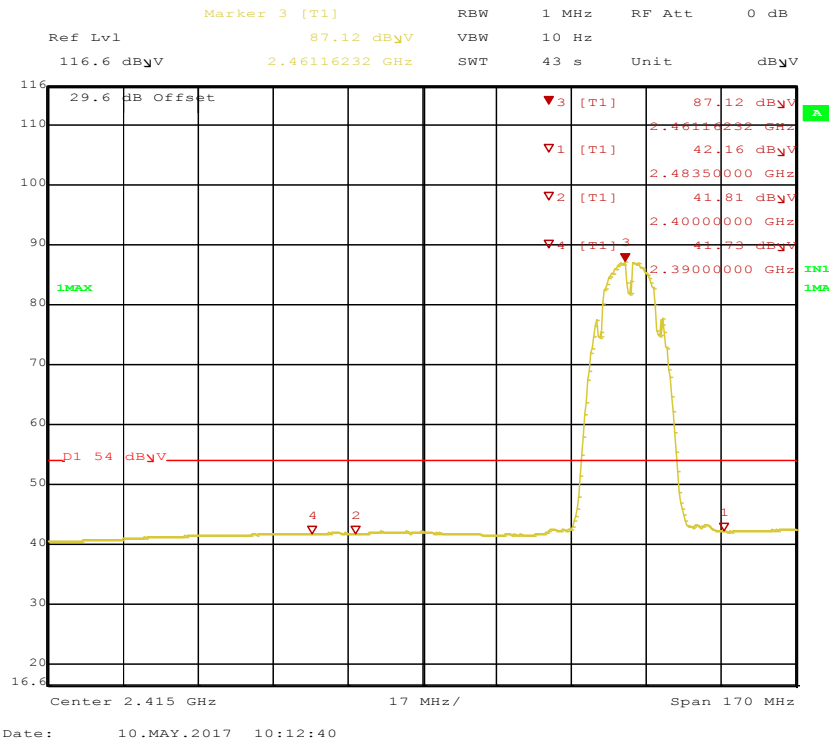


Figure 62: Radiated Emission at the Edge for 11b-2462 MHz-1Mbps-H-Ave

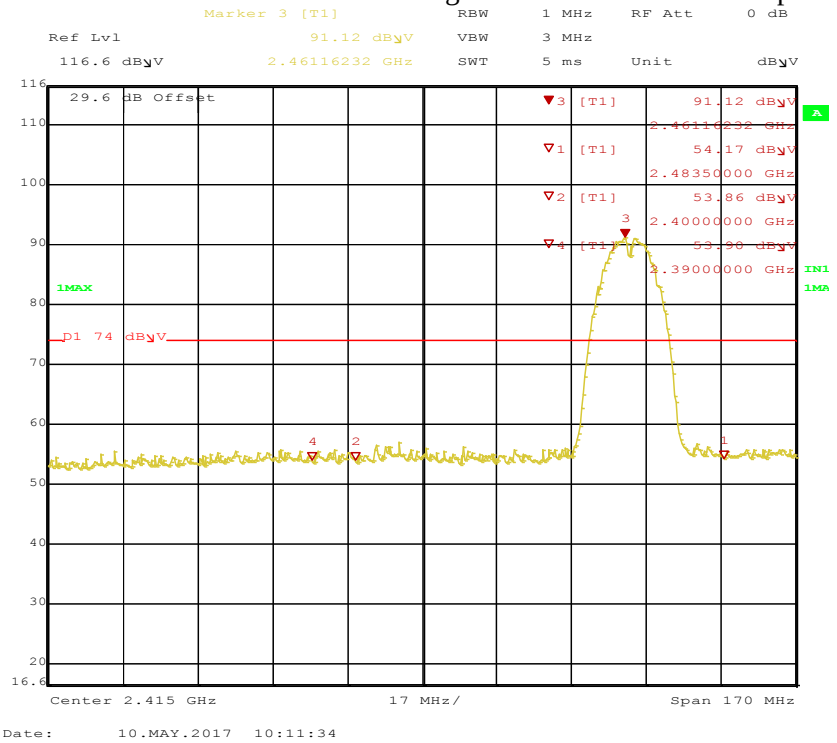


Figure 63: Radiated Emission at the Edge for 11b-2462 MHz-1Mbps-H-Pk

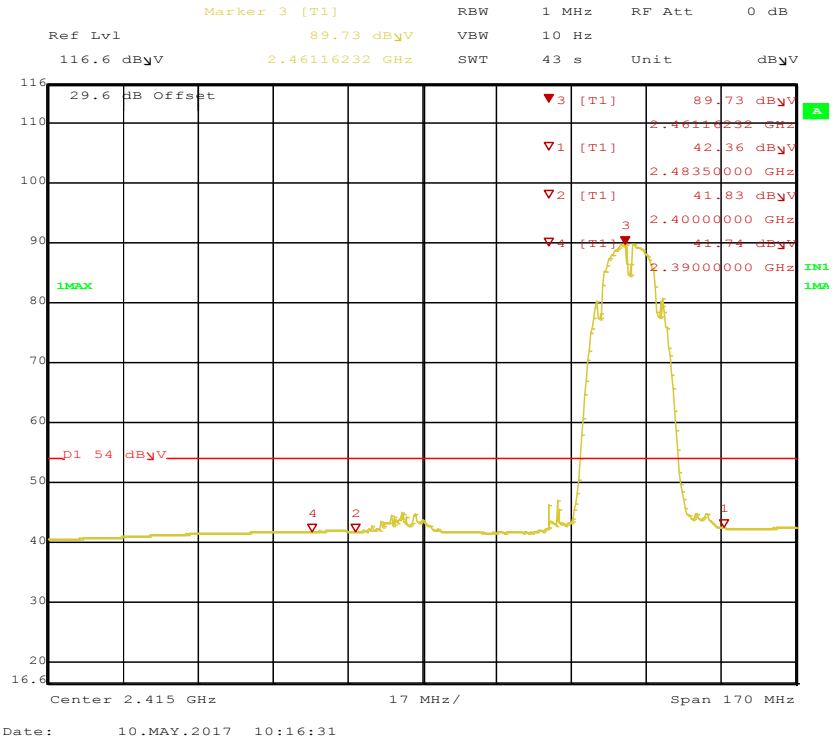


Figure 64: Radiated Emission at the Edge for 11b-2462 MHz-1Mbps-V-Ave

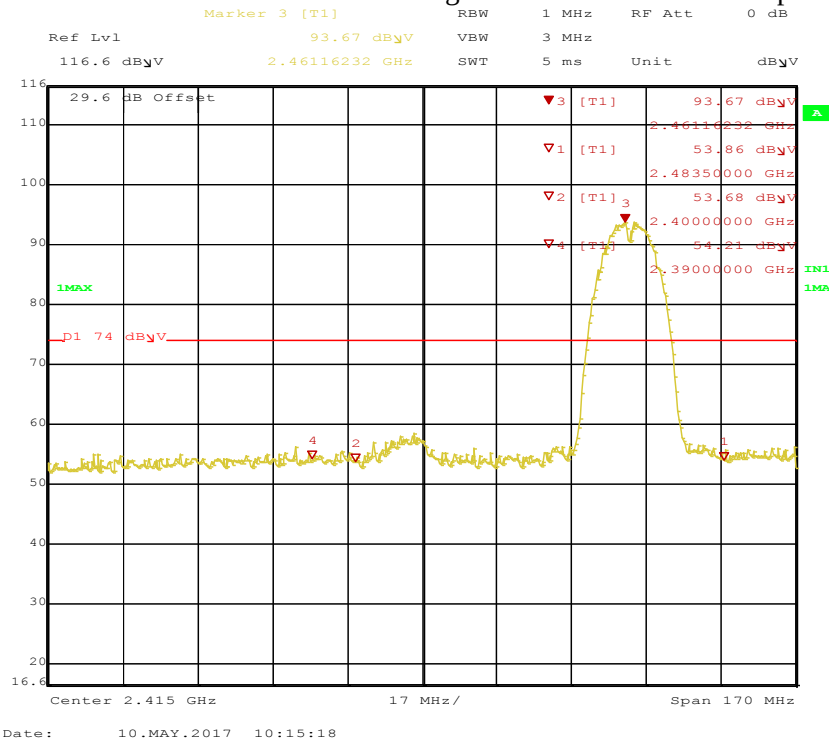


Figure 65: Radiated Emission at the Edge for 11b-2462 MHz-1Mbps-V-Pk

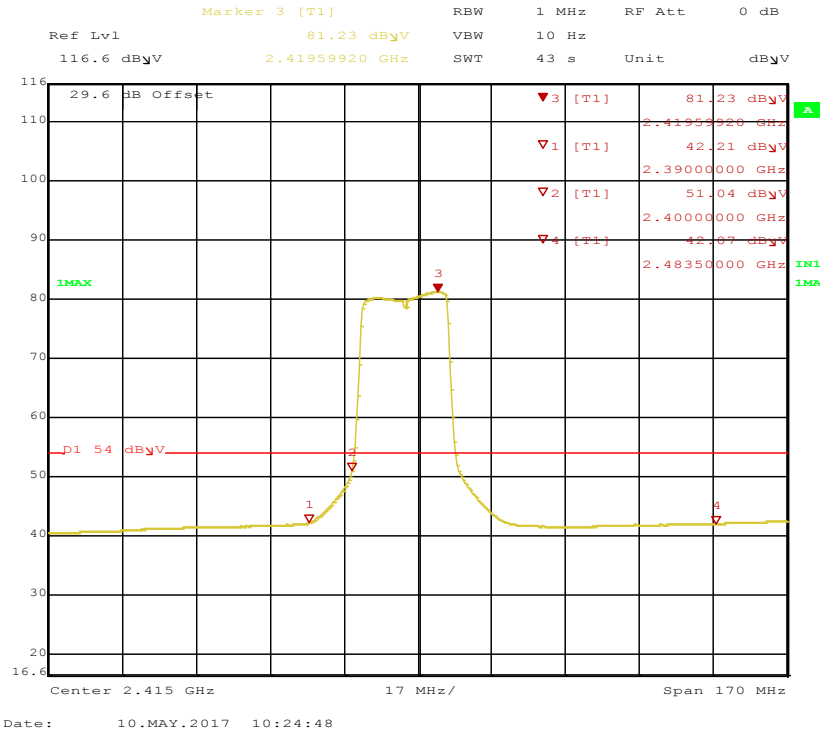


Figure 66: Radiated Emission at the Edge for 11g-2412 MHz-6Mbps-V-Ave

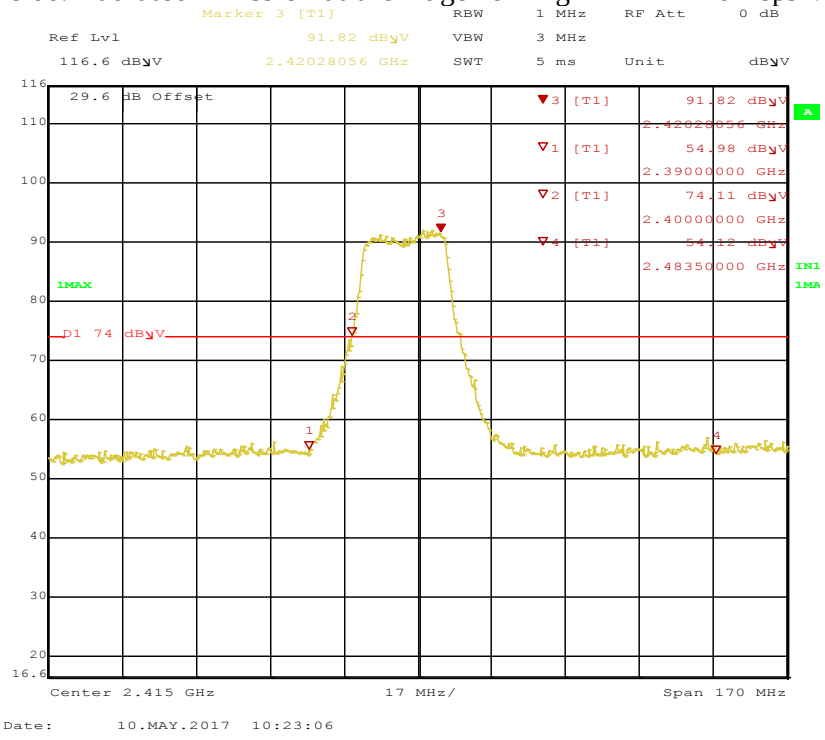


Figure 67: Radiated Emission at the Edge for 11g-2412 MHz-6Mbps-V-Pk

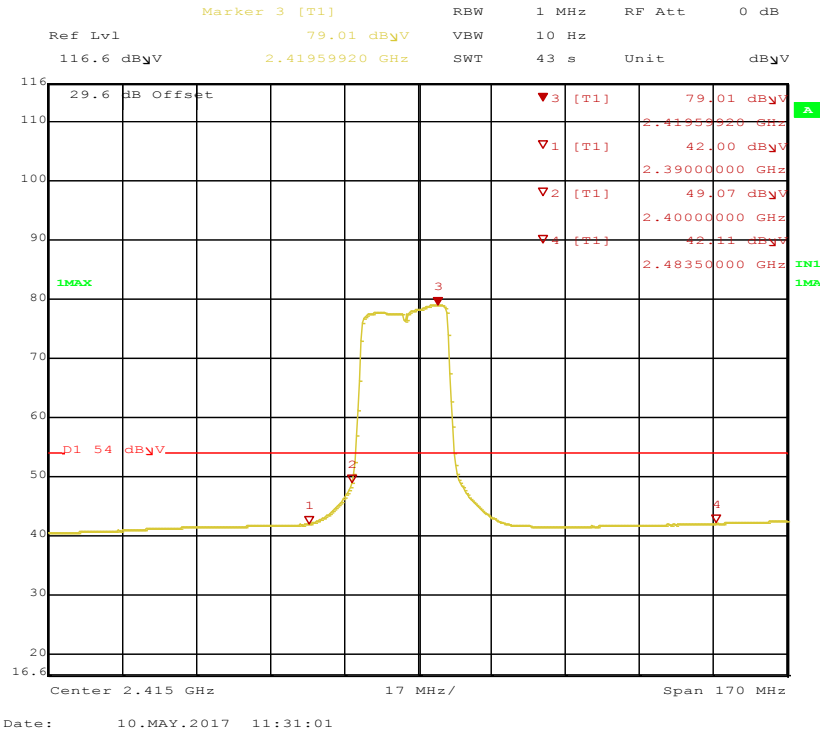


Figure 68: Radiated Emission at the Edge for 11g-2412 MHz-6Mbps-H-Ave

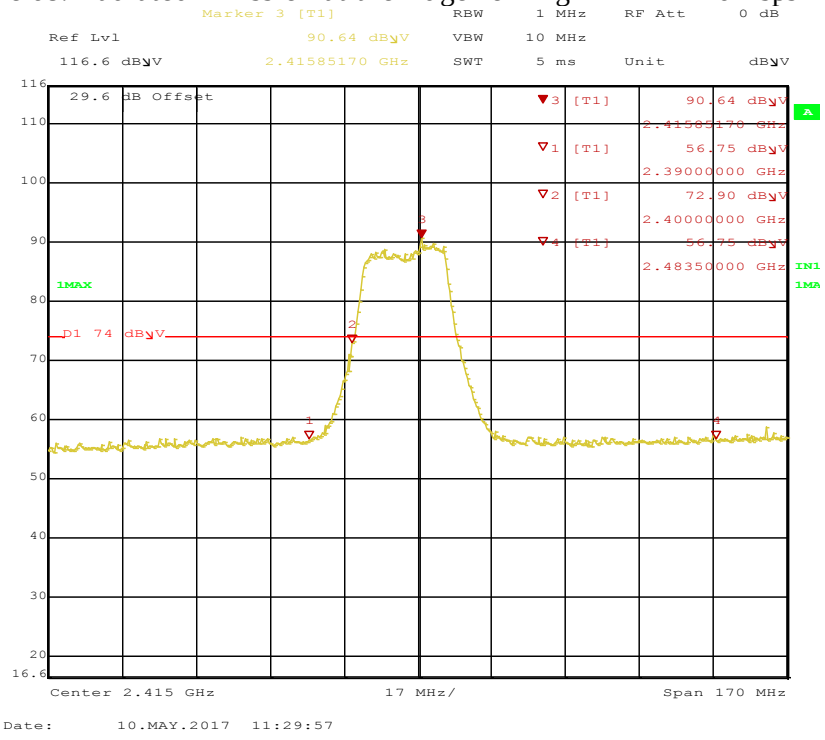


Figure 69: Radiated Emission at the Edge for 11g-2412 MHz-6Mbps-H-Pk

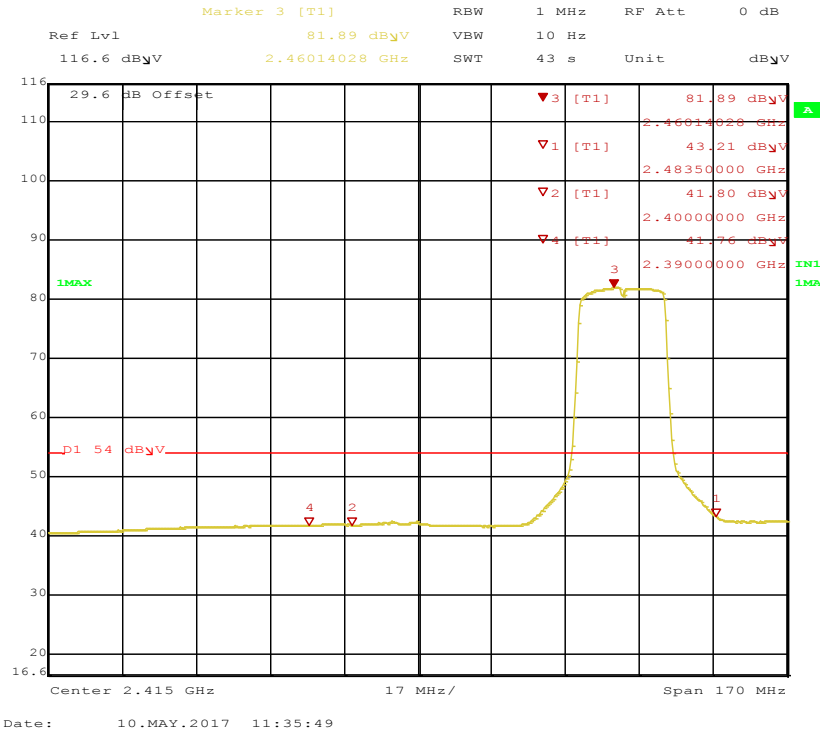


Figure 70: Radiated Emission at the Edge for 11g-2462 MHz-6Mbps-H-Ave

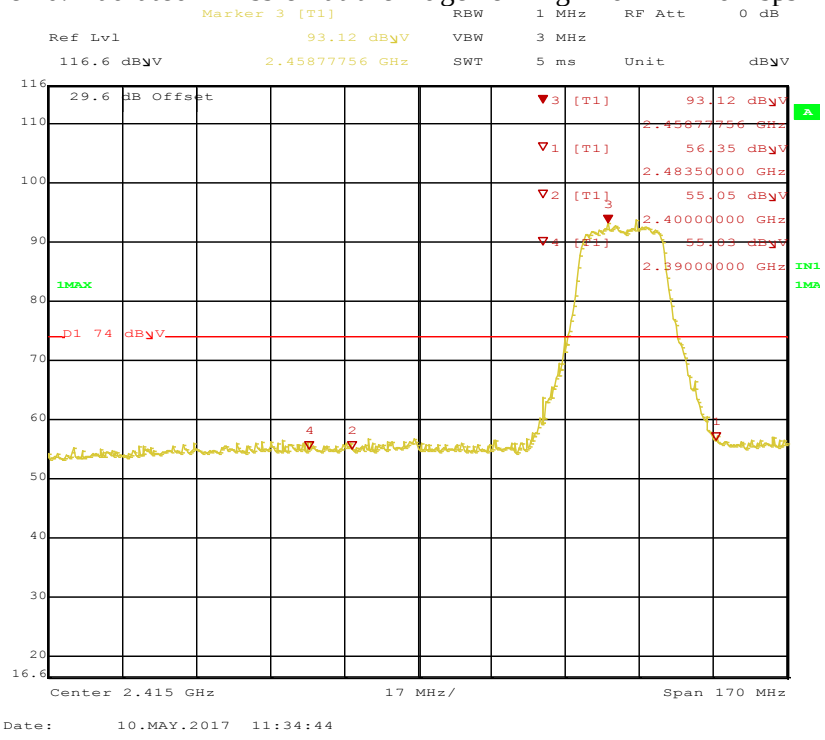


Figure 71: Radiated Emission at the Edge for 11g-2462 MHz-6Mbps-H-Pk

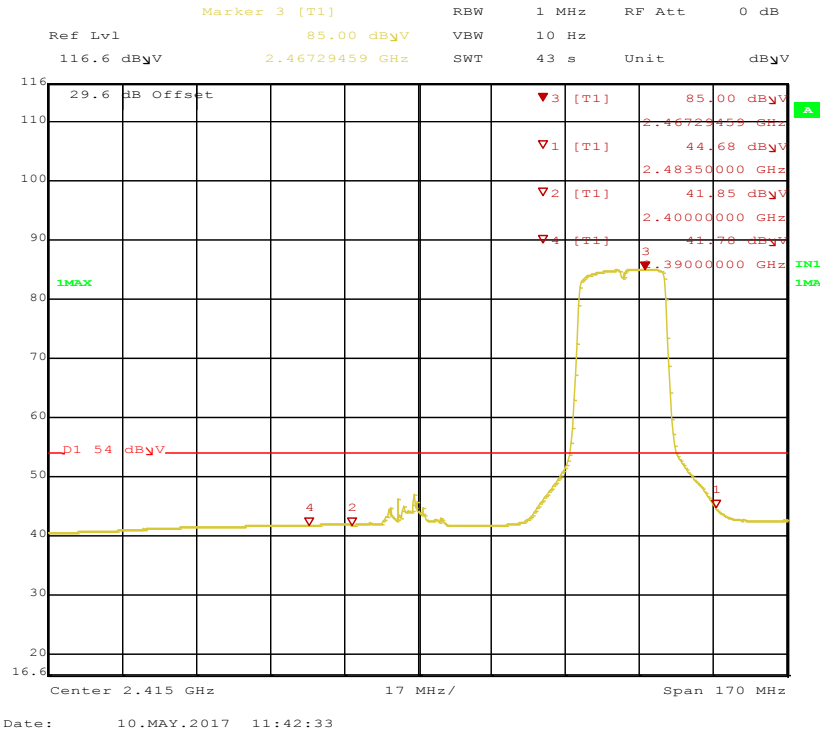


Figure 72: Radiated Emission at the Edge for 11g-2462 MHz-6Mbps-V-Ave

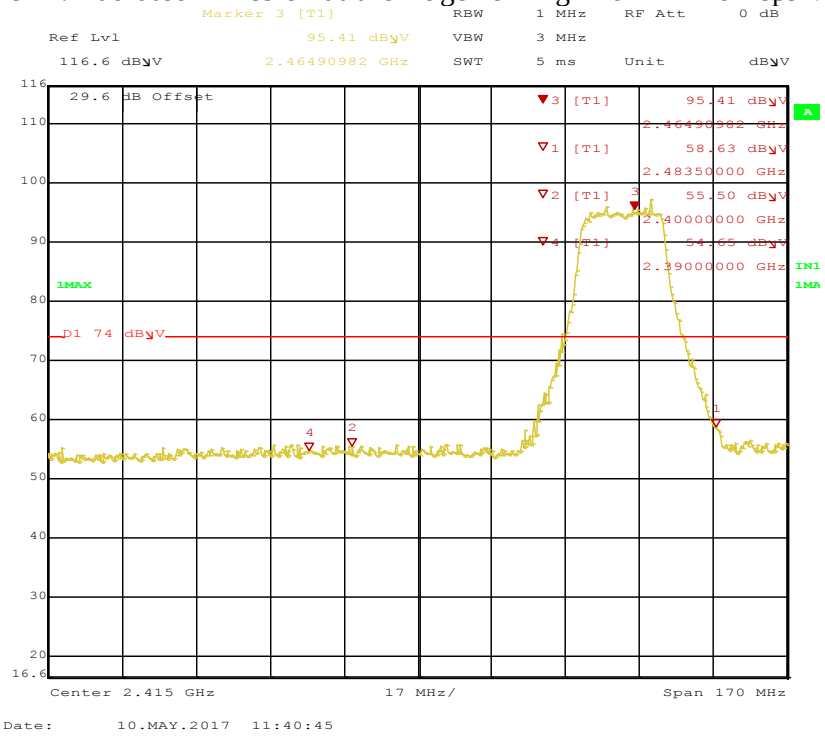


