



# PCTEST ENGINEERING LABORATORY, INC.

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## MEASUREMENT REPORT FCC PART 15.247 WLAN 802.11a/b/g/n/ac

**Applicant Name:**  
Samsung Electronics, Co. Ltd.  
129, Samsung-ro, Maetan dong,  
Yeongtong-gu, Suwon-si  
Gyeonggi-do 443-742, Korea

**Date of Testing:**  
12/30/2013 - 1/9/2014  
**Test Site/Location:**  
PCTEST Lab, Columbia, MD, USA  
**Test Report Serial No.:**  
0Y1311252234.A3L

**FCC ID:** A3LSMP905V  
**APPLICANT:** Samsung Electronics, Co. Ltd.

**Application Type:** Certification  
**Model(s):** SM-P905V  
**EUT Type:** Portable Tablet  
**FCC Classification:** Digital Transmission System (DTS)  
**FCC Rule Part(s):** Part 15.247  
**Test Procedure(s):** KDB 558074 v03r01, KDB 662911 v02r01

Mode	Tx Frequency (MHz)	ANT1				ANT2				MIMO			
		Avg Conducted		Peak Conducted		Avg Conducted		Peak Conducted		Avg Conducted		Peak Conducted	
		Max. Power (mW)	Max. Power (dBm)	Max. Power (mW)	Max. Power (dBm)	Max. Power (mW)	Max. Power (dBm)	Max. Power (mW)	Max. Power (dBm)	Max. Power (mW)	Max. Power (dBm)	Max. Power (mW)	Max. Power (dBm)
802.11b	2412 - 2462	16.069	12.06	33.574	15.26	15.596	11.93	33.574	15.26	-	-	-	-
802.11g	2412 - 2462	14.060	11.48	83.753	19.23	11.995	10.79	70.632	18.49	-	-	-	-
802.11n	2412 - 2462	10.399	10.17	61.802	17.91	9.397	9.73	54.702	17.38	11.220	10.50	64.269	18.08
802.11a	5745 - 5825	7.907	8.98	42.658	16.30	7.816	8.93	47.973	16.81	-	-	-	-
802.11n (20MHz)	5745 - 5825	7.709	8.87	37.931	15.79	7.621	8.82	43.853	16.42	7.943	9.00	52.602	17.21
802.11n (40MHz)	5755 - 5795	7.943	9.00	41.210	16.15	7.907	8.98	49.204	16.92	7.943	9.00	43.251	16.36
802.11ac (80MHz)	5775	7.709	8.87	33.189	15.21	7.447	8.72	35.237	15.47	7.907	8.98	37.325	15.72

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in KDB 558074 v03r01 and KDB 662911 v02r01. Test results reported herein relate only to the item(s) tested.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.



Randy Ortanez  
President

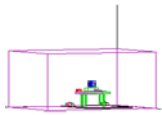


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<b>Test Report S/N:</b> 0Y1311252234.A3L	<b>Test Dates:</b> 12/30/2013 - 1/9/2014	<b>EUT Type:</b> Portable Tablet	Page 1 of 116	

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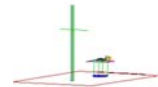
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# MEASUREMENT REPORT

## FCC Part 15.247



### § 2.1033 General Information

**APPLICANT:** Samsung Electronics, Co. Ltd.

**APPLICANT ADDRESS:** 129, Samsung-ro, Maetan dong,  
Yeongtong-gu, Suwon-si, Gyeonggi-do 443-742, Korea

**TEST SITE:** PCTEST ENGINEERING LABORATORY, INC.

**TEST SITE ADDRESS:** 7185 Oakland Mills Road, Columbia, MD 21046 USA

**FCC RULE PART(S):** Part 15.247

**IC SPECIFICATION(S):** RSS-210 Issue 8

**MODEL NAME:** SM-P905V

**FCC ID:** A3LSMP905V

**Test Device Serial No.:** 23DEC-1, 23DEC-2, 23DEC-3  Production  Pre-Production  Engineering

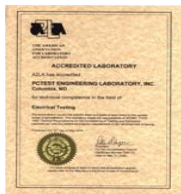
**FCC CLASSIFICATION:** Digital Transmission System (DTS)

**DATE(S) OF TEST:** 12/30/2013 - 1/9/2014



**TEST REPORT S/N:** 0Y1311252234.A3L

### Test Facility / Accreditations

Measurements were performed at PCTEST Engineering Lab located in Columbia, MD 21046, U.S.A.



- PCTEST facility is an FCC registered (PCTEST Reg. No. 159966) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules and Industry Canada (2451B-1).
- PCTEST Lab is accredited to ISO 17025 by U.S. National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP Lab code: 100431-0) in EMC, FCC and Telecommunications.
- PCTEST Lab is accredited to ISO 17025-2005 by the American Association for Laboratory Accreditation (A2LA) in Specific Absorption Rate (SAR) testing, Hearing Aid Compatibility (HAC) testing, CTIA Test Plans, and wireless testing for FCC and Industry Canada Rules.
- PCTEST Lab is a recognized U.S. Conformity Assessment Body (CAB) in EMC and R&TTE (n.b. 0982) under the U.S.-EU Mutual Recognition Agreement (MRA).
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC Guide 65 by the American National Standards Institute (ANSI) in all scopes of FCC Rules and Industry Canada Standards (RSS).
- PCTEST facility is an IC registered (2451B-1) test laboratory with the site description on file at Industry Canada.
- PCTEST is a CTIA Authorized Test Laboratory (CATL) for AMPS, CDMA, and EvDO wireless devices and for Over-the-Air (OTA) Antenna Performance testing for AMPS, CDMA, GSM, GPRS, EGPRS, UMTS (W-CDMA), CDMA 1xEVDO, and CDMA 1xRTT.

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# 1.0 INTRODUCTION

## 1.1 Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

## 1.2 PCTEST Test Location

The map below shows the location of the PCTEST LABORATORY, its proximity to the FCC Laboratory, the Columbia vicinity, the Baltimore-Washington Intern't'l (BWI) airport, the city of Baltimore and the Washington, DC area. (See Figure 1-1).

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The site coordinates are 39° 10'23" N latitude and 76° 49'50" W longitude. The facility is 0.4 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2009 on February 15, 2012.



Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

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## 2.0 PRODUCT INFORMATION

### 2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Tablet FCC ID: A3LSMP905V**. The test data contained in this report pertains only to the emissions due to the EUT's WLAN (DTS) transmitter.

### 2.2 Device Capabilities

This device contains the following capabilities:

850/1900 GSM/GPRS/EDGE, 850/1900 WCDMA/HSPA, Band 4, 13 LTE, 802.11a/b/g/n/ac WLAN (DTS/NII), Bluetooth (1x,EDR, LE), ANT+

**Note:** 5GHz WLAN (DTS/NII) operation is possible in 20MHz, 40MHz, and 80MHz channel bandwidths. The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz, and detector = peak per the guidance of Section 6.0 b) of KDB 558074 v03r01. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

- 802.11b – 99.93%
- 802.11a/g/n 20MHz Bandwidth – 99.38%
- 802.11n 40MHz Bandwidth – 98.83%
- 802.11ac 80MHz Bandwidth – 98.52%

The device employs MIMO technology. Below are the possible configurations.

WiFi Configurations		SISO		SDM	
		ANT1	ANT2	ANT1	ANT2
2.4GHz	11b	✓	✓	✗	✗
	11g	✓	✓	✗	✗
	11n	✓	✓	✓	✓
5GHz	11a	✓	✓	✗	✗
	11n (20MHz)	✓	✓	✓	✓
	11n (40MHz)	✓	✓	✓	✓
	11ac (80MHz)	✓	✓	✓	✓



**Table 2-1. Frequency/Channel Operations**

✓ = Support ; ✗ = NOT Support

**SISO** = Single Input Single Output

**SDM** = Spatial Diversity Multiplexing – MIMO function

CDD or Cyclic Delay Diversity MIMO function is also a capability of the EUT. However, since CDD only alters the system by transmitting a phase shifted (i.e. cyclical) copy of the original signal within the same allotted bandwidth and using the same Tx power, it was determined that CDD operation was the same, in regards to matters relating to the bandwidth and powers, as SDM MIMO mode, which is addressed in the report. Thus, no further measurements were performed for CDD MIMO operation.

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## 2.3 Test Configuration

The Samsung Portable Tablet FCC ID: A3LSMP905V was tested per the guidance of KDB 558074 v03r01 and KDB 662911 v02r01. ANSI C63.10-2009 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing. See Sections 3.2, 3.3, and 6.1 of this test report for a description of the AC line conducted emissions, radiated emissions, and antenna port conducted emissions test setups, respectively.



## 2.4 EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

## 2.5 Labeling Requirements

Per 15.19; Docket 95-19

The label shall be permanently affixed at a conspicuous location on the device; instruction manual or pamphlet supplied to the user and be readily visible to the purchaser at the time of purchase. However, when the device is so small wherein placement of the label with specified statement is not practical, only the trade name and FCC ID must be displayed on the device per Section 15.19(a)(5). Please see attachment for FCC ID label and label location.

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## 3.0 DESCRIPTION OF TEST

### 3.1 Evaluation Procedure

The measurement procedures described in the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2009), and the guidance provided in KDB 558074 v03r01 and KDB 662911 v02r01 were used in the measurement of the **Samsung Portable Tablet FCC ID: A3LSMP905V**.

Deviation from measurement procedure.....None



### 3.2 AC Line Conducted Emissions

The line-conducted facility is located inside a 10'x16'x9' shielded enclosure. The shielded enclosure is manufactured by ETS Lindgren RF Enclosures. The shielding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 65-5. A 1m x 1.5m wooden table 80cm high is placed 40cm away from the vertical wall and 80cm away from the sidewall of the shielded room. Two 10kHz-30MHz, 50Ω/50μH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room floor. Power to the LISNs is filtered by external high-current high-insertion loss power line filters. The external power line filter is an ETS Lindgren Model LPRX-4X30 (100dB Attenuation, 14kHz-18GHz) and the two EMI/RFI filters are ETS Lindgren Model LRW-2030-S1 (100dB Minimum Insertion Loss, 14kHz – 10GHz). These filters attenuate ambient signal noise from entering the measurement lines. These filters are also bonded to the shielded enclosure.

The EUT is powered from one LISN and the support equipment is powered from the second LISN. If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply line(s) will be connected to the second LISN. All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion) and draped over the back edge of the test table. All cables were at least 40cm above the horizontal reference groundplane. Power cables for support equipment were routed down to the second LISN while ensuring that that cables were not draped over the second LISN.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer and exploratory measurements were made to determine the frequencies producing the maximum emission from the EUT. The spectrum was scanned from 150kHz to 30MHz with a spectrum analyzer. The detector function was set to peak mode for exploratory measurements while the bandwidth of the analyzer was set to 10kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Each emission was also maximized by varying: power lines, the mode of operation or resolution, clock or data exchange speed, scrolling H pattern to the EUT and/or support equipment whichever determined the worst-case emission. Once the worst case emissions have been identified, the one EUT cable configuration/arrangement and mode of operation that produced these emissions is used for final measurements on the same test site. The analyzer is set to CISPR quasi-peak and average detectors with a 9kHz resolution bandwidth for final measurements.

Line conducted emissions test results are shown in Section 6.11. Automated test software was used to perform the AC line conducted emissions testing. Automated measurement software utilized is Rohde & Schwarz EMC32, Version 8.51.0.



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### 3.3 Radiated Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed. An ETS Lindgren Model 2188 raised turntable is used for radiated measurement. It is a continuously rotatable, remote-controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. A 78cm high PVC support structure is placed on top of the turntable. A ¾" (~1.9cm) sheet of high density polyethylene is used as the table top and is placed on top of the PVC supports to bring the total height of the table to 80cm.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33(b)(1) depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up was placed on top of the 0.8 meter high, 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, if applicable, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions. For the EUT positioning, "H" is defined with the EUT lying flat on the test surface, "H2" is defined with the EUT standing up on its side, and "V" is defined with the EUT standing upright.

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## 4.0 ANTENNA REQUIREMENTS

**Excerpt from §15.203 of the FCC Rules/Regulations:**

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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 antennas of the Portable Tablet are **permanently attached**.
- There are no provisions for connection to an external antenna.

**Conclusion:**



The **Samsung Portable Tablet FCC ID: A3LSMP905V** unit complies with the requirement of §15.203.

Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437		

Ch.	BW (MHz)	Frequency (MHz)
149	20	5745
151	20 / 40	5755
153	20	5765
155	20 / 80	5775
157	20	5785

Ch.	BW (MHz)	Frequency (MHz)
159	20 / 40	5795
161	20	5805
163	20	5815
165	20	5825

**Table 4-1. Frequency/ Channel Operations**



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## 5.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST).

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	3/29/2013	Annual	3/29/2014	N/A
-	RE2	Radiated Emissions Cable Set (VHF/UHF)	3/29/2013	Annual	3/29/2014	N/A
-	WL40-1	Conducted Cable Set (40GHz)	7/22/2013	Annual	7/22/2014	N/A
Agilent	8447D	Broadband Amplifier	5/31/2013	Annual	5/31/2014	2443A01900
Agilent	N9020A	MXA Signal Analyzer	10/29/2013	Annual	10/29/2014	US46470561
Anritsu	ML2495A	Power Meter	10/31/2013	Annual	10/31/2014	941001
Anritsu	MA2411B	Pulse Sensor	11/13/2013	Annual	11/13/2014	846215
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	6/26/2013	Annual	6/26/2014	121034
Emco	3816/2	Line Impedance Stabilization Network	2/12/2013	Biennial	2/12/2015	9709-1077
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	7/24/2013	Biennial	7/24/2015	125518
ETS Lindgren	3160-09	18-26.5 GHz Standard Gain Horn	5/30/2012	Biennial	5/30/2014	135427
ETS Lindgren	3160-10	26.5-40 GHz Standard Gain Horn	6/6/2012	Biennial	6/6/2014	130993
Huber+Suhner	Sucoflex 102A	40GHz Radiated Cable	3/1/2013	Annual	3/1/2014	251425001
K & L	6000/T18000	High Pass Filter	3/4/2013	Annual	3/4/2014	1
Mini-Circuits	VHF-3100+	High Pass Filter	1/17/2013	Annual	1/17/2014	30841
Rohde & Schwarz	TS-PR18	1-18 GHz Pre-Amplifier	5/31/2013	Annual	5/31/2014	100071
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	5/31/2013	Annual	5/31/2014	100040
Rohde & Schwarz	ESU26	EMI Test Receiver	2/25/2013	Annual	2/25/2014	100342
Rohde & Schwarz	TS-PR40	26.5-40 GHz Pre-Amplifier	6/6/2012	Biennial	6/6/2014	100037
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	1/26/2012	Biennial	1/26/2014	A051107

**Table 5-1. Annual Test Equipment Calibration Schedule**

<b>FCC ID:</b> A3LSMP905V		<b>FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Reviewed by:</b> Quality Manager
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## 6.0 TEST RESULTS

### 6.1 Summary



Company Name: Samsung Electronics, Co. Ltd.  
 FCC ID: A3LSMP905V  
 FCC Classification: Digital Transmission System (DTS)  
 Data Rate(s) Tested: 1Mbps, 2Mbps, 5.5Mbps, 11Mbps (b)  
6Mbps, 9Mbps, 12Mbps, 18Mbps, 24Mbps, 36Mbps, 48Mbps, 54Mbps (a/g)  
6.5/7.2/13Mbps, 13/14.4/26Mbps, 19.5/21.7/39Mbps, 26/28.9/52Mbps,  
39/43.3/78Mbps, 52/57.8/104Mbps, 58.5/65/117Mbps, 65/72.2/130Mbps (n –  
20MHz)  
13.5/15/27Mbps, 27/30/54Mbps, 40.5/45/81Mbps, 54/60/108Mbps, 81/90/162Mbps,  
108/120/216Mbps, 121.5/135/243Mbps, 135/150/270Mbps (n – 40MHz)  
29.3/32.5/58.5Mbps, 58.5/65/117Mbps, 87.8/97.5/175.5Mbps, 117/130/234Mbps,  
175.5/195/351Mbps, 234/260/468Mbps, 263.3/292.5/526.5Mbps,  
292.5/325/585Mbps, 351/390/702Mbps, 390/433.3/780Mbps (ac – 80MHz BW)

FCC Part Section(s)	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
<b>TRANSMITTER MODE (TX)</b>						
15.247(a)(2)	RSS-210 [A8.2]	6dB Bandwidth	> 500kHz	CONDUCTED	PASS	Section 6.2
15.247(b)(3)	RSS-210 [A8.4]	Transmitter Output Power	< 1 Watt		PASS	Section 6.3
15.247(e)	RSS-210 [A8.2]	Transmitter Power Spectral Density	< 8dBm / 3kHz Band		PASS	Section 6.4
15.247(d)	RSS-210 [A8.5]	Band Edge / Out-of-Band Emissions	Conducted ≥ 30dBc		PASS	Sections 6.5, 6.6
15.205 15.209	RSS-210 [A8.5]	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209	RADIATED	PASS	Sections 6.7, 6.8, 6.9, 6.10
15.207	RSS-Gen [7.2.2]	AC Conducted Emissions 150kHz – 30MHz	< FCC 15.207 limits	LINE CONDUCTED	PASS	Section 6.11

**Table 6-1. Summary of Test Results**

**Notes:**

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables and attenuators.
- 4) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST “WLAN Automation”, Version 2.3.

FCC ID: A3LSMP905V		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1311252234.A3L	Test Dates: 12/30/2013 - 1/9/2014	EUT Type: Portable Tablet	Page 11 of 116	

## 6.2 6dB Bandwidth Measurement – 802.11a/b/g/n/ac

§15.247(a)(2); RSS-210 [A8.2]

### Test Overview and Limit

The bandwidth at 6dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the transmitter antenna terminal of the EUT while the EUT is operating at its maximum duty cycle (>98%), at maximum power, and at the appropriate frequencies. All data rates were investigated and the worst case configuration results are reported in this section.

*The minimum permissible 6dB bandwidth is 500 kHz.*

### Test Procedure Used

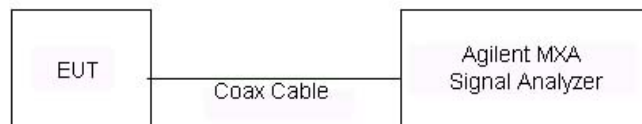
KDB 558074 v03r01 – Section 8.2 Option 2

### Test Settings

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 6dB bandwidth measurement. The "X" dB bandwidth parameter was set to X = 6. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 100kHz
3. VBW  $\geq 3 \times$  RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize

### Test Setup



The EUT and measurement equipment were set up as shown in the diagram below.



**Figure 6-1. Test Instrument & Measurement Setup**

### Test Notes



None

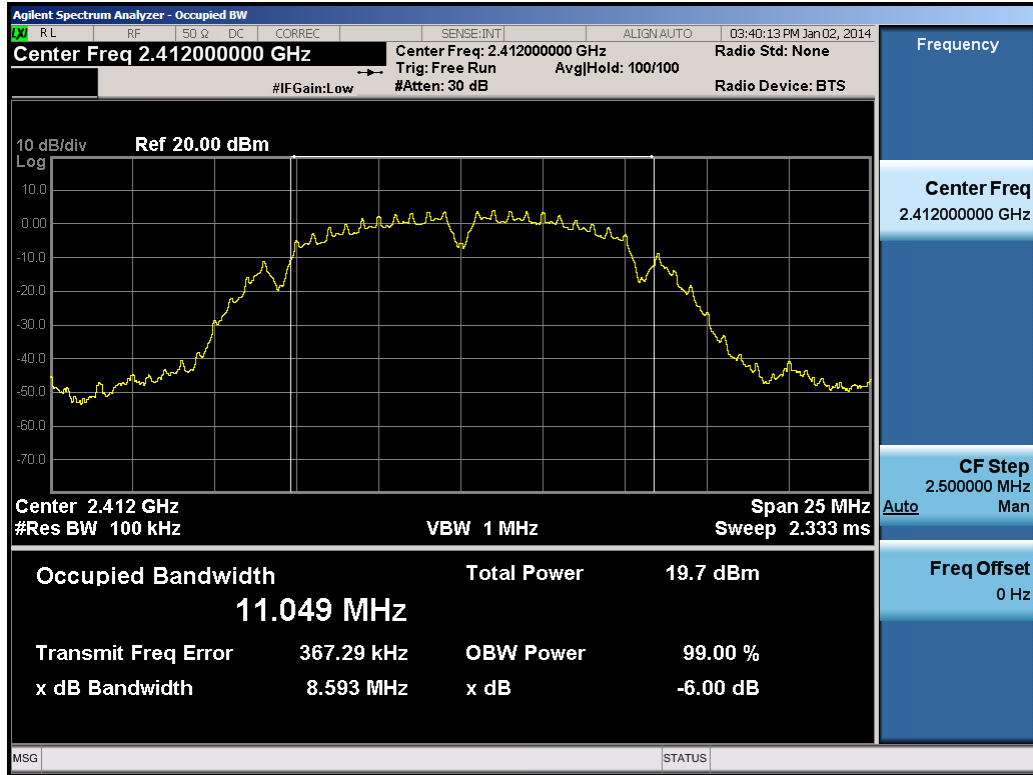
FCC ID: A3LSMP905V		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1311252234.A3L	Test Dates: 12/30/2013 - 1/9/2014	EUT Type: Portable Tablet	Page 12 of 116	

## Antenna-1 6dB Bandwidth Measurements

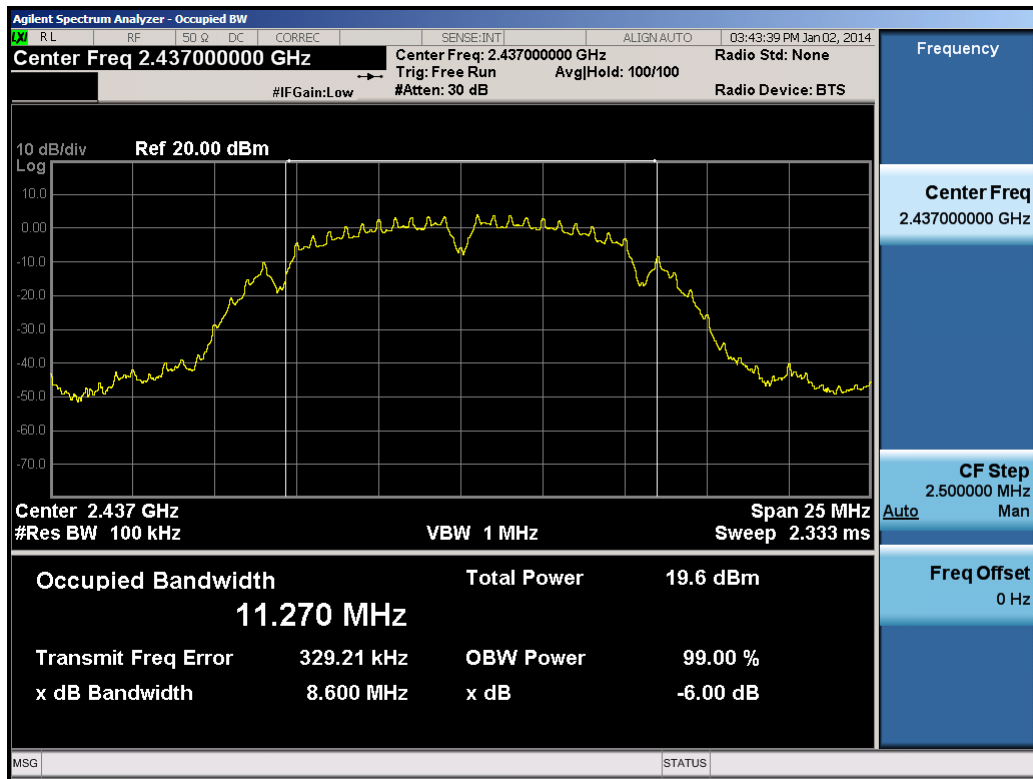
Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
2412	1	b	1	8.593	0.500	Pass
2437	6	b	1	8.600	0.500	Pass
2462	11	b	1	8.600	0.500	Pass
2412	1	g	6	16.03	0.500	Pass
2437	6	g	6	16.36	0.500	Pass
2462	11	g	6	16.42	0.500	Pass
2412	1	n	6.5/7.2 (MCS0)	16.70	0.500	Pass
2437	6	n	6.5/7.2 (MCS0)	17.41	0.500	Pass
2462	11	n	6.5/7.2 (MCS0)	17.67	0.500	Pass
5745	149	a	6	16.38	0.500	Pass
5785	157	a	6	16.41	0.500	Pass
5825	165	a	6	16.36	0.500	Pass
5745	149	n (20MHz)	6.5/7.2 (MCS0)	17.58	0.500	Pass
5785	157	n (20MHz)	6.5/7.2 (MCS0)	17.61	0.500	Pass
5825	165	n (20MHz)	6.5/7.2 (MCS0)	17.62	0.500	Pass
5755	151	n (40MHz)	13.5/15 (MCS0)	36.35	0.500	Pass
5795	159	n (40MHz)	13.5/15 (MCS0)	36.34	0.500	Pass
5775	155	ac (80MHz)	29.3/32.5 (MCS0)	75.80	0.500	Pass