Figure 73: Radiated Emission at the Edge for 11g-2462 MHz-6Mbps-V-Pk

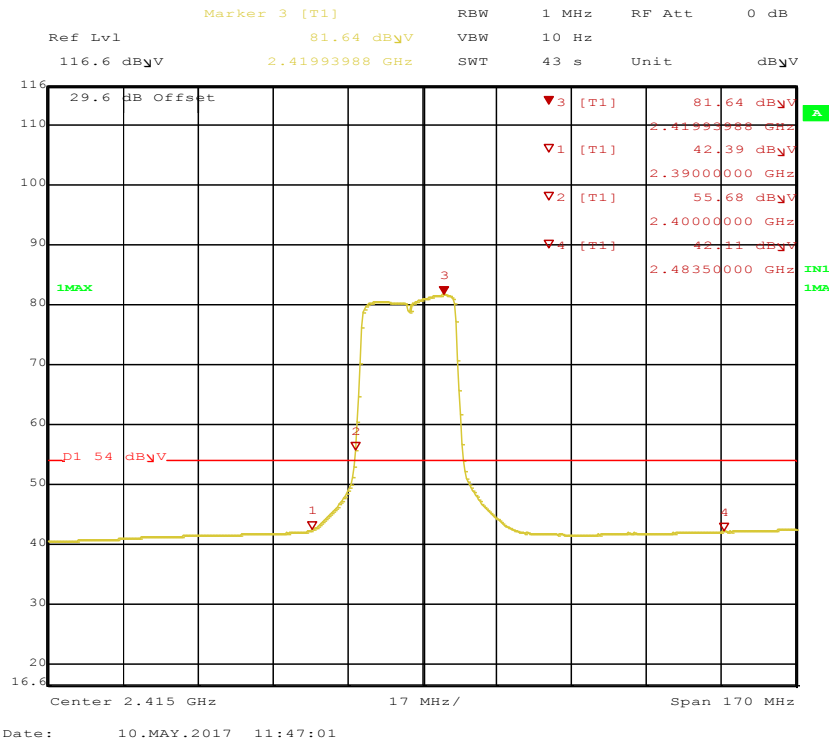


Figure 74: Radiated Emission at the Edge for HT20-2412 MHz-6.5Mbps-V-Ave

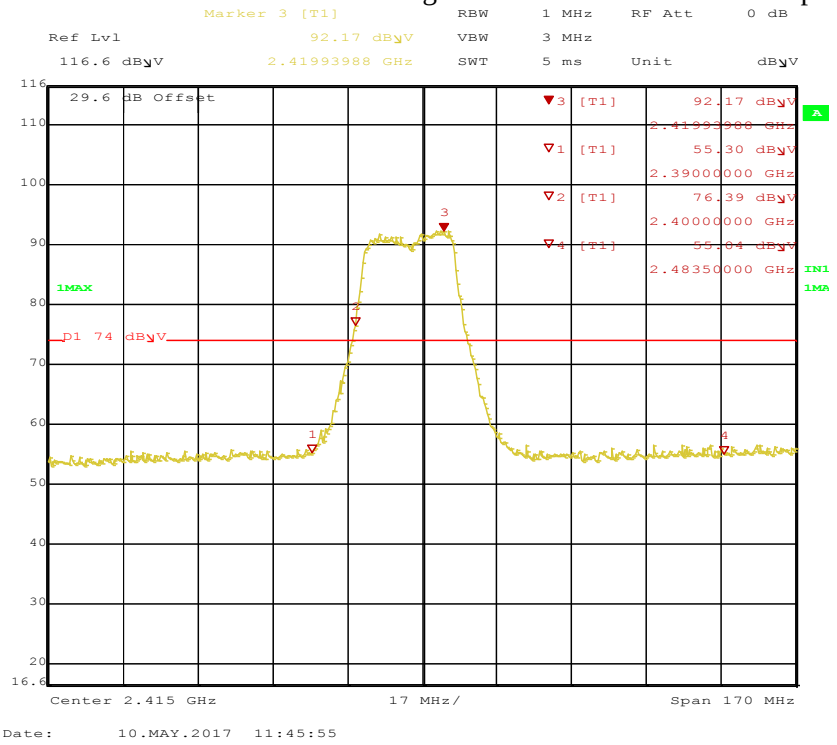


Figure 75: Radiated Emission at the Edge for HT20-2412 MHz-6.5Mbps-V-Pk

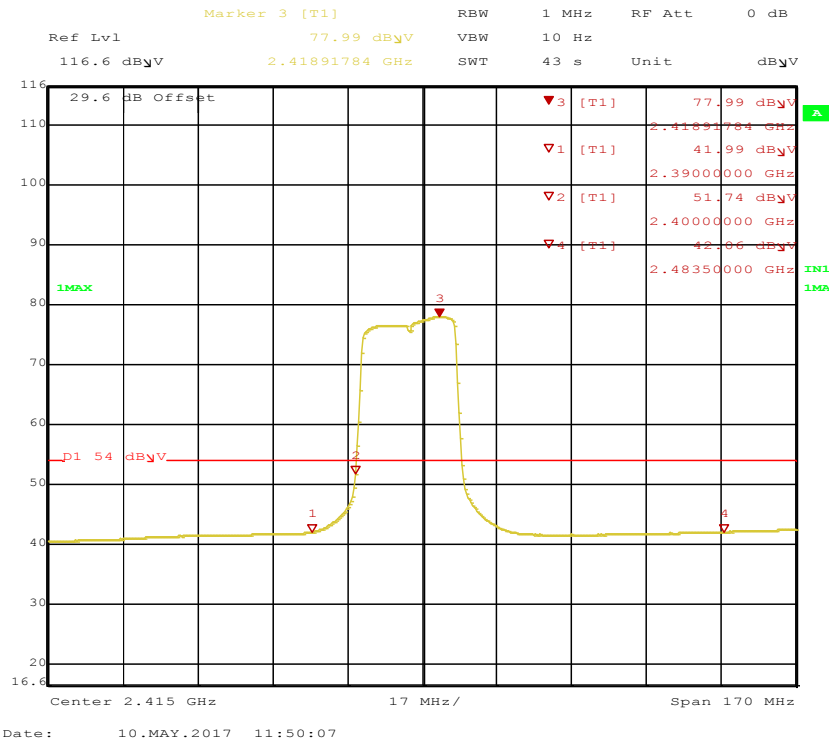


Figure 76: Radiated Emission at the Edge for HT20-2412 MHz-6.5Mbps-H-Ave

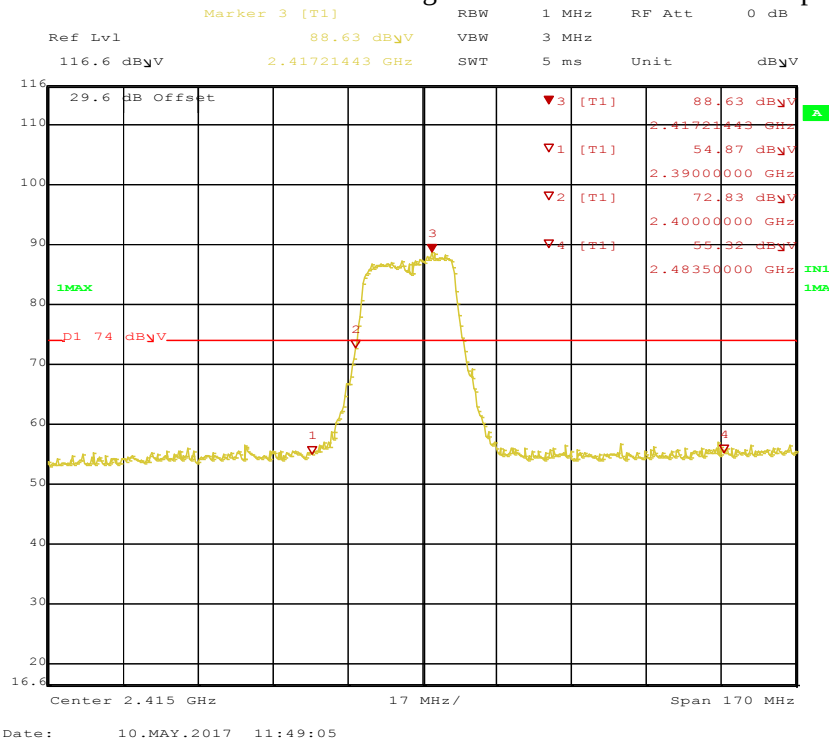


Figure 77: Radiated Emission at the Edge for HT20-2412 MHz-6.5Mbps-H-Pk

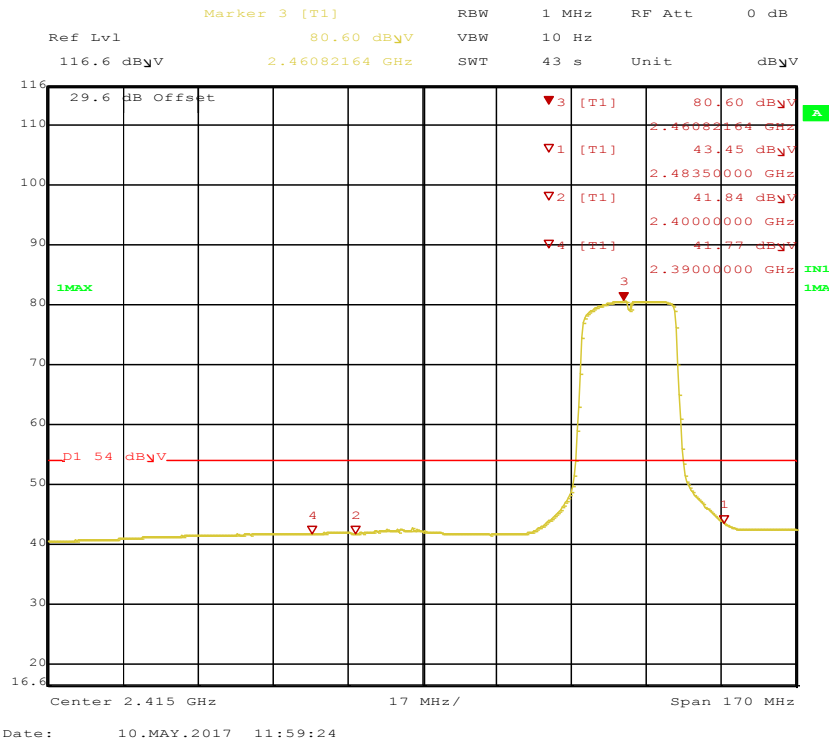


Figure 78: Radiated Emission at the Edge for HT20-2462 MHz-6.5Mbps-H-Ave

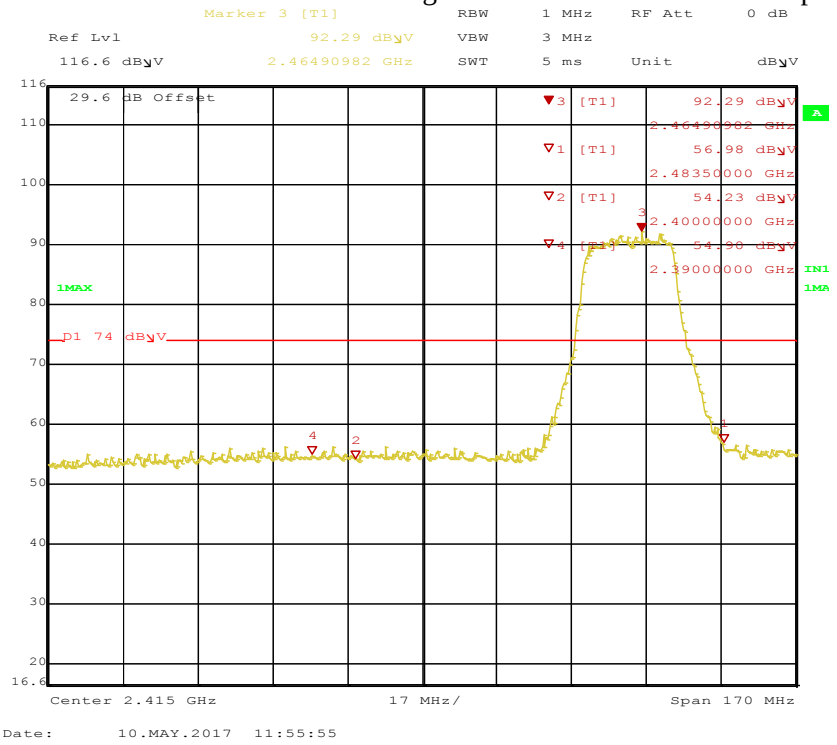


Figure 79: Radiated Emission at the Edge for HT20-2462 MHz-6.5Mbps-H-Pk

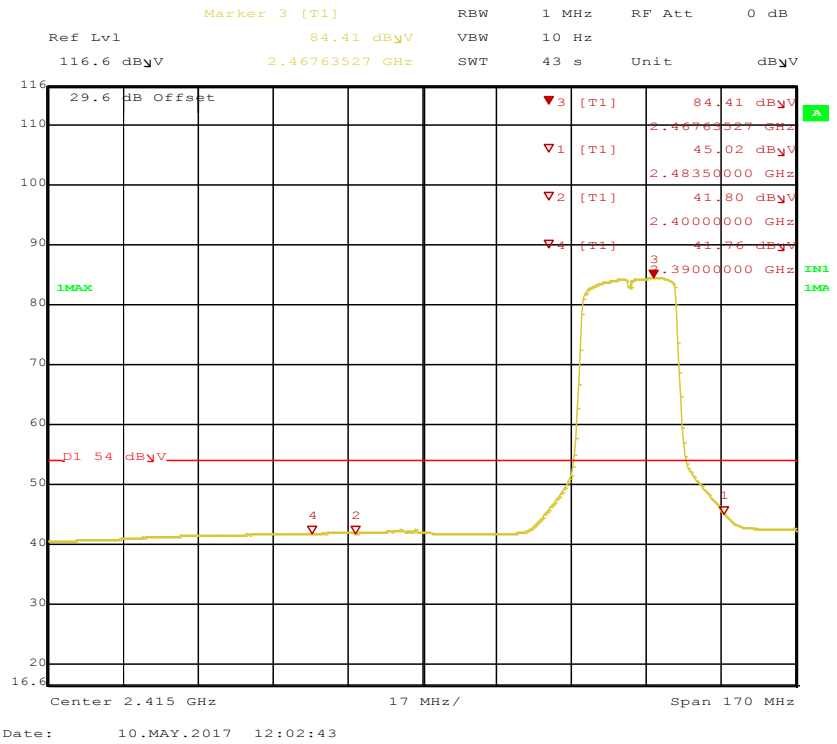


Figure 80: Radiated Emission at the Edge for HT20-2462 MHz-6.5Mbps-V-Ave

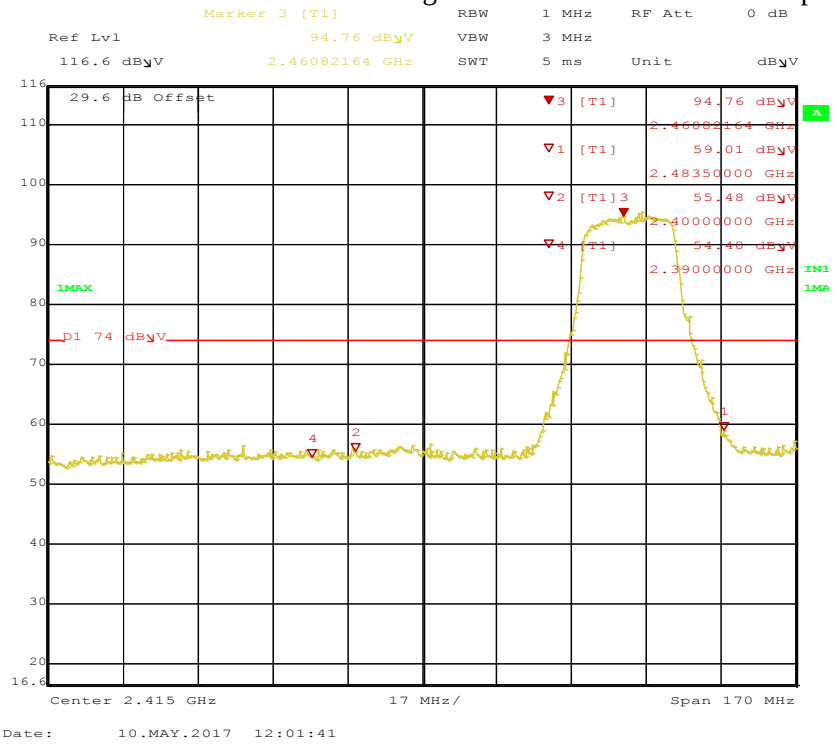


Figure 81: Radiated Emission at the Edge for HT20-2462 MHz-6.5Mbps-V-Pk

SOP 1 Radiated Emissions		Tracking # 31761682.001 Page 1 of 14	
EUT Name	Wireless Audio Headset	**Date**	May 19, 2017
EUT Model	Ear Force Stealth 600X	**Temp / Hum in**	22° C / 37%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11b 1Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C, RSS-247, RSS-GEN	**RBW / VBW**	120 kHz/ 300 kHz
Dist/Ant Used	3m / JB3	**Performed by**	Jeremy Luong

9 kHz – 1 GHz Transmit at 2437 MHz

Frequency	Raw	Cable Loss	AF	Level	Detector	Polarity	Height	Azimuth	Limit	Margin
MHz	dBuV/m	dB	dB	dBuV/m		H/V	cm	deg	dBuV/m	dB
720.02	37.80	5.10	-7.10	35.80	QP	H	111	71	46.00	-10.20
36.01	33.55	2.62	-11.35	24.82	QP	V	135	96	40.00	-15.18
47.98	48.75	2.72	-18.92	32.55	QP	V	106	14	40.00	-7.45
120.00	46.90	3.20	-14.50	35.60	QP	V	105	318	43.50	-7.90
240.01	50.90	3.70	-16.00	38.60	QP	V	152	165	46.00	-7.40
480.05	37.50	4.50	-10.30	31.70	QP	V	112	6	46.00	-14.30

Spec Margin = E-Field QP - Limit, E-Field QP = FIM QP+ Total CF ± Uncertainty
Total CF= AF+ Cable Loss AF= Antenna factor + Preamp

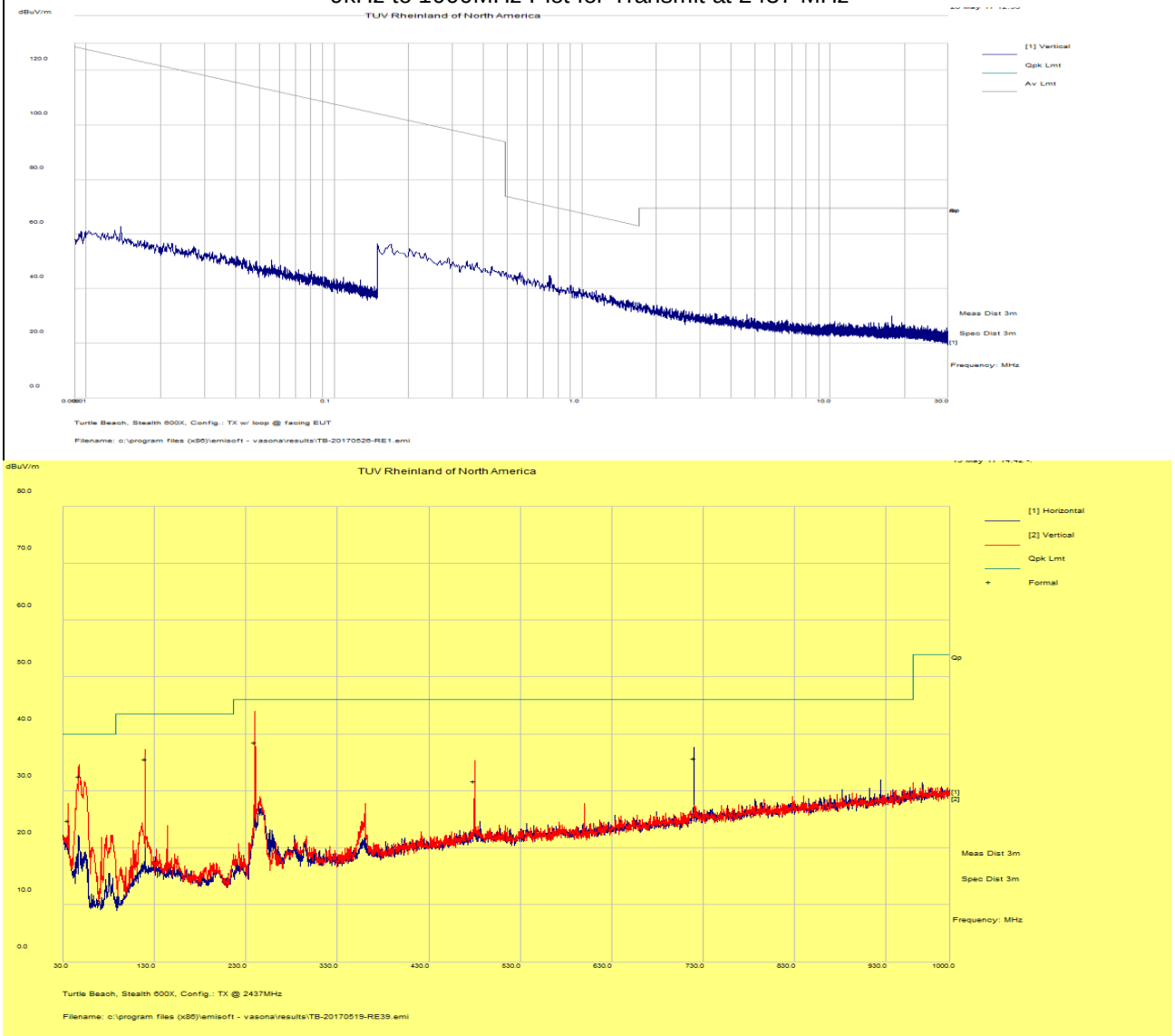
Note: 1. Worst case was observed on Mid channel of 802.11b 1Mbps mode.
2. Mode tested are 802.11b, g and, HT20 (low, mid & high channel).
3. No significant emission was observed below 30MHz.

SOP 1 Radiated Emissions

Tracking # 31761682.001 Page 2 of 14

EUT Name	Wireless Audio Headset	**Date**	May 19, 2017
EUT Model	Ear Force Stealth 600X	**Temp / Hum in**	22° C / 37%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11b 1Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	120 kHz/ 300 kHz
Dist/Ant Used	3m / JB3 & 6505	**Date**	Jeremy Luong

9kHz to 1000MHz Plot for Transmit at 2437 MHz



Notes: None.