**Table 6-2. Conducted Bandwidth Measurements**

FCC ID: A3LSMP905V		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1311252234.A3L	Test Dates: 12/30/2013 - 1/9/2014	EUT Type: Portable Tablet	Page 13 of 116	

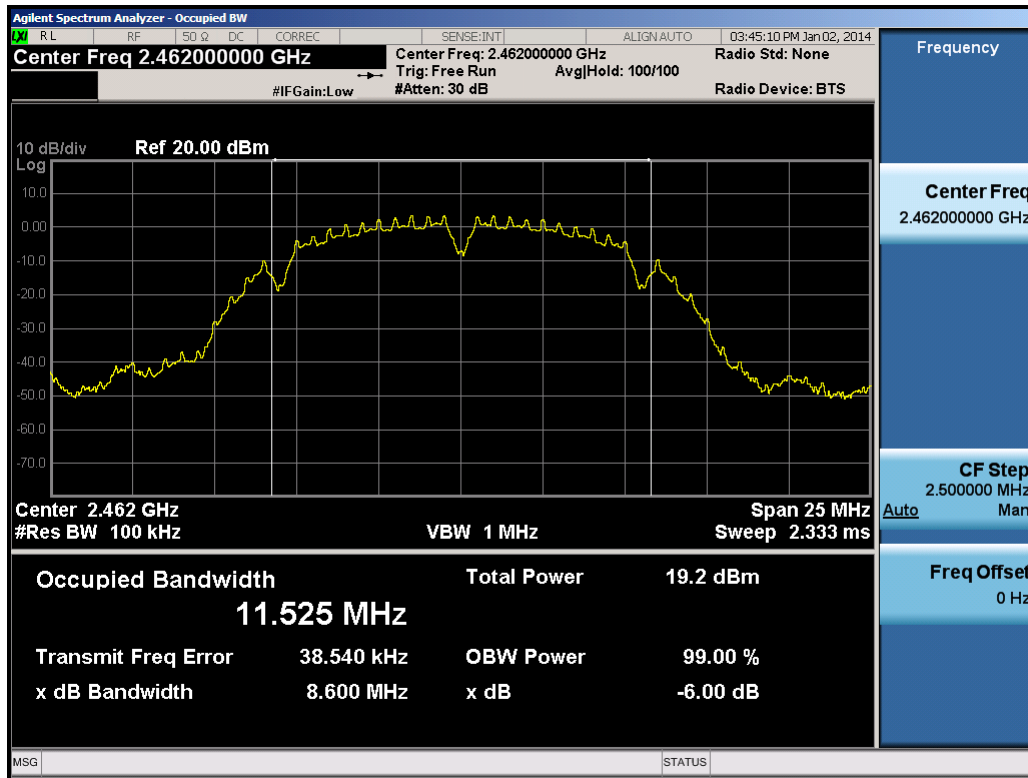


Plot 6-1. 6dB Bandwidth Plot (802.11b – Ch. 1)

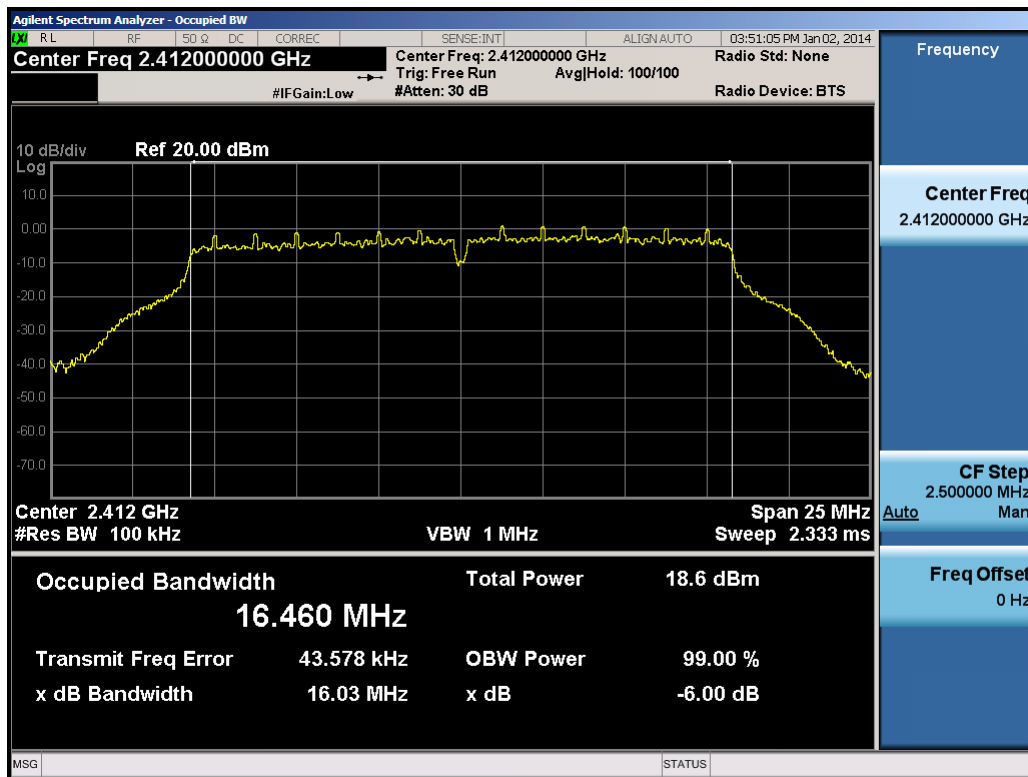


Plot 6-2. 6dB Bandwidth Plot (802.11b – Ch. 6)

FCC ID: A3LSMP905V		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1311252234.A3L	Test Dates: 12/30/2013 - 1/9/2014	EUT Type: Portable Tablet		Page 14 of 116

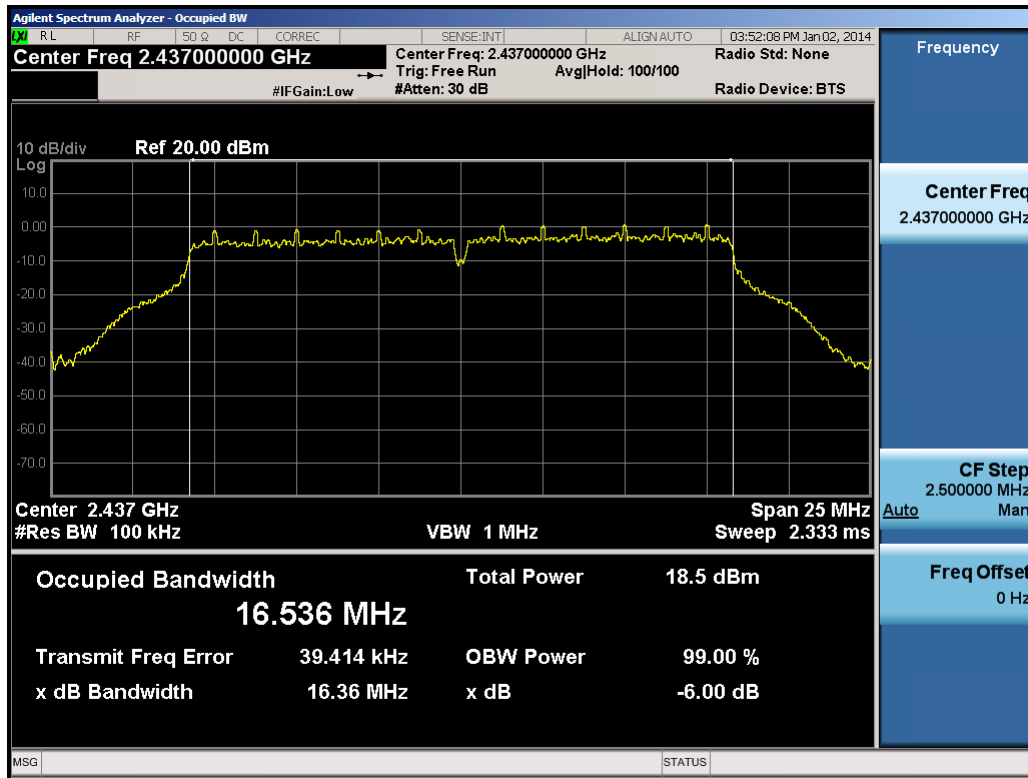


Plot 6-3. 6dB Bandwidth Plot (802.11b – Ch. 11)

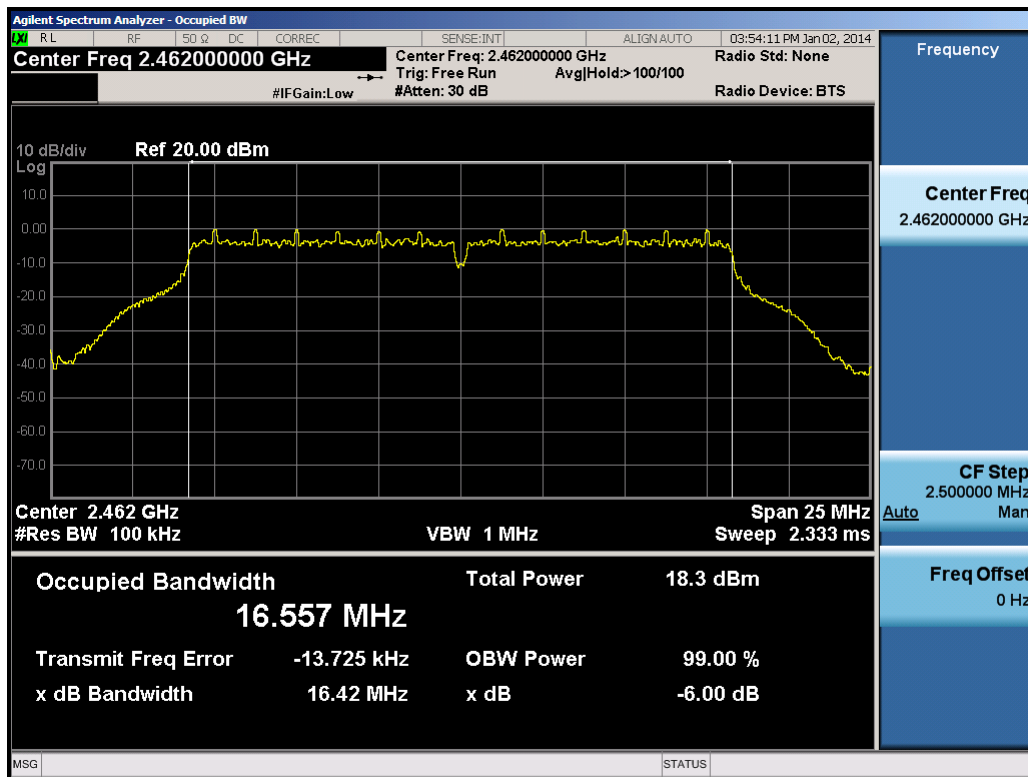


Plot 6-4. 6dB Bandwidth Plot (802.11g – Ch. 1)

FCC ID: A3LSMP905V		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1311252234.A3L	Test Dates: 12/30/2013 - 1/9/2014	EUT Type: Portable Tablet		Page 15 of 116

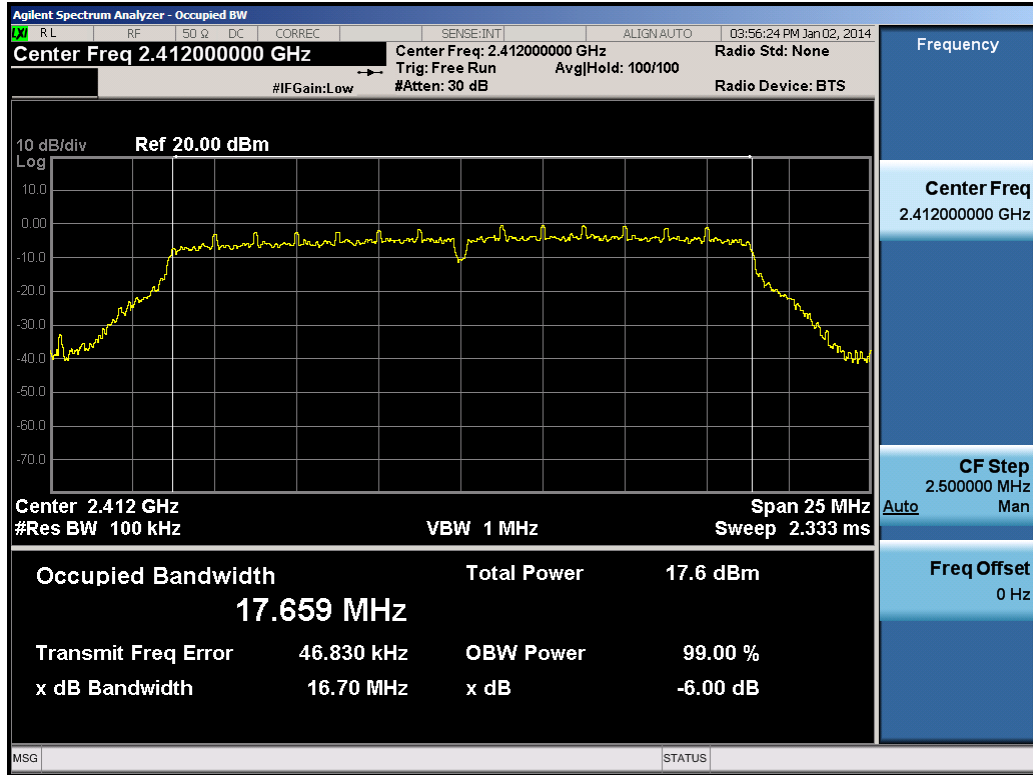


Plot 6-5. 6dB Bandwidth Plot (802.11g – Ch. 6)

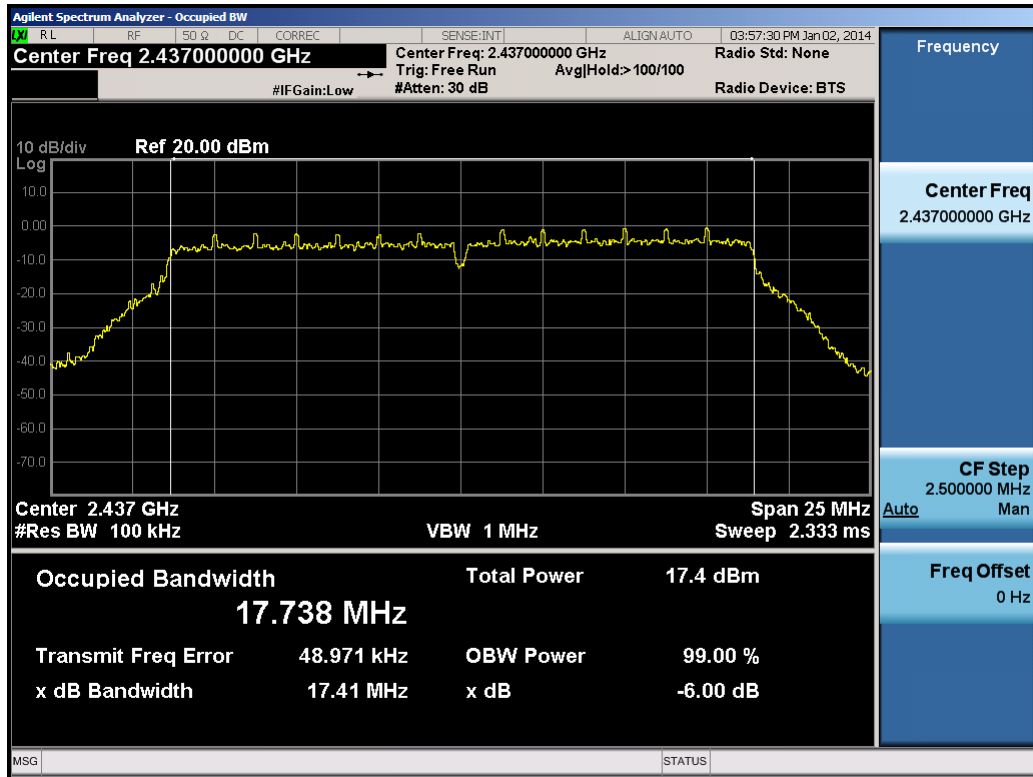


Plot 6-6. 6dB Bandwidth Plot (802.11g – Ch. 11)

FCC ID: A3LSMP905V		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1311252234.A3L	Test Dates: 12/30/2013 - 1/9/2014	EUT Type: Portable Tablet		Page 16 of 116

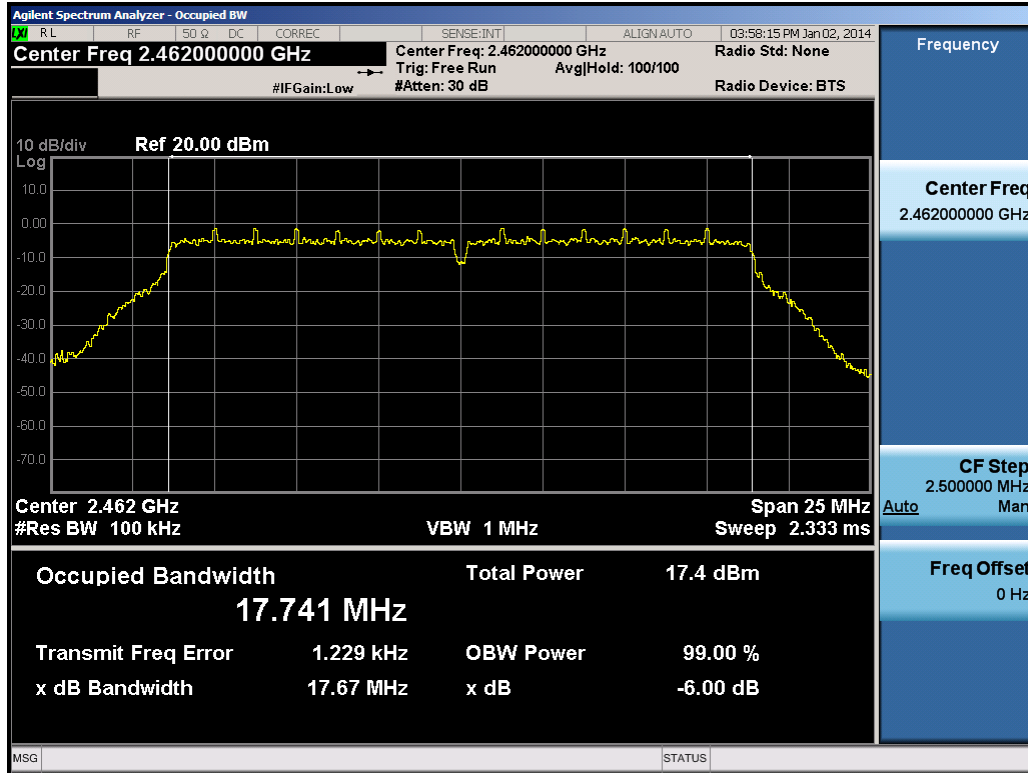


Plot 6-7. 6dB Bandwidth Plot (802.11n (2.4GHz) – Ch. 1)

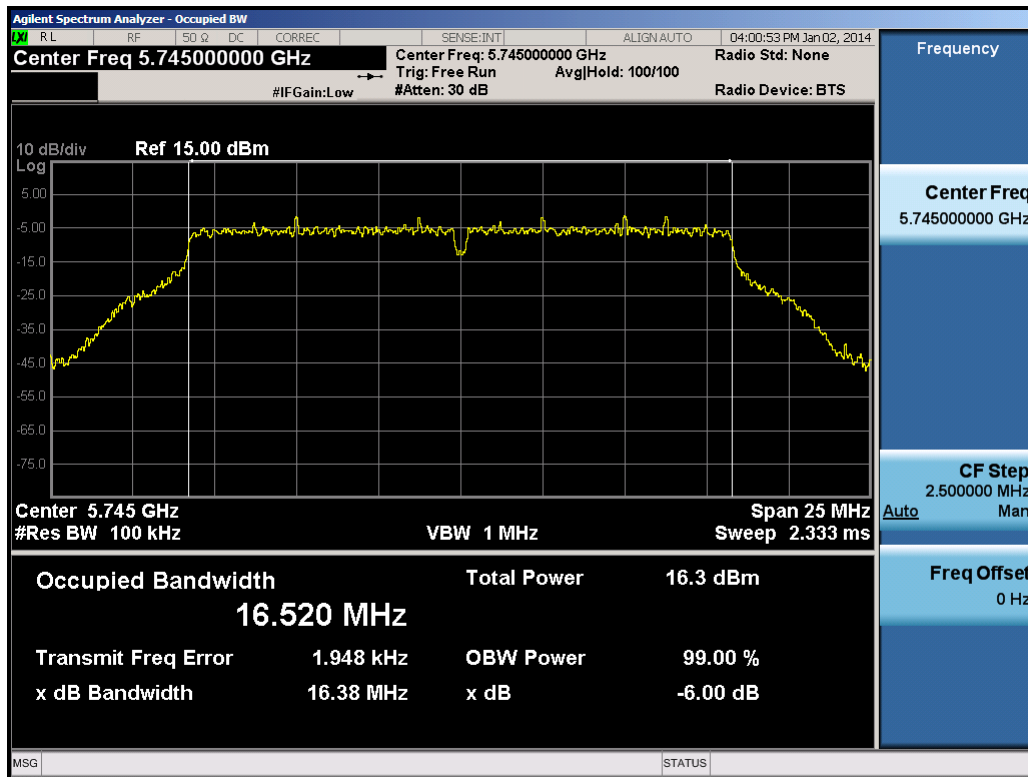


Plot 6-8. 6dB Bandwidth Plot (802.11n (2.4GHz) – Ch. 6)

FCC ID: A3LSMP905V		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1311252234.A3L	Test Dates: 12/30/2013 - 1/9/2014	EUT Type: Portable Tablet		Page 17 of 116