SOP 1 Radiated Emissions — Tracking # 31761682.001 Page 3 of 14

EUT Name	Wireless Audio Headset	**Date**	May 8, 2017
EUT Model	Ear Force Stealth 600X	**Temp / Hum in**	21° C / 34%rh
EUT Serial	PP#2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11b 1Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C, RSS-247, RSS-GEN	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m – EMCO3115 / 1m – AHA-840	**Performed by**	Jeremy Luong

1 – 26 GHz Transmit at 2412 MHz (Low Channel)

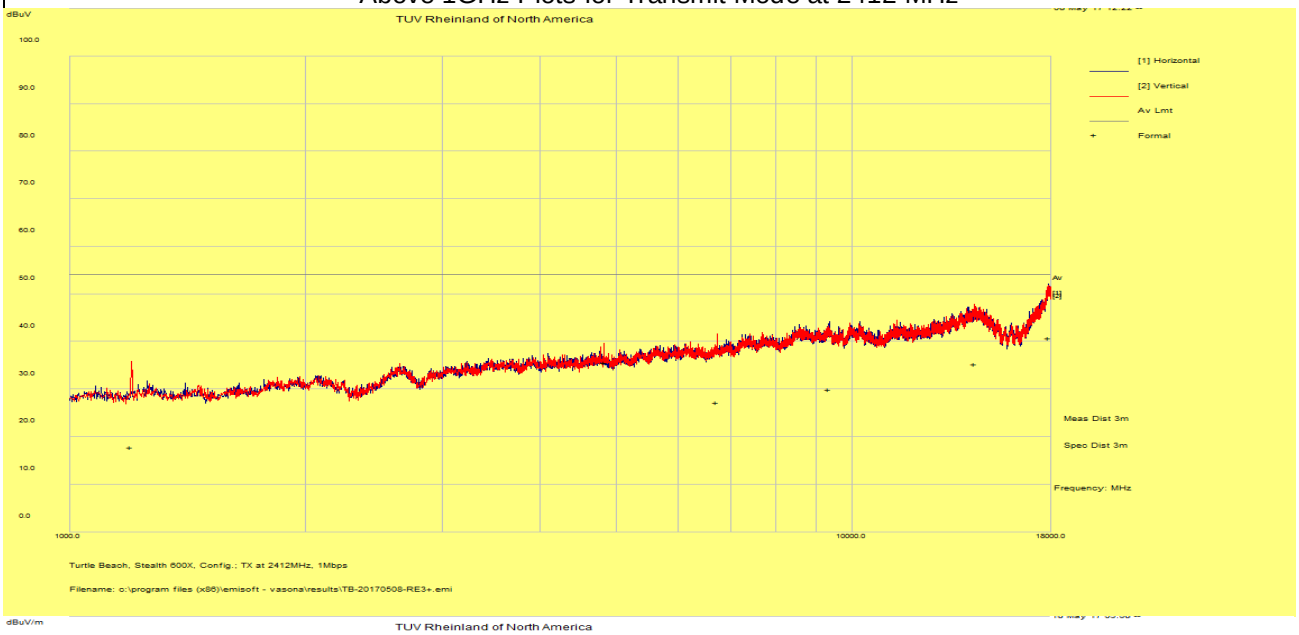
Frequency	Raw	Cable Loss	AF	Level	Detector	Polarity	Height	Azimuth	Limit	Margin
MHz	dBuV/m	dB	dB	dBuV/m		H/V	cm	deg	dBuV/m	dB
17876.32	40.59	3.71	-3.50	40.80	Ave	H	138	42	54.00	-13.20
1198.04	45.02	0.83	-28.08	17.76	Ave	V	139	-1	54.00	-36.24
4823.77	53.97	1.75	-20.12	35.61	Ave	V	103	190	54.00	-18.39
6728.72	42.80	2.12	-17.63	27.29	Ave	V	200	27	54.00	-26.71
9361.33	40.70	2.51	-13.24	29.97	Ave	V	226	302	54.00	-24.03
14363.80	40.44	3.19	-8.34	35.29	Ave	V	244	349	54.00	-18.71
1 – 26 GHz Transmit at 2437 MHz (Middle Channel)										
4873.93	50.09	1.77	-20.13	31.73	Ave	V	157	182	54.00	-22.27
7770.08	41.62	2.25	-15.45	28.42	Ave	V	240	257	54.00	-25.58
9343.33	40.82	2.52	-13.25	30.09	Ave	V	166	118	54.00	-23.91
14370.56	40.38	3.19	-8.36	35.22	Ave	V	114	0	54.00	-18.78
17873.92	40.67	3.71	-3.52	40.86	Ave	V	164	64	54.00	-13.14
1 – 26 GHz Transmit at 2462 MHz (High Channel)										
4923.75	46.48	1.76	-20.17	28.07	Ave	V	124	232	54.00	-25.93
14380.33	40.57	3.20	-8.39	35.39	Ave	V	152	64	54.00	-18.62
17851.29	40.60	3.72	-3.65	40.68	Ave	V	150	324	54.00	-13.32

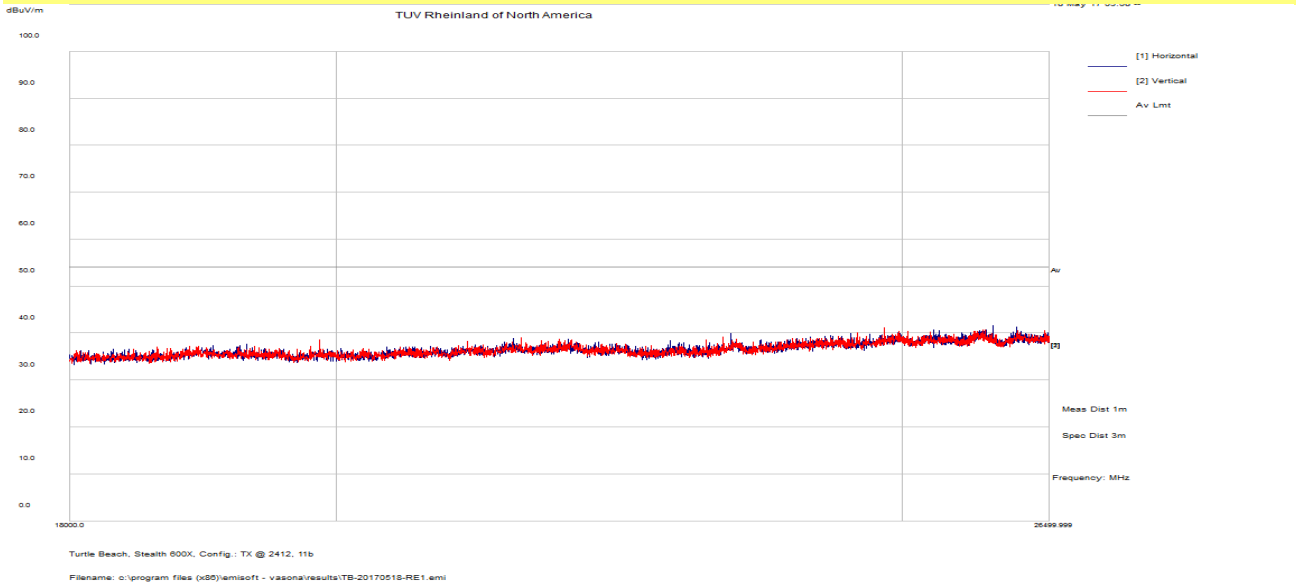
Spec Margin = E-Field AVG - Limit, E-Field AVG = FIM AVG+ Total CF ± Uncertainty
Total CF= AF+ Cable Loss AF= Antenna factor + Preamp

Note: Worst case was observed at 1Mbps for 802.11b mode.
Headset intended to transmit less than 8dBm.

SOP 1 Radiated Emissions		Tracking # 31761682.001 Page 4 of 14	
EUT Name	Wireless Audio Headset	**Date**	May 8, 2017
EUT Model	Ear Force Stealth 600X	**Temp / Hum in**	21° C / 34%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11b 1Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m / DRH-118, 1m / RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1GHz Plots for Transmit Mode at 2412 MHz

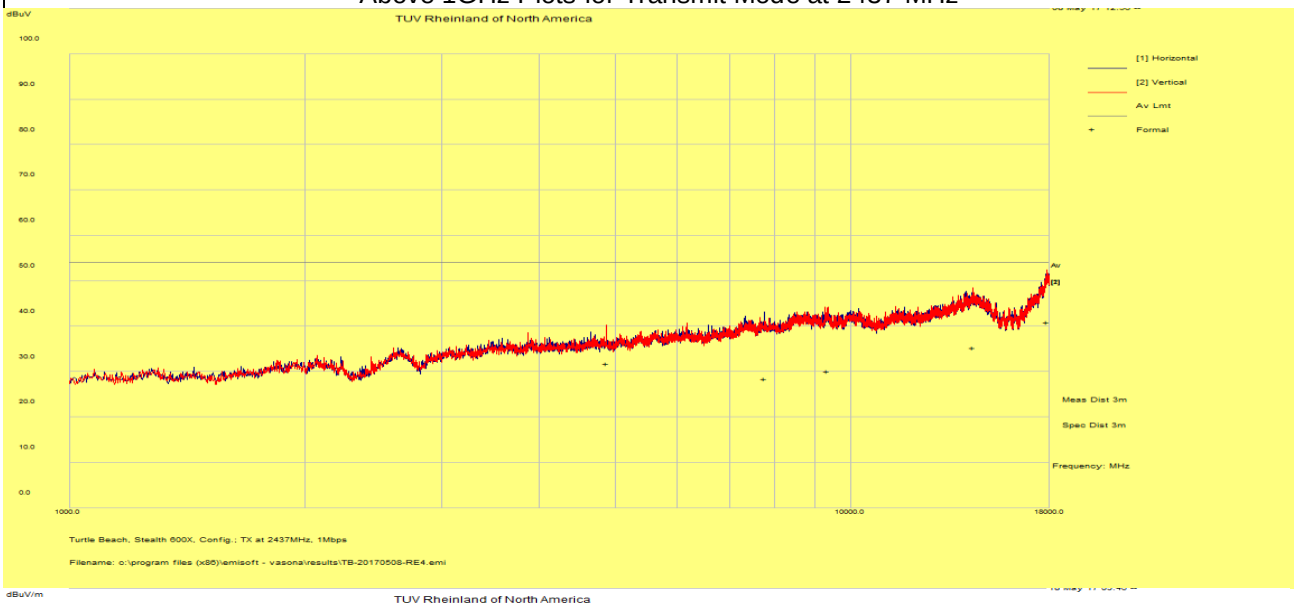


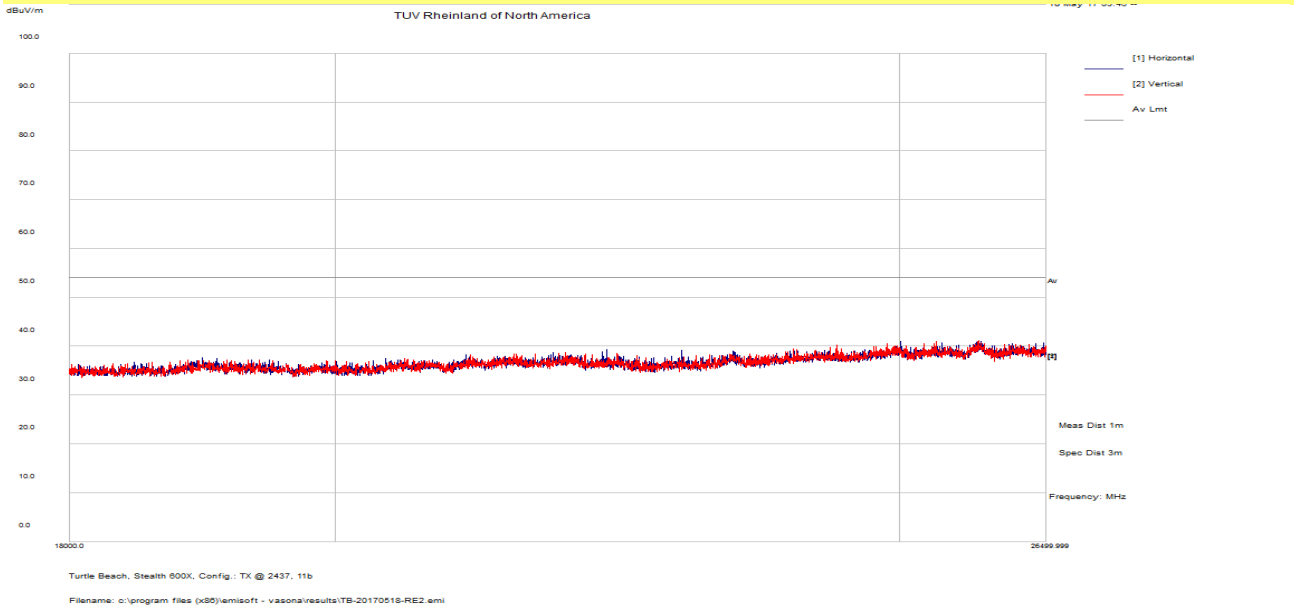


Notes: No significant emission observed above 18 GHz.

SOP 1 Radiated Emissions		Tracking # 31761682.001 Page 5 of 14	
EUT Name	Wireless Audio Headset	**Date**	May 8, 2017
EUT Model	Ear Force Stealth 600X	**Temp / Hum in**	21° C / 34%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11b 1Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m / DRH-118, 1m / RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1GHz Plots for Transmit Mode at 2437 MHz

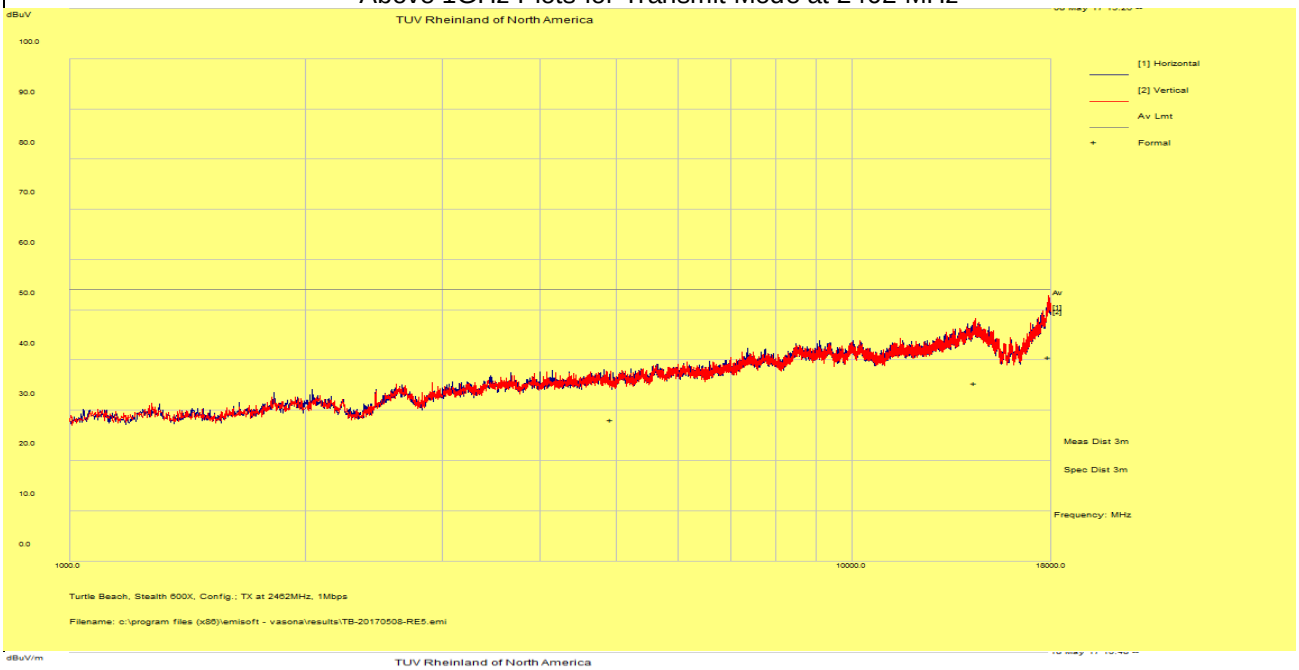


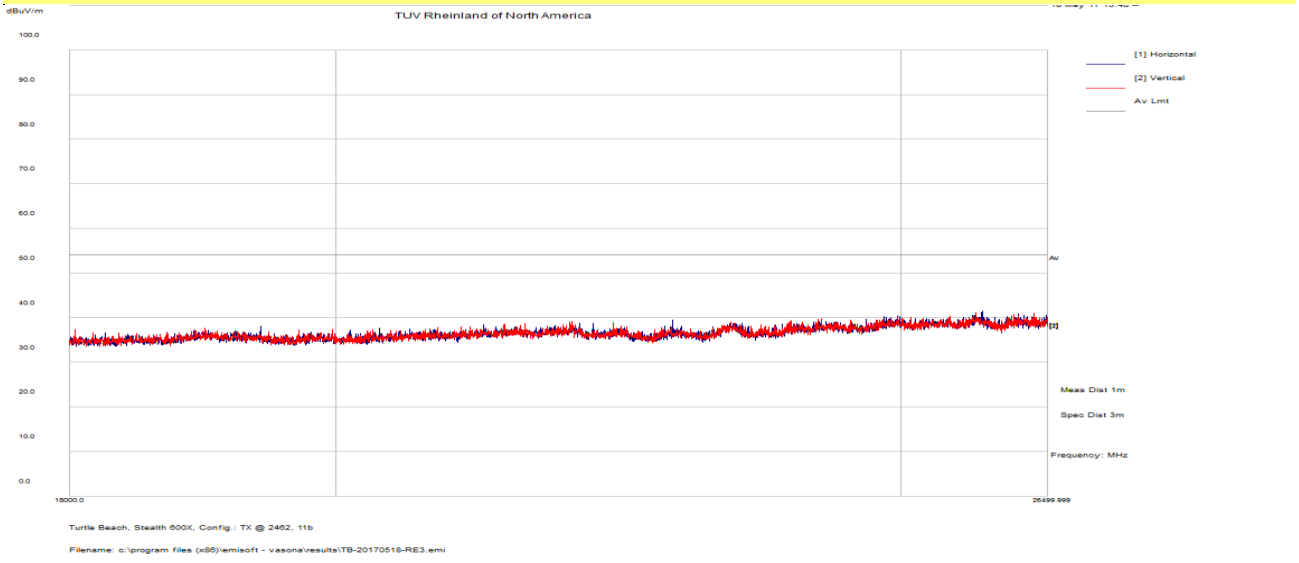


Notes: No significant emission observed above 18 GHz.