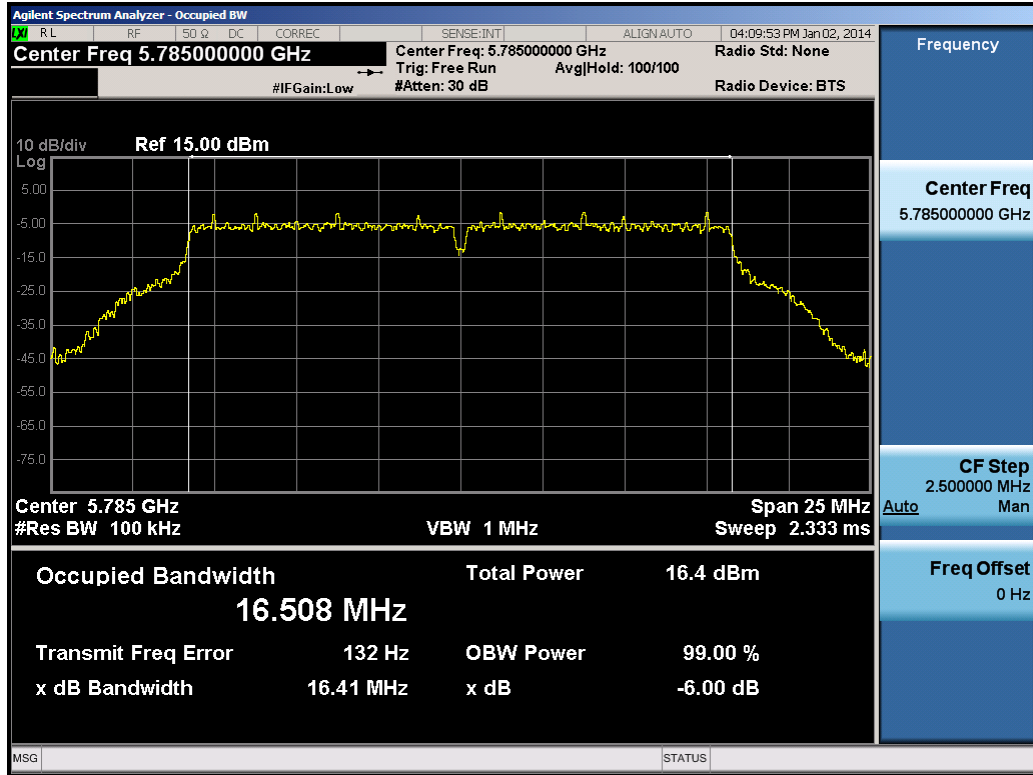


Plot 6-9. 6dB Bandwidth Plot (802.11n (2.4GHz) – Ch. 11)

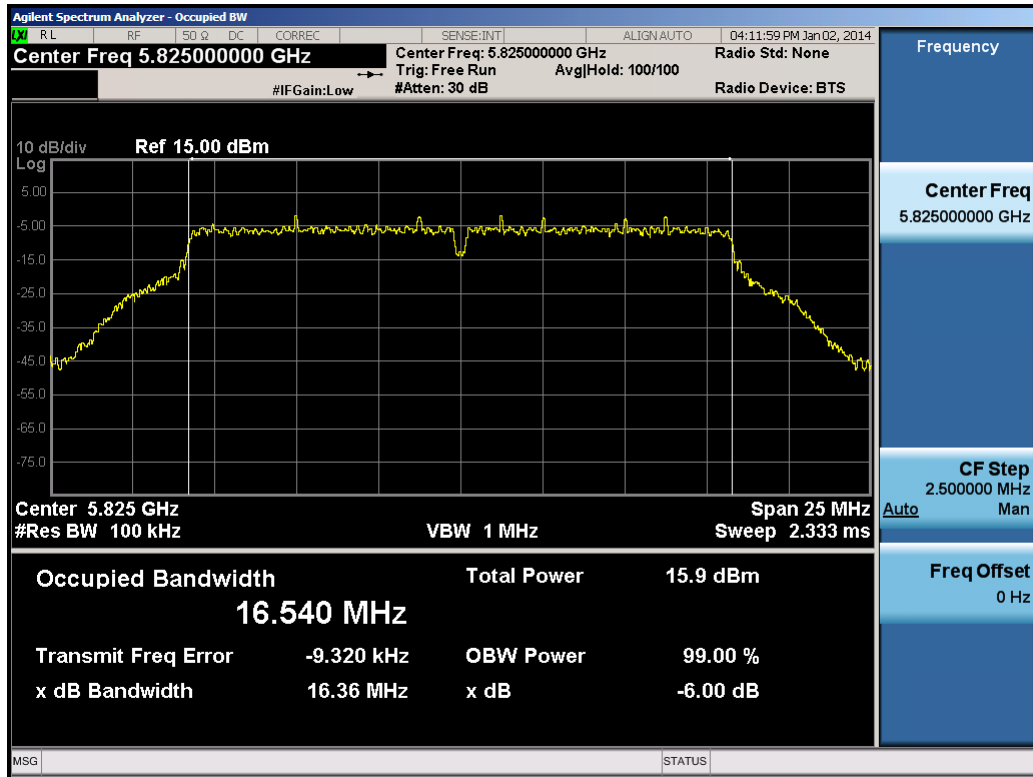


Plot 6-10. 6dB Bandwidth Plot (802.11a – Ch. 149)

FCC ID: A3LSMP905V		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1311252234.A3L	Test Dates: 12/30/2013 - 1/9/2014	EUT Type: Portable Tablet		Page 18 of 116

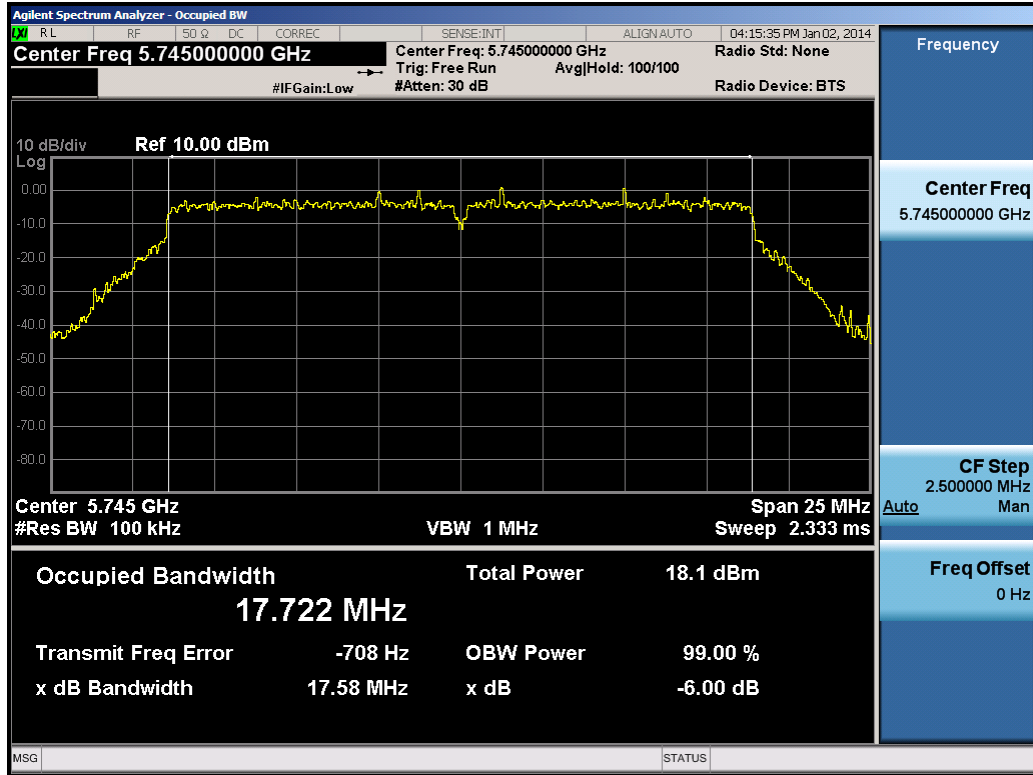


Plot 6-11. 6dB Bandwidth Plot (802.11a – Ch. 157)

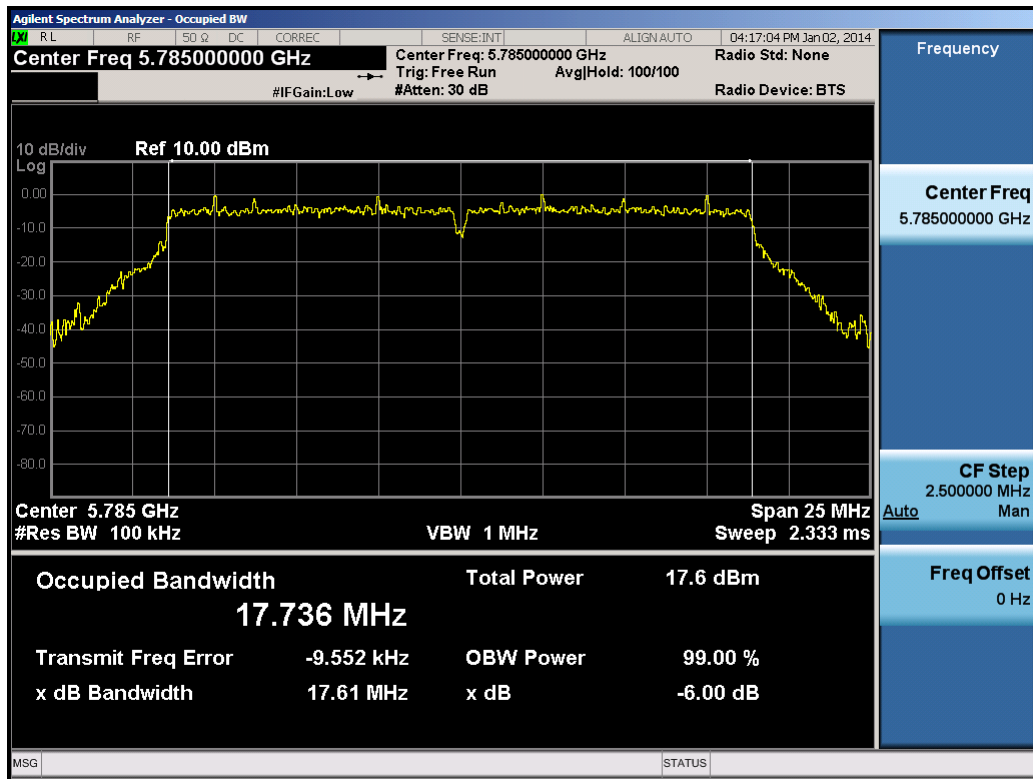


Plot 6-12. 6dB Bandwidth Plot (802.11a – Ch. 165)

FCC ID: A3LSMP905V		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1311252234.A3L	Test Dates: 12/30/2013 - 1/9/2014	EUT Type: Portable Tablet		Page 19 of 116

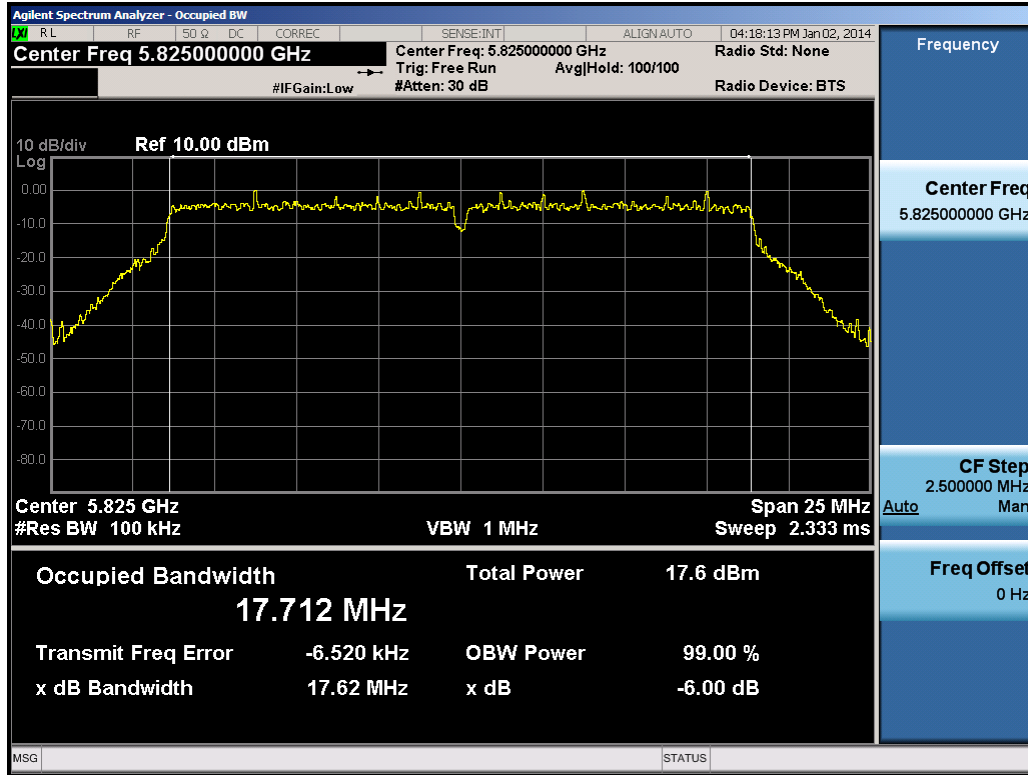


Plot 6-13. 6dB Bandwidth Plot (20MHz BW 802.11n (5.8GHz) – Ch. 149)

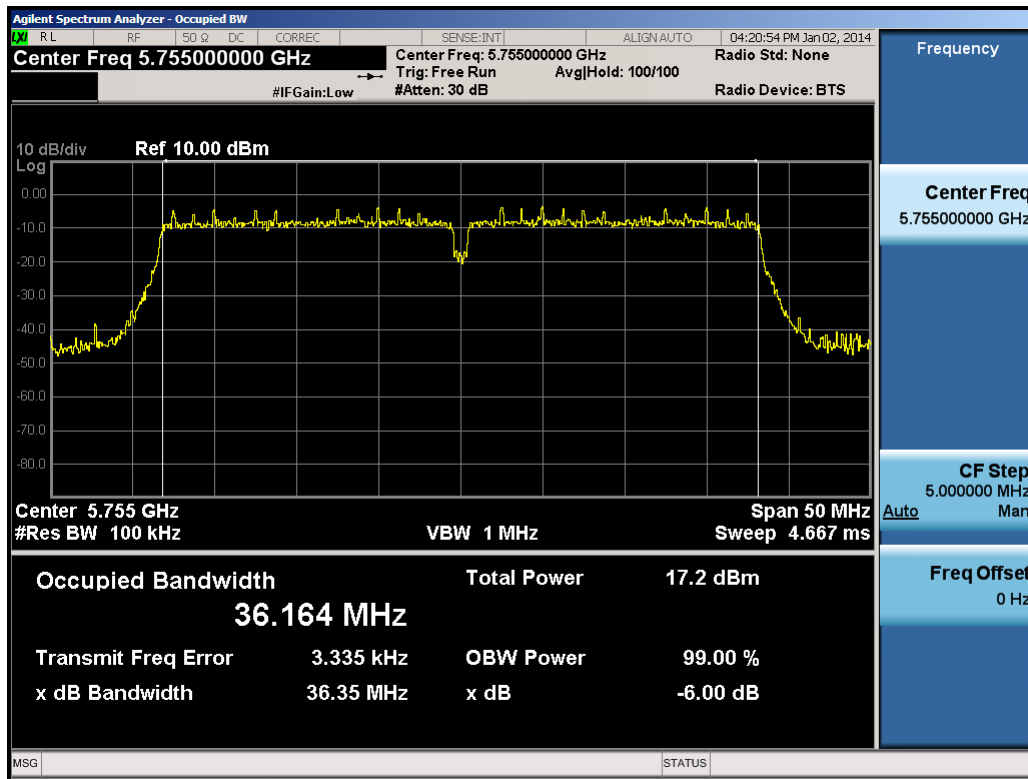


Plot 6-14. 6dB Bandwidth Plot (20MHz BW 802.11n (5.8GHz) – Ch. 157)

FCC ID: A3LSMP905V		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1311252234.A3L	Test Dates: 12/30/2013 - 1/9/2014	EUT Type: Portable Tablet		Page 20 of 116

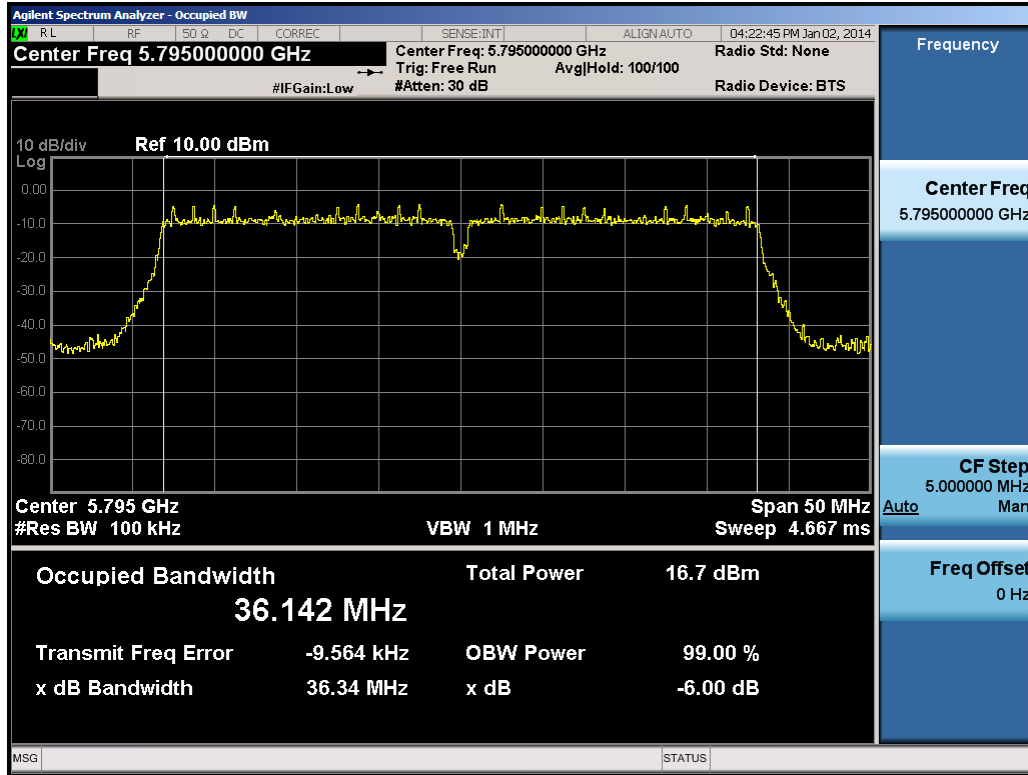


Plot 6-15. 6dB Bandwidth Plot (20MHz BW 802.11n (5.8GHz) – Ch. 165)

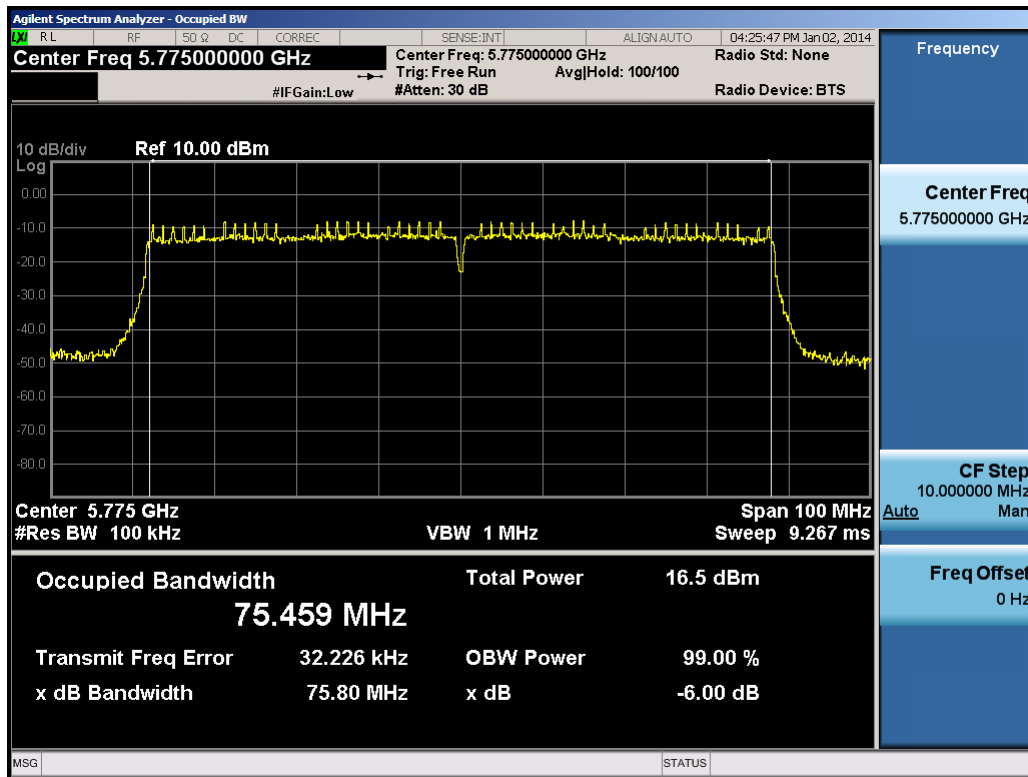


Plot 6-16. 6dB Bandwidth Plot (40MHz BW 802.11n (5.8GHz) – Ch. 151)

FCC ID: A3LSMP905V		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1311252234.A3L	Test Dates: 12/30/2013 - 1/9/2014	EUT Type: Portable Tablet		Page 21 of 116



Plot 6-17. 6dB Bandwidth Plot (40MHz BW 802.11n (5.8GHz) – Ch. 159)





Plot 6-18. 6dB Bandwidth Plot (80MHz BW 802.11ac (5.8GHz) – Ch. 155)

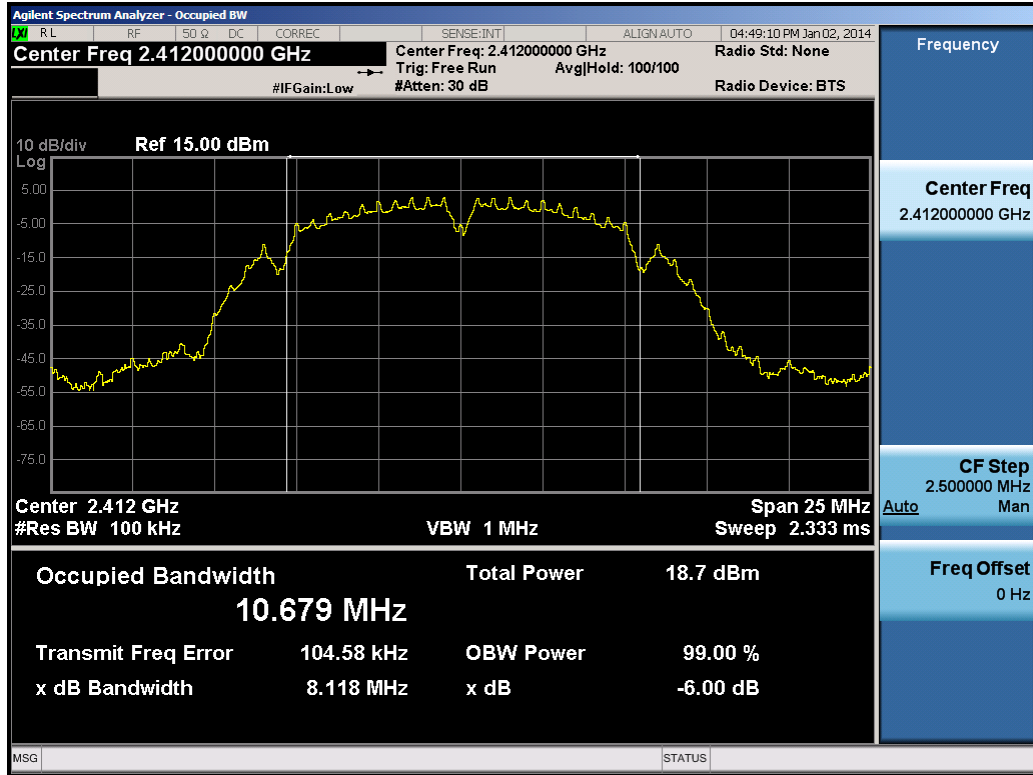
FCC ID: A3LSMP905V		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1311252234.A3L	Test Dates: 12/30/2013 - 1/9/2014	EUT Type: Portable Tablet		Page 22 of 116