SOP 1 Radiated Emissions		Tracking # 31761682.001 Page 6 of 14	
EUT Name	Wireless Audio Headset	**Date**	May 8, 2017
EUT Model	Ear Force Stealth 600X	**Temp / Hum in**	21° C / 34%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11b 1Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m / DRH-118, 1m / RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1GHz Plots for Transmit Mode at 2462 MHz





Notes: No significant emission observed above 18 GHz.

SOP 1 Radiated Emissions		Tracking # 31761682.001 Page 7 of 14	
EUT Name	Wireless Audio Headset	**Date**	May 8, 2017
EUT Model	Ear Force Stealth 600X	**Temp / Hum in**	21° C / 34%rh
EUT Serial	PP#2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11g 6Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C, RSS-247, RSS-GEN	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m – EMCO3115 / 1m – AHA-840	**Performed by**	Jeremy Luong

1 – 26 GHz Transmit at 2412 MHz (Low Channel)

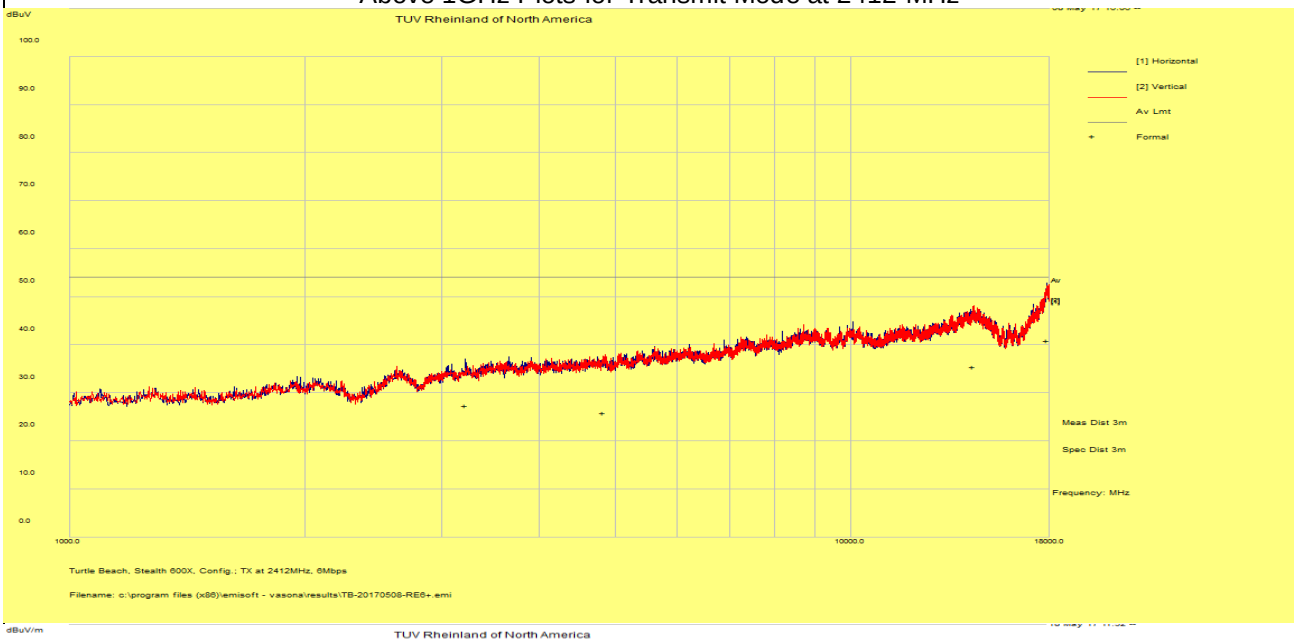
Frequency	Raw	Cable Loss	AF	Level	Detector	Polarity	Height	Azimuth	Limit	Margin
MHz	dBuV/m	dB	dB	dBuV/m		H/V	cm	deg	dBuV/m	dB
3216.09	48.23	1.40	-22.17	27.45	Ave	H	122	0	54.00	-26.55
17879.21	40.67	3.71	-3.49	40.90	Ave	H	235	220	54.00	-13.10
4824.63	44.21	1.75	-20.12	25.84	Ave	V	222	248	54.00	-28.16
14384.15	40.63	3.21	-8.40	35.44	Ave	V	217	28	54.00	-18.56
1 – 26 GHz Transmit at 2437 MHz (Middle Channel)										
14538.93	40.43	3.24	-8.64	35.03	Ave	H	157	322	54.00	-18.98
4871.93	43.58	1.77	-20.13	25.21	Ave	V	203	244	54.00	-28.79
7297.29	42.68	2.22	-15.75	29.14	Ave	V	174	318	54.00	-24.86
17881.30	40.57	3.71	-3.47	40.81	Ave	V	115	302	54.00	-13.19
1 – 26 GHz Transmit at 2462 MHz (High Channel)										
17895.81	40.66	3.72	-3.39	40.99	Ave	H	202	332	54.00	-13.01
4367.67	44.42	1.66	-21.16	24.93	Ave	V	204	206	54.00	-29.08
4914.86	43.34	1.76	-20.16	24.94	Ave	V	225	342	54.00	-29.06
14324.50	40.38	3.20	-8.27	35.31	Ave	V	133	20	54.00	-18.69

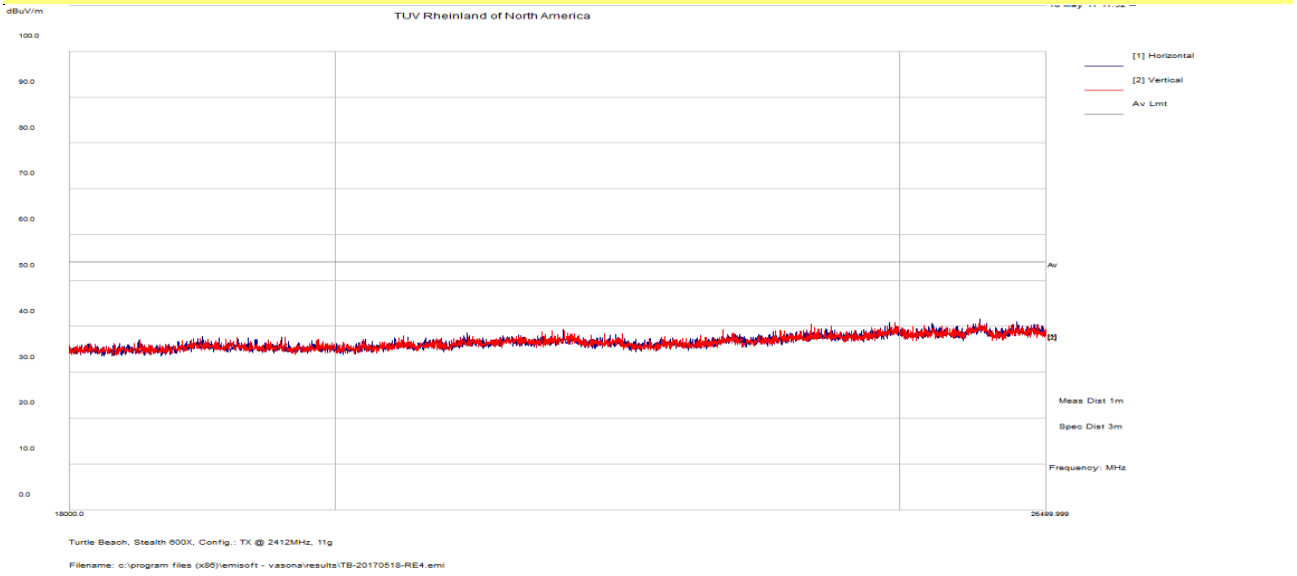
Spec Margin = E-Field AVG - Limit, E-Field AVG = FIM AVG+ Total CF ± Uncertainty
Total CF= AF+ Cable Loss AF= Antenna factor + Preamp

Note: Worst case was observed at 6Mbps for 802.11g mode.
Headset intended to transmit less than 8dBm.

SOP 1 Radiated Emissions		Tracking # 31761682.001 Page 8 of 14	
EUT Name	Wireless Audio Headset	**Date**	May 8, 2017
EUT Model	Ear Force Stealth 600X	**Temp / Hum in**	21° C / 34%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11g 6Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m / DRH-118, 1m / RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1GHz Plots for Transmit Mode at 2412 MHz

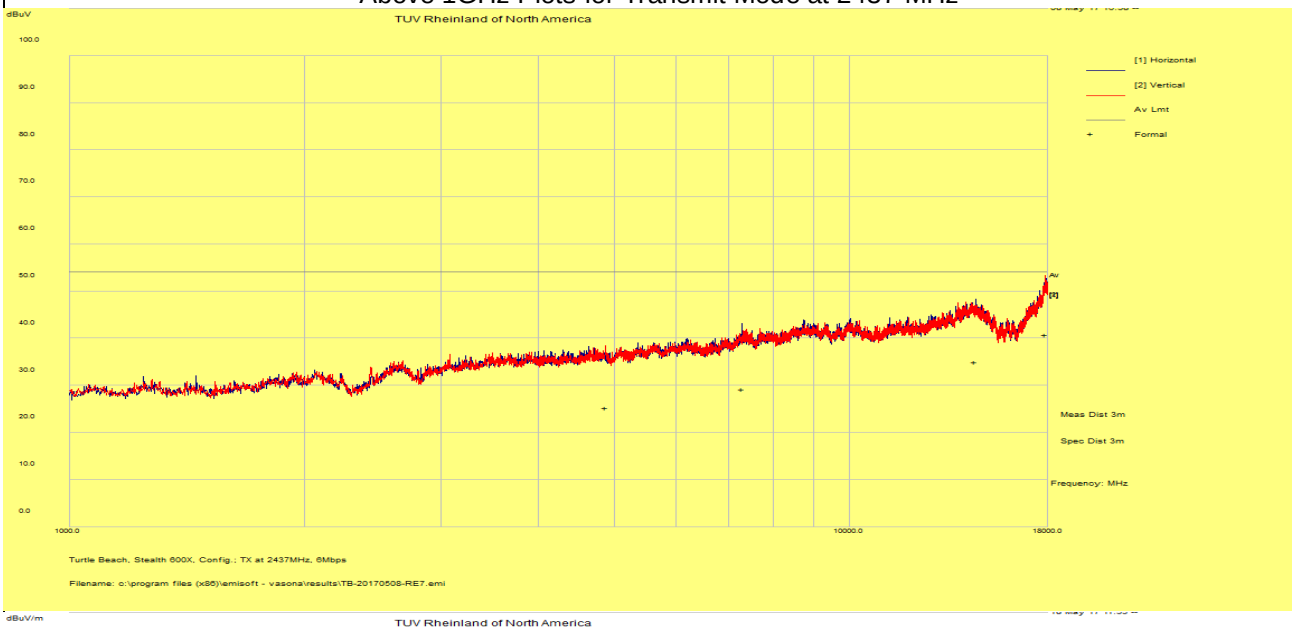


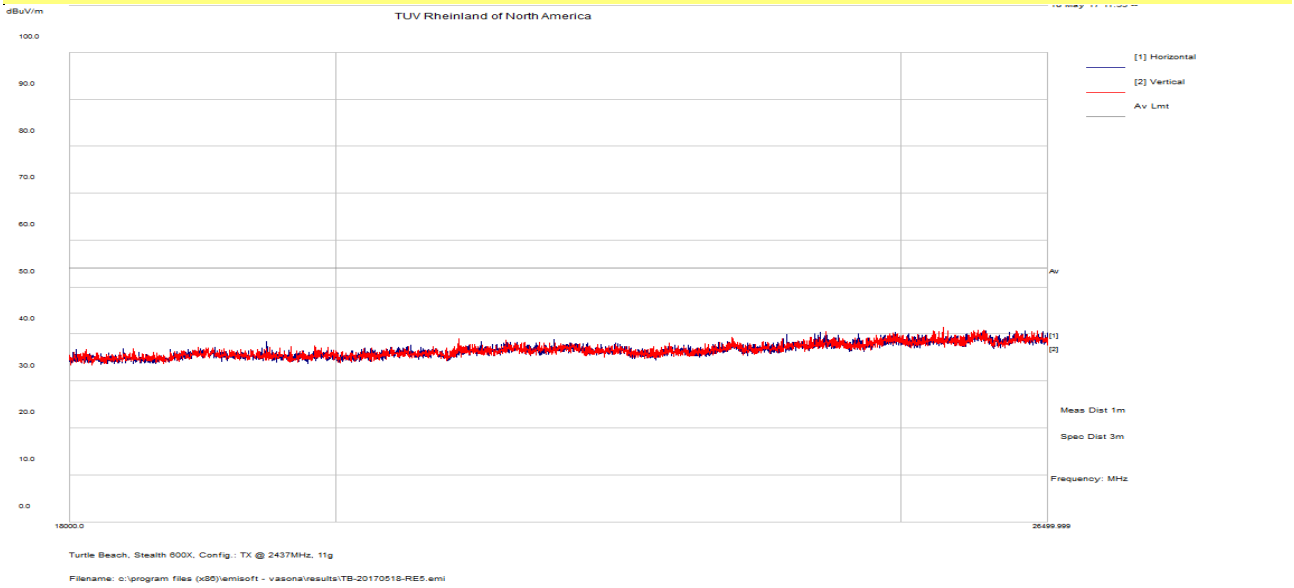


Notes: No significant emission observed above 18 GHz.