## Antenna-2 6dB Bandwidth Measurements

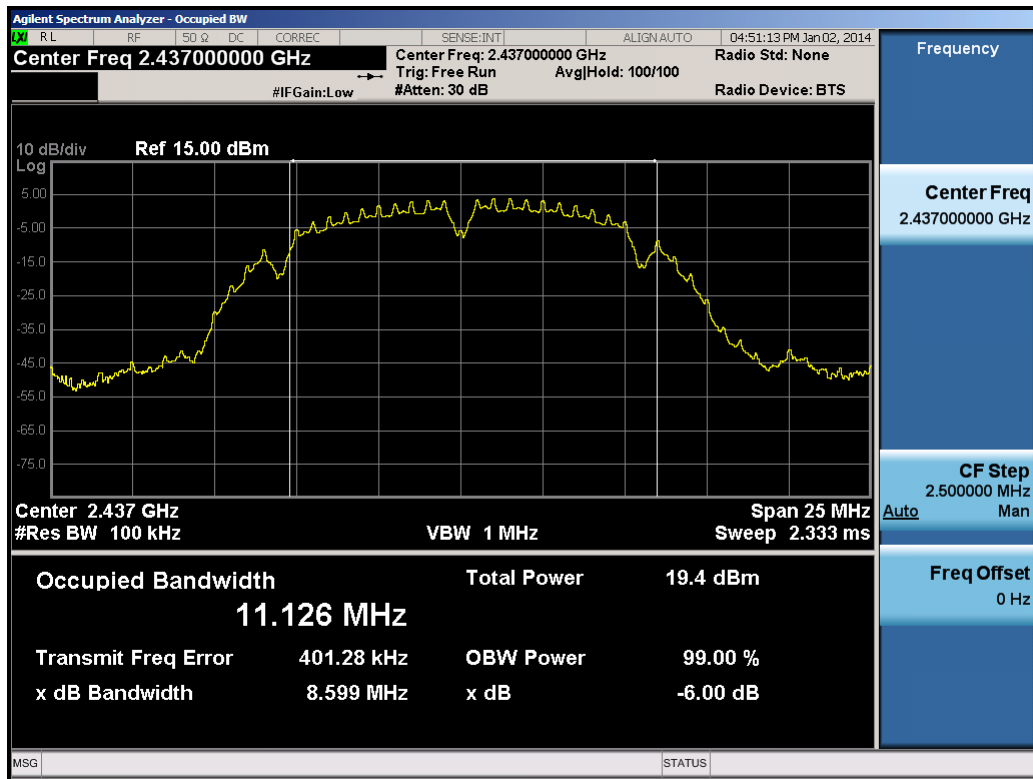
Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
2412	1	b	1	8.118	0.500	Pass
2437	6	b	1	8.599	0.500	Pass
2462	11	b	1	8.606	0.500	Pass
2412	1	g	6	15.78	0.500	Pass
2437	6	g	6	15.76	0.500	Pass
2462	11	g	6	16.36	0.500	Pass
2412	1	n	6.5/7.2 (MCS0)	16.11	0.500	Pass
2437	6	n	6.5/7.2 (MCS0)	16.40	0.500	Pass
2462	11	n	6.5/7.2 (MCS0)	17.58	0.500	Pass
5745	149	a	6	16.36	0.500	Pass
5785	157	a	6	16.38	0.500	Pass
5825	165	a	6	16.37	0.500	Pass
5745	149	n (20MHz)	6.5/7.2 (MCS0)	17.62	0.500	Pass
5785	157	n (20MHz)	6.5/7.2 (MCS0)	17.64	0.500	Pass
5825	165	n (20MHz)	6.5/7.2 (MCS0)	17.62	0.500	Pass
5755	151	n (40MHz)	13.5/15 (MCS0)	36.38	0.500	Pass
5795	159	n (40MHz)	13.5/15 (MCS0)	36.36	0.500	Pass
5775	155	ac (80MHz)	29.3/32.5 (MCS0)	75.81	0.500	Pass

**Table 6-3. Conducted Bandwidth Measurements**

FCC ID: A3LSMP905V		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1311252234.A3L	Test Dates: 12/30/2013 - 1/9/2014	EUT Type: Portable Tablet	Page 23 of 116	

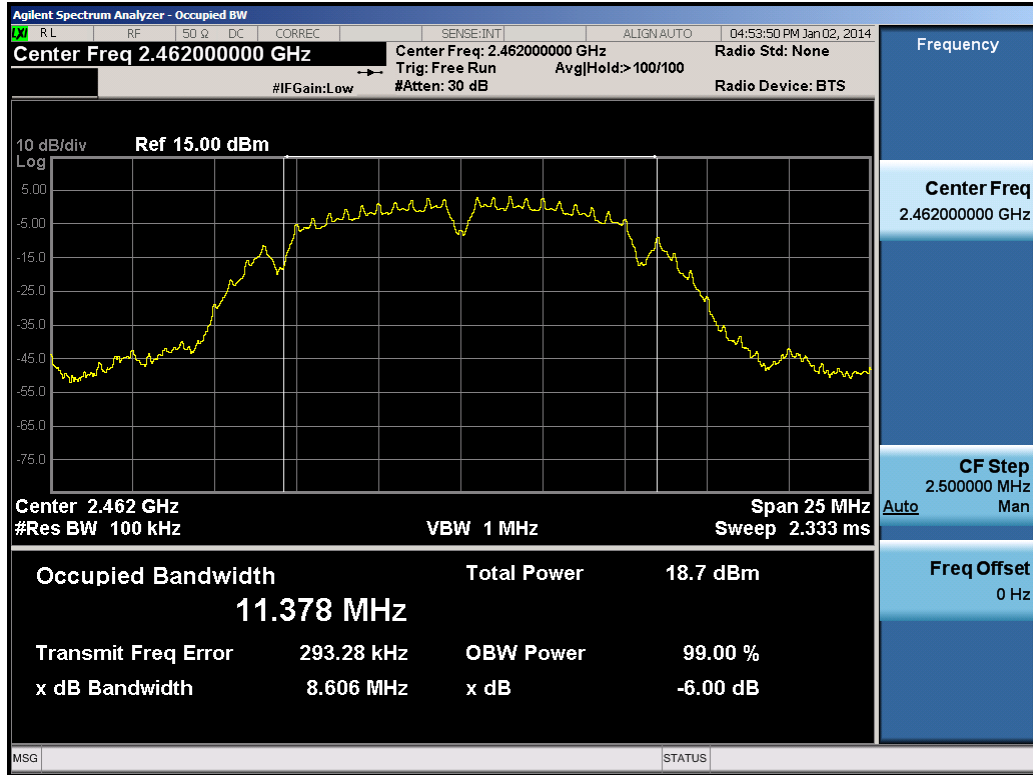


Plot 6-19. 6dB Bandwidth Plot (802.11b – Ch. 1)

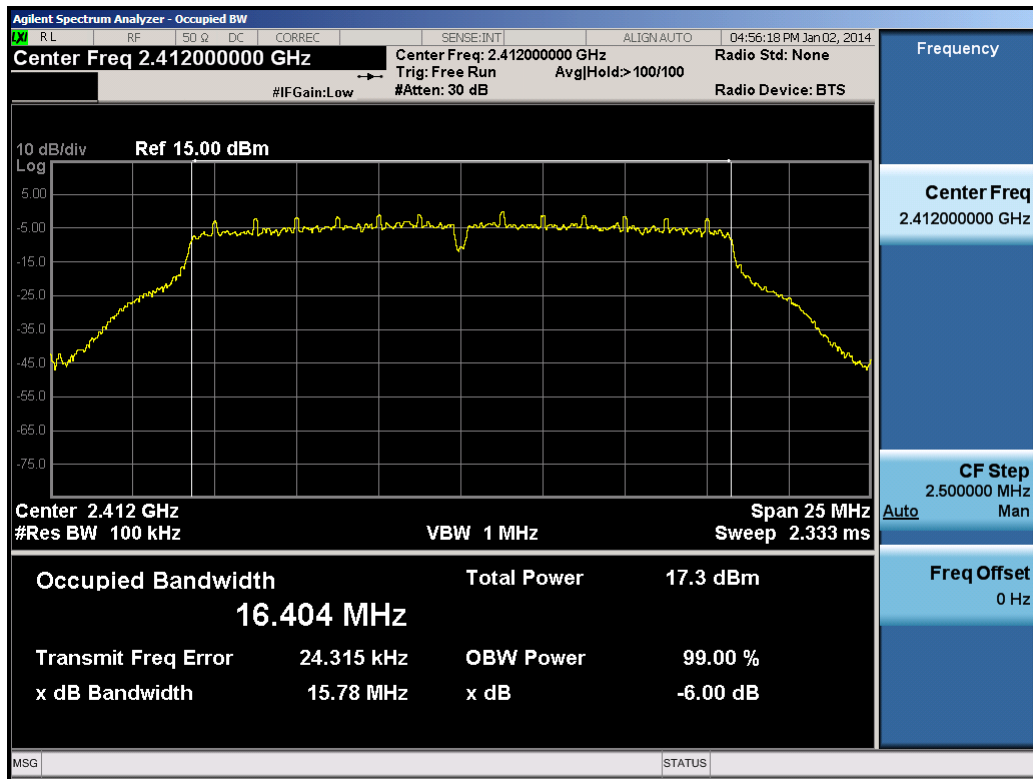


Plot 6-20. 6dB Bandwidth Plot (802.11b – Ch. 6)

FCC ID: A3LSMP905V		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1311252234.A3L	Test Dates: 12/30/2013 - 1/9/2014	EUT Type: Portable Tablet		Page 24 of 116

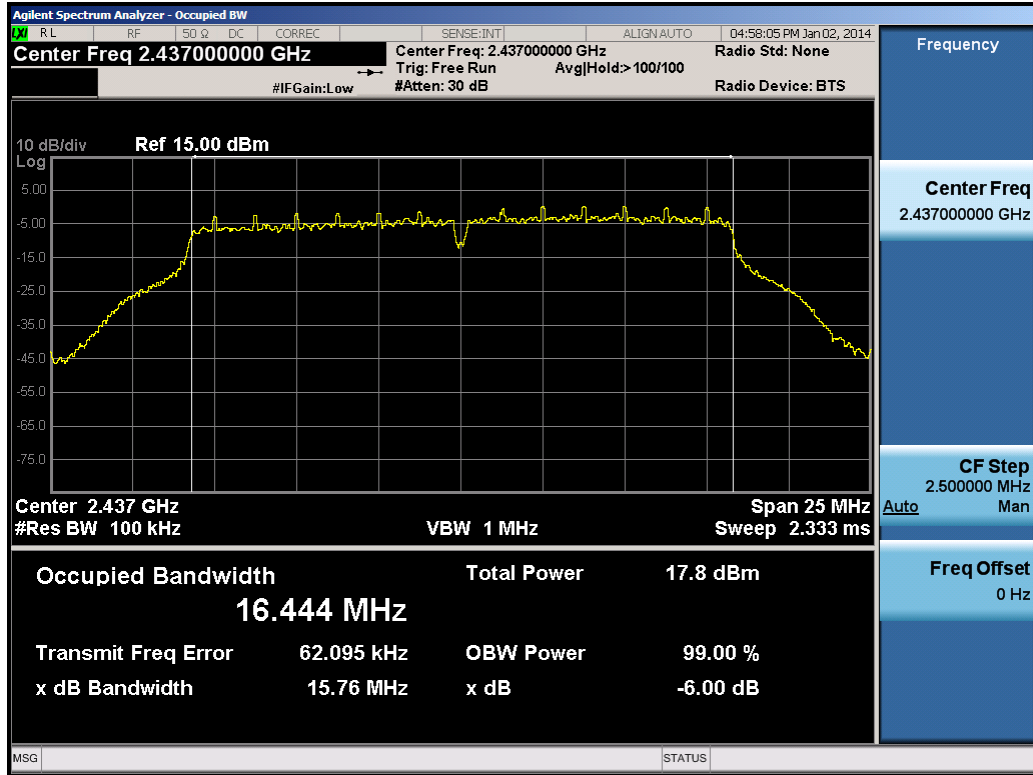


Plot 6-21. 6dB Bandwidth Plot (802.11b – Ch. 11)

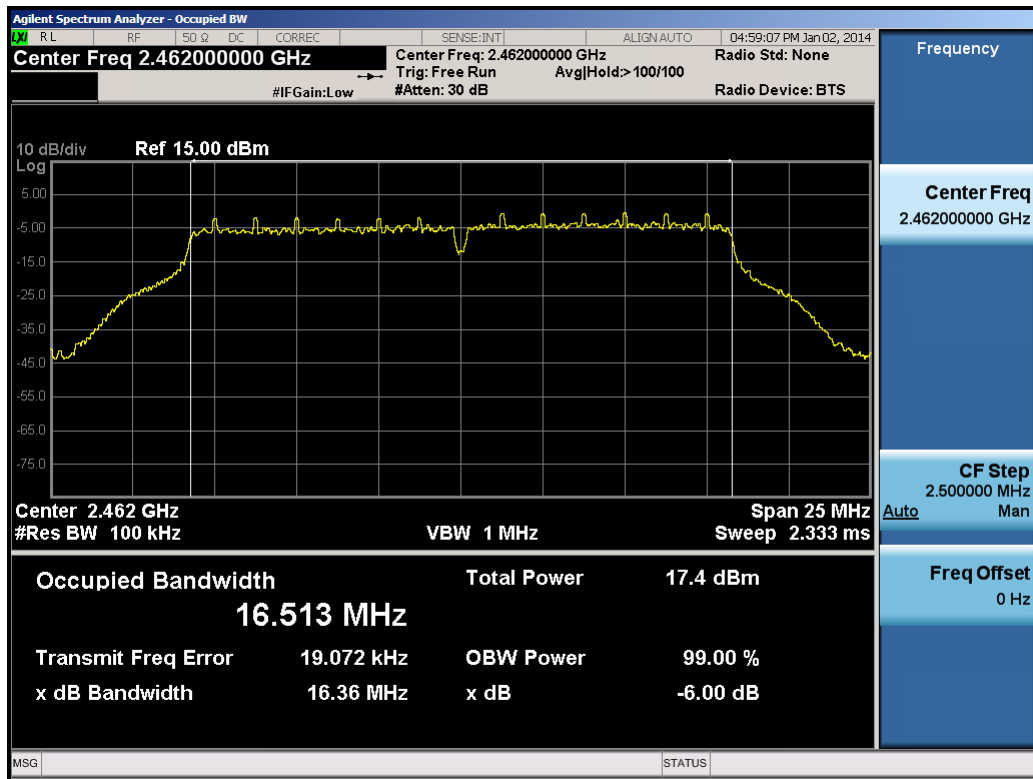


Plot 6-22. 6dB Bandwidth Plot (802.11g – Ch. 1)

FCC ID: A3LSMP905V	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
Test Report S/N: 0Y1311252234.A3L	Test Dates: 12/30/2013 - 1/9/2014	EUT Type: Portable Tablet		Page 25 of 116

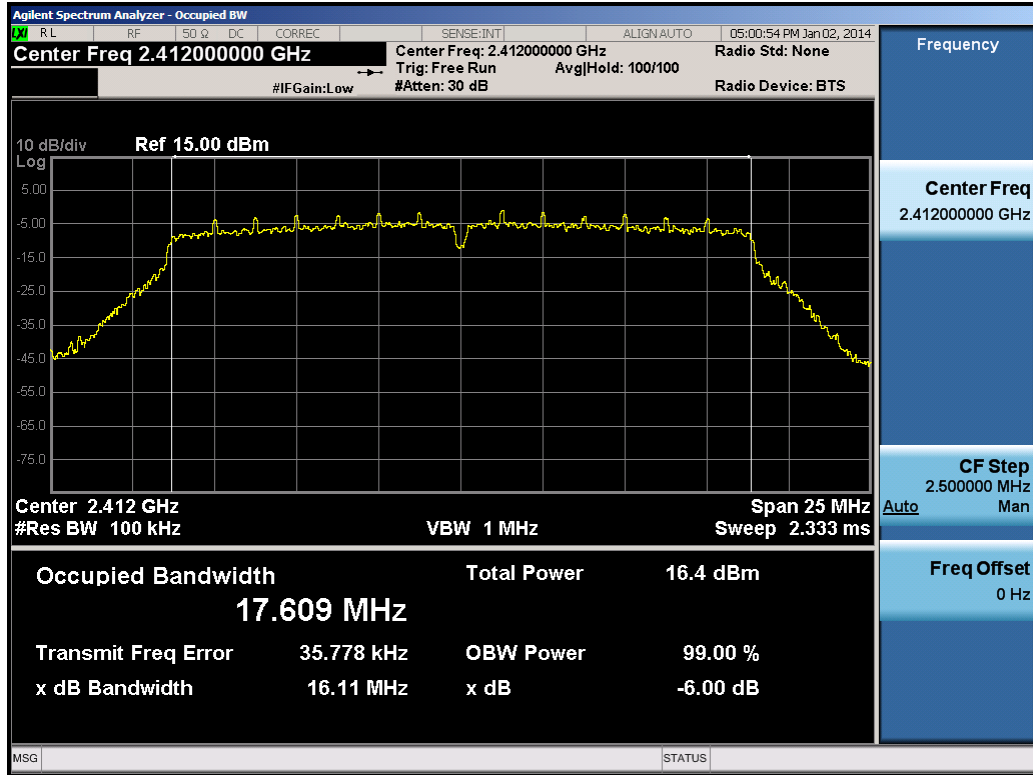


Plot 6-23. 6dB Bandwidth Plot (802.11g – Ch. 6)

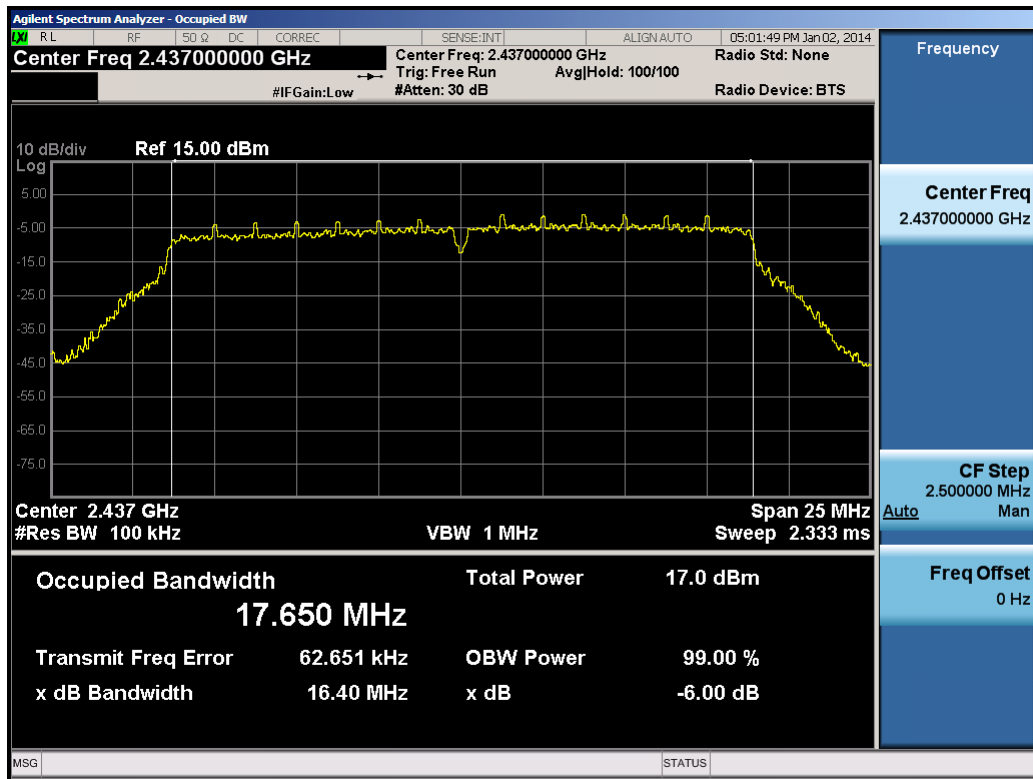


Plot 6-24. 6dB Bandwidth Plot (802.11g – Ch. 11)

FCC ID: A3LSMP905V	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
Test Report S/N: 0Y1311252234.A3L	Test Dates: 12/30/2013 - 1/9/2014	EUT Type: Portable Tablet		Page 26 of 116

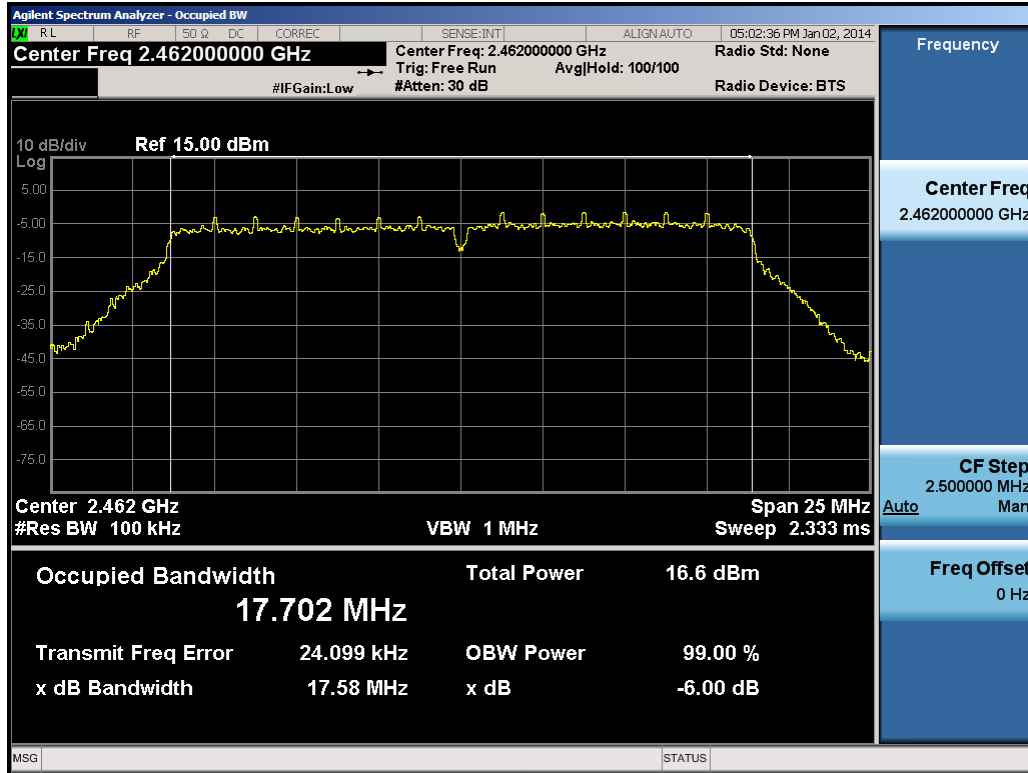


Plot 6-25. 6dB Bandwidth Plot (802.11n (2.4GHz) – Ch. 1)