SOP 1 Radiated Emissions		Tracking # 31761682.001 Page 9 of 14	
EUT Name	Wireless Audio Headset	**Date**	May 8, 2017
EUT Model	Ear Force Stealth 600X	**Temp / Hum in**	21° C / 34%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11g 6Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m / DRH-118, 1m / RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1GHz Plots for Transmit Mode at 2437 MHz

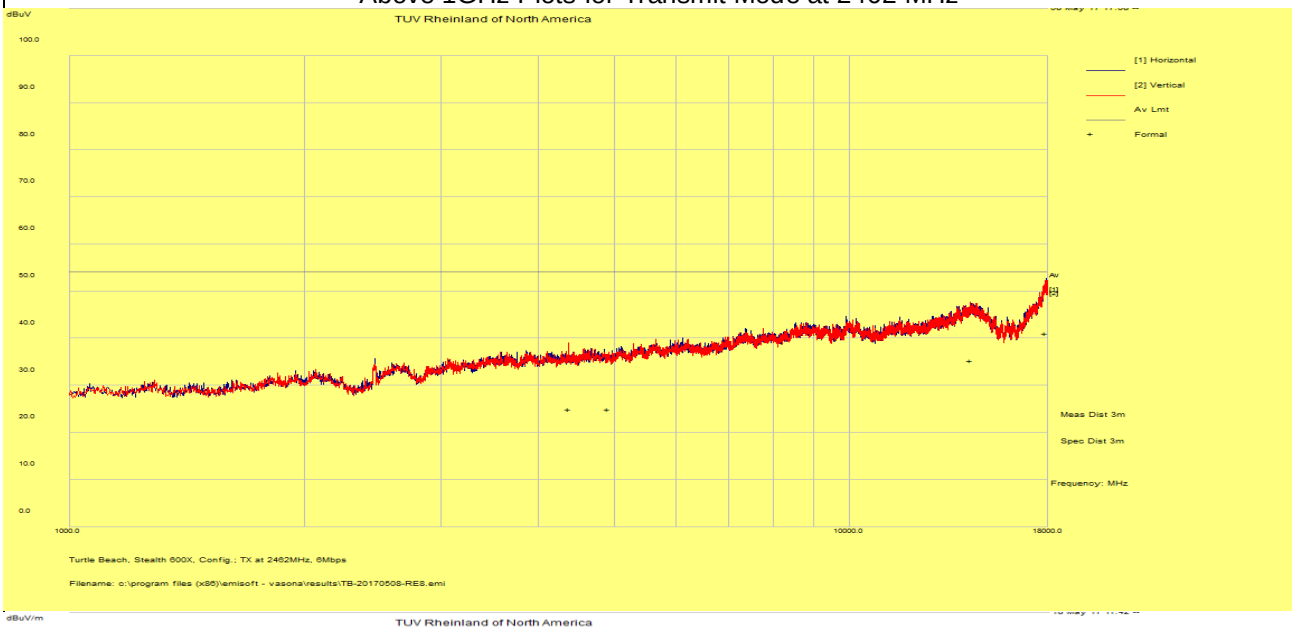


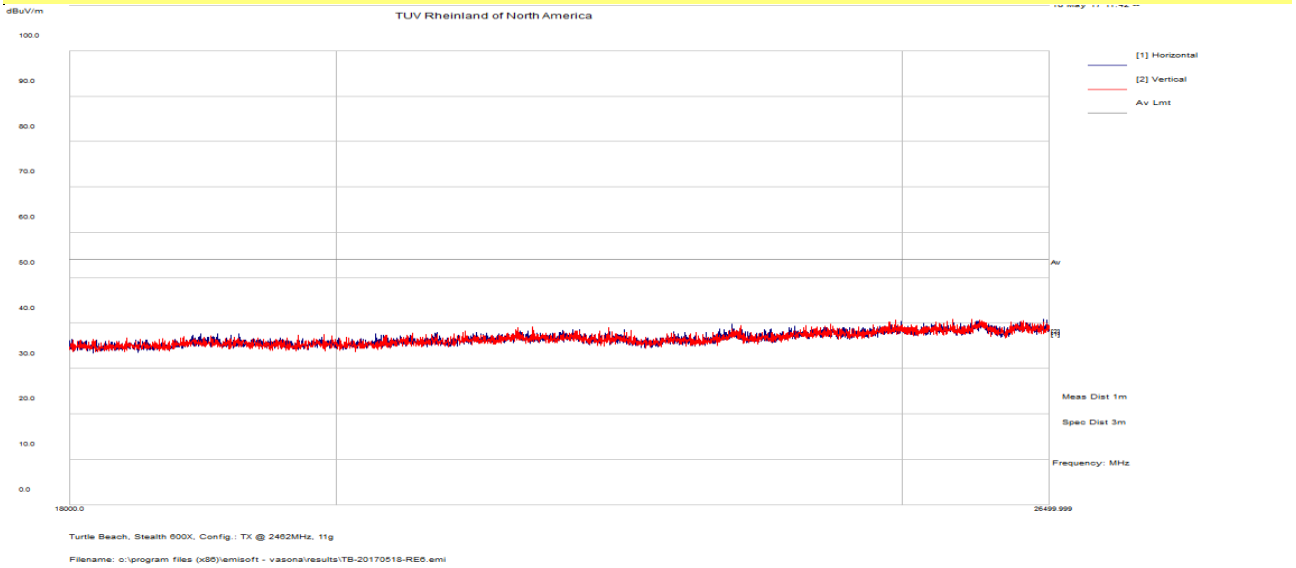


Notes: No significant emission observed above 18 GHz.

SOP 1 Radiated Emissions		Tracking # 31761682.001 Page 10 of 14	
EUT Name	Wireless Audio Headset	**Date**	May 8, 2017
EUT Model	Ear Force Stealth 600X	**Temp / Hum in**	21° C / 34%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11g 6Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m / DRH-118, 1m / RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1GHz Plots for Transmit Mode at 2462 MHz





Notes: No significant emission observed above 18 GHz.

SOP 1 Radiated Emissions		Tracking # 31761682.001 Page 11 of 14	
EUT Name	Wireless Audio Headset	**Date**	May 8, 2017
EUT Model	Ear Force Stealth 600X	**Temp / Hum in**	21° C / 34%rh
EUT Serial	PP#2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11n HT20 6.5Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C, RSS-247, RSS-GEN	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m – EMCO3115 / 1m – AHA-840	**Performed by**	Jeremy Luong

1 – 26 GHz Transmit at 2412 MHz (Low Channel)

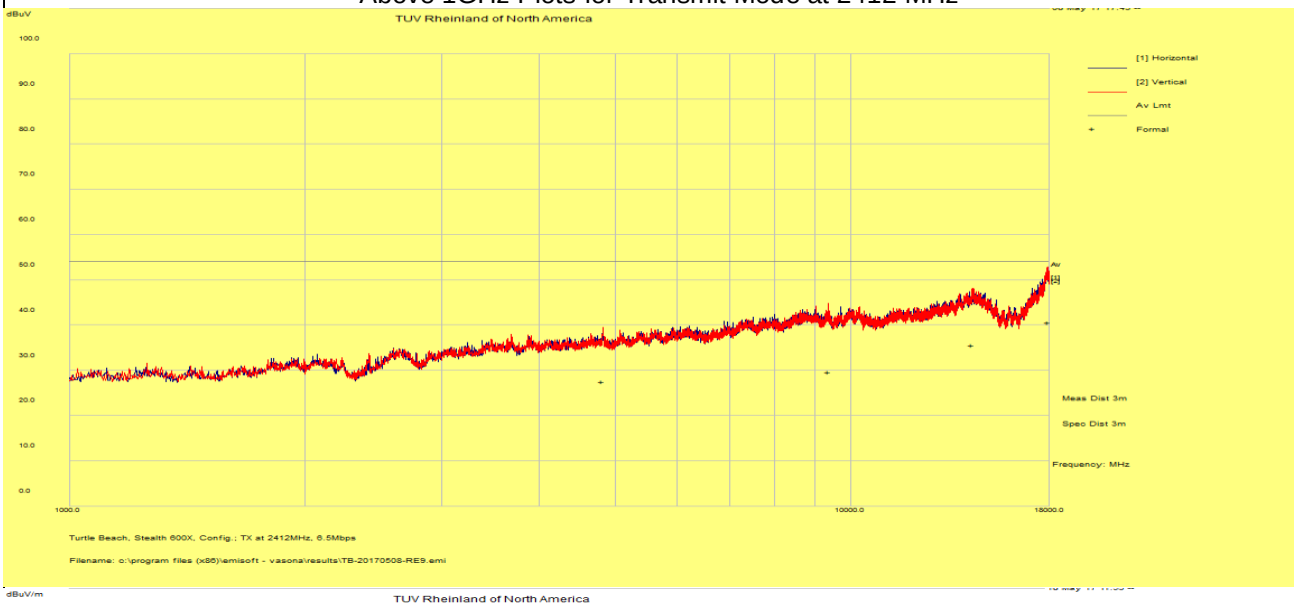
Frequency	Raw	Cable Loss	AF	Level	Detector	Polarity	Height	Azimuth	Limit	Margin
MHz	dBuV/m	dB	dB	dBuV/m		H/V	cm	deg	dBuV/m	dB
4820.22	45.97	1.75	-20.12	27.60	Ave	V	115	78	54.00	-26.40
9391.84	40.43	2.53	-13.24	29.72	Ave	V	145	330	54.00	-24.29
14335.53	40.60	3.20	-8.28	35.52	Ave	V	108	300	54.00	-18.48
17916.09	40.11	3.72	-3.28	40.55	Ave	V	168	134	54.00	-13.45
1 – 26 GHz Transmit at 2437 MHz (Middle Channel)										
14062.15	40.61	3.19	-8.67	35.14	Ave	H	218	298	54.00	-18.87
17876.54	40.79	3.71	-3.50	41.00	Ave	H	215	276	54.00	-13.00
4873.86	44.27	1.77	-20.13	25.91	Ave	V	203	284	54.00	-28.09
7302.80	43.53	2.22	-15.72	30.03	Ave	V	212	308	54.00	-23.97
1 – 26 GHz Transmit at 2462 MHz (High Channel)										
14316.98	40.21	3.20	-8.26	35.15	Ave	H	152	258	54.00	-18.85
3896.22	43.64	1.55	-20.39	24.81	Ave	V	200	76	54.00	-29.20
4922.91	43.00	1.76	-20.17	24.59	Ave	V	135	258	54.00	-29.41
5089.07	43.82	1.81	-19.80	25.83	Ave	V	232	242	54.00	-28.18
17893.31	40.46	3.72	-3.41	40.77	Ave	V	142	336	54.00	-13.23

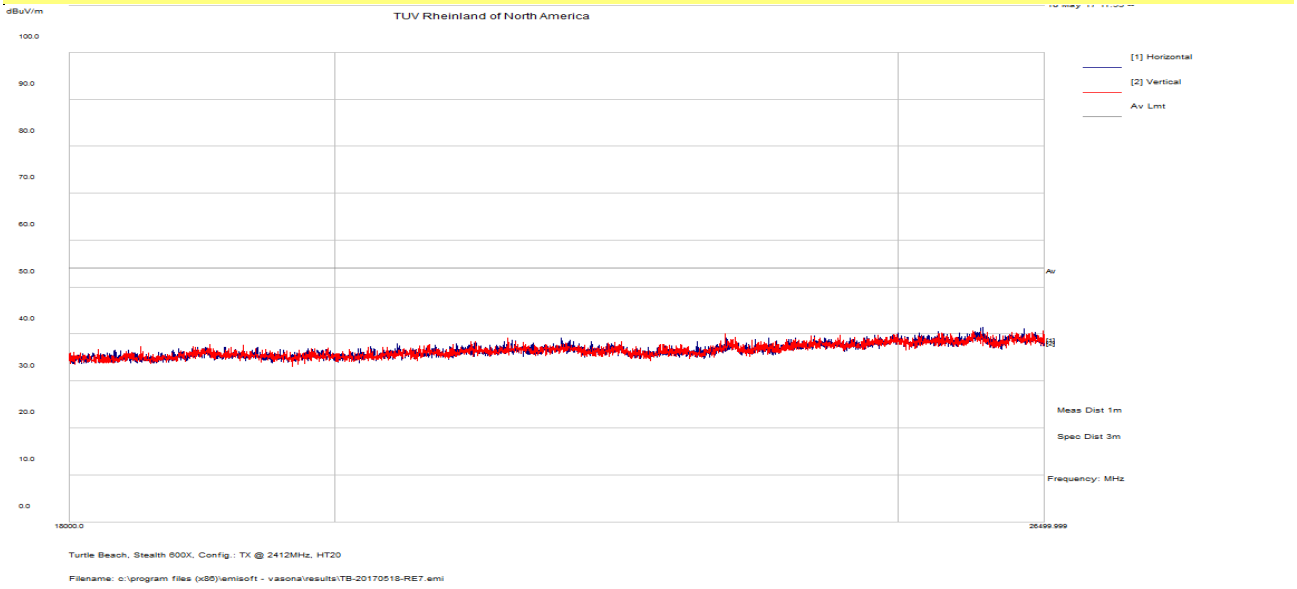
Spec Margin = E-Field AVG - Limit, E-Field AVG = FIM AVG+ Total CF ± Uncertainty
Total CF= AF+ Cable Loss AF= Antenna factor + Preamp

Note: Worst case was observed at 6.5Mbps for 802.11n HT20 mode.
Headset intended to transmit less than 8dBm.

SOP 1 Radiated Emissions		Tracking # 31761682.001 Page 12 of 14	
EUT Name	Wireless Audio Headset	**Date**	May 8, 2017
EUT Model	Ear Force Stealth 600X	**Temp / Hum in**	21° C / 34%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11n HT20 6.5Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m / DRH-118, 1m / RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1GHz Plots for Transmit Mode at 2412 MHz

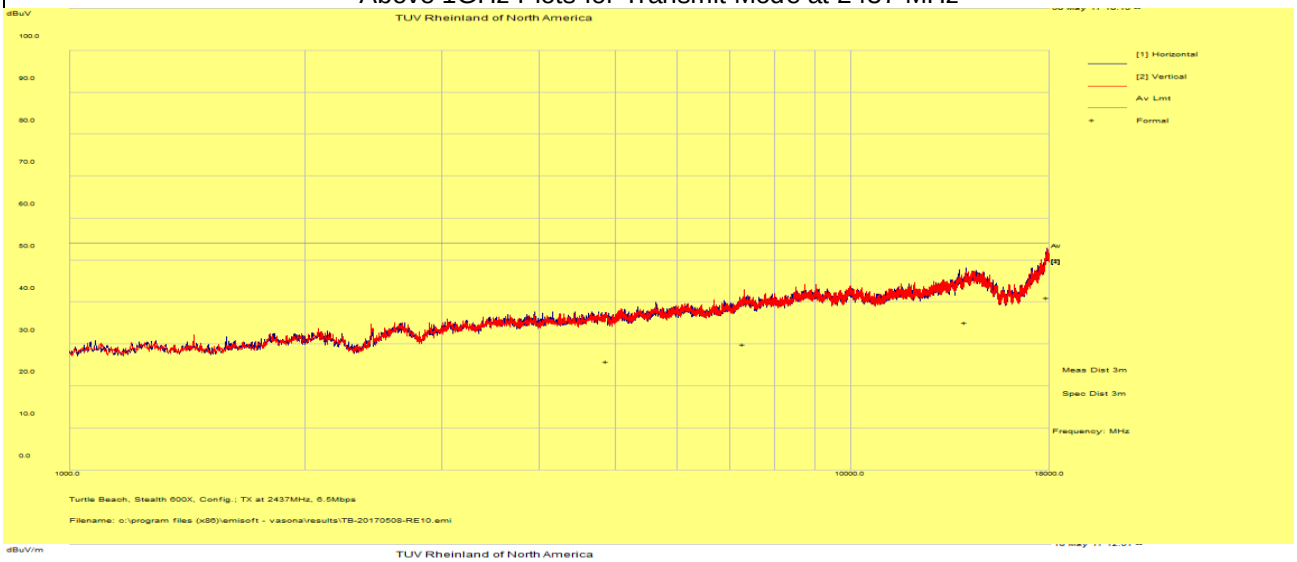


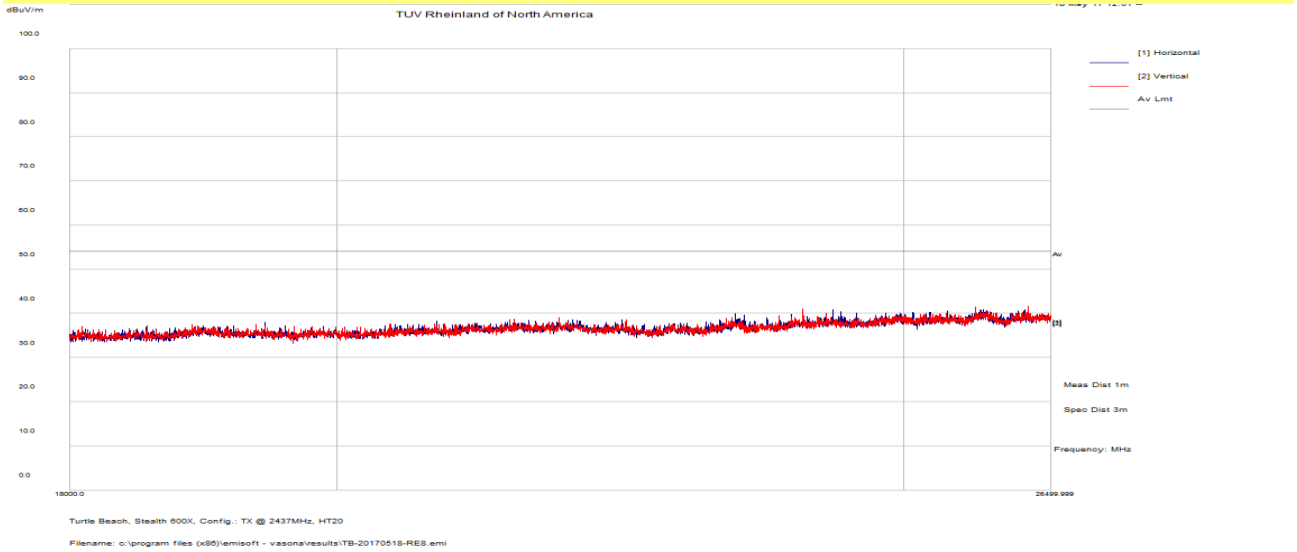


Notes: No significant emission observed above 18 GHz.

SOP 1 Radiated Emissions		Tracking # 31761682.001 Page 13 of 14	
EUT Name	Wireless Audio Headset	**Date**	May 8, 2017
EUT Model	Ear Force Stealth 600X	**Temp / Hum in**	21° C / 34%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11n HT20 6.5Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m / DRH-118, 1m / RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1GHz Plots for Transmit Mode at 2437 MHz

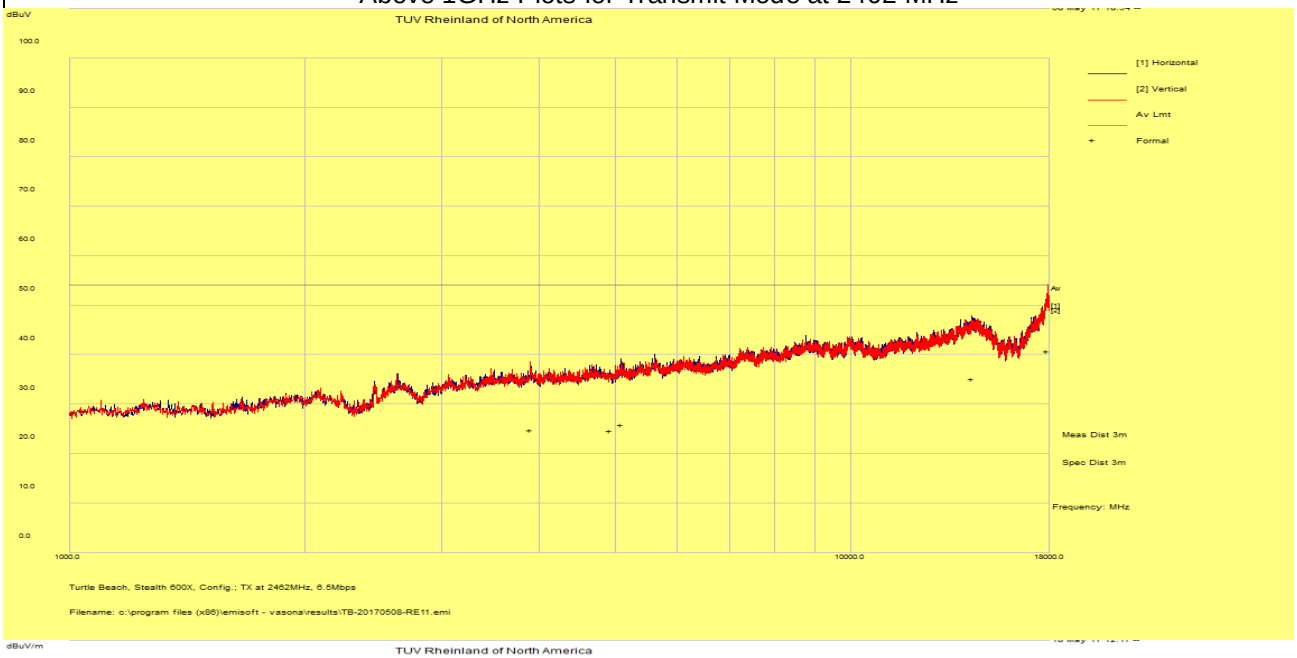


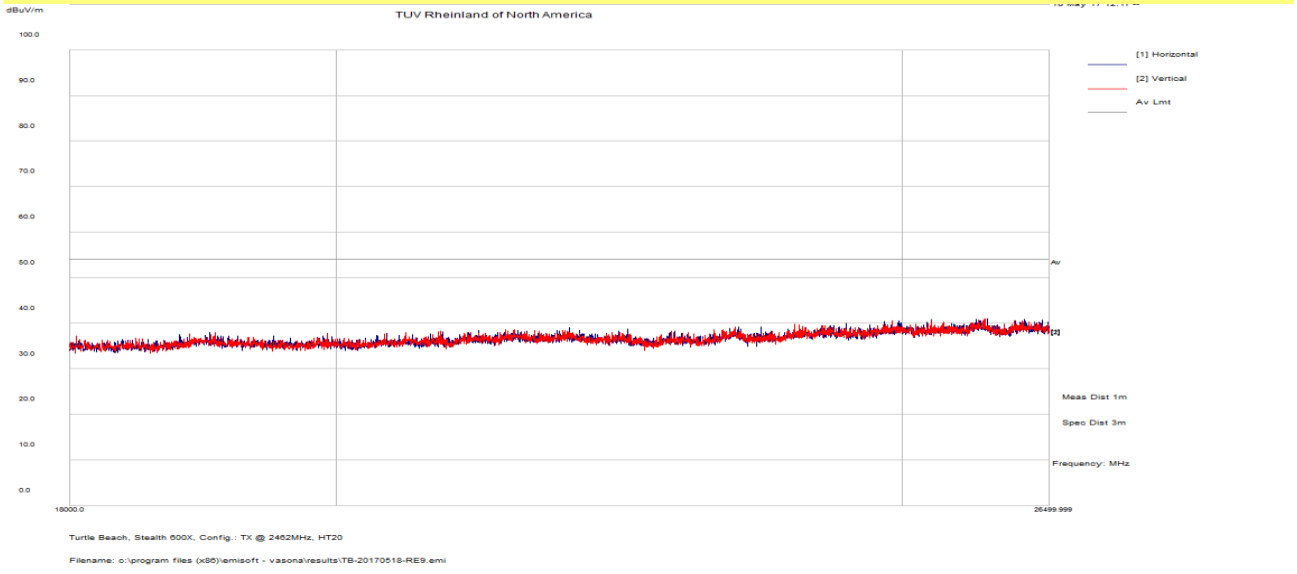


Notes: No significant emission observed above 18 GHz.

SOP 1 Radiated Emissions		Tracking # 31761682.001 Page 14 of 14	
EUT Name	Wireless Audio Headset	**Date**	May 8, 2017
EUT Model	Ear Force Stealth 600X	**Temp / Hum in**	21° C / 34%rh
EUT Serial	PP #2	**Temp / Hum out**	N/A
EUT Config.	Headset upright in 802.11n HT20 6.5Mbps	**Line AC / Freq**	3.7Vdc
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	1 MHz/ 3 MHz
Dist/Ant Used	3m / DRH-118, 1m / RA42-K-F-4B-C	**Performed by**	Jeremy Luong

Above 1GHz Plots for Transmit Mode at 2462 MHz





Notes: No significant emission observed above 18 GHz.

4.5.4 Sample Calculation

The field strength is calculated by subtracting the Amplifier Gain and adding the Cable Loss and Antenna Correction Factor to the measured reading. The basic equation is as follows:

Field Strength (dBμV/m) = FIM - AMP + CBL + ACF

Where: FIM = Field Intensity Meter (dBμV)

AMP = Amplifier Gain (dB)

CBL = Cable Loss (dB)

ACF = Antenna Correction Factor (dB/m)

$$\mu V/m = 10^{\frac{dB\mu V/m}{20}}$$

4.6 AC Conducted Emissions

Testing was performed in accordance with ANSI C63.10: 2013. These test methods are listed under the laboratory's A2LA Scope of Accreditation.

This test measures the levels emanating from the EUT's AC input port, thus evaluating the potential for the EUT to cause radio frequency interference to other electronic devices.

The AC conducted emissions of equipment under test shall not exceed the values in CFR47 Part 15.207 and RSS-GEN. Sect. 8.8.

4.6.1 Test Methodology

A test program that controls instrumentation and data logging was used to automate the AC Power Line Conducted emission test procedure. The frequency range of interest was divided into sub-ranges such as to yield a frequency resolution of 9 kHz. Each phase and neutral of the AC power line were measured with respect to ground. Measurements were performed using a set of 50µH / 50Ω LISNs.

Testing is performed in Lab 5. The setup photographs clearly identify which site was used. The vertical ground plane used in the semi-anechoic chamber is a 2m x 2m solid aluminum frame and panel, and it is bonded to the horizontal ground plane.

In the case of tabletop equipment, the EUT is placed on a 1.0m x 1.5m non-conductive table 80cm above the ground plane and 40cm from a vertical ground reference plane. The rear of the EUT was positioned flush with the backside of the table and directly over the LISNs. The power and I/O cables were routed over the edge of the table and bundled approximately 40cm from the ground plane. Support equipment was powered from a separate LISN.

Preliminary test were performed: 802.11b, g, 802.11n HT20.

4.6.1.1 Deviations

There were no deviations from this test methodology.

4.6.2 Test Results

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Table 8: AC Conducted Emissions – Test Results

Test Conditions: Conducted Measurement at Normal Conditions only		
Antenna Type: Integrated	**Power Level:** See Test Plan	
AC Power: 110 Vac/60 Hz at host device	**Configuration:** Tabletop	
Ambient Temperature: 23° C	**Relative Humidity:** 34% RH	
Configuration	**Frequency Range**	**Test Result**
Line 1 (Hot)	0.15 to 30 MHz	Pass
Line 2 (Neutral)	0.15 to 30 MHz	Pass

SOP 2 Conducted Emissions

Tracking # 31761682.001 Page 1 of 4

EUT Name	Wireless Audio Headset	**Date**	May 12, 2017
EUT Model	Ear Force Stealth 600X	**Temp / Hum in**	22° C / 36% rh
EUT Serial	PP#2	**Temp / Hum out**	N/A
EUT Config.	TX mode at 802.11b 1Mbps, 2437 MHz	**Line AC / Freq**	110Vac / 60Hz (host)
Standard	CFR47 Part 15.207 and RSS Gen	**RBW / VBW**	9 kHz / 30 kHz
Lab/LISN	Lab #5 /Com-Power, Line 1	**Performed by**	Jeremy Luong

Frequency	Raw	Limiter	Ins. Loss	Level	Detector	Line	Limit	Margin	Result
MHz	dBuV	dB	dB	dBuV			dBuV	dB	
0.176	33.67	9.83	0.05	43.54	QP	Live	64.66	-21.12	Pass
0.176	19.42	9.83	0.05	29.29	Ave	Live	54.66	-25.37	Pass
0.221	33.26	9.83	0.04	43.13	QP	Live	62.78	-19.65	Pass
0.221	20.04	9.83	0.04	29.91	Ave	Live	52.78	-22.87	Pass
0.272	37.49	9.83	0.04	47.36	QP	Live	61.07	-13.71	Pass
0.272	34.20	9.83	0.04	44.07	Ave	Live	51.07	-7.00	Pass
0.406	25.20	9.84	0.03	35.07	QP	Live	57.73	-22.66	Pass
0.406	16.61	9.84	0.03	26.48	Ave	Live	47.73	-21.25	Pass
0.561	28.23	9.85	0.03	38.10	QP	Live	56.00	-17.90	Pass
0.561	33.37	9.85	0.03	43.24	Ave	Live	46.00	-2.76	Pass
0.722	21.13	9.86	0.03	31.02	QP	Live	56.00	-24.98	Pass
0.722	13.43	9.86	0.03	23.32	Ave	Live	46.00	-22.68	Pass
25.878	27.05	10.09	-0.06	37.08	QP	Live	60.00	-22.92	Pass
25.878	24.51	10.09	-0.06	34.54	Ave	Live	50.00	-15.46	Pass

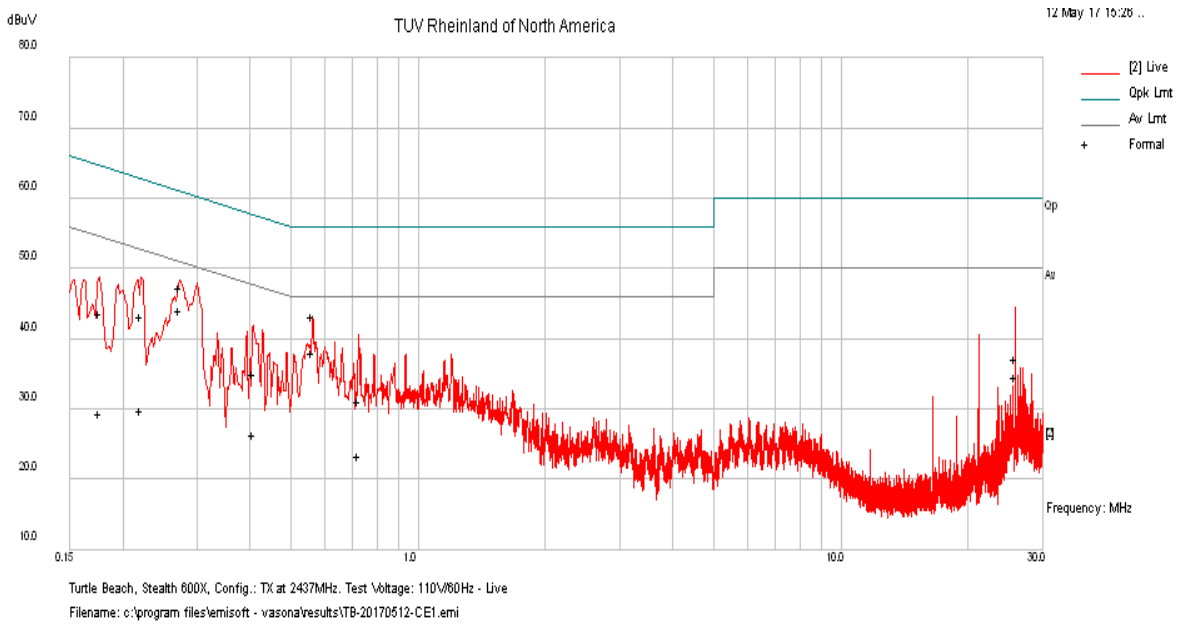
Spec Margin = QP./Ave. - Limit, ± Uncertainty

Combined Standard Uncertainty $u_c(y)$ = ± 1.2 dB Expanded Uncertainty $U = ku_c(y)$ k = 2 for 95% confidence

Notes: EUT was setup as table top equipment and transmitted at 2437 MHz in 802.11b at 1Mbps (worse case).

SOP 2 Conducted Emissions		Tracking # 31761682.001 Page 2 of 4	
EUT Name	Wireless Audio Headset	**Date**	May 12, 2017
EUT Model	Ear Force Stealth 600X	**Temp / Hum in**	22° C / 36% rh
EUT Serial	PP#2	**Temp / Hum out**	N/A
EUT Config.	TX mode at 802.11b 1Mbps, 2437 MHz	**Line AC**	110Vac / 60Hz (host)
Standard	CFR47 Part 15.207 and RSS Gen	**RBW / VBW**	9 kHz / 30 kHz
Lab/LISN	Lab #5 /Com-Power, Line 1	**Performed by**	Jeremy Luong

150 kHz to 30 MHz Plot for Line 1 (Live)



Note: Met FCC Class B limit.