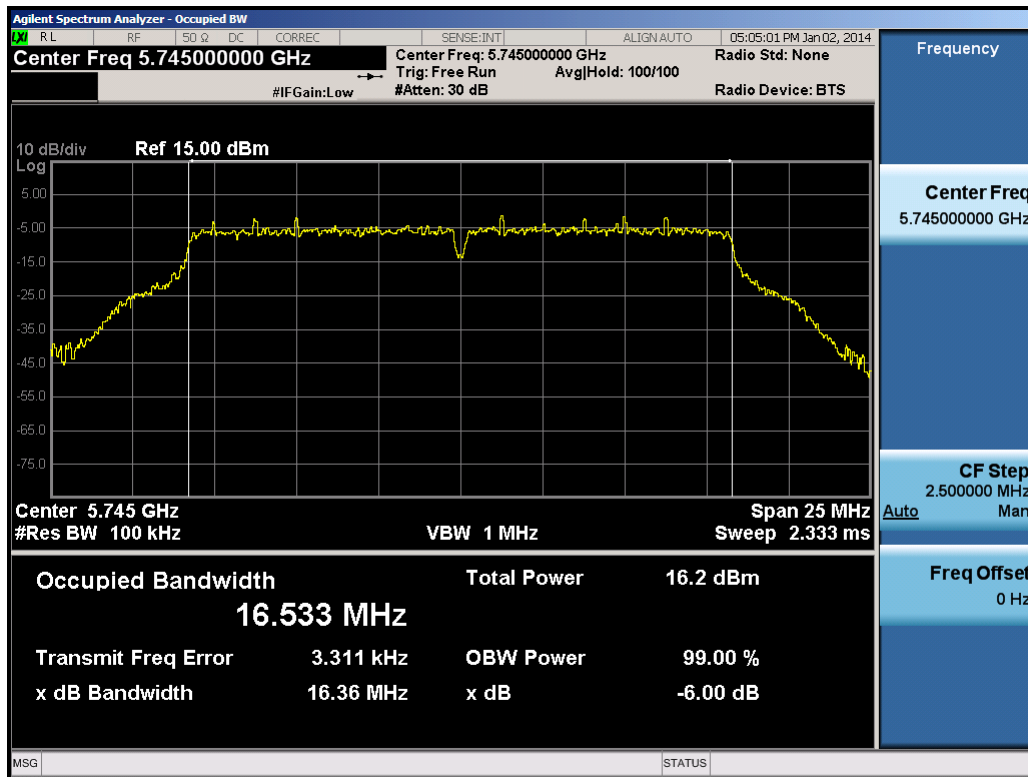


Plot 6-26. 6dB Bandwidth Plot (802.11n (2.4GHz) – Ch. 6)

FCC ID: A3LSMP905V	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
Test Report S/N: 0Y1311252234.A3L	Test Dates: 12/30/2013 - 1/9/2014	EUT Type: Portable Tablet		Page 27 of 116

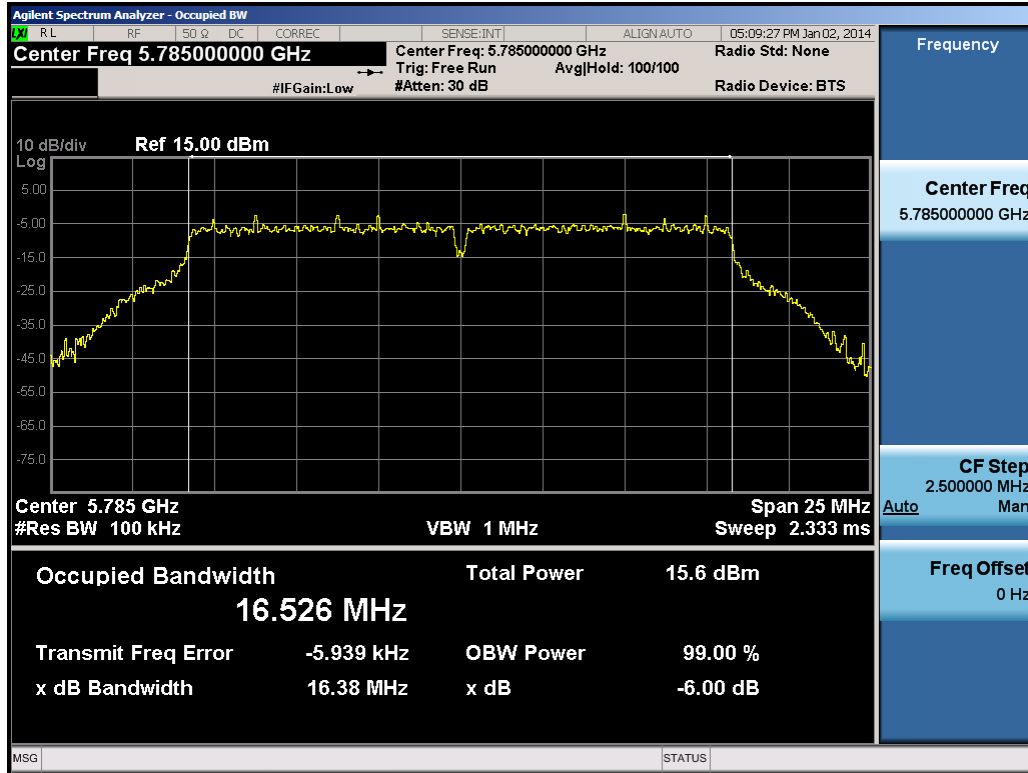


Plot 6-27. 6dB Bandwidth Plot (802.11n (2.4GHz) – Ch. 11)

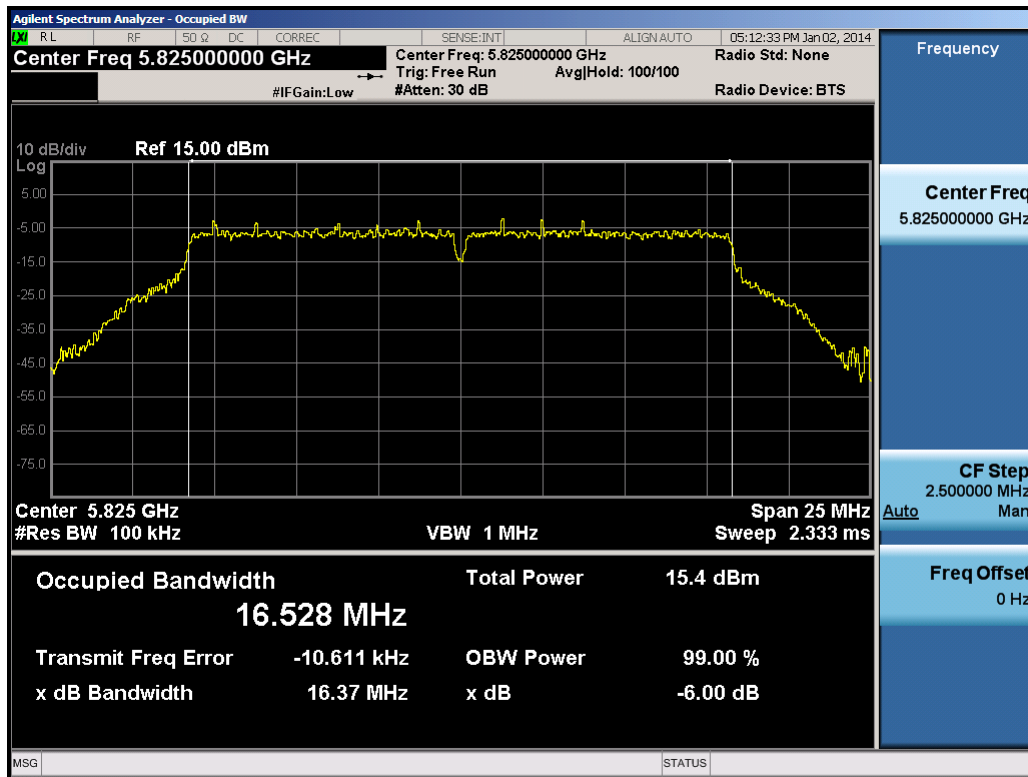


Plot 6-28. 6dB Bandwidth Plot (802.11a – Ch. 149)

FCC ID: A3LSMP905V		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1311252234.A3L	Test Dates: 12/30/2013 - 1/9/2014	EUT Type: Portable Tablet		Page 28 of 116

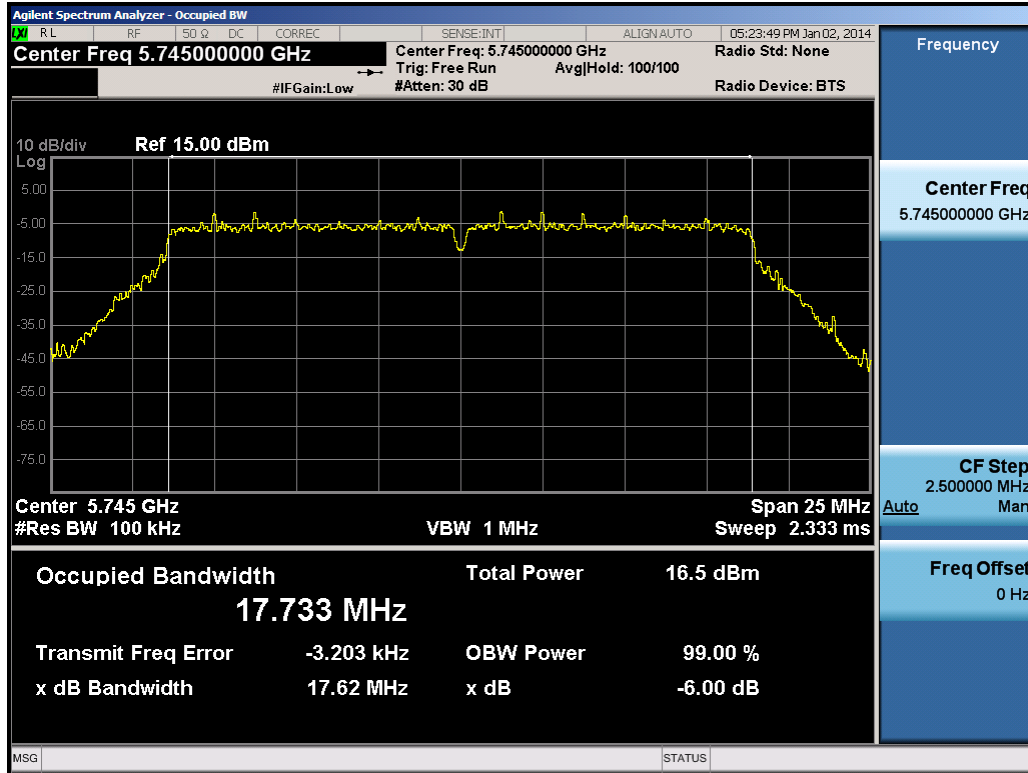


Plot 6-29. 6dB Bandwidth Plot (802.11a – Ch. 157)

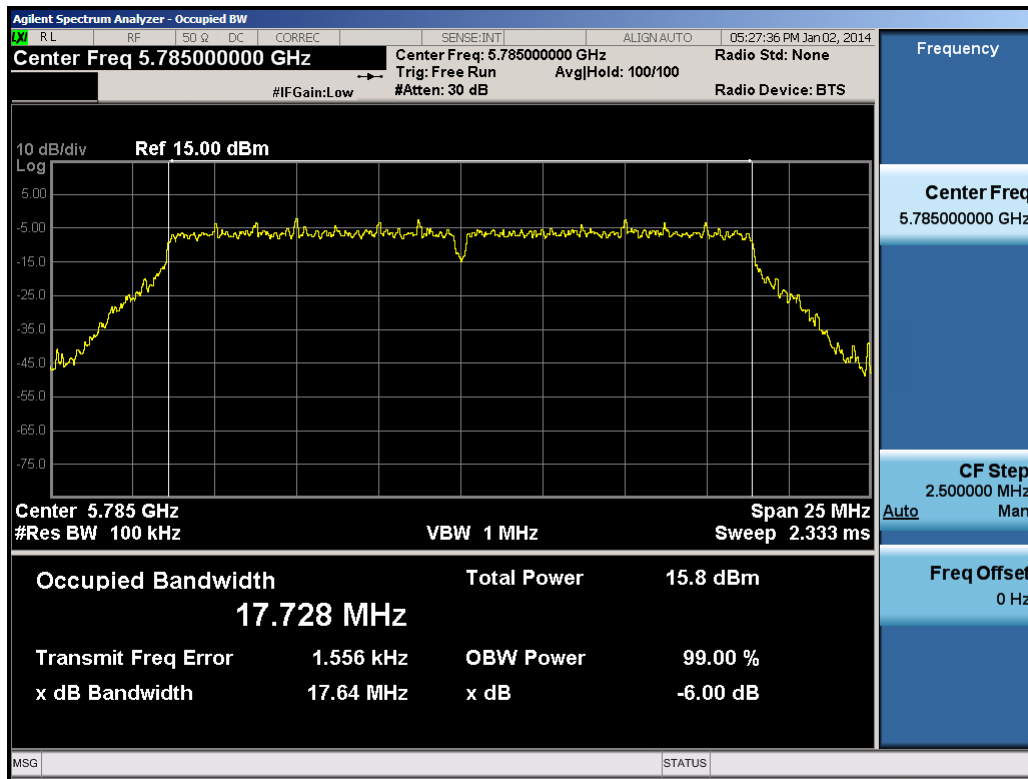


Plot 6-30. 6dB Bandwidth Plot (802.11a – Ch. 165)

FCC ID: A3LSMP905V		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1311252234.A3L	Test Dates: 12/30/2013 - 1/9/2014	EUT Type: Portable Tablet		Page 29 of 116

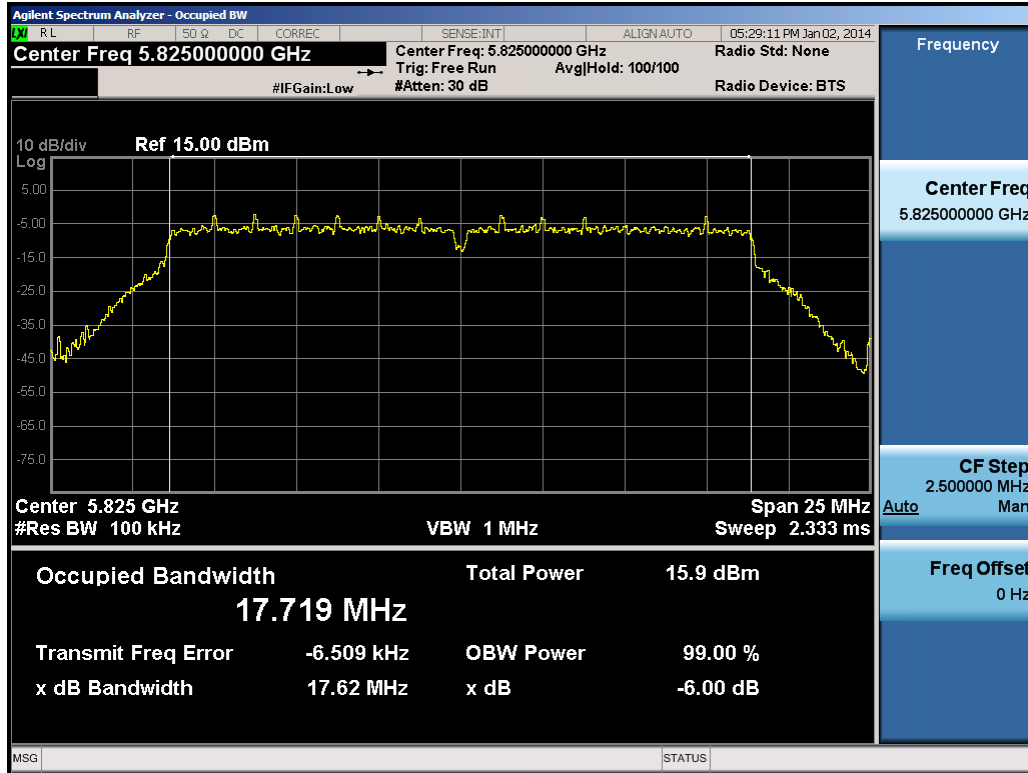


Plot 6-31. 6dB Bandwidth Plot (20MHz BW 802.11n (5.8GHz) – Ch. 149)

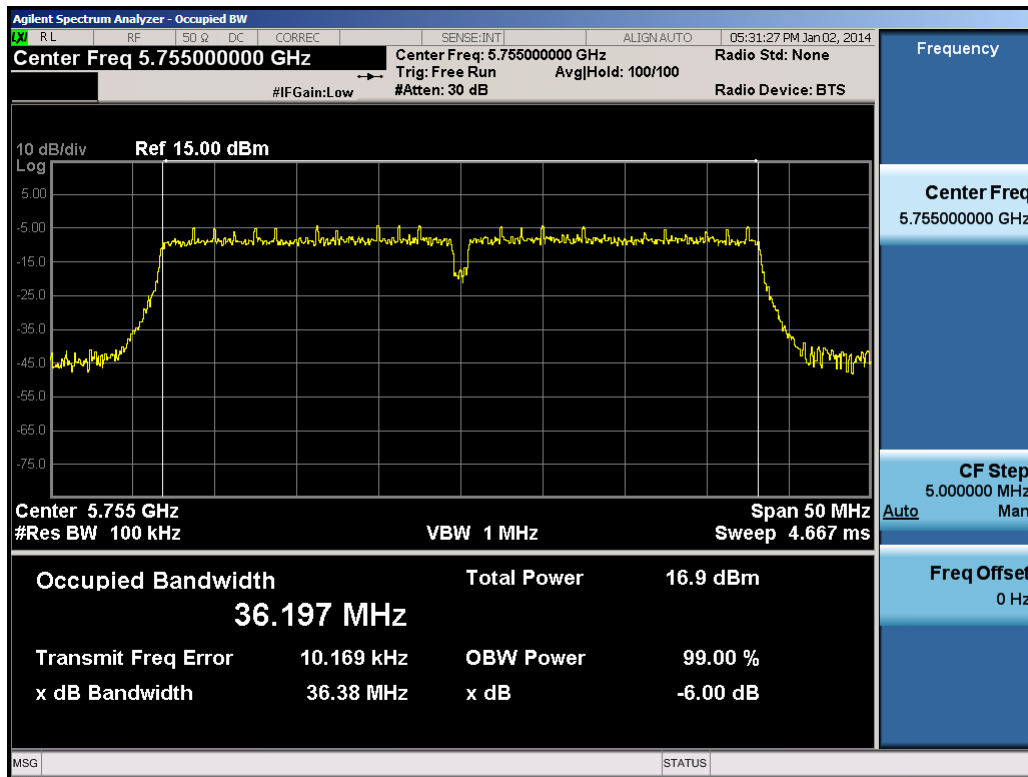


Plot 6-32. 6dB Bandwidth Plot (20MHz BW 802.11n (5.8GHz) – Ch. 157)

FCC ID: A3LSMP905V		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1311252234.A3L	Test Dates: 12/30/2013 - 1/9/2014	EUT Type: Portable Tablet		Page 30 of 116

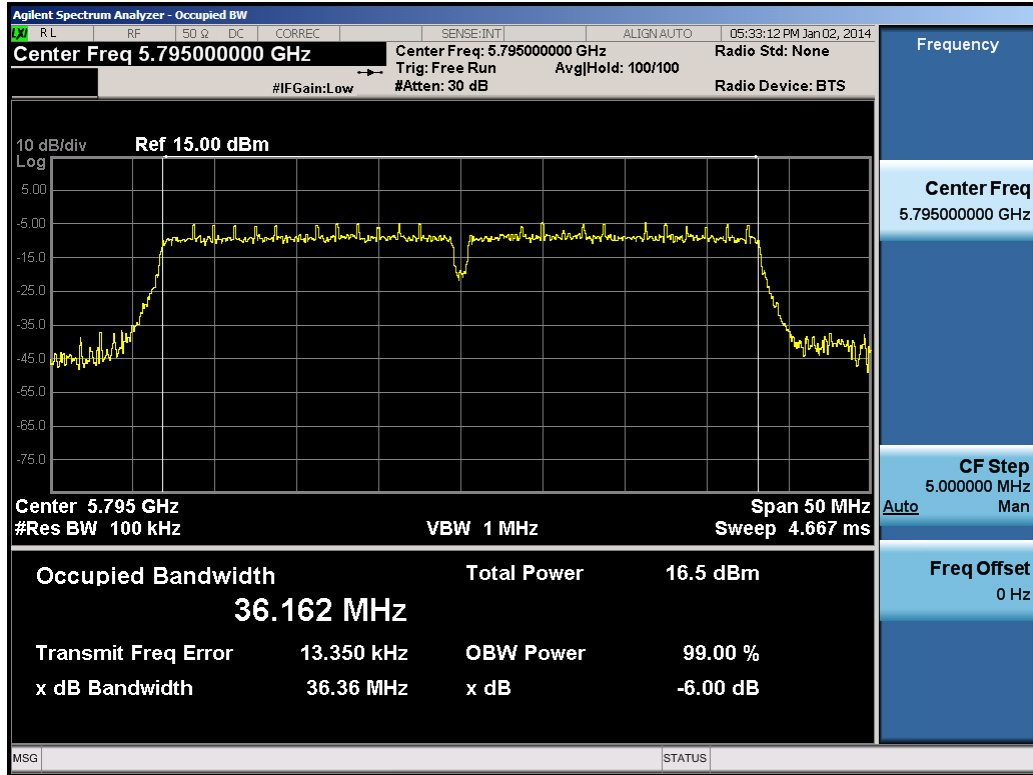


Plot 6-33. 6dB Bandwidth Plot (20MHz BW 802.11n (5.8GHz) – Ch. 165)

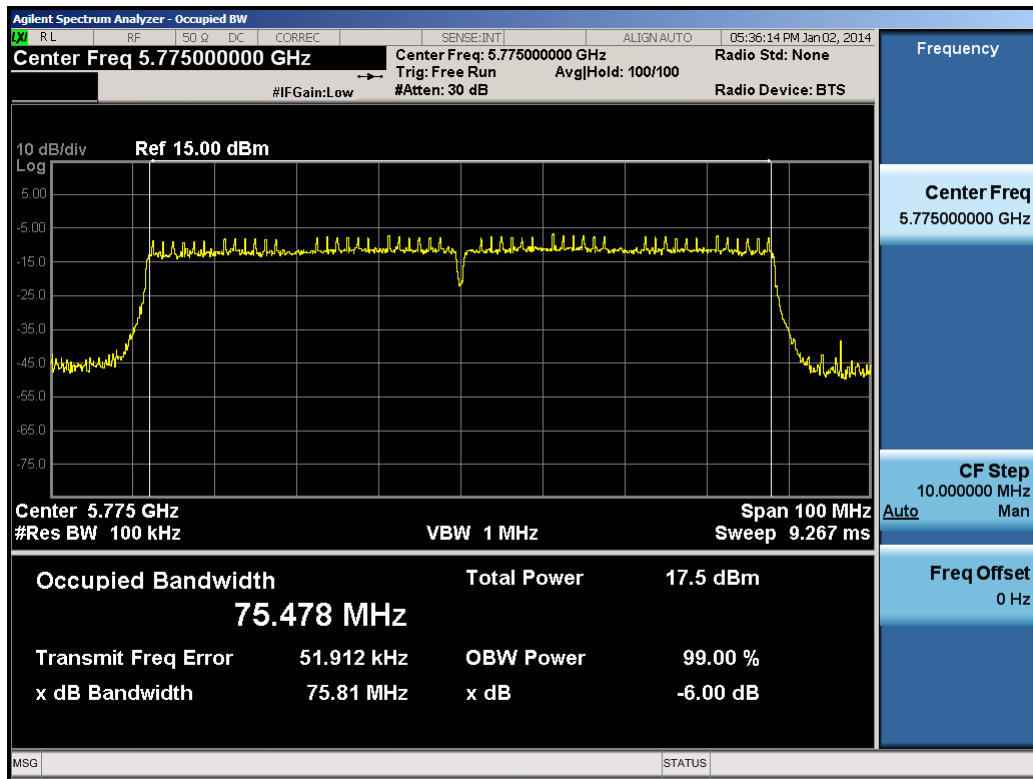


Plot 6-34. 6dB Bandwidth Plot (40MHz BW 802.11n (5.8GHz) – Ch. 151)

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Plot 6-35. 6dB Bandwidth Plot (40MHz BW 802.11n (5.8GHz) – Ch. 159)



Plot 6-36. 6dB Bandwidth Plot (80MHz BW 802.11ac (5.8GHz) – Ch. 155)

FCC ID: A3LSMP905V		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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### 6.3 Output Power Measurement – 802.11ab/g/n/ac (2.4GHz/5GHz) §15.247(b)(3); RSS-210 [A8.4]

#### Test Overview and Limits

A transmitter antenna terminal of EUT is connected to the input of an RF power sensor. Measurement is made using a broadband power meter capable of making peak and average measurements while the EUT is operating at its maximum duty cycle (>98%), at maximum power, and at the appropriate frequencies.

***The maximum permissible conducted output power is 1 Watt.***

#### Test Procedure Used

KDB 558074 v03r01 – Section 9.1.3 PKPM1 Peak Power Method (for signals with BW ≤ 50MHz)  
 KDB 558074 v03r01 – Section 9.1.2 Integrated Band Power Method (for signals with BW > 50MHz)  
  
 KDB 558074 v03r01 – Section 9.2.3.2 Method AVGPM-G (for signals of all BWs)  
 KDB 662911 v02r01

#### Test Settings

##### Method PKPM1 (Peak Power Measurement of Signals with DTS BW ≤ 50MHz)

Peak power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The pulse sensor employs a VBW = 50MHz so this method was only used for signals whose DTS bandwidth was less than or equal to 50MHz.



##### Integrated Band Power Method (Peak Power Measurement of Signals with DTS BW > 50MHz)

Since the RF power meter used only implemented a VBW of 50MHz, a signal analyzer was required to perform power measurements for signals' whose bandwidth were > 50MHz. The following settings shown in the next two sub-sections were used on a signal analyzer:

1. The signal analyzers' channel power measurement function was enabled with the integration bandwidth set to the measured DTS bandwidth
2. RBW = 1MHz
3. VBW ≥ 3 x RBW
4. Span ≥ 1.5 x DTS BW
5. Detector = peak
6. Sweep time = auto
7. Trace mode = max hold
8. Trace was allowed to fully stabilize

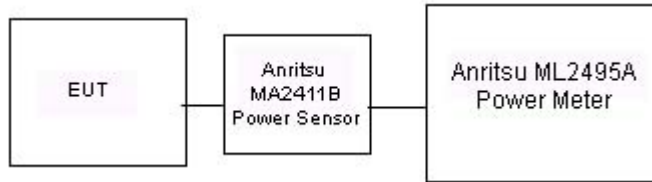
##### Method AVGPM-G (Average Power Measurements for Signals With Any Channel BW)

Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter. The trace was averaged over 100 traces to obtain the final measured average power.

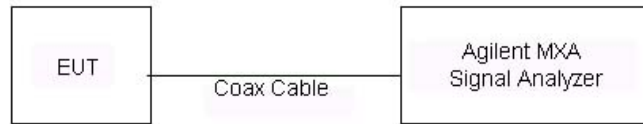
FCC ID: A3LSMP905V		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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**Test Setup**

The EUT and measurement equipment were set up as shown in the diagrams below.





**Figure 6-2. Test Instrument & Measurement Setup for Power Meter Measurements**



**Figure 6-3. Test Instrument & Measurement Setup for Signal Analyzer Measurements**

**Test Notes**

Per KDB 662911 v02r01, the individual spectra were summed mathematically in linear power units for MIMO measurements.

<b>FCC ID:</b> A3LSMP905V		<b>FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0Y1311252234.A3L	<b>Test Dates:</b> 12/30/2013 - 1/9/2014	<b>EUT Type:</b> Portable Tablet	Page 34 of 116	

**Antenna-1 Output Power Measurement – 802.11b/g/n (2.4GHz)**  
 §15.247(b)(3); RSS-210 [A8.4]

Mode	Freq [MHz]	Channel	Detector	802.11b Conducted Power [dBm]			
				Data Rate [Mbps]			
				1	2	5.5	11
802.11b	2412	1	AVG	11.88	12.06	12.01	12.04
			PEAK	15.17	15.22	15.26	15.21
802.11b	2437	6	AVG	11.78	11.85	11.87	11.91
			PEAK	15.03	15.08	15.07	15.12
802.11b	2462	11	AVG	11.61	11.77	11.81	11.79
			PEAK	14.88	15.02	15.08	14.99



**Table 6-4. 802.11b Conducted Output Power Measurements**

Mode	Freq [MHz]	Channel	Detector	802.11g Conducted Power [dBm]							
				Data Rate [Mbps]							
				6	9	12	18	24	36	48	54
802.11g	2412	1	AVG	11.39	11.37	11.42	11.33	11.39	11.33	11.43	11.28
			PEAK	18.51	18.77	18.61	19.13	18.57	19.23	19.18	18.87
802.11g	2437	6	AVG	11.34	11.43	11.32	11.34	11.44	11.36	11.48	11.34
			PEAK	18.41	18.70	18.38	18.76	18.58	18.97	19.11	18.80
802.11g	2462	11	AVG	11.12	11.24	11.19	11.17	11.16	11.05	11.27	11.23
			PEAK	18.32	18.52	18.31	18.72	18.31	18.67	18.83	18.78

**Table 6-5. 802.11g Conducted Output Power Measurements**

Mode	Freq [MHz]	Channel	Detector	802.11n (2.4GHz) Conducted Power [dBm]							
				Data Rate [Mbps]							
				6.5/7.2	13/14.4	19.5/21.7	26/28.9	39/43.4	52/57.8	58.5/65	65/72.2
802.11n	2412	1	AVG	10.08	10.05	10.03	10.13	10.05	10.14	10.17	10.08
			PEAK	17.53	17.57	17.75	17.91	17.58	17.69	17.83	17.64
802.11n	2437	6	AVG	10.01	10.17	10.15	10.06	10.02	10.08	10.04	10.02
			PEAK	17.51	17.78	17.54	17.53	17.49	17.72	17.38	17.38
802.11n	2462	11	AVG	9.81	9.96	9.90	9.95	9.94	9.91	9.95	9.98
			PEAK	17.21	17.53	17.32	17.41	17.54	17.48	17.36	17.34

**Table 6-6. 20MHz BW 802.11n (2.4GHz) Conducted Output Power Measurements**

FCC ID: A3LSMP905V		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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### Antenna-1 Output Power Measurement – 802.11a/n/ac (5GHz) §15.247(b)(3); RSS-210 [A8.4]

Mode	Freq [MHz]	Channel	Detector	802.11a Conducted Power [dBm]							
				Data Rate [Mbps]							
				6	9	12	18	24	36	48	54
802.11a	5745	149	AVG	8.91	8.79	8.84	8.76	8.84	8.73	8.72	8.70
			PEAK	15.88	15.93	15.77	15.94	15.70	16.30	16.09	16.05
802.11a	5765	153	AVG	8.50	8.44	8.56	8.24	8.52	8.49	8.65	8.42
			PEAK	15.43	15.35	15.36	15.49	15.35	15.91	15.90	15.76
802.11a	5785	157	AVG	8.60	8.42	8.48	8.61	8.56	8.57	8.76	8.63
			PEAK	15.51	15.50	15.49	15.78	15.53	16.07	16.10	15.88
802.11a	5805	161	AVG	8.83	8.80	8.81	8.87	8.80	8.72	8.95	8.74
			PEAK	15.74	15.83	15.58	15.98	15.67	16.09	16.27	15.86
802.11a	5825	165	AVG	8.90	8.92	8.79	8.83	8.98	8.85	8.97	8.83
			PEAK	15.79	15.78	15.68	15.97	15.64	16.16	16.13	16.04

Table 6-7. 802.11a Conducted Output Power Measurements

Mode	Freq [MHz]	Channel	Detector	20MHz BW 802.11n (5GHz) Conducted Power [dBm]							
				Data Rate [Mbps]							
				6.5/7.2	13/14.4	19.5/21.7	26/28.9	39/43.4	52/57.8	58.5/65	65/72.2
802.11n	5745	149	AVG	8.61	8.65	8.24	8.19	8.20	8.32	8.37	8.26
			PEAK	15.46	15.54	15.24	15.12	15.18	15.18	15.07	15.01
802.11n	5765	153	AVG	8.77	8.82	8.84	8.82	8.82	8.87	8.71	8.69
			PEAK	15.57	15.53	15.57	15.45	15.62	15.55	15.30	15.28
802.11n	5785	157	AVG	8.78	8.78	8.69	8.84	8.87	8.79	8.76	8.68
			PEAK	15.60	15.79	15.50	15.52	15.72	15.73	15.56	15.38
802.11n	5805	161	AVG	8.51	8.55	8.53	8.33	8.53	8.52	8.54	8.47
			PEAK	15.31	15.40	15.33	15.04	15.28	15.29	15.19	15.31
802.11n	5825	165	AVG	8.69	8.75	8.64	8.57	8.74	8.76	8.73	8.72
			PEAK	15.55	15.48	15.47	15.31	15.76	15.51	15.33	15.37



Table 6-8. 20MHz BW 802.11n (5GHz) Conducted Output Power Measurements

Mode	Freq [MHz]	Channel	Detector	40MHz BW 802.11n (5GHz) Conducted Power [dBm]							
				Data Rate [Mbps]							
				13.5/15	27/30	40.5/45	54/60	81/90	108/120	121.5/135	135/150
802.11n	5755	151	AVG	8.66	8.88	8.85	8.86	8.84	8.79	8.91	8.87
			PEAK	15.19	15.32	15.29	15.69	15.38	15.26	15.41	15.57
802.11n	5795	159	AVG	8.94	9.00	8.97	8.98	8.98	8.95	8.99	8.99
			PEAK	15.61	15.70	15.57	16.15	15.62	15.55	15.69	15.83

Table 6-9. 40MHz BW 802.11n (5GHz) Conducted Output Power Measurements

Mode	Freq [MHz]	Channel	Detector	80MHz BW 802.11ac (5GHz) Conducted Power [dBm]									
				Data Rate [Mbps]									
				29.3/32.5	58.5/65	87.8/97.5	117/130	175.5/195	234/260	263.3/292.5	292.5/325	351/390	390/433.3
802.11ac	5775	155	AVG	8.78	8.71	8.82	8.72	8.80	8.75	8.69	8.84	8.79	8.87
			PEAK	14.74	14.55	14.72	14.59	14.81	14.72	14.42	14.52	14.56	15.21

Table 6-10. 80MHz BW 802.11ac (5GHz) Conducted Output Power Measurements

FCC ID: A3LSMP905V		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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**Antenna-2 Output Power Measurement – 802.11b/g/n (2.4GHz)**  
 §15.247(b)(3); RSS-210 [A8.4]

Mode	Freq [MHz]	Channel	Detector	802.11b Conducted Power [dBm]			
				Data Rate [Mbps]			
				1	2	5.5	11
802.11b	2412	1	AVG	11.51	11.65	11.61	11.69
			PEAK	14.84	14.91	14.89	14.92
802.11b	2437	6	AVG	11.72	11.92	11.93	11.84
			PEAK	15.17	15.24	15.26	15.15
802.11b	2462	11	AVG	11.31	11.44	11.51	11.40
			PEAK	14.78	14.87	14.86	14.78



**Table 6-11. 802.11b Conducted Output Power Measurements**

Mode	Freq [MHz]	Channel	Detector	802.11g Conducted Power [dBm]							
				Data Rate [Mbps]							
				6	9	12	18	24	36	48	54
802.11g	2412	1	AVG	10.19	10.20	10.15	10.27	10.37	10.16	10.36	10.13
			PEAK	17.51	17.56	17.41	17.83	17.41	17.96	17.92	17.71
802.11g	2437	6	AVG	10.76	10.69	10.67	10.65	10.75	10.64	10.79	10.63
			PEAK	18.01	18.13	17.84	18.29	17.88	18.49	18.39	18.25
802.11g	2462	11	AVG	10.35	10.31	10.28	10.24	10.33	10.19	10.37	10.18
			PEAK	17.52	17.56	17.44	17.94	17.53	17.72	18.02	17.55

**Table 6-12. 802.11g Conducted Output Power Measurements**

Mode	Freq [MHz]	Channel	Detector	802.11n (2.4GHz) Conducted Power [dBm]							
				Data Rate [Mbps]							
				6.5/7.2	13/14.4	19.5/21.7	26/28.9	39/43.4	52/57.8	58.5/65	65/72.2
802.11n	2412	1	AVG	9.25	9.30	9.15	9.12	9.16	9.10	9.21	9.24
			PEAK	16.78	16.89	16.93	16.74	16.78	16.68	16.60	16.71
802.11n	2437	6	AVG	9.60	9.71	9.62	9.73	9.66	9.64	9.69	9.61
			PEAK	16.96	17.38	17.31	17.24	17.37	17.21	17.22	17.11
802.11n	2462	11	AVG	9.19	9.29	9.32	9.27	9.17	9.19	9.25	9.22
			PEAK	16.59	16.77	16.87	16.61	16.92	16.60	16.72	16.65

**Table 6-13. 20MHz BW 802.11n (2.4GHz) Conducted Output Power Measurements**

FCC ID: A3LSMP905V		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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### Antenna-2 Output Power Measurement – 802.11a/n/ac (5GHz) §15.247(b)(3); RSS-210 [A8.4]

Mode	Freq [MHz]	Channel	Detector	802.11a Conducted Power [dBm]							
				Data Rate [Mbps]							
				6	9	12	18	24	36	48	54
802.11a	5745	149	AVG	8.85	8.91	8.82	8.79	8.87	8.74	8.93	8.81
			PEAK	16.11	16.28	16.07	16.47	16.05	16.59	16.81	16.31
802.11a	5765	153	AVG	8.71	8.66	8.73	8.76	8.81	8.69	8.92	8.72
			PEAK	15.94	16.18	16.03	16.23	16.13	16.59	16.49	16.36
802.11a	5785	157	AVG	8.59	8.64	8.64	8.71	8.79	8.56	8.74	8.63
			PEAK	15.83	16.13	15.99	16.11	16.01	16.57	16.44	16.39
802.11a	5805	161	AVG	8.56	8.56	8.52	8.49	8.62	8.48	8.70	8.47
			PEAK	15.89	15.98	15.76	16.04	15.83	16.32	16.45	16.07
802.11a	5825	165	AVG	8.45	8.51	8.43	8.35	8.48	8.36	8.59	8.41
			PEAK	15.77	15.96	15.64	16.08	15.59	16.21	16.42	16.23

Table 6-14. 802.11a Conducted Output Power Measurements

Mode	Freq [MHz]	Channel	Detector	20MHz BW 802.11n (5GHz) Conducted Power [dBm]							
				Data Rate [Mbps]							
				6.5/7.2	13/14.4	19.5/21.7	26/28.9	39/43.4	52/57.8	58.5/65	65/72.2
802.11n	5745	149	AVG	8.81	8.74	8.76	8.82	8.74	8.71	8.70	8.75
			PEAK	16.01	16.33	16.37	16.36	16.25	16.17	16.19	16.32
802.11n	5765	153	AVG	8.66	8.71	8.78	8.67	8.72	8.69	8.69	8.73
			PEAK	16.22	16.17	16.29	16.11	16.33	16.21	16.26	16.28
802.11n	5785	157	AVG	8.67	8.61	8.70	8.47	8.68	8.63	8.68	8.68
			PEAK	15.95	16.23	16.07	16.01	16.15	16.27	16.17	16.13
802.11n	5805	161	AVG	8.48	8.53	8.53	8.49	8.61	8.48	8.53	8.49
			PEAK	15.87	16.42	16.23	16.19	16.23	16.13	16.14	16.01
802.11n	5825	165	AVG	8.37	8.56	8.37	8.44	8.48	8.46	8.38	8.31
			PEAK	15.82	16.07	16.04	15.94	16.19	15.93	15.91	16.08



Table 6-15. 20MHz BW 802.11n (5GHz) Conducted Output Power Measurements

Mode	Freq [MHz]	Channel	Detector	40MHz BW 802.11n (5GHz) Conducted Power [dBm]							
				Data Rate [Mbps]							
				13.5/15	27/30	40.5/45	54/60	81/90	108/120	121.5/135	135/150
802.11n	5755	151	AVG	8.98	8.79	8.73	8.77	8.73	8.70	8.85	8.68
			PEAK	16.83	16.15	16.20	16.16	16.44	16.31	15.97	15.75
802.11n	5795	159	AVG	8.86	8.80	8.83	8.76	8.72	8.82	8.92	8.85
			PEAK	16.68	16.57	16.07	16.92	16.32	16.27	16.53	16.19

Table 6-16. 40MHz BW 802.11n (5GHz) Conducted Output Power Measurements

Mode	Freq [MHz]	Channel	Detector	80MHz BW 802.11ac (5GHz) Conducted Power [dBm]									
				Data Rate [Mbps]									
				29.3/32.5	58.5/65	87.8/97.5	117/130	175.5/195	234/260	263.3/292.5	292.5/325	351/390	390/433.3
802.11ac	5775	155	AVG	8.63	8.71	8.71	8.51	8.62	8.64	8.68	8.72	8.65	8.69
			PEAK	15.25	15.21	15.38	15.07	14.73	14.85	15.47	14.85	15.29	15.31

Table 6-17. 80MHz BW 802.11ac (5GHz) Conducted Output Power Measurements

FCC ID: A3LSMP905V		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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## MIMO Output Power Measurement – 802.11n/ac (2.4GHz/5GHz)

§15.247(b)(3); RSS-210 [A8.4]

Mode	Freq [MHz]	Channel	Detector	802.11n (2.4GHz) Conducted Power [dBm]							
				Data Rate [Mbps]							
				13	26	39	52	78	104	117	130
802.11n	2412	1	AVG	10.41	10.41	10.44	10.43	10.40	10.32	10.30	10.37
			PEAK	16.84	16.69	16.70	16.77	16.77	17.70	17.22	17.05
802.11n	2437	6	AVG	10.50	10.50	10.49	10.48	10.48	10.41	10.38	10.46
			PEAK	17.22	17.07	17.07	17.15	17.14	18.08	17.60	17.43
802.11n	2462	11	AVG	10.38	10.39	10.42	10.41	10.37	10.30	10.27	10.35
			PEAK	16.95	16.80	16.81	16.88	16.87	17.81	17.33	17.16

Table 6-18. 20MHz BW 802.11n (2.4GHz) Conducted Output Power Measurements

Mode	Freq [MHz]	Channel	Detector	20MHz BW 802.11n (5GHz) Conducted Power [dBm]							
				Data Rate [Mbps]							
				13	26	39	52	78	104	117	130
802.11n	5745	149	AVG	8.83	8.87	8.98	8.85	8.93	8.94	8.99	8.99
			PEAK	16.06	15.55	16.04	15.93	15.92	17.04	16.40	16.46
802.11n	5765	153	AVG	8.63	8.67	8.89	8.76	8.85	8.73	8.78	8.92
			PEAK	15.89	15.39	15.87	15.74	15.73	16.86	16.22	16.28
802.11n	5785	157	AVG	8.89	8.88	8.90	8.78	8.91	8.74	8.79	8.95
			PEAK	16.24	15.78	16.22	16.07	16.06	17.21	16.56	16.63
802.11n	5805	161	AVG	8.69	8.73	8.94	8.79	8.90	8.77	8.82	8.98
			PEAK	15.94	15.48	15.91	15.76	15.75	16.91	16.25	16.32
802.11n	5825	165	AVG	8.72	8.77	8.98	8.84	8.94	8.81	8.87	9.00
			PEAK	16.01	15.54	15.98	15.83	15.82	16.97	16.33	16.39

Table 6-19. 20MHz BW 802.11n (5GHz) Conducted Output Power Measurements

Mode	Freq [MHz]	Channel	Detector	40MHz BW 802.11n (5GHz) Conducted Power [dBm]							
				Data Rate [Mbps]							
				27.0	54.0	81.0	108.0	162.0	216.0	243.0	270.0
802.11n	5755	151	AVG	8.94	8.87	8.68	8.93	8.99	8.96	8.74	8.96
			PEAK	15.92	15.21	15.90	15.77	16.05	16.09	16.16	15.78
802.11n	5795	159	AVG	8.99	8.92	8.77	8.97	8.93	8.98	8.81	9.00
			PEAK	16.11	15.41	16.11	15.97	16.24	16.29	16.36	15.98

Table 6-20. 40MHz BW 802.11n (5GHz) Conducted Output Power Measurements

Mode	Freq [MHz]	Channel	Detector	80MHz BW 802.11ac (5GHz) Conducted Power [dBm]									
				Data Rate [Mbps]									
				58.5	117	175.5	234	351	468	526.5	585	702	780
802.11ac	5775	155	AVG	8.74	8.76	8.85	8.87	8.90	8.92	8.91	8.97	8.98	8.87
			PEAK	15.19	15.02	15.25	15.72	15.13	15.28	15.32	15.45	15.31	15.49



Table 6-21. 80MHz BW 802.11ac (5GHz) Conducted Output Power Measurements

### Sample MIMO Calculation:

At 2412MHz the average conducted output power was measured to be 5.33dBm for Antenna-1 and 6.68dBm for Antenna-2. The measured values were summed in linear power units then converted back to dBm.

$$\text{Antenna 1} + \text{Antenna 2} = \text{MIMO}$$

$$(9.24\text{dBm} + 4.13\text{dBm}) = (8.39\text{mW} + 2.59\text{mW}) = 10.98\text{mW} = 10.41\text{dBm}$$

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## 6.4 Power Spectral Density (802.11a/b/g/n/ac) §15.247(e); RSS-210 [A8.2]

### Test Overview and Limit

The peak power density is measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle (>98%), at maximum power, and at the appropriate frequencies. All data rates were investigated and the worst case configuration results are reported in this section.

*The maximum permissible power spectral density is 8 dBm in any 3 kHz band.*

### Test Procedure Used

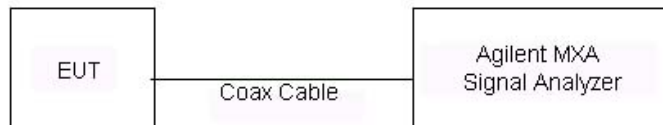
KDB 558074 v03r01 – Section 10.2 Method PKPSD  
KDB 662911 v02r01

### Test Settings

1. Analyzer was set to the center frequency of the DTS channel under investigation
2. Span = 1.5 times the DTS channel bandwidth
3. RBW = 10kHz
4. VBW = 1MHz
5. Detector = peak
6. Sweep time = auto couple
7. Trace mode = max hold
8. Trace was allowed to stabilize

### Test Setup



The EUT and measurement equipment were set up as shown in the diagram below.



**Figure 6-4. Test Instrument & Measurement Setup**

### Test Notes



Per KDB 662911 v02r01, Section E)2)b), MIMO power spectral density values were calculated by summing the maximum power spectral density values from Antenna-1 and Antenna-2 in linear power units (mW), then converted back to dBm.