SOP 2 Conducted Emissions

Tracking # 31761682.001 Page 3 of 4

EUT Name	Wireless Audio Headset	**Date**	May 12, 2017
EUT Model	Ear Force Stealth 600X	**Temp / Hum in**	22° C / 36% rh
EUT Serial	PP#2	**Temp / Hum out**	N/A
EUT Config.	TX mode at 802.11b 1Mbps, 2437 MHz	**Line AC / Freq**	110Vac / 60Hz (host)
Standard	CFR47 Part 15.207 and RSS Gen	**RBW / VBW**	9 kHz / 30 kHz
Lab/LISN	Lab #5 /Com-Power, Line 2	**Performed by**	Jeremy Luong

Frequency	Raw	Limiter	Ins. Loss	Level	Detector	Line	Limit	Margin	Result
MHz	dBuV	dB	dB	dBuV			dBuV	dB	
0.150	40.67	9.82	0.06	50.55	QP	Neutral	66.00	-15.45	Pass
0.150	24.69	9.82	0.06	34.57	Ave	Neutral	56.00	-21.43	Pass
0.176	36.13	9.83	0.05	46.00	QP	Neutral	64.66	-18.66	Pass
0.176	17.26	9.83	0.05	27.13	Ave	Neutral	54.66	-27.53	Pass
0.195	35.08	9.82	0.04	44.95	QP	Neutral	63.83	-18.88	Pass
0.195	19.18	9.82	0.04	29.05	Ave	Neutral	53.83	-24.78	Pass
0.225	38.86	9.83	0.04	48.73	QP	Neutral	62.64	-13.91	Pass
0.225	15.68	9.83	0.04	25.55	Ave	Neutral	52.64	-27.09	Pass
0.270	37.34	9.83	0.04	47.21	QP	Neutral	61.13	-13.92	Pass
0.270	33.92	9.83	0.04	43.79	Ave	Neutral	51.13	-7.34	Pass
0.298	31.10	9.83	0.03	40.96	QP	Neutral	60.31	-19.35	Pass
0.298	26.96	9.83	0.03	36.82	Ave	Neutral	50.31	-13.49	Pass
0.546	27.09	9.84	0.03	36.96	QP	Neutral	56.00	-19.04	Pass
0.546	20.74	9.84	0.03	30.61	Ave	Neutral	46.00	-15.39	Pass

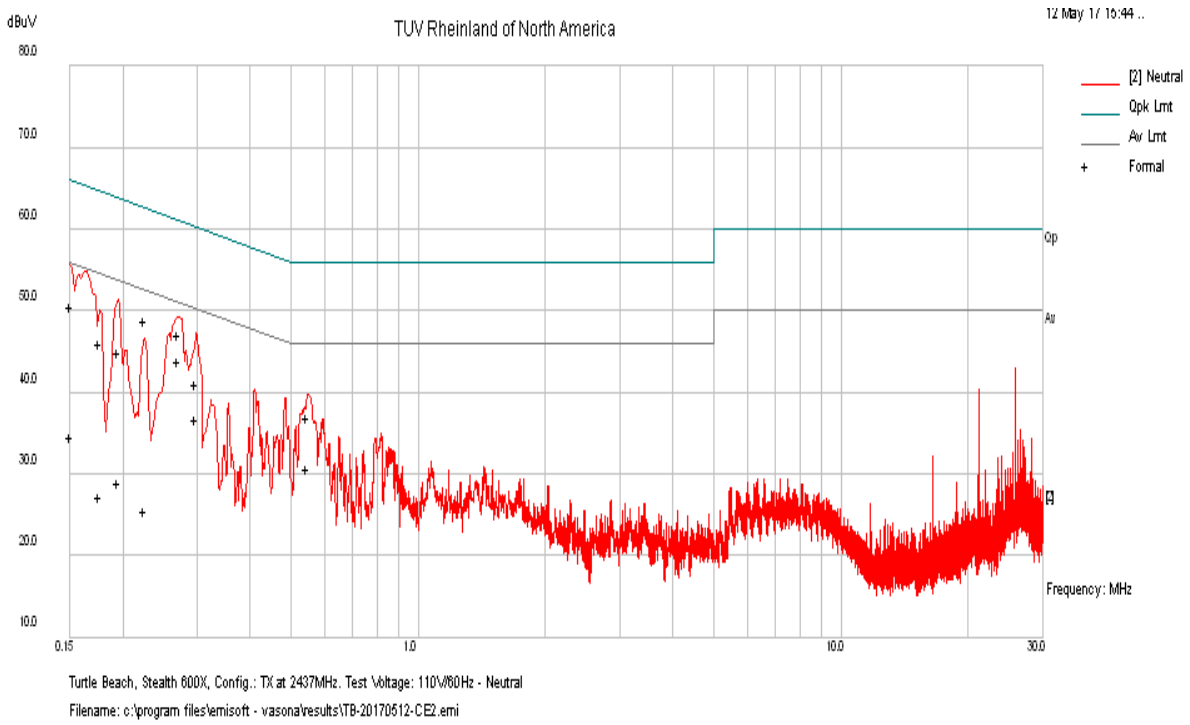
Spec Margin = QP./Ave. - Limit, ± Uncertainty

Combined Standard Uncertainty $u_c(y)$ = ± 1.2 dB Expanded Uncertainty $U = ku_c(y)$ k = 2 for 95% confidence

Notes: EUT was setup as table top equipment and transmitted at 2442 MHz in BLE at 1Mbps (worse case).

SOP 2 Conducted Emissions		Tracking # 31761682.001 Page 4 of 4	
EUT Name	Wireless Audio Headset	**Date**	May 12, 2017
EUT Model	Ear Force Stealth 600X	**Temp / Hum in**	22° C / 36% rh
EUT Serial	PP#2	**Temp / Hum out**	N/A
EUT Config.	TX mode at 802.11b 1Mbps, 2437 MHz	**Line AC**	110Vac / 60Hz (host)
Standard	CFR47 Part 15.207 and RSS Gen	**RBW / VBW**	9 kHz / 30 kHz
Lab/LISN	Lab #5 /Com-Power, Line 2	**Performed by**	Jeremy Luong

150 kHz to 30 MHz Plot for Line 2 (Neutral)



Note: Met FCC Class B Limit.

4.7 Maximum Permissible Exposure

4.7.1 Test Methodology

In this section, we try to prove the safety of radiation harmfulness to the human body for our product. The KDB 447498 D01 General RF Exposure Guidance is followed. The Gain of the antenna used in this calculation is declared by the manufacturer, and the maximum average power input to the antenna is measured. Using the general SAR test exclusion guidance in Section 4.3 of KDB 447498, we show the device meeting the SAR exclusion threshold.

4.7.2 FCC KDB 447498 D01 – General SAR Test Exclusion Guidance

The SAR exclusion threshold conditions are listed:

1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] ·[√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR,16 where

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation17
- The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

2) At 100 MHz to 6 GHz and for test separation distances > 50 mm, the SAR test exclusion threshold is determined according to the following, and as illustrated in Appendix B:18
a) [Threshold at 50 mm in step 1) + (test separation distance - 50 mm)·(f(MHz)/150)] mW, at 100 MHz to 1500 MHz
b) [Threshold at 50 mm in step 1) + (test separation distance - 50 mm)·10] mW at > 1500 MHz and ≤ 6 GHz

3) At frequencies below 100 MHz, the following may be considered for SAR test exclusion, and as illustrated in Appendix C:19
a) The threshold at the corresponding test separation distance at 100 MHz in step 2) is multiplied by [1 + log(100/f(MHz))] for test separation distances > 50 mm and < 200 mm
b) The threshold determined by the equation in a) for 50 mm and 100 MHz is multiplied by ½ for test separation distances ≤ 50 mm
c) SAR measurement procedures are not established below 100 MHz. When SAR test exclusion cannot be applied, a KDB inquiry is required to determine SAR evaluation requirements for any test results to be acceptable.

4.7.3 EUT Operating Condition

The software provided by Manufacturer enabled the EUT to transmit data at lowest, middle and highest channel individually.

4.7.4 Classification

The antenna of the product, under normal use condition, is less than 2cm away from the body of the user. This device is classified as a **Portable Device**. It is intended to be used with head wear device; extremity SAR limit is applied.

4.7.5 SAR Test Exclusion Threshold

4.7.5.1 Antenna Gain

The 2.437 GHz transmitting with antenna gain is +1.8 dBi or 1.51 (numeric).

4.7.5.2 SAR Exclusion Threshold Calculation

Mode	Max. Power (dBm)	EIRP (dBm)	Min. Separation Distance (mm)	Cal. Excl. Threshold	1-g SAR Limit	10-g extremity SAR Limit	Result
Modulated	8.00	9.80	5	2.98	≤3.0	≤7.5	Exempted *

Note:
1. Since EUT can operate at distance less than 50 mm, the minimum distance, 5 mm, was used for calculation per condition #1 of SAR Exclusion Threshold.
2. The maximum output power was taken from Table 2.
3. (*) The calculated threshold is less than 3.0; therefore, EUT is SAR exempted for head and body usage.
4. Calculation only applies when EUT operates at 2.4GHz.

5 Test Equipment List

5.1 Equipment List

Equipment	Manufacturer	Model #	Serial/Inst #	Last Cal mm/dd/yyyy	Next Cal mm/dd/yyyy
Bilog Antenna	Sunol Sciences	JB3	A102606	06/15/2016	06/15/2018
Horn Antenna	Sunol Science	DRH118	A040806	11/11/2016	11/11/2018
Antenna w/ Amplifier	Rohde & Schwarz	TS-PR26	100011	07/11/2016	07/11/2017
Loop Antenna	EMCO	6502	9110-2683	06/13/2016	06/13/2017
Spectrum Analyzer	Rohde & Schwarz	FSL6	100169	01/13/2017	01/13/2018
Spectrum Analyzer	Agilent	N9038A	MY552260210	01/16/2017	01/16/2018
Spectrum Analyzer	Rohde Schwarz	ESIB40	832427/002	01/16/2017	01/16/2018
Spectrum Analyzer	Rohde Schwarz	FSV40	1321.3008K40	08/30/2016	08/30/2017
Amplifier	Sonoma Instruments	310	165516	01/19/2017	01/19/2018
Amplifier	Miteq	TTA1800-30-HG	2020728	11/12/2016	11/12/2017
Amplifier	Rohde & Schwarz	TS-PR26	100011	11/04/2017	11/04/2018
Amplifier	Rohde & Schwarz	TS-PR40	100012	08/02/2017	08/02/2017
Power Meter	Agilent	E4418B	MY45103902	01/11/2017	01/11/2018
Power Sensor	Hewlett Packard	8482A	1925A04647	01/01/2017	01/01/2018
Thermometer	Fluke	52II	88650033	11/04/2016	11/04/2017
Thermo Chamber	Espec	BTZ-133	0613436	06/01/2017	06/01/2018
Multimeter	Fluke	177	92780312	01/11/2017	01/11/2018
DC Power Supply	Agilent	E3634A	MY400004331	01/12/2017	01/12/2018
Notch Filter	Micro-Tronics	BRM50702	037	01/19/2017	01/19/2018
Signal Generator	Anritsu	MG3694A	42803	01/13/2017	01/13/2018
Signal Generator	Rohde & Schwarz	SMF100A	1167.0000K02	09/06/2016	09/06/2017
Signal Generator	Rohde & Schwarz	SMBV100A	1407.6004K02	09/06/2016	09/06/2017
Power Sensors	Rohde & Schwarz	OSP120	1520.9010.02	09/06/2016	09/06/2017

* Calibration of equipment past due for re-calibration will be performed expeditiously. If any equipment is found to be out of tolerance at that time, affected customers will be notified accordingly.

NCR = No Calibration Required

6 EMC Test Plan

6.1 Introduction

This section provides a description of the Equipment Under Test (EUT), configurations, operating conditions, and performance acceptance criteria. It is an overview of information provided by the manufacturer so that the test laboratory may perform the requested testing.

6.2 Customer

Table 9: Customer Information

Company Name	Voyetra Turtle Beach, Inc.
Address	100 Summit Lake Drive, Suite 100
City, State, Zip	Valhalla, New York 10595 USA
Country	USA
Phone	(530) 277-3482

Table 10: Technical Contact Information

Name	Tim Blaney
E-mail	tim@commcepts.net
Phone	(530) 277-3482

6.3 Equipment Under Test (EUT)

Table 11: EUT Specifications

EUT Specifications	
Dimensions	225mm (8.9”) x 252mm (9.9”) x 115mm (4.5”)
DC Input	Headset Input Voltage: 3.7 Vdc (battery)
Environment	Indoor
Operating Temperature Range:	0 to 50 degrees C
Multiple Feeds:	☐ Yes and how many ☒ No
Product Marketing Name (PMN)	Ear Force Stealth 600X
Hardware Version Identification Number (HVIN)	Stealth 600X
Firmware Version Identification Number (FVIN)	1.0.2
802.11-radio modules	
Operating Mode	802.11b, g, 802.11n HT20
Transmitter Frequency Band	2.4 GHz – 2.4835 GHz
Max. Rated Power Output	8.00 dBm
Power Setting @ Operating Channel	See Channel Planning Table.
Antenna Type	PCB Chip
Antenna Gain	+1.8 dBi at 2.4GHz
Modulation Type	☐ Thread (Zigbee) ☐ BLE ☒ DSSS ☒ OFDM ☒ Other describe: 16QAM
Data Rate	802.11b: 1, 2, 5.5, and 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n HT20: 6.5, 13, 19.5, 26, 39, 52, 58.5, 65 Mbps
TX/RX Chain (s)	1
Directional Gain Type	☐ Correlated ☐ Beam-Forming ☒ Other describe: No beam-forming or correlated.
Type of Equipment	☐ Table Top ☐ Wall-mount ☐ Floor standing cabinet ☒ Other: Head wear device.
Note: The radio can only operate in one band and on one channel at a time.	

Table 12: Antenna Information

Number	Antenna Type	Description	Max Gain (dBi)
Antenna 1	Chip	Max. peak gain at 2.4 GHz	+1.8

Table 13: EUT Channel Power Specifications

No.	Frequency (MHz)	Target Power Level in ART2					
		802.11b	802.11g	802.11n HT20			
1	2412	4.5	4.0	4.0			
2	2417						
3	2422						
4	2427						
5	2432						
6	2437	4.5	4.0	4.0			
7	2442						
8	2447						
9	2452						
10	2457						
11	2462	4.5	4.0	4.0			

Note: 1. The adjusted power target values are updated at the evaluated frequencies.
2. TX Pwr level in the ART2 was set according to this table to obtain the maximum output power of 8dBm.
3. The power levels above are set and recorded from S/N PP#1 (Jetta 22).

Table 14: Interface Specifications

Interface Type	Cabled with what type of cable?	Is the cable shielded?	Maximum potential length of the cable?	Metallic (M), Coax (C), Fiber (F), or Not Applicable?
USB	Laptop	☒ Yes	☒ Metric:3m	☒ M

Table 15: Supported Equipment

Equipment	Manufacturer	Model	Serial	Used for
Laptop	Dell	Latitude	35521341769	Setup EUT operating channel
Note: None.				

Table 16: Description of Sample used for Testing

Device	Serial	RF Connection	CFR47 Part 15.247
Ear Force Stealth 600X	PP#2	Radiated Sample	TX Emissions, AC Conducted Emission
	PP#1	Conducted Sample	Peak Transmit Power, Peak Power Spectral Density, Occupied Bandwidth Band-Edge Out-of-Band Emission
Note: N/A			

Table 17: Description of Test Configuration used for Radiated Measurement.

Device	Antenna	Mode	Setup Photo (X-Axis)	Setup Photo (Y-Axis)	Setup Photo (Z-Axis)
Ear Force Stealth 600X	Chip (FR05-S1-NO-1-004)	Transmit	EUT laid flat	Normal usage. Up right.	On the side
Note: The Y-Axis setup configuration used for final testing.					

6.4 Test Specifications

Table 18: Test Specifications

Emissions and Immunity	
Standard	**Requirement**
CFR 47 Part 15.247: 2017	All
RSS 247 Issue 2, 2017	All

END OF REPORT