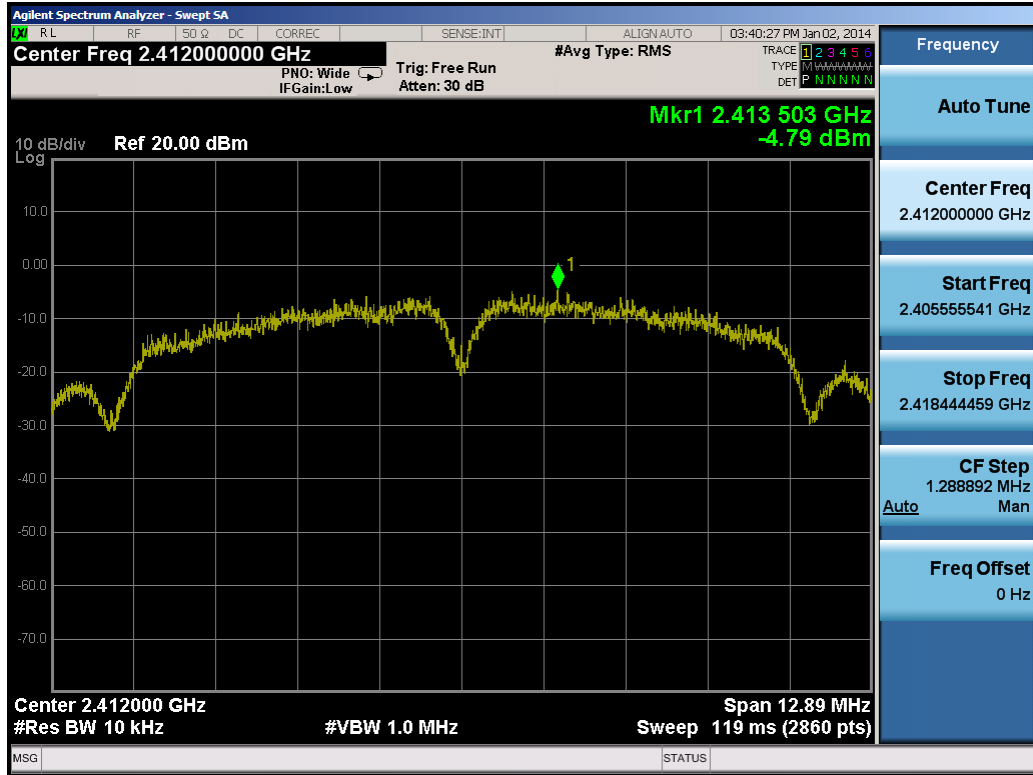
FCC ID: A3LSMP905V		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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## Antenna-1 Power Spectral Density Measurements

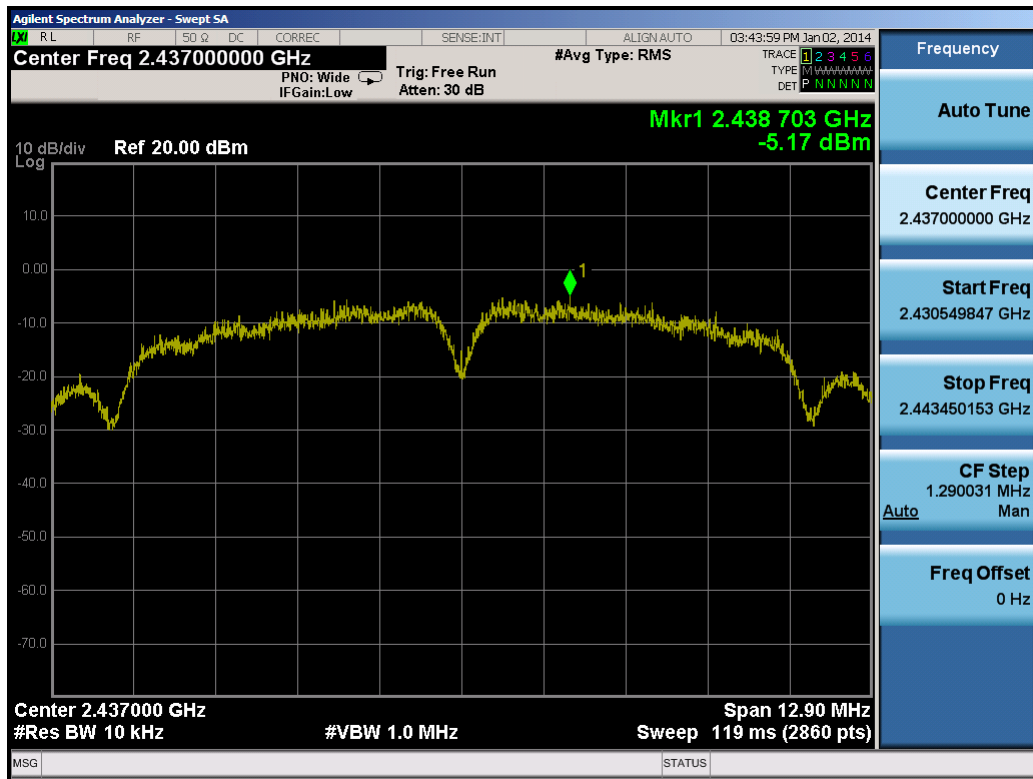
Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured Power Spectral Density [dBm]	Maximum Permissible Power Density [dBm / 3kHz]	Margin [dB]	Pass / Fail
2412	1	b	1	-4.79	8.000	-12.79	Pass
2437	6	b	1	-5.17	8.000	-13.17	Pass
2462	11	b	1	-5.50	8.000	-13.50	Pass
2412	1	g	6	-8.61	8.000	-16.61	Pass
2437	6	g	6	-8.14	8.000	-16.14	Pass
2462	11	g	6	-8.44	8.000	-16.44	Pass
2412	1	n	6.5/7.2 (MCS0)	-8.95	8.000	-16.95	Pass
2437	6	n	6.5/7.2 (MCS0)	-8.78	8.000	-16.78	Pass
2462	11	n	6.5/7.2 (MCS0)	-9.78	8.000	-17.78	Pass
5745	149	a	6	-10.46	8.000	-18.46	Pass
5785	157	a	6	-10.46	8.000	-18.46	Pass
5825	165	a	6	-10.44	8.000	-18.44	Pass
5745	149	n (20MHz)	6.5/7.2 (MCS0)	-8.88	8.000	-16.88	Pass
5785	157	n (20MHz)	6.5/7.2 (MCS0)	-7.84	8.000	-15.84	Pass
5825	165	n (20MHz)	6.5/7.2 (MCS0)	-8.04	8.000	-16.04	Pass
5755	151	n (40MHz)	13.5/15 (MCS0)	-12.24	8.000	-20.24	Pass
5795	159	n (40MHz)	13.5/15 (MCS0)	-11.80	8.000	-19.80	Pass
5775	155	ac (80MHz)	29.3/32.5 (MCS0)	-17.16	8.000	-25.16	Pass

**Table 6-22. Conducted Power Density Measurements**

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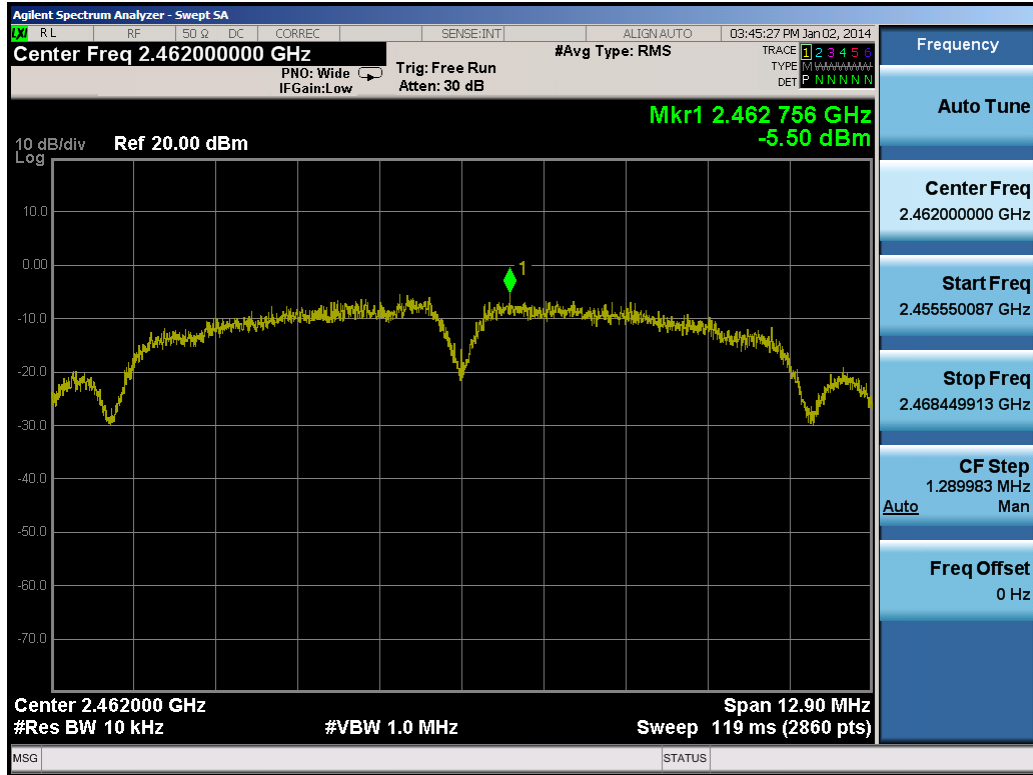


Plot 6-37. Power Spectral Density Plot (802.11b – Ch. 1)

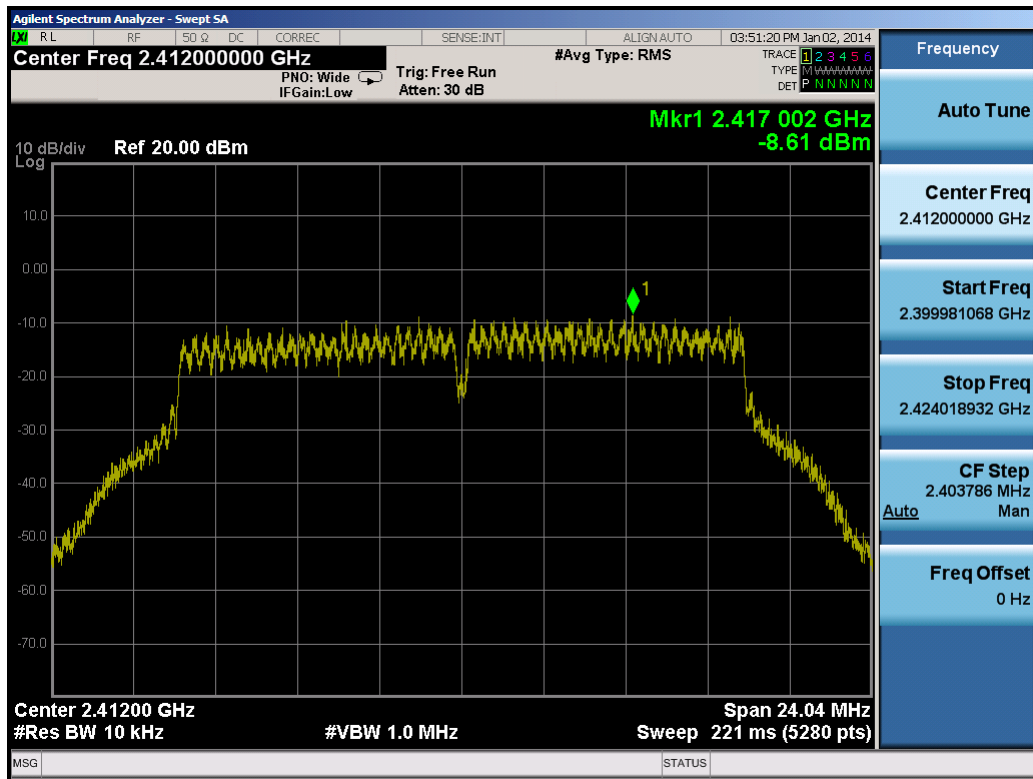


Plot 6-38. Power Spectral Density Plot (802.11b – Ch. 6)

FCC ID: A3LSMP905V		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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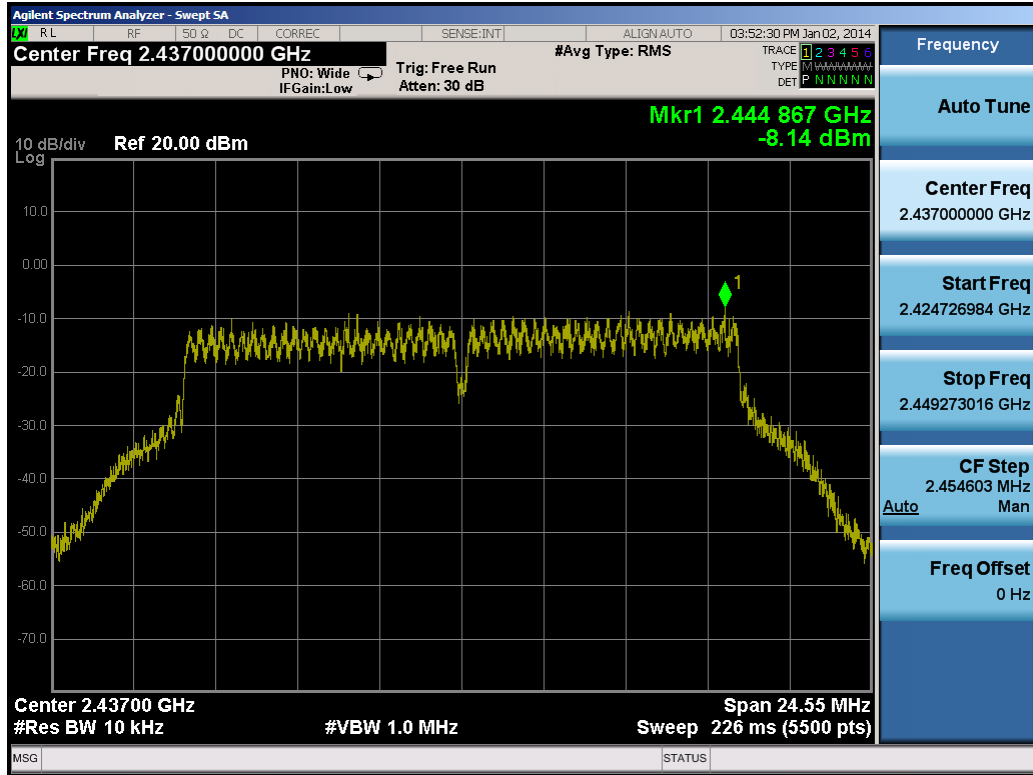


Plot 6-39. Power Spectral Density Plot (802.11b – Ch. 11)

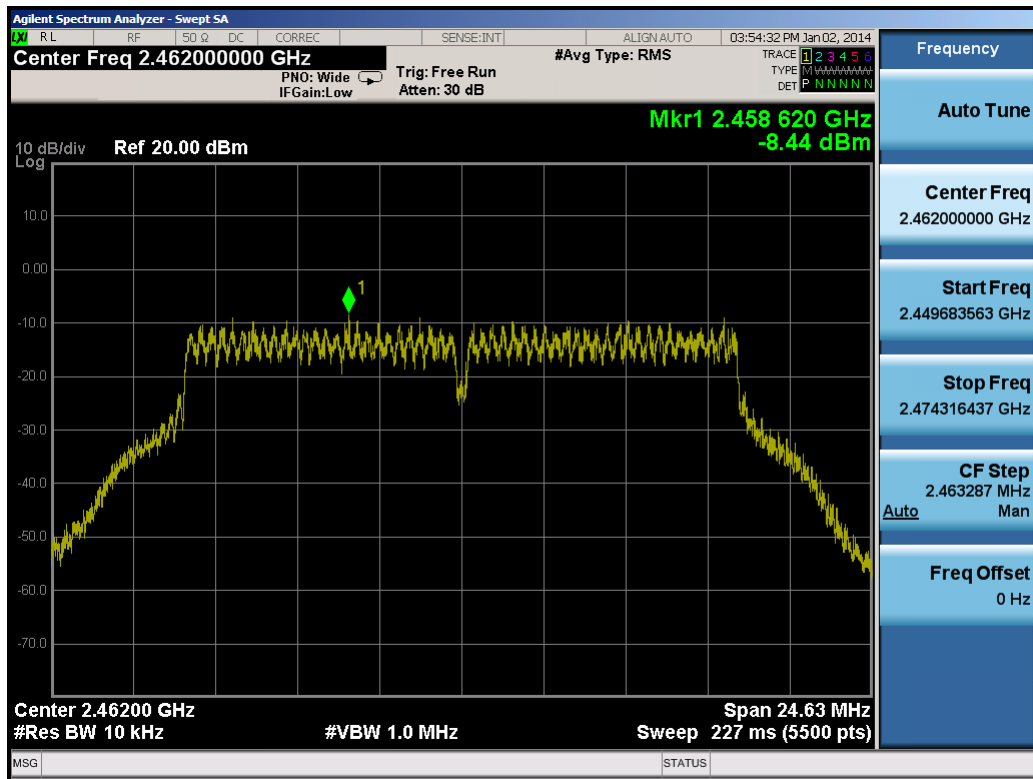


Plot 6-40. Power Spectral Density Plot (802.11g – Ch. 1)

FCC ID: A3LSMP905V		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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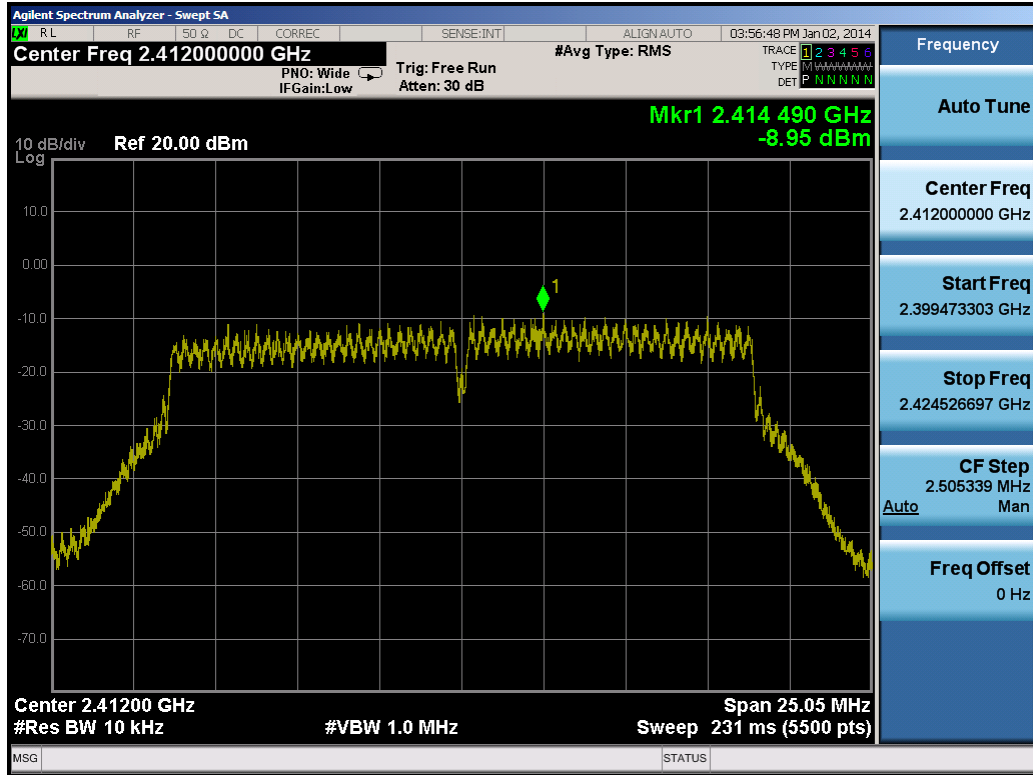


Plot 6-41. Power Spectral Density Plot (802.11g – Ch. 6)

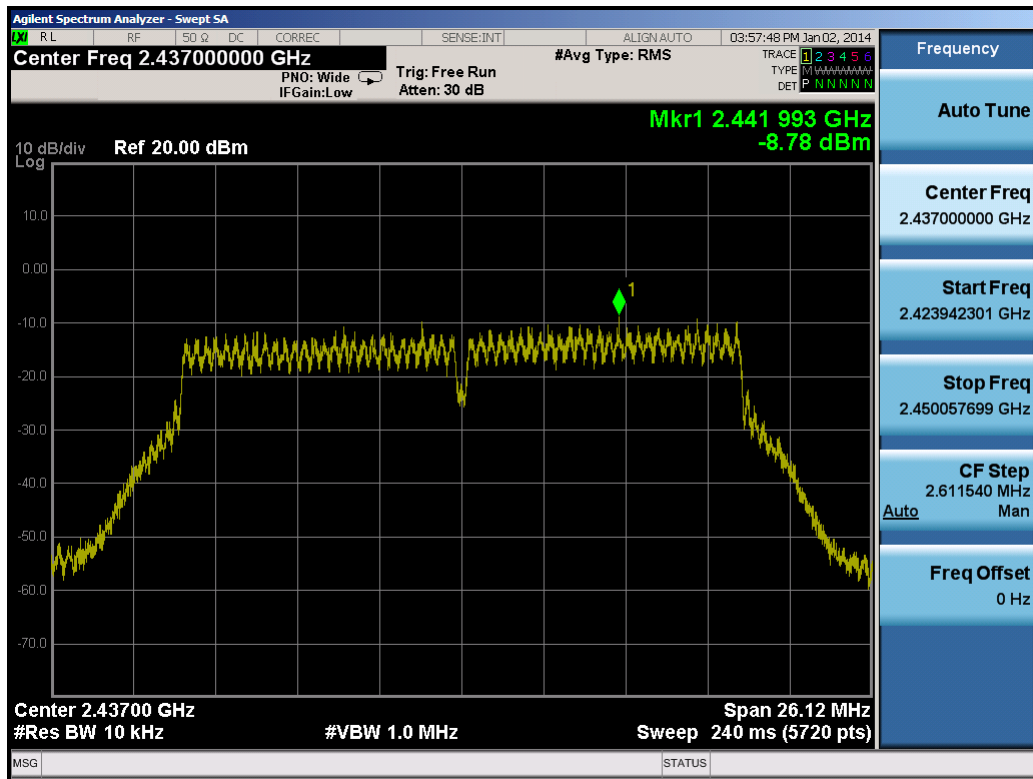


Plot 6-42. Power Spectral Density Plot (802.11g – Ch. 11)

FCC ID: A3LSMP905V	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
Test Report S/N: 0Y1311252234.A3L	Test Dates: 12/30/2013 - 1/9/2014	EUT Type: Portable Tablet		Page 44 of 116

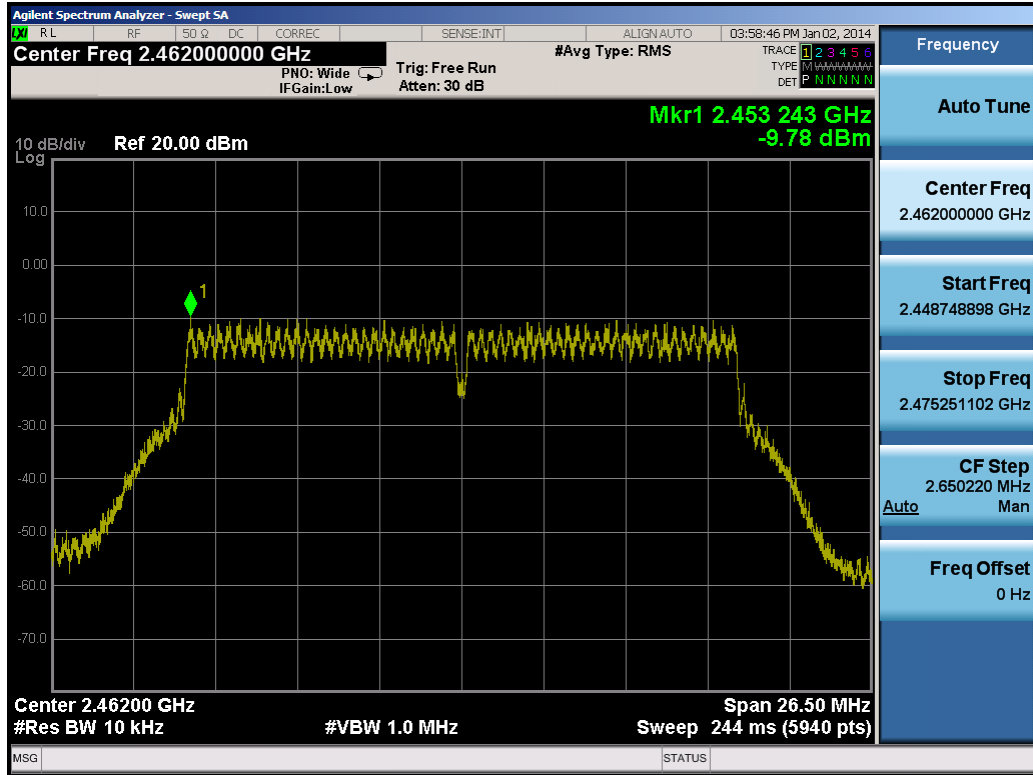


Plot 6-43. Power Spectral Density Plot (802.11n (2.4GHz) – Ch. 1)

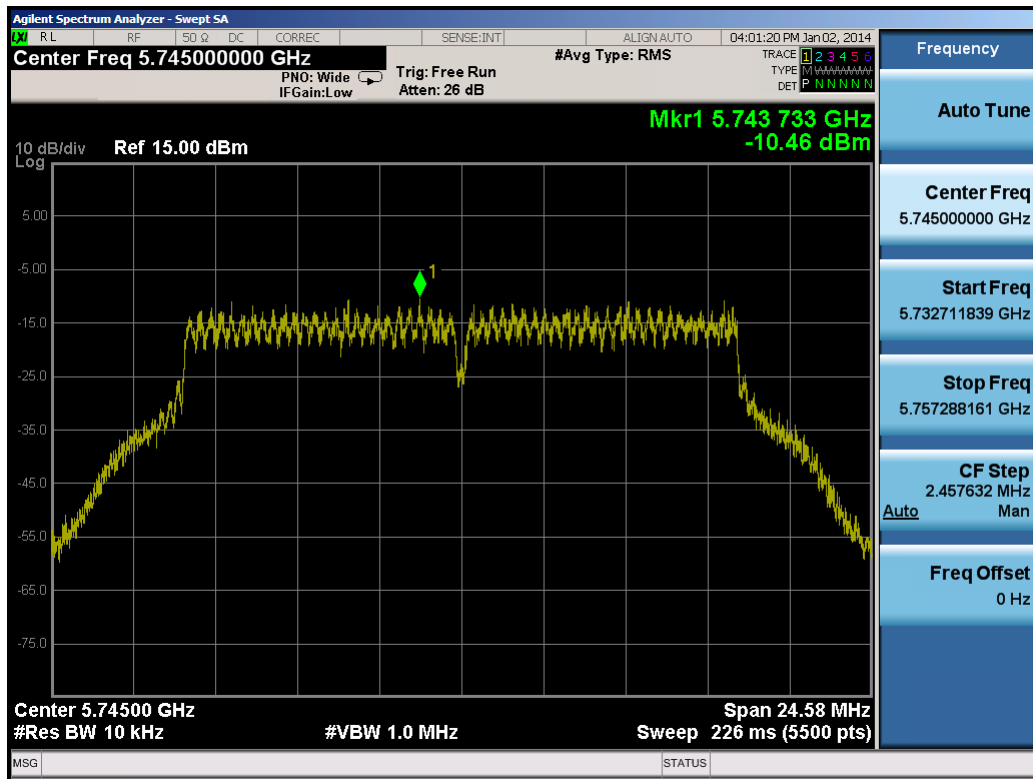


Plot 6-44. Power Spectral Density Plot (802.11n (2.4GHz) – Ch. 6)

FCC ID: A3LSMP905V		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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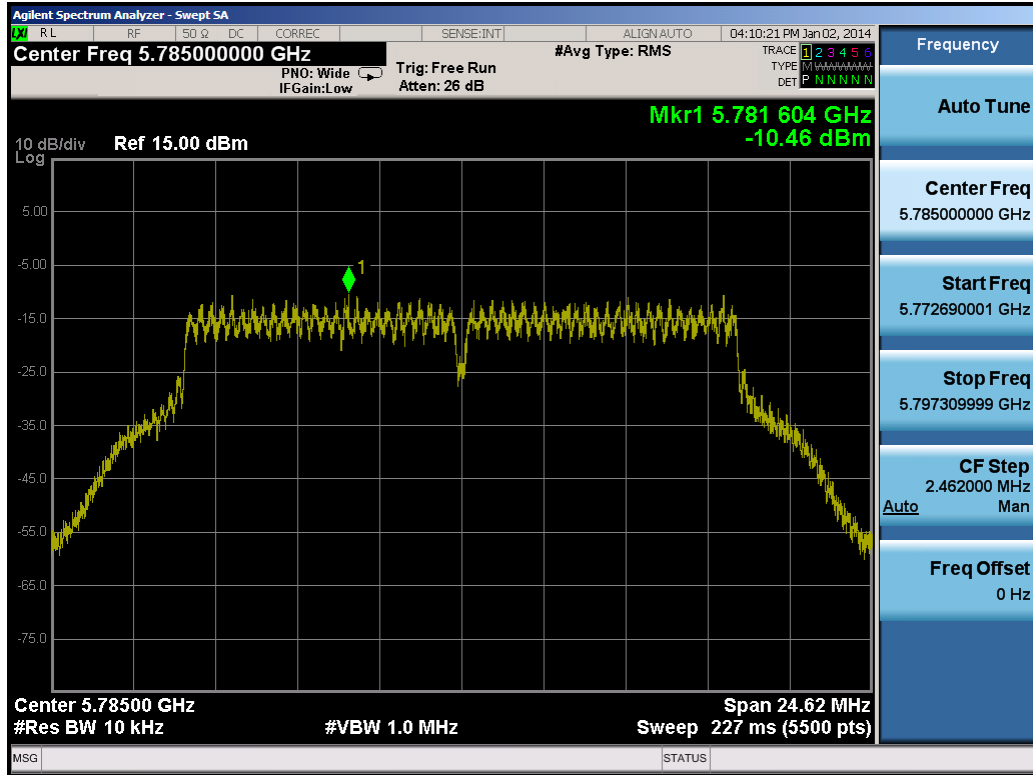


Plot 6-45. Power Spectral Density Plot (802.11n (2.4GHz) – Ch. 11)

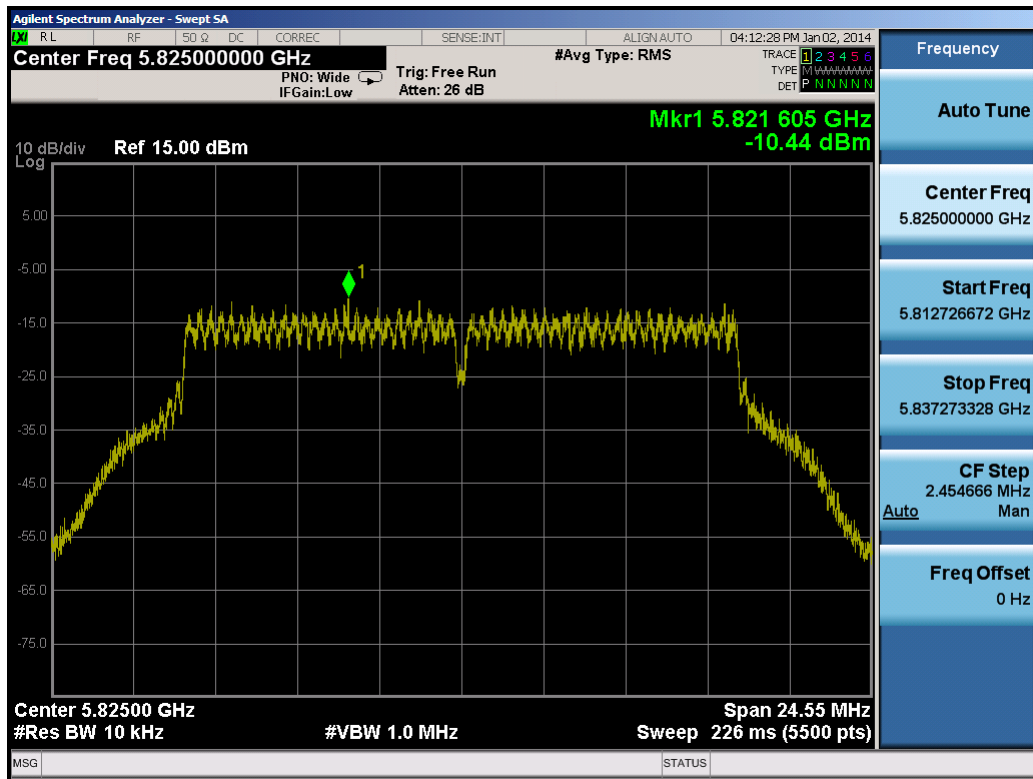


Plot 6-46. Power Spectral Density Plot (802.11a – Ch. 149)

FCC ID: A3LSMP905V		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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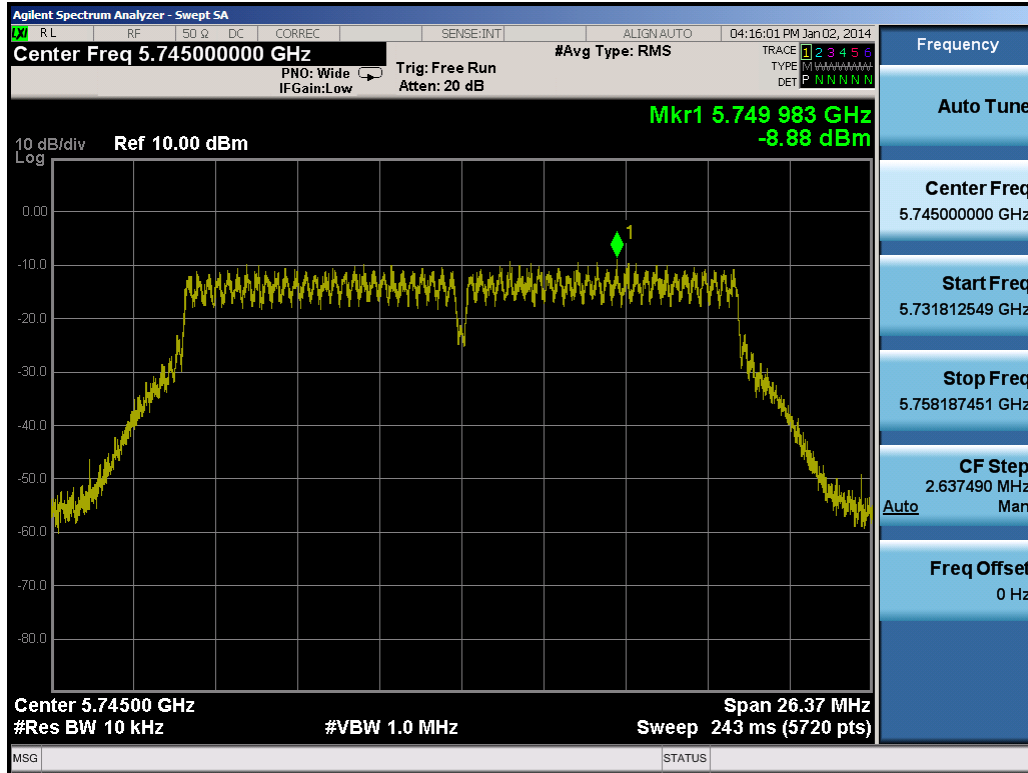


Plot 6-47. Power Spectral Density Plot (802.11a – Ch. 157)

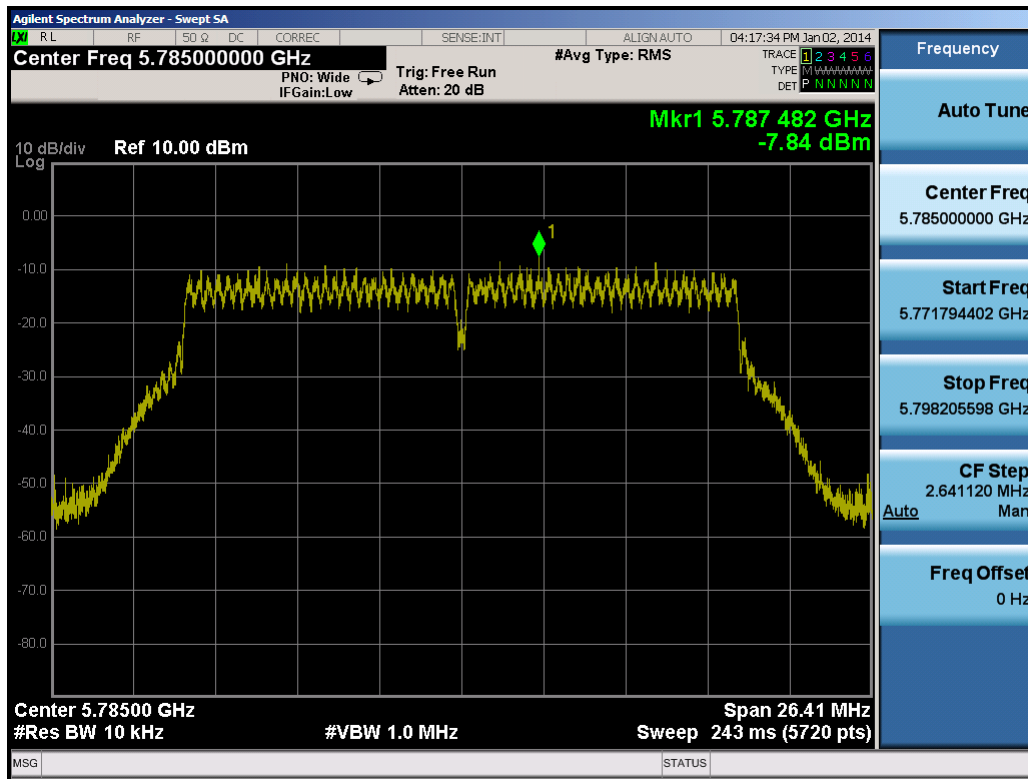


Plot 6-48. Power Spectral Density Plot (802.11a – Ch. 165)

FCC ID: A3LSMP905V		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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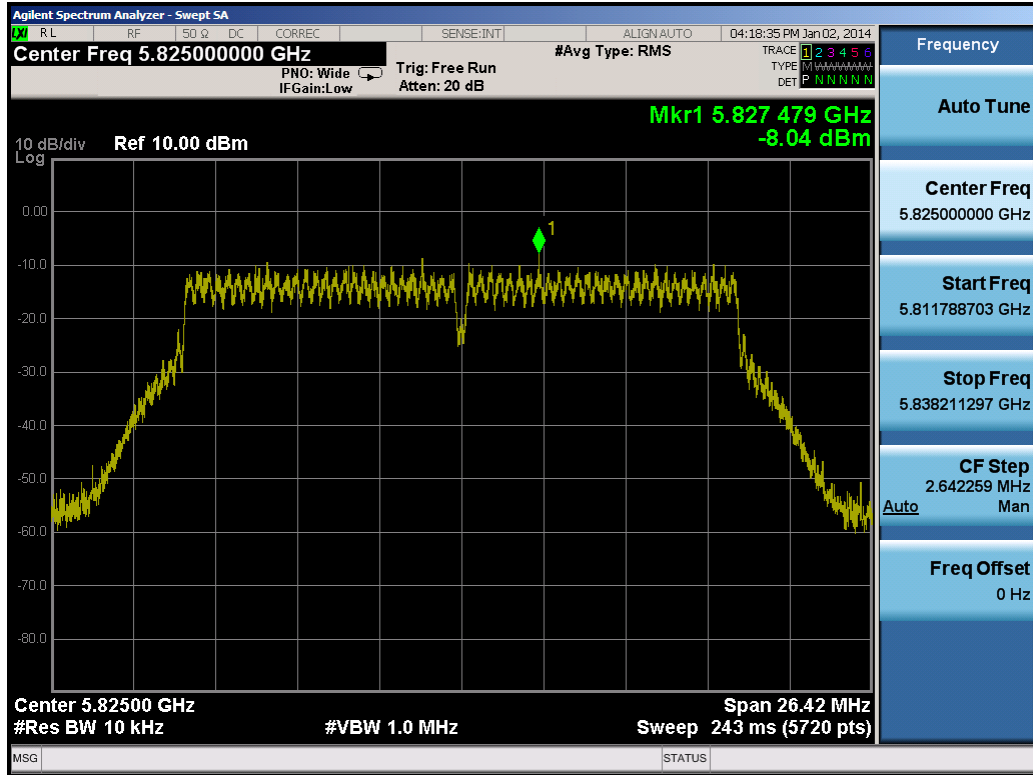


Plot 6-49. Power Spectral Density Plot (20MHz BW 802.11n (5.8GHz) – Ch. 149)

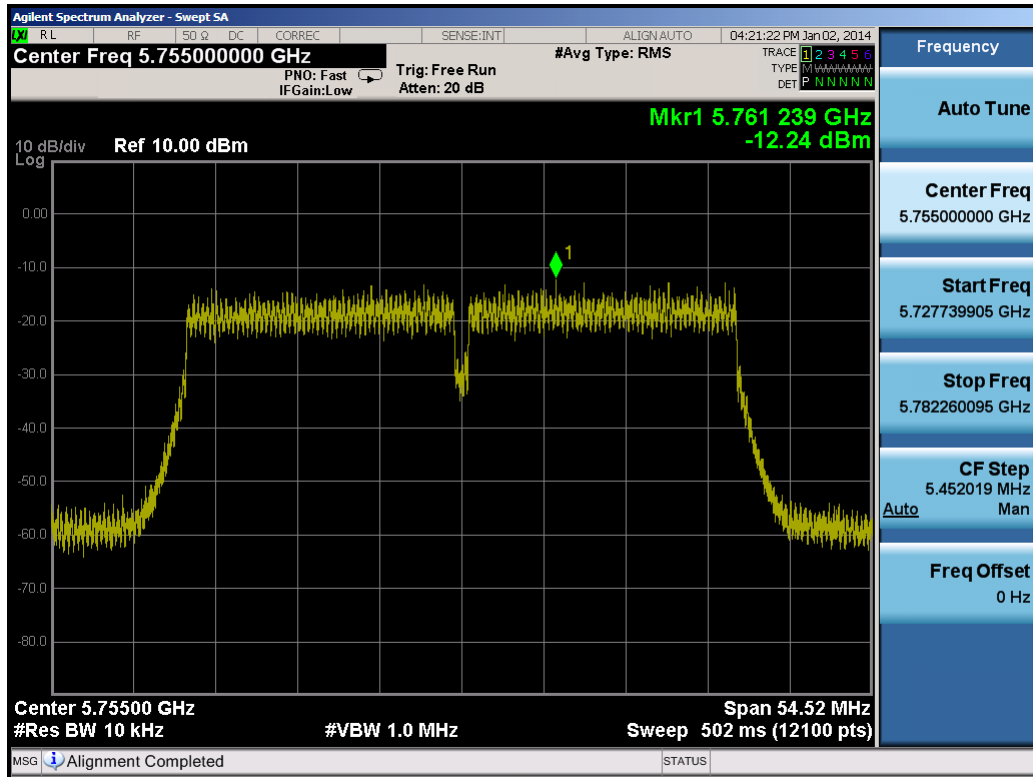


Plot 6-50. Power Spectral Density Plot (20MHz BW 802.11n (5.8GHz) – Ch. 157)

FCC ID: A3LSMP905V		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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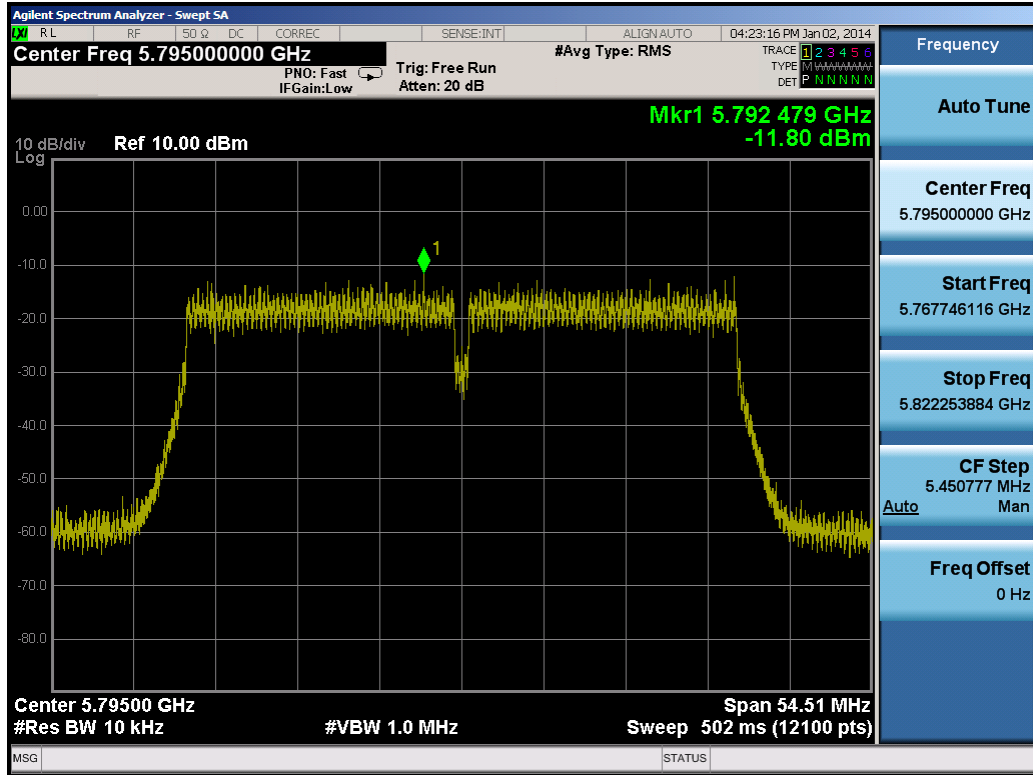


Plot 6-51. Power Spectral Density Plot (20MHz BW 802.11n (5.8GHz) – Ch. 165)

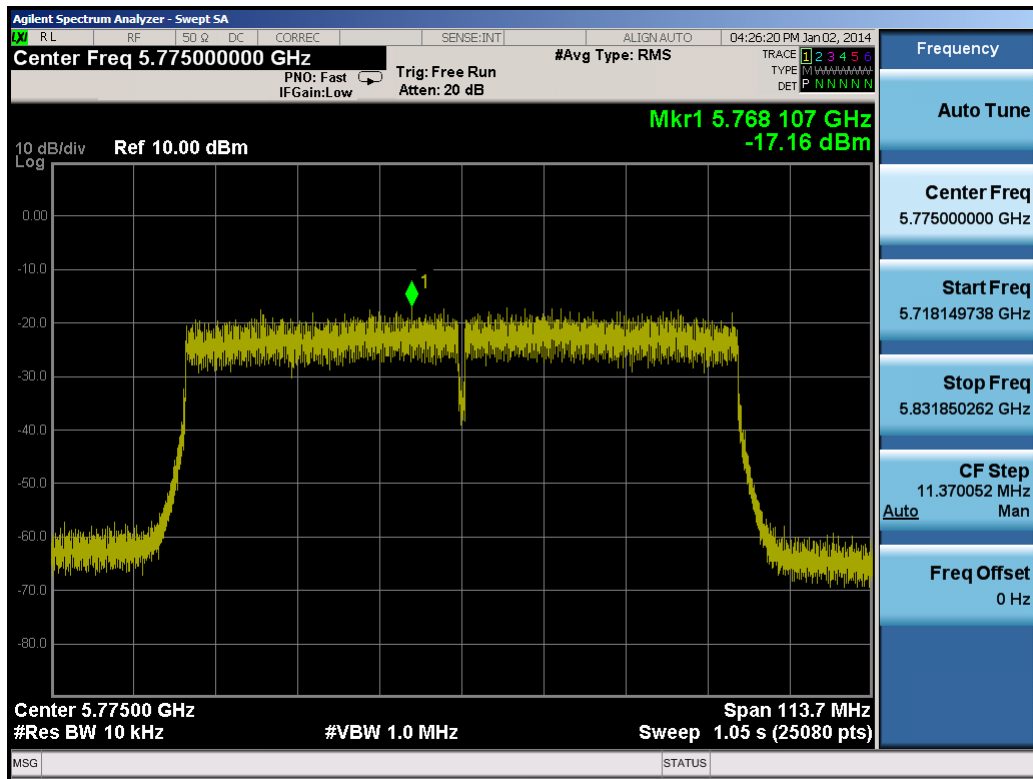


Plot 6-52. Power Spectral Density Plot (40MHz BW 802.11n (5.8GHz) – Ch. 151)

FCC ID: A3LSMP905V		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Plot 6-53. Power Spectral Density Plot (40MHz BW 802.11n (5.8GHz) – Ch. 159)



Plot 6-54. Power Spectral Density Plot (80MHz BW 802.11ac (5.8GHz) – Ch. 155)

FCC ID: A3LSMP905V		FCC Pt. 15.247 802.11a/b/g/n/ac MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1311252234.A3L	Test Dates: 12/30/2013 - 1/9/2014	EUT Type: Portable Tablet		Page 50 of 